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THE
ALGA-FLORA OF YORKSHIRE:

A COMPLETE ACCOUNT OF THE KNOWN
FRESHWATER ALGÆ OF THE COUNTY.

BY

W. WEST, F.L.S.,

An Ex-President of the Yorkshire Naturalists' Union ;

AND

G. S. WEST, B.A., A.R.C.S.,

Hutchinson Research Student, and formerly Scholar of St. John's College,
Cambridge ; Professor of Natural History at the Royal
Agricultural College, Cirencester.

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LEEDS :

PRINTED FOR THE YORKSHIRE NATURALISTS' UNION

BY TAYLOR BROTHERS.

DEC., 1900.



80424

This variety has not previously been recorded for the British Isles.

209. **Closterium sigmoideum** Lagerh. & Nordst.

MID W.—Eldwick, abundant.

From the dorsal view this species possesses a regular and well-marked sigmoid curvature. It is nearest to *Cl. Lunula* but is not so robust, and the apices though possessing the slight but characteristic recurvature of the latter species, are narrower. The number of moving corpuscles in each apical locellus was usually about twenty, but sometimes they were as few as five at one pole though normal at the other. There were eight to ten pyrenoids in each semicell. Length 310—330 μ ; breadth 35—44 μ .

This species has only previously been seen from Brazil.

Forma **major**.

Length 482—552 μ ; breadth 47—58 μ .

MID W.—Eldwick, with the typical form, but more abundant.

210. **Closterium peracerosum** Gay.

S.W.—Rawcliffe Common.

211. **Closterium littorale** Gay.

N.W.—Masham.

N.E.—In stream, Rievaulx Abbey. Stokesley.

212. **Closterium tumidum** Johnson 1895.

[Syn. *Cl. Cornu* Wille non Ehrenb.].

MID W.—Near Norwood Hall, above Lindley Reservoir. Ribbleshead.

213. **Closterium Cornu** Ehrenb.

S.W.—Greetland, near Halifax. Cullingworth.

MID W.—Adel Bog (J. Abbott). Eldwick. Ilkley (W. H. Dikes). Cocket Moss, near Giggleswick. Moughton Fell. Ribbleshead.

N.W.—Mickle Fell. Lund's Fell.

N.E.—Gormire (W. B. Turner).

214. **Closterium didymotocum** Corda.

[Syn. *C. antiacerosum* DeNot.].

MID W.—Cocket Moss, near Giggleswick.

215. **Closterium abruptum** West.

MID W.—Above Eldwick. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

216. **Closterium toxon** West.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

217. **Closterium pusillum** Hantzsch, var. **major** Racib.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

218. **Closterium prælongum** Bréb.

MID W.—Malham Tarn Bog. Boston Spa.

S.E.—Riccall Common.

Forma **brevior** West.

S.W.—Rawcliffe Common. Heaton.

MID W.—Malham Tarn.

N.E.—Terrington.

219. **Closterium gracile** Bréb.

MID W.—Wigton Moor. Cocket Moss, near Giggleswick.

N.W.—Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk. Terrington.

S.E.—Riccall and Skipwith Commons.

220. **Closterium aciculare** Tuffen West.

Recorded from 'Yorkshire' in Cooke's Brit. Desm., p. 37.

221. **Closterium angustatum** Kütz.

MID W.—Cocket Moss, near Giggleswick.

N.E.—Strensall Common (W. B. Turner).

222. **Closterium costatum** Corda.

S.W.—Cullingworth.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.
Terrington.

223. **Closterium striolatum** Ehrenb.

S.W.—Greetland, near Halifax. Frizinghall. Cullingworth. Keighley Moor.

MID W.—Adel Bog. Baildon. Rombald's Moor. Eldwick. Ilkley! (W. H. Dikes). Wigton Moor. Cocket Moss, near Giggleswick. Cam Fell.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Bog near Widdale Beck.

N.E.—Pilmoor, near Thirsk. Terrington. Carlton Bank. Seamer.

S.E.—Riccall and Skipwith Commons.

Var. **orthonotum** Roy.

MID W.—Above Eldwick. Black Hill, near Settle. Malham Tarn Bog. Whernside.

224. **Closterium intermedium** Ralfs.

S.W.—Cullingworth.

MID W.—Baildon. Ilkley (W. H. Dikes). Cocket Moss, near Giggleswick. Whernside.

N.W.—Great Shunnor Fell.

N.E.—Strensall.

S.E.—Skipwith Common! (Rev. W. Fowler).

Var. **sculptum** Racib. forma **eboracense** Turner.

N.E.—Strensall (W. B. Turner).

Var. **hibernicum** West.

N.E.—Terrington.

225. **Closterium ulna** Focke, 1847.

[Syn. *Closterium directum* Arch. 1862].

MID W.—Cocket Moss, near Giggleswick, and Giggleswick Common. Bog two miles south of Clapham.

226. **Closterium attenuatum** Ehrenb.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

227. **Closterium lineatum** Ehrenb.

S.W.—Frizinghall.

MID W.—Adel Bog. Baildon. Wigton Moor,

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Skipwith Common.

228. **Closterium juncidum** Ralfs.

MID W.—Moor-Allerton (W. B. Turner). Baildon. Wigton Moor. Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner).

S.E.—Riccall and Skipwith Commons.

229. **Closterium turgidum** Ehrenb.

N.W.—Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk.

230. **Closterium Pritchardianum** Arch.

S.W.—Crimsworth Dean.

S.E.—Market Weighton.

231. **Closterium pronum** Bréb.

S.W.—Rawcliffe Common. Keighley Moor.

MID W.—Whernside.

N.W.—Mickle Fell.

S.E.—Skipwith Common! (Rev. W. Fowler).

232. **Closterium subpronum** West.

MID W.—Malham Tarn.

N.E.—Pilmoor, near Thirsk.

S.E.—Sandholme.

233. **Closterium ceratium** Perty.

N.W.—Mickle Fell.

234. **Closterium acutum** (Lyngb.) Ralfs.

S.W.—Cullingworth. Keighley Tarn.

MID W.—Markington, with zygospores! (Rev. J. S. Tute).
Adel Bog (W. B. Turner). Eldwick. Bride Cross, above Farnley
Moor. Bowland Knotts. Staveley Dam, near Knaresborough.

N.W.—Mickle Fell. Reeth.

N.E.—Strensall! (W. B. Turner). Scarborough Mere. Seamer.

S.E.—Routh.

Var. **linea** (Perty) Nob. [Syn. *Closterium linea* Perty].

MID W.—Cocket Moss, near Giggleswick. Cowgill Wold Moss, Widdale Fell.

N.W.—Mickle Fell.

Closterium linea differs so little from *C. acutum* that it can only be considered as a variety of the latter species. Moreover, the zygospores of the two plants are precisely alike.

235. **Closterium subulatum** (Kütz.) Bréb.

MID W.—Rombald's Moor, very abundant, associated with *Cosmarium pseudarctoum* in washings of *Potamogeton polygoni folius*. Cocket Moss, near Giggleswick. Cam Fell.

N.W.—Great Shunnor Fell. Lund's Fell. Hunter's Hole, Craydale Moor (1,900 feet).

236. **Closterium Ralfsii** Bréb.

S.W.—Cullingworth.

237. **Closterium Kützingii** Bréb.

S.W.—Goole! (W. B. Turner).

MID W.—Cocket Moss, near Giggleswick.

N.E.—Strensall. Pilmoor, near Thirsk.

238. **Closterium rostratum** Ehrenb.

S.W.—Goole (H. F. Parsons). Greetland, near Halifax. Wibsey. Nab Wood, near Bingley (with zygospores). Cullingworth.

MID W.—Markington! (Rev. J. S. Tute). Askwith Moor (W. B. Turner). Adel Bog! (J. Abbott). Eldwick. Wigton Moor. Cocket Moss, near Giggleswick. Giggleswick Common. Bowland Knotts. Pateley Bridge (with zygospores). Boston Spa. Cam Fell.

N.W.—Great Shunnor Fell. Cronkley Fell.

N.E.—Strensall. Terrington.

Generally distributed throughout the county, but not so frequent as in the south of England.

239. **Closterium setaceum** Ehrenb.

S.W.—Rawcliffe Common. Wakefield (W. H. Dikes).

MID W.—Meanwood (J. Abbott). Roundhay ; Adel Bog (J. Abbott). Wigton Moor. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Strensall (W. B. Turner).

GENUS DOCIDIUM Bréb., 1844.

240. **Docidium baculum** Bréb.

S.W.—Cullingworth.

MID W.—Adel Bog (W. B. Turner). Ilkley.

N.E.—Strensall ! (W. B. Turner).

GENUS PLEUROTÆNIUM Näg., 1849.

241. **Pleurotænium Ehrenbergii** (Bréb.) DeBary, 1858. [Syn. *Docidium Ehrenbergii* Bréb., 1844].

S.W.—Near Mirfield. Cullingworth.

MID W.—Moor-Allerton ; Adel ! (W. B. Turner). Wigton Moor (pure gathering). Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Gormire (W. B. Turner). Strensall. Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

Var. **granulatum** (Ralfs.) Hansg.

MID W.—Wigton Moor.

N.W.—Cronkley Fell. Great Shunnor Fell.

242. **Pleurotænium Trabecula** (Ehrenb.) Näg.

S.W.—Fixby.

MID W.—Roundhay Park, Leeds.

N.E.—Terrington.

Forma **clavata** (Kütz.) Reinsch. [Syn. *P. clavatum* (Kütz.) DeBary ; *Docidium clavatum* Kütz.].

MID W.—Meanwood ; Roundhay ! (W. B. Turner). Ilkley (W. H. Dikes).

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Strensall ; Gormire (W. B. Turner).

243. **Pleurotænium coronatum** (Bréb.) Rabenh.

[Syn. *Docidium coronatum* Bréb.].

N.E.—Pilmoor, near Thirsk.

Var. **nodulosum** (Bréb.) West & G. S. West.

[Syn. *Docidium nodulosum* Bréb.].

MID W.—Adel Bog (W. B. Turner).

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

Terrington. Carlton Bank.

— — — Forma **labiata** Turn.

[Syn. *Docidium nodulosum* var. *labiatum* Turn.].

N.E.—Gormire (W. B. Turner).

NOTE.—This was recorded in the Naturalist, Sept., 1887, p. 275, as '*Docidium truncatum* γ *labiatum* Turn.,' but in the October number, p. 290, he stated this to be an error, and that it should be *D. nodulosum* γ *labiatum* Turn.

244. **Pleurotænium Hutchinsonii** (Turn.).

[Syn. *Docidium Hutchinsonii* Turn.].

N.E.—Strensall Common (W. B. Turner).

245. **Pleurotænium truncatum** (Bréb.) Näg.

[Syn. *Docidium truncatum* Bréb.].

S.W.—Rawcliffe Common.

MID W.—Shipley Glen. Ilkley (W. H. Dikes). Malham Cove (J. M. Kirk). Staveley Dam, near Knaresborough.

N.E.—Gormire (W. B. Turner). Strensall.

Var. **crassum** Boldt.

N.E.—Gormire (W. B. Turner).

GENUS TETMEMORUS Ralfs, 1844.

246. **Tetmemorus Brébissonii** (Menegh.) Ralfs.

S.W.—Near Halifax. Cullingworth.

MID W.—Adel Bog. Blubberhouses (W. B. Turner). Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Ingleborough. Cam Fell.

N.W.—Mickle Fell. Cotterdale. Bog near Widdale Beck.

N.E.—Strensall! (W. B. Turner).

247. **Tetmemorus granulatus** (Bréb.) Ralfs.

S.W.—Fairly general, but not common. Rawcliffe Common.

Greetland, near Halifax. Ogden Clough. Cragg Vale, towards Blackstone Edge. Cullingworth. Keighley Moor.

MID W.—Austwick. Eldwick. Baildon. Wigton Moor. Roundhay; Adel Bog! (J. Abbott). Ilkley! (W. H. Dikes). Harrogate (J. M. Kirk). Bride Cross, above Farnley Moor. Malham Tarn Bog. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Cam Fell. Ribbleshead.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell. Birkdale Tarn Moss.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington. Carlton Bank.

S.E.—Skipwith Common.

Forma **minor** Nordst.

MID W.—Black Hill, near Settle.

N.W.—Great Sleddale. Bog near Widdale Beck.

248. **Tetmemorus lævis** (Kütz.) Ralfs.

S.W.—Ogden Clough. Thornton Moor, abundant among *Dicranella squarrosa*. Keighley Moor. Cullingworth.

MID W.—Near Hawksworth. Eldwick. Adel. Blubberhouses (W. B. Turner). Ilkley! (W. H. Dikes). Black Hill, near Settle. Bog two miles south of Clapham. Ingleton. Ingleborough. Old Cote Moor. Ribbleshead. Whernside. Cowgill Wold Moss, Widdale Fell.

N.W.—Cautley Spout. Mickle Fell. Great Shunnor Fell. Cotterdale. Mossdale Moor, Widdale Fell.

N.E.—Carlton Bank.

S.E.—East of Selby.

Widely distributed in the upland districts, but rare in the lowlands.

249. **Tetmemorus minutus** DeBary.

N.W.—Dodd Fell, at 2,000 feet (iv. 1898).

GENUS EUASTRUM Ehrenb., 1832.

250. **Euastrum crassum** (Bréb.) Kütz.

S.W.—Cullingworth.

N.W.—Mickle and Cronkley Fells.

N.E.—Pilmoor, near Thirsk.

251. **Euastrum humerosum** Ralfs.

N.E.—Pilmoor, near Thirsk (vi. 1898).

252. **Euastrum oblongum** (Grev.) Ralfs.

S.W.—Rawcliffe Common. Cullingworth.

MID W.—Markington ! (Rev. J. S. Tute). Adel. Malham Tarn Bog. Cocket Moss, near Giggleswick. Giggleswick Common.

N.W.—Mickle and Cronkley Fells. Snaizeholme Fell.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk (with zygospores). Terrington.

S.E.—Skipwith Common.

253. **Euastrum didelta** (Turp.) Ralfs.

S.W.—Cullingworth.

MID W.—Eldwick. Adel ! (W. B. Turner). Ilkley (W. H. Dikes). Bride Cross, above Farnley Moor. Malham Cove (J. M. Kirk). Cocket Moss, near Giggleswick. Giggleswick Common. Ingleborough. Cam Fell.

N.W.—Mickle and Cronkley Fells. Great Sleddale. Lund's Fell. Bog near Widdale Beck.

N.E.—Strensall ! (W. B. Turner). Scarborough Mere.

254. **Euastrum affine** Ralfs.

MID W.—Bog two miles south of Clapham. Cam Fell. Cowgill Wold Moss, Widdale Fell. Whernside.

N.W.—Mickle Fell. Bog near Widdale Beck.

255. **Euastrum ampullaceum** Ralfs.

S.W.—Cullingworth.

MID W.—Adel Dam (W. B. Turner). Wigton Moor. Ilkley (W. H. Dikes). Whernside.

N.W.—Bog near Widdale Beck.

256. **Euastrum sinuosum** Lenorm.

[Syn. *E. circulare* Hass.].

MID W.—Baildon. Penyghent.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

257. **Euastrum Jenneri** Arch.

N.E.—Strensall Common.

258. **Euastrum cuneatum** Jenner.

MID W.—Bog two miles south of Clapham, abundant. Ingleborough. Near Buckden. Cam Fell. Cowgill Wold Moss, Widdale Fell.

N.W.—Mickle Fell. Lund's Fell. Mossdale Moor, Widdale Fell. Bog near Widdale Beck.

259. **Euastrum ansatum** Ehbrenb.

S.W.—Cullingworth.

MID W.—Eldwick. Baildon. Wigton Moor. Adel Bog. Cocket Moss near Giggleswick. Bog two miles south of Clapham. Penyghent.

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington.

S.E.—Riccall and Skipwith Commons.

260. **Euastrum obesum** Josh.

N.W.—Mossdale Moor, Widdale Fell. Length, 111 μ ; breadth, 59 μ ; breadth of apex, 28 μ ; breadth of isthmus, 21 μ . Not previously recorded for the British Isles.

261. **Euastrum insigne** Hass.

S.W.—Cullingworth.

MID W.—Wigton Moor. Ilkley (W. H. Dikes). Whernside.

N.W.—Mickle and Cronkley Fells. Lund's Fell. Dodd Fell (at 2,000 feet).

262. **Euastrum rostratum** Ralfs.

N.W.—Cronkley Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

263. **Euastrum bidentatum** Näg.

[Syn. *E. elegans* var. *bidentatum* Jacobs].

MID W.—Malham Tarn Bog. Cocket Moss, near Giggleswick. Cowgill Wold Moss, Widdale Fell.

N.W.—Cronkley Fell. Bog near Widdale Beck.

264. **Euastrum lobulatum** Bréb.

[Syn. *E. erosum* Lund var. *notabile* West].

S.W.—Cragg Vale, towards Blackstone Edge. Keighley Moor.

MID W.—Malham Tarn Bog. Cocket Moss, near Giggleswick. Penyghent. Old Cote Moor. Cam Fell. Whernside.

N.W.—Mickle Fell. Lund's Fell.

S.E.—Riccall Common.

After much consideration we have come to regard the var. *notabile* we described of *E. erosum* (cfr. Journ. Roy. Micr. Soc., 1892, p. 723, t. ix., fig. 17) as identical with *E. lobulatum* Bréb., 1856. Brébisson's description and figure are not good, but yet the outward form, the size and the habit, admit of no other conclusion. The frequency of the plant in bog-gatherings, and its constant association with other Desmids that were perfectly familiar to Brébisson, also tend to confirm this view.

Cfr. also West & G. S. West in Journ. Bot., Aug. 1900, p. 290.

265.—**Euastrum erosum** Lund.

N.W.—Mickle Fell.

266.—**Euastrum pulchellum** Bréb.

S.E.—Riccall Common.

267.—**Euastrum elegans** (Bréb.) Kütz.

S.W.—Cullingworth.

MID W.—Adel (W. B. Turner). Eldwick. Wigton Moor. Malham Tarn. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. West of Selby.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

We regard *E. elegans* forma *declivis* Reinsch, 1867 (placed by Roy as *E. declive* in 1886) as a mere form of this species, not sufficiently deserving of a definite varietal name, much less to be placed as a distinct species.

268. **Euastrum binale** (Turp.) Ehrenb.

S.W.—Cullingworth.

MID W.—Blubberhouses ; Adel ! (W. B. Turner). Eldwick. Bride Cross, above Farnley Moor. Malham Tarn Bog. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Ingleborough. Oughtershaw Tarn. Ribblehead. Whernside.

N.W.—Mickle Fell. Great Shunnor Fell. Lund's Fell. Mossdale Moor, Widdale Fell (with zygosporoes). Bog near Widdale Beck. Dodd Fell (at 2,000 feet). Up to 2,000 feet on Widdale Fell.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common. Skipwith Common ! (Rev. W. Fowler).

Forma **minor** West.

MID W.—Adel Bog.

N.E.—Pilmoor, near Thirsk.

Forma **hians** West.

S.W.—Keighley Moor.

S.E.—Skipwith Common.

Var. **elobatum** Lund.

MID W.—Penyghent.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall ! (W. B. Turner).

S.E.—Riccall Common.

Var. **subelobatum** West.

MID W.—Oughtershaw Tarn.

N.W.—Baugh Fell. Cronkley Fell. Hunter's Hole, Craydale Moor (1,900 ft.).

269. **Euastrum denticulatum** (Kirchn.) Gay.

S.W.—Skelmanthorpe.

MID W.—Black Hill, near Settle. Malham Tarn. Bog two miles south of Clapham.

N.W.—Lund's Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

270. **Euastrum incavatum** Josh. & Nordst.

N.W.—Mickle Fell. Length, 35 μ ; breadth, 20 μ ; breadth of isthmus, 4.5 μ .

271. **Euastrum pectinatum** Bréb.

S.W.—Cullingworth.

MID W.—Adel Bog (with zygospores). Wigton Moor. Malham Tarn. Cocket Moss, near Giggleswick (with zygospores). Bog two miles south of Clapham.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

272. **Euastrum gemmatum** (Bréb.) Ralfs.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

273. **Euastrum verrucosum** Ehrenb.

S.W.—Rawcliffe Common.

MID W.—Bramhope (W. B. Turner). Ilkley (W. H. Dikes). Malham Tarn.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

274. **Euastrum insulare** (Wittr.) Roy 1883. [Syn. *E. binale* var. *insulare* Wittr. 1872; *Cosmarium insulare* Schmidle 1894].

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

275. **Euastrum crassicolle** Lund.

N.W.—Mickle Fell.

GENUS MICRASTERIAS Ag., 1827.

276. **Micrasterias oscitans** Ralfs var. **mucronata**

(Dixon) Wille. [Syn. *M. mucronata* (Dixon) Rabenh.].

N.W.—Cronkley Fell. Lund's Fell (iv. 1898).

277. **Micrasterias truncata** (Corda) Bréb.

This is the most generally distributed species of the genus in Yorkshire, but it is by no means common; it seems to prefer peaty *Sphagnum*-pools.

S.W.—Cullingworth.

MID W.—Eldwick. Cocket Moss, near Giggleswick. Giggleswick Common. Bog two miles south of Clapham. Ingleborough.

N.W.—Mickle Fell. Lund's Fell. Mossdale Moor, Widdale Fell. Bog near Widdale Beck. Hunter's Hole, Craydale Moor (1,900 feet).

N.E.—Strensall. Pilmoor, near Thirsk. Terrington.

S.E.—Skipwith Common! (Rev. W. Fowler).

278. **Micrasterias crenata** Bréb.

S.W.—Cullingworth.

MID W.—Eldwick. Ilkley (W. H. Dikes).

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner).

279. **Micrasterias papillifera** Bréb.

MID W.—Adel Dam (W. B. Turner).

S.W.—Cullingworth.

N.W.—Cronkley Fell. Birkdale Tarn Moss.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk. Terrington.

280. **Micrasterias apiculata** (Ehrenb.) Menegh. sub-species **fimbriata** (Ralfs) Nordst., 1888.

[Syn. *M. fimbriata* Ralfs, 1848].

S.W.—Cullingworth.

MID W.—Adel Dam (W. B. Turner). Eldwick.

281. **Micrasterias rotata** (Grev.) Ralfs.

S.W.—Cullingworth.

MID W.—Adel Bog. Harrogate (J. M. Kirk). Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

282. **Micrasterias denticulata** Bréb.

Probably general, but very local.

S.W.—Cullingworth.

MID W.—Wigton Moor. Adel and Eldwick, pure gatherings.

Cocket Moss, near Giggleswick. Bowland Knotts. Bog two miles south of Clapham.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner). Seamer. Carlton Bank. Stokesley.

Var. **notata** Nordst.

N.E.—Terrington.

283. **Micrasterias Thomasiana** Arch.

MID W.—Malham Tarn Bog (iii. 1894).

N.E.—Pilmoor, near Thirsk. Terrington.

284. **Micrasterias Crux-melitensis** (Ehrenb.) Hass.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

285. **Micrasterias Americana** (Ehrenb.) Ralfs.

MID W.—Askwith Moor (W. B. Russell and R. Hebblethwaite). Cocket Moss, near Giggleswick (iv. 1898).

N.W.—Mickle Fell.

Var. **recta** Wolle, forma. (Cfr. Journ. Bot., Oct. 1889, t. 291, f. 13).

N.W.—Mickle Fell. Length, 117 μ ; breadth, 98 μ ; breadth of isthmus, 19 μ .

GENUS XANTHIDIUM Ehrenb., 1834.

286. **Xanthidium armatum** (Bréb.) Rabenh.

S.W.—Cullingworth.

MID W.—Adel. Ilkley (W. H. Dikes).

N.E.—Strensall (W. B. Turner).

287. **Xanthidium antilopæum** (Bréb.) Kütz.

[Syn. *X. fasciculatum* var. *polygonum* Ehrenb.].

MID W.—Wigton Moor. Bog two miles south of Clapham.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk (with zygospores, vi. 1898).

288. **Xanthidium cristatum** Bréb., 1848.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

289. **Xanthidium fasciculatum** Ehrenb.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

290. **Xanthidium Brébissonii** Ralfs.

MID W.—Bog two miles south of Clapham (iv. 1898).

N.E.—Strensall (W. B. Turner), a variety.

291. **Xanthidium aculeatum** Ehrenb.

MID W.—Ilkley (W. H. Dikes). Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

292. **Xanthidium variabile** West & G. S. West in Journ.

Bot., Aug. 1900, p. 291. [Syn. *X. Smithii* Arch. var. *variabile* Nordst. 1887].

N.W.—Mickle Fell.

We have found this plant in many parts of England, and from some localities (especially certain *Sphagnum*-bogs) it is very abundant. It retains its distinctive characters in such a constant manner that we feel compelled to regard it as a distinct species from *X. Smithii*. Moreover, we never find *X. variabile* associated with *X. Smithii*; and although the former varies considerably, yet no forms are met with intermediate between the two species. (Cfr. G. S. West in Journ. Linn. Soc., Bot. vol. xxvii., 1899, p. 386, t. 8, f. 20—22).

293. **Xanthidium concinnum** Arch. 1883.

[Syn. *Arthrodesmus hexagonus* Boldt, 1885].

MID W.—Bog two miles south of Clapham.

GENUS COSMARIUM Corda, 1834.

294. **Cosmarium Ralfsii** Bréb.

MID W.—Cam Fell (viii. 1896).

N.W.—Mickle Fell. Lund's Fell (iv. 1898). Mossdale Moor, Widdale Fell. Bog near Widdale Beck.

295. **Cosmarium circulare** Reinsch.

N.W.—Mickle Fell.

296. **Cosmarium pachydermum** Lund.

MID W.—Malham Tarn. Penyghent.

N.E.—Pilmoor, near Thirsk.

Var. **minus** Nordst.

N.W.—Cautley Spout.

297. **Cosmarium Cucumis** Corda.

S.W.—Crimsworth Dean. Ogden Clough. Near Keighley.

MID W.—Baildon. Rombald's Moor. Wigton Moor. Moughton Fell. Penyghent. Ribblehead. Cowgill Wold Moss, Widdale Fell.

N.W.—Mickle and Cronkley Fells. Staindale. Near Moorcock Inn.

N.E.—Gormire, Strensall! (W. B. Turner). Scarborough Mere.

S.E.—Skipwith Common.

298. **Cosmarium Subcucumis** Schmidle.

S.W.—Ogden Clough, abundant along with *Closterium Ehrenbergii* among *Vaucheria* sp.

MID W.—In a ditch near Ilkley.

N.W.—Cautley Spout.

This species was described by Schmidle in *Berichte der Naturf. Gesellsch. Freiburg*, Bd. vii., Heft 1, p. 98, t. iv., f. 20—22. The Yorkshire specimens agree more with those from the south of England (cfr. *Journ. Roy. Micr. Soc.* 1897, p. 485) than with the original ones from Germany.

299. **Cosmarium subtumidum** Nordst.

MID W.—Bog two miles south of Clapham. Arncliffe.

N.W.—Cronkley Fell.

300. **Cosmarium cyclicum** Lund.

N.W.—Mickle Fell.

Var. **angulatum** West 1889. [Syn. ? *C. Nordstedtii* Reinsch; *C. cyclicum* var. *truncatum* Borge 1894].

MID W.—Penyghent (iv. 1896).

N.W.—Mickle Fell.

301. **Cosmarium monomazum** Lund.

MID W.—Penyghent.

Var. **polymazum** Nordst.

N.E.—Gormire (W. B. Turner).

302. **Cosmarium cœlatum** Ralfs.

S.W.—Cragg Vale towards Blackstone Edge. Ogden Clough. Cullingworth. Keighley Moor.

MID W.—Black Hill, near Settle. Malham Tarn Bog. Penyghent.

N.W.—Mickle and Cronkley Fells.

N.E.—Carlton Bank. Stokesley.

303. **Cosmarium subcrenatum** Hantzsch.

S.W.—Cragg Vale towards Blackstone Edge.

MID W.—Langcliffe, near Settle. Penyghent. Holden Ghyll, near Keighley.

N.W.—Cronkley Fell. Cautley Spout. Bog near Widdale Beck.

N.E.—Gormire (W. B. Turner).

304. **Cosmarium microsphinctum** Nordst.

MID W.—Dripping limestone rocks, Heseltine Ghyll, Penyghent. Near Ilkley! (Miss J. Town).

N.W.—Mickle Fell.

305. **Cosmarium dovrense** Nordst.

MID W.—Cowside Beck, Arncliffe (viii. 1896) in pure gelatinous masses on vertical dripping rocks. On wet rocks, Heseltine Ghyll, Penyghent.

This rare species was described by Nordstedt (in Wittr. & Nordst. Alg. Exsic. 1879, no. 255) as occurring among mosses on wet rocks on the Norwegian mountains.

It has not previously been recorded for the British Isles.

306. **Cosmarium quadrifarium** Lund. forma **hexasticha** (Lund.) Nordst. [Syn. *C. hexastichum* Lund.].

N.W.—Mickle Fell.

307. **Cosmarium Phaseolus** Bréb.

MID W.—Wigton Moor. Malham Tarn. Whernside (at 2,000 feet). Staveley Dam, near Knaresborough.

N.E.—Gormire (W. B. Turner). Strensall. Pilmoor, near Thirsk.

S.E.—Riccall Common.

308. **Cosmarium ornatum** Ralfs.

MID W.—Blubberhouses (W. B. Turner). Cocket Moss, near Giggleswick.

N.W.—Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner).

S.E.—Riccall and Skipwith Commons.

309. **Cosmarium commissurale** Bréb.

S.W.—Rawcliffe Common.

N.E.—Strensall.

310. **Cosmarium reniforme** (Ralfs) Arch.

MID W.—Wigton Moor.

N.E.—Gormire (W. B. Turner). Strensall. Pilmoor, near Thirsk. Carlton Bank. Stokesley.

S.E.—Riccall and Skipwith Commons.

311. **Cosmarium margaritifera** (Turp.) Menegh.

S.W.—Hatfield Chase (J. M. Kirk).

MID W.—Malham Tarn.

N.E.—Strensall! (W. B. Turner). Gormire (W. B. Turner).

N.W.—Mickle and Cronkley Fells. Cotterdale.

S.E.—Riccall Common. Hornsea Mere.

312. **Cosmarium Brébissonii** Menegh.

S.W.—Cullingworth.

MID W.—Adel Bog. Blubberhouses (W. B. Turner). Malham Tarn Bog. Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Strensall.

Forma **erosa** West.

N.W.—Cronkley Fell.

313. **Cosmarium Logiense** Biss.

MID W.—Cocket Moss, near Giggleswick. Ingleton. Bowland Knotts,

N.W.—Mickle Fell. Great Shunnor Fell.

314. **Cosmarium granulatum** West.

MID W.—Crook Ghyll, near Buckden.

N.W.—Cronkley Fell.

315. **Cosmarium Portianum** Arch.

MID W.—Cocket Moss, near Giggleswick.

N.E.—Gormire (W. B. Turner). Pilmoor, near Thirsk (with zygospores).

S.E.—Riccall and Skipwith Commons.

316. **Cosmarium orthostichum** Lund.

S.W.—Cullingworth.

317. **Cosmarium solidum** Nordst.

N.W.—Cronkley Fell.

N.E.—Carlton Bank.

This plant was described by Nordstedt in Kongl. Sv. Vet.-Akad. Handl., Bd. 22, No. 8, 1888, p. 48, and was figured by him under the name of *Cosmarium punctulatum* in Öfvers. af K. Vet.-Akad. Förh., 1872, No. 6, t. vi., f. 1-2. It is, however, quite a distinct plant from *C. punctulatum* Bréb.

Previously unrecorded for the British Isles.

318. **Cosmarium trachypleurum** Lund.

N.E.—Pilmoor, near Thirsk (vi. 1898).

319. **Cosmarium isthmochondrum** Nordst.

S.W.—Near Keighley.

N.W.—Cautley Spout. Jervaulx Abbey.

N.E.—Pilmoor, near Thirsk.

320. **Cosmarium sphaerostichum** Nordst.

S.W.—Cullingworth.

MID W.—Cocket Moss, near Giggleswick. Arncliffe. Cam Fell. Ribblesdale.

N.W.—Mickle and Cronkley Fells.

321. **Cosmarium Etchachanense** Roy & Biss.

MID W.—Langcliffe, near Settle. Cowside Beck, Arncliffe. Horton-in-Ribblesdale. Penyghent. Cowgill Wold Moss, Wid-dale Fell.

322. *Cosmarium undulatum* Corda.

S.W.—Rawcliffe Common. Cullingworth.

MID W.—Rombald's Moor. Ilkley (W. H. Dikes). Malham Tarn.

N.W.—Mickle Fell.

N.E.—Strensall.

S.E.—Riccall Common. Peat deposit, Filey.

Var. *minutum* Wittr.

N.E.—Strensall ! (W. B. Turner).

323. *Cosmarium minutissimum* Arch.

N.E.—Pilmoor, near Thirsk (with zygospores).

The semi-cells were somewhat flattened at the apex, and the zygospore was rhomboido-elliptical. Length, $8\cdot4 \mu$; breadth, $8\cdot5 \mu$; breadth of isthmus, $2\cdot7 \mu$; length of zygospore, 12μ ; breadth of zygospore, 10μ .

324. *Cosmarium Scenedesmus* Delp.

MID W.—Malham Tarn.

S.E.—Skipwith Common.

325. *Cosmarium sphæroideum* West.

N.E.—Strensall Common.

326. *Cosmarium trachydermum* West & G. S. West.

MID W.—Cowgill Wold Moss, Widdale Fell.

Previously unrecorded for the British Isles.

327. *Cosmarium bioculatum* Bréb.

S.W.—Rawcliffe (H. F. Parsons). Halifax. In horse-trough, Allerton, near Bradford. Cullingworth.

MID W.—Adel Bog. Rombald's Moor. Malham Tarn. Bog two miles south of Clapham.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Strensall. Pilmoor, near Thirsk. Carlton Bank. Scarborough Mere.

S.E.—Riccall Common.

328. *Cosmarium tinctum* Ralfs.

S.W.—Thornton Moor. Cullingworth.

MID W.—Adel Bog. Baildon Moor. Ilkley. Bolton Woods.
Cocket Moss, near Giggleswick. Ribbleshead. Cam Fell.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Strensall.

S.E.—Riccall and Skipwith Commons.

329. **Cosmarium inconspicuum** West & G. S. West.

MID W.—Bog two miles south of Clapham (iv. 1898).

330. **Cosmarium asphærosporum** Nordst. 1879. [Syn.

C. Schliephackianum Grunow forma *spetsbergensis*
Nordst 1875].

MID W.—Penyghent.

331. **Cosmarium contractum** Kirchn.

MID W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

332. **Cosmarium Hammeri** Reinsch. 1867.

[Syn. *C. homalodermum* Nordst. 1875].

S.W.—Ogden Clough.

MID W.—Baildon.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell.

Reeth.

N.E.—Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Riccall Common. Peat deposit, Filey.

333. **Cosmarium galeritum** Nordst.

MID W.—Roundhay Park, Leeds. Malham Tarn. Cocket
Moss, near Giggleswick. Penyghent.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

334. **Cosmarium Klebsii** Gutw.

N.E.—Pilmoor, near Thirsk.

Only previously recorded for the British Isles from the New
Forest, Hants.

335. **Cosmarium Malinvernianum** (Racib.) Schmidle,

1894. [Syn. *C. subtholiforme* var. *Malinvernianum*
Racib., 1889].

Var. **Badense** Schmidle, 1894.

[Syn. *C. subtholiforme* var. *Badense* Schmidle].

MID W.—Cocket Moss, near Giggleswick.

N.E.—Pilmoor, near Thirsk.

This plant is by no means an uncommon species in the boggy districts of the British Isles. It is described and fairly well figured by Schmidle in Flora oder allg. Botan. Zeitung, 1894, heft 1, p, 58, t. vii., f. 21. We have figured its zygosporangium in Journ. Roy. Micr. Soc., 1896, t. vii., f. 41, under the erroneous name of *C. confusum* Cooke var. *regularius* Nordst. The zygosporangia were from the extensive bog on Thursley Common, Surrey, and were not uncommon in a gathering made towards the end of June, 1895. Schmidle, in Oesterr. Bot. Zeitschrift, Jahrg. 1895, p. 21 (Sep.), remarks on its resemblance to *C. confusum* var. *regularius* and also to *C. præmorsum* Bréb. It certainly has some resemblance to the latter species, but we think no one could fail to readily discriminate between the two plants.

336. **Cosmarium confusum** Cooke var. **regularius** Nordst.

S.E.—Riccall and Skipwith Commons.

337. **Cosmarium præmorsum** Bréb.

S.W.—Cragg Vale, towards Blackstone Edge. Ogden Clough.

MID W.—Roundhay Park, Leeds. Eldwick. Staveley Dam, near Knaresborough. Near Ilkley. Ingleton.

N.W.—Sedbergh and Cautley Spout. Mickle and Cronkley Fells.

N.E.—Strensall. Pilmoor, near Thirsk. Malton. Stokesley. Scarborough Mere.

S.E.—Riccall Common. Market Weighton.

338. **Cosmarium quaternarium** Nordst.

MID W.—Baildon Moor. Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

339. **Cosmarium Sportella** Bréb.

MID W.—Cowside Beck, Arncliffe (viii. 1896).

340. **Cosmarium Corbula** Bréb.

MID W.—Cocket Moss, near Giggleswick (iv. 1898).

341. **Cosmarium Turpinii** Bréb.[Syn. *C. Turpinii* var. *Lundellii* Gutw. 1884].

S.W.—Marley, near Bingley.

MID W.—Roundhay Park, Leeds. Shipley Glen. Malham Tarn. Cocket Moss, near Giggleswick. Ingleton.

342. **Cosmarium Kjellmanii** Wille.

MID W.—Above Eldwick. Rombald's Moor.

N.W.—Near 'Moorcock Inn.'

Sub-sp. **grande** Wille.

MID W.—Baildon Moor.

Length, 45 μ ; breadth, 42 μ ; breadth of isthmus, 13 μ ; thickness, 18 μ .343. **Cosmarium quinarium** Lund.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

344. **Cosmarium anisochondrum** Nordst.

N.E.—Gormire (W. B. Turner).

345. **Cosmarium subpunctulatum** Nordst.

S.W.—Cullingworth. Wigton Moor.

S.E.—Riccall Common. Market Weighton.

Var. **Börgesenii** West.

S.W.—Cullingworth.

N.E.—Strensall Common.

346. **Cosmarium punctulatum** Bréb.

S.W.—Rawcliffe Common. Askern. Thornton Moor. Halifax. Cullingworth. Moor near Keighley.

MID W.—Adel Bog. Baildon. Wigton Moor. Ilkley. Staveley Dam, near Knaresborough. Malham Tarn. Cocket Moss, near Giggleswick. Ingleborough. Penyghent.

N.W.—Cronkley Fell. Cotterdale. Near 'Moorcock Inn.' Jervaulx Abbey.

N.E.—Strensall. Pilmoor, near Thirsk. Stokesley. Scarborough Mere.

S.E.—Riccall Common.

347. **Cosmarium humile** (Gay) Nordst.

[Syn. *C. celatum* Gay].

Var. **substriatum** (Nordst.) Schmidle.

[Syn. *C. substriatum* Nordst.].

S.W.—Rawcliffe Common.

MID W.—Penyghent. Staveley Dam, near Knaresborough.

Wigton Moor.

N.E.—Strensall Common. Pilmoor, near Thirsk. Malton.

S.E.—Riccall Common. Skipwith Common. Market Weigh-
ton. Hornsea Mere.

Var. **striatum** (Boldt) Schmidle. [Syn. *C. striatum* Boldt].

N.E.—Pilmoor, near Thirsk.

C. humile, *C. striatum*, *C. substriatum*, and *C. danicum* are unquestionably all forms of the same species. This was first directly pointed out by Schmidle in Flora oder Allg. Bot. Zeitung, 1894, heft 1, p. 53; he afterwards placed *C. striatum*, *C. substriatum*, *C. danicum*, *C. subhumile*, and other forms as varieties of *C. humile*; cfr. Oesterr. Botan. Zeitschrift, 1895, nr. 7, p. 18 (Sep.).

348. **Cosmarium Blyttii** Wille.

S.W.—Cragg Vale, towards Blackstone Edge.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells.

S.E.—Skipwith Common.

349. **Cosmarium Bœckii** Wille.

MID W.—Malham Tarn.

N.W.—Mickle Fell.

350. **Cosmarium subprotumidum** Nordst.

N.E.—Strensall Common.

Var. **Gregorii** (Roy & Biss.) Nob.

[Syn. *C. Gregorii* Roy & Biss.].

MID W.—Roundhay Park, Leeds.

N.E.—Pilmoor, near Thirsk.

S.E.—Hornsea Mere.

351. **Cosmarium subcostatum** Nordst.

MID W.—Shipley Glen. Ben Rhydding. Malham Tarn.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

352. **Cosmarium formosulum** Hoff.

MID W.—Eldwick.

N.E.—Strensall Common. Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

353. **Cosmarium nitidulum** De Not., 1867.[Syn. *C. rectosporum* Turn., 1893].

S.W.—Cullingworth.

N.W.—Mickle Fell. Pilmoor, near Thirsk.

N.E.—Beast Cliff.

354. **Cosmarium pseudonitidulum** Nordst.

S.W.—Cullingworth.

N.W.—Mickle Fell.

355. **Cosmarium variolatum** Lund.

MID W.—Baildon.

356. **Cosmarium pseudopyramidatum** Lund.

S.W.—Cullingworth.

MID W.—Malham Tarn.

S.E.—Riccall Common.

357. **Cosmarium pyramidatum** Bréb.

S.W.—Cullingworth. Saltaire.

MID W.—Bramhope (W. B. Turner). Bog two miles south of Clapham. Moughton Fell. Penyghent.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Bog near Widdale Beck.

N.E.—Gormire. Strensall! (W. B. Turner).

S.E.—Riccall Common.

358. **Cosmarium Nymannianum** Grun.

S.W.—Keighley Tarn.

N.W.—Great Shunnor Fell.

359. **Cosmarium granatum** Bréb.

MID W.—Baildon. Malham Tarn. Cowside Beck, Arncliffe. Penyghent. Cray Moss.

N.W.—Mickle Fell. Jervaulx Abbey.

N.E.—Strensall Common. Pilmoor, near Thirsk. Carlton Bank.

S.E.—Riccall and Skipwith Commons. Sandholme. Hornsea Mere.

This is the most universal and widely distributed species of the genus *Cosmarium*.

Var. **subgranatum** Nordst.

S.W.—Crimsworth Dean.

MID W.—Baildon. Ingleton. Half-a-mile south of Cray Moss. Boston Spa. Knaresborough. Holden Ghyll, near Keighley.

N.E.—Pilmoor, near Thirsk.

S.E.—Malton.

360. **Cosmarium Pokornyanum** (Grun.) Nob. [Syn. *Euastrum Pokornyanum* Grun., 1868; *E. binale* var. *angustatum* Wittr., 1872; *E. polare* Nordst., 1872; *C. angustatum* (Wittr.) Nordst., 1875].

MID W.—Helln Pot, near Selside, on wet rocks among *Glæocapsa* sp. Moughton Fell. Penyghent. South of Cray Moss.

N.W.—Mickle Fell. Mossdale Moor, Widdale Fell. Cowgill Wold Moss, Widdale Fell.

The description of *Euastrum Pokornyanum*, given by Grunow in Rabenh. Flor. Europ. Alg., iii., p. 185, agrees in every way with *C. angustatum* (Wittr.) Nordst. It is as follows:—'*E. minutum, quasi prioris* [*E. Ralfsii* Rabenh.] *infans; semicellulis trilobis, lobis basalibus brevibus integris vel margine crenatobilobulatis, lobo polari porrecto subcuneato, apice truncato, leniter inciso-emarginato; cytiodermate lævi.*' The size of the plants is the same, and the habitats '*in locis paludosis*' and '*inter muscos madidos*' given for *E. Pokornyanum* are those of *C. angustatum*. Moreover, *E. Pokornyanum* Grun. var. *subcrassicolle* Gutw. (in Spraw. Kom. fizyjogr. Akad. Umiej. Krakow, tom. xxx., p. 103, t. iii., f. 40) could unquestionably be referred to *C. angustatum*, and therefore Gutwinski, by referring a form of *C. angustatum* to

Euastrum Pokornyanum, unconsciously confirms the view that the two species are identical.

As *E. Pokornyanum* was described four years previous to *E. binale* var. *angustatum*, the specific name '*Pokornyanum*' must take precedence.

361. **Cosmarium cymatopleurum** Nordst. 1872.

MID W.—Penyghent, extremely rare along with *Staurastrum acarides*, *Cosmarium Etchachanense*, *C. speciosum*, *C. anceps*, etc.

Var. **tyrolicum** Nordst., 1876.

[Syn. *C. subochthodes* Schmidle, 1895, pro parte.].

MID W.—Shipley Glen, forming pure gelatinous masses on wet shaly rocks. Penyghent.

N.W.—Lund's Fell.

Var. **Archerii** (Roy & Biss.) Nob.

[Syn. *C. Archerii* Roy & Biss, 1893].

MID W.—Penyghent.

Length, 91 μ ; breadth, 67 μ ; breadth of isthmus, 24 μ .

The drawn-out apices of the semi-cells of this variety give it a rather remarkable character, but this feature is not sufficient to warrant its separation by Messrs. Roy and Bissett as a distinct species. The specimens observed from West Yorkshire were intermediate between the typical form and the var. *Archerii* with regard to the produced apices; they were also intermediate in size, thus proving that these plants are forms of one species.

This species and its varieties are essentially alpine Desmids.

362. **Cosmarium Holmiense** Lund.

S.W.—Ogden Clough.

MID W.—Baildon. Holden Ghyll, near Keighley. Near Ilkley. Cowside Beck, Arncliffe. Moughton Fell. Heseltine Ghyll.

N.W.—Mickle Fell. Lund's Fell. Cowgill Wold Moss, Wid-dale Fell.

Var. **integrum** Lund.

MID W.—Malham Tarn. Bog two miles south of Clapham. Cowside Beck, Arncliffe. Penyghent.

N.W.—Mossdale Moor, Widdale Fell.

This species is usually found associated with *C. anceps*, *C. speciosum*, etc., amongst wet mosses and algæ on wet rocks.

363. **Cosmarium subundulatum** Wille, 1880.

[Syn. *C. Nuttallii* West].

N.E.—Pilmoor, near Thirsk.

Var. **Beanlandii** West, 1894.

S.E.—Newsholme.

364. **Cosmarium tetragonum** (Näg.) Arch.

MID W.—Near Ilkley! (Miss J. Town). Penyghent.

N.W.—Mickle Fell.

Var. **Lundellii** Cooke.

MID W.—Cocket Moss, near Giggleswick. Penyghent. Cam Fell.

N.W.—Mickle Fell.

Var. **Davidsonii** (Roy & Biss.) Nob.

[Syn. *C. Davidsonii* Roy & Biss.].

MID W.—Penyghent.

N.W.—Mickle Fell.

365. **Cosmarium notabile** Bréb.

S.W.—Ogden Clough.

MID W.—Ribblehead. Cam Fell.

Forma **minor** Wille.

N.W.—Mickle Fell.

366.—**Cosmarium Subreinschii** Schmidle, in *Flora oder allg. Bot. Zeitung*, 1894, heft 1, p. 59, t. vii., f. 24.

This is a small species of somewhat characteristic form, approaching *C. impressulum* Efv. in outline, but with less marked lobulations and more truncate apex, not to mention the prominent, almost peg-like, protuberance on each side of the vertical view. We have not yet seen it from England.

Var. **Boldtiana** Schmidle, in *Hedwigia*, Bd. xxxiii., 1894, p. 90, t. vi., f. 8. [Syn. *C. Meneghinii* Bréb. forma Boldt in *Bih. till K. Sv. Vet.-Akad. Handl.*, bd. 13, afd. III., no. 5, p. 13, t. i., f. 15; *C. Meneghinii*

forma *Boldtii* West in Journ. Roy. Micr. Soc., 1892, p. 726.]

S.W.—Keighley Moor.

N.W.—Bog near Widdale Beck. Snaizeholme Fell.

This variety has not before been recorded for the British Isles. It differs from the typical form in the rather less pronounced undulations of the lateral margins, the faintly incised apex, and the reduced protuberances of the vertical view, the central area of the semi-cells being slightly thickened.

367. **Cosmarium venustum** (Bréb.) Arch., 1861. [Syn. *Euastrum venustum* Bréb., 1856; *Cosmarium cambricum* Cooke & Wille, 1880].

S.W.—Keighley Tarn. Old Cote Moor.

N.W.—Mickle Fell.

S.E.—Riccall and Skipwith Commons. Hornsea Mere.

368. **Cosmarium ovale** Ralfs.

N.W.—Great Shunnor Fell.

N.E.—Strensall.

369. **Cosmarium tetraophthalmum** (Kütz.), Menegh.

S.W.—Ogden Clough.

MID W.—Bramhope (W. B. Turner). Adel Bog. Eldwick. Malham Tarn.

N.W.—Mickle and Cronkley Fells.

N.E.—Thirkleby Park (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common. Cleava Cliffs, north of Selby.

Var. **Lundellii** Wittr.

N.E.—Pilmoor, near Thirsk.

S.E.—Sandholme. Hornsea Mere.

370. **Cosmarium eboracense** West.

MID W.—Baildon. Cowside Beck, Arncliffe. Half-a-mile south of Cray Moss.

N.W.—Cronkley Fell.

N.E.—Staindale.

371. **Cosmarium Botrytis** (Bory) Menegh.

S.W.—Denholme. Frizinghall. Cullingworth. Near Keighley.

MID W.—Markington, with zygospores! (Rev. J. S. Tute). Adel Bog. Roundhay! (W. B. Turner). Baildon. Kildwick. Rombald's Moor. Otley. Ilkley. Staveley Dam, near Knaresborough. Cocket Moss, near Giggleswick. Near Buckden. Penyghent.

N.W.—Sedbergh. Mickle Fell. Great Shunnor Fell. Lund's Fell. Bog near Widdale Beck.

N.E.—Thirkleby Park; Strensall! (W. B. Turner). Pilmoor, near Thirsk (with zygospores). Terrington. Stokesley.

S.E.—Riccall and Skipwith Commons. Newsholme. Loftsome Bridge, near Wressle. Hornsea Mere.

Var. **mediolæve** West, 1892.

[Syn. *C. subochthodes* Schmidle, 1895, pro parte].

MID W.—Near Ingleton.

N.E.—Strensall Common.

372. **Cosmarium ochthodes** Nordst.

[Syn. *C. ochthodes* var. *obtusatum* Gutw.].

S.W.—Rawcliffe Common. Crimsworth Dean. Cullingworth.

MID W.—Baildon. Wigton Moor. Holden Ghyll, near Keighley. Malham Tarn and Bog. Cocket Moss, near Giggleswick. Ingleton. Moughton Fell. Penyghent. Ribblehead. Oughtershaw Moss.

N.W.—Sedbergh and Cautley Spout. Mickle and Cronkley Fells. Great Shunnor Fell. Cotterdale. Lund's Fell (with zygospores).

N.E.—Pilmoor, near Thirsk. Terrington. Stokesley. Scarborough Mere.

This species is widely distributed in upland districts and is not uncommon in the lowlands. The granules are broad, flattened elevations with a somewhat irregularly-circular outline; they vary considerably in the extent of their development, in some being very prominent, causing the cell-margin to appear distinctly crenate, whereas in others they are much more flattened, the cell-margin only appearing slightly undulate.

Length, 83–94 μ ; breadth, 62–67 μ ; breadth of apex, about 19–25 μ ; breadth of isthmus, 17·5–23 μ .

Zygospore globose, furnished with few (about eleven in the periphery) short, very thick spines; apices of spines obtuse or slightly emarginate.

Diam. without spines 60 μ , with spines 76 μ ; length of spines 6–7·5 μ .

Var. **subcirculare** Wille, 1880.

MID W.—Baildon. Boston Spa.

Var. **amœbum** West, 1892. [Syn. *C. ochthodes* forma *granulosum* Lütken, 1893; *C. ochthodes* var. *amœbo-granulosum* Schmidle, 1894; *C. speciosum* Lund. var. *australianum* Nordst. forma Gutw., 1891].

N.W.—Mickle and Cronkley Fells.

This variety is about the same size as the type, but the semi-cells are more trapeziform, possessing broader apices. The outline is but faintly undulate (much less undulate than in the type), and the granules are very broad towards the centre of the semi-cells, of almost inappreciable elevation and sinuous in outline (hence the name, var. *amœbum*).

Length, 87–90 μ ; breadth, 60–67 μ ; breadth of apex, 25–27 μ ; breadth of isthmus, 21 μ ; thickness, 40 μ .

373. **Cosmarium didymochondrum** Nordst.

MID W.—ShIPLEY Glen (iv. 1895), abundant on dripping rocks. Ingleton (viii. 1899).

374. **Cosmarium subnotabile** Wille.

MID W.—Near Settle (viii. 1896). Penyghent (iv. 1896).

N.W.—Cautley Spout (ix. 1899).

375. **Cosmarium Rostafinskii** Gutw.

N.W.—Cautley Spout (ix. 1899).

This species has not previously been recorded for the British Isles. We have also seen it from Scotland.

376. **Cosmarium tumens** Nordst.

MID W.—Ingleton, on dripping rocks (viii. 1899).

Length, 49–51 μ ; breadth, 30–33 μ ; breadth of isthmus, 17–19 μ ; thickness, 27 μ .

This rare species has not previously been recorded for the British Isles. It is known from Spitzbergen, Bohemia, and the United States.

377. **Cosmarium speciosum** Lund.

S.W.—Ogden Clough. Crimsworth Dean. Keighley Tarn.

MID W.—ShIPLEY Glen. Holden Ghyll, near Keighley. Near Ilkley. Cowside Beck, Arncliffe. Penyghent.

N.W.—Mickle Fell. Lund's Fell. Cautley Spout.

Var. **biforme** Nordst.

MID W.—Arncliffe, abundant.

Var. **simplex** Nordst.

MID W.—Penyghent.

N.W.—Mickle Fell. Cowgill Wold Moss, Widdale Fell.

— — — forma **intermedia** Wille.

S.W.—Woolley.

This species and its varieties are not unfrequent on wet rocks amongst *C. Holmiense*, *C. amceps*, *Penium cucurbitinum*, etc.

378. **Cosmarium subspeciosum** Nordst.

MID W.—ShIPLEY Glen. Penyghent.

N.W.—Mickle Fell.

N.E.—Scarborough Mere.

379. **Cosmarium speciosissimum** Schmidle.

N.W.—Mickle Fell.

This alpine species was described by Schmidle in Oesterr. Botan. Zeitschrift, Jahrg. 1895, p. 24 (Sep.), t. xv., f. 30, 31. It is more profoundly crenate than *C. speciosum* or *C. subspeciosum* and the crenations are slightly emarginate; moreover, the row of marks across the base of the semi-cells is distinctive.

Length, 55 μ ; breadth, 36.5 μ ; breadth of isthmus, 17.5 μ ; thickness, 24 μ .

It has not previously been recorded for the British Isles.

380. **Cosmarium hexalobum** Nordst.

N.W.—Mickle Fell.

381. **Cosmarium nasutum** Nordst.

MID W.—Bog, two miles south of Clapham.

N.W.—Cowgill Wold Moss, Widdale Fell (with zygospores).

Zygospores globose, with rather few mamilliform protuberances (about nine in the periphery); each protuberance furnished with a short, thick, somewhat uncinuate spine. Diameter: zygospores without spines, 34—35 μ ; with spines, 45—47 μ .

This is another of the rare alpine species of the genus, and its occurrence in Yorkshire is noteworthy.

382. **Cosmarium alatum** Kirchn.

MID W.—Boston Spa.

N.E.—Pilmoor, near Thirsk.

383. **Cosmarium orbiculatum** Ralfs.

S.W.—Cullingworth.

N.W.—Mickle Fell.

N.E.—Strensall (W. B. Turner).

384. **Cosmarium moniliforme** (Turp.) Ralfs.

MID W.—Ilkley (W. H. Dikes). Penyghent.

N.W.—Leeming. Mickle Fell.

N.E.—Strensall. Pilmoor, near Thirsk.

S.E.—Riccall Common.

Forma **panduriformis** Heimerl.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

385. **Cosmarium subexcavatum** Nob. [Syn. *C. excavatum* Nordst. var. *ellipticum* Wille, öfvers. af K. Vet.-Akad. Förh. 1879, no. 5, p. 47, t. xiii., f. 46; *C. isthmium* West var. *Willei* West, Journ. Linn. Soc., Bot., vol. xxix., 1892, p. 160; *Dysphinctium Willei* Schmidle in Hedwigia, Bd. xxxiii., 1894, p. 94].

This plant differs so considerably from *C. excavatum* Nordst. that it must necessarily be considered as a distinct species. Schmidle evidently arrived at the same conclusion but placed it under the genus *Dysphinctium*. The specific name '*Willei*' could not be utilized, as there is a *C. Willei* Lagerh.

Var. **ordinatum** var. n. [Syn. *Dysphinctium Willei* forma Schmidle, l.c., p. 95, t. vi., f. 2].

A little longer than the typical form; granules small, arranged in definite vertical and horizontal series. Length, 29—37 μ ; breadth, 17—21 μ ; breadth of isthmus, 11.5—13.5 μ .

MID W.—Ingleton, on dripping limestone rocks (viii. 1899).

In the plants examined there were about six horizontal and eight vertical series of granules on each semicell.

On further consideration we are inclined to regard *C. æquinoctiale* West & G. S. West ('Welw. Afric. Alg.,' Journ. Bot., May, 1897, p. 175, t. 365, f. 11) as *C. subexcavatum* var. *æquinoctiale*.

No form of this species has previously been recorded for the British Isles.

386. **Cosmarium connatum** Bréb.

[Syn. *Calocylindrus connatus* (Bréb.) Kirchn.]

S.W.—Cullingworth.

MID W.—Ilkley (W. H. Dikes).

387. **Cosmarium pseudoconnatum** Nordst.

[Syn. *Calocylindrus pseudoconnatus* (Nordst.) Wolle].

N.W.—Mickle Fell.

388. **Cosmarium globosum** Buln., 1861. [Syn. *Calocylindrus strangulatus* Cooke & Wills, 1887].

N.W.—Mickle Fell.

N.E.—Peat deposit, Filey.

389. **Cosmarium pseudarctoum** Nordst.

[Syn. *Calocylindrus pseudarctous* (Nordst.) Cooke].

S.W.—Ogden Clough.

MID W.—Rombald's Moor, abundant along with *Closterium subulatum* in washings of *Potamogeton polygonifolius* and *Bulbochæte setigera*.

N.W.—Cautley Spout.

N.E.—Carlton Bank.

390. **Cosmarium pericymatium** Nordst. 'Desm. arctoæ,' öfvers. af K. Vet.-Akad. Förh., 1875, no. 6, p. 29, t. vii., f. 26.

Var. **eboracense** var. n.

Smaller than the typical form ; semicells with fewer and more prominent undulations ; membrane punctate. Length, 21μ ; breadth, 14μ ; breadth of isthmus, 10μ ; thickness, 12μ .

N.W.—Cautley Spout.

This rare alpine species has not been previously recorded for the British Isles.

391. **Cosmarium conspersum** Ralfs.

MID W.—Malham Tarn.

N.W.—Mickle Fell. Great Shunnor Fell.

Var. **rotundatum** Witttr.

S.E.—Skipwith Common ; a form with the sides slightly diverging.

392. **Cosmarium quadrum** Lund.

S.W.—Cullingworth.

393. **Cosmarium latum** Bréb.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk. Carlton Bank.

Forma **minor** Boldt, 1888.

[Syn. *C. latum* var. *minor* Roy & Biss., 1894].

S.W.—Ogden Clough.

MID W.—Boston Spa.

394. **Cosmarium biretum** Bréb.

S.W.—Cullingworth.

MID W.—Roundhay Park, Leeds.

Var. **trigibberum** Nordst.

MID W.—Roundhay Park, Leeds.

395. **Cosmarium Broomei** Thwaites.

S.W.—Cullingworth.

MID W.—Wigton Moor. Baildon. Adel Bog. Moughton Fell.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

396. **Cosmarium amœnum** Bréb.

MID W.—Cocket Moss, near Giggleswick.

N.E.—Strensall! (W. B. Turner).

S.E.—Skipwith Common! (Rev. W. Fowler).

397. **Cosmarium pseudamœnum** Wille, 1884.

[Syn. *C. inornatum* Josh., 1886].

S.E.—Skipwith Common.

398. **Cosmarium lepidum** West.

N.W.—Mickle Fell.

399. **Cosmarium Novæ-Semliæ** Wille.

MID W.—Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

400. **Cosmarium Regnesii** Reinsch.

S.E.—Riccall Common.

Var. **montanum** Schmidle, 1895 (April). [Syn. *C. Pseudo-regnesii* West & G. S. West, 1895 (Oct.); *C. montanum* Schmidle, 1896; *C. Novæ Semliæ* Wille var. *polonicum* Eichl. & Gutw., 1894].

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

For an exhaustive account of the forms of this species see G. S. West in Journ. Linn. Soc., Bot. vol. xxvii., 1899, pp. 387–389, t. 10, f. 10–21.

401. **Cosmarium crenatum** Ralfs.

S.W.—Rawcliffe (H. F. Parsons). Crimsworth Dean. Ogden Clough. Cullingworth.

MID W.—Adel. Baildon. Rombald's Moor. Kildwick. Near Ilkley. Harrogate (J. M. Kirk). Malham Tarn. Arncliffe. Cocket Moss, near Giggleswick. Moughton Fell. Penyghent. Cam Fell.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Great Shunnor Fell. Cowgill Wold Moss, Widdale Fell, with zygospores in abundance (iv. 1898).

N.E.—Gormire. Strensall! (W. B. Turner). Peat deposit, Filey.

402. **Cosmarium Grantii** Roy & Biss.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

403. **Cosmarium DeBaryi** Arch.[Syn. *Calocylindrus DeBaryi* (Arch.) Wolle].

MID W.—Adel Bog.

N.E.—Pilmoor, near Thirsk. Peat deposit, Filey.

404. **Cosmarium subquadratum** Nordst.

MID W.—Ingleton, on wet rocks.

This rare species has not previously been recorded for the British Isles; it was first described from the Tyrol

405. **Cosmarium quadratum** Ralfs.

S.W.—Ogden Clough. Cullingworth.

MID W.—Eldwick. Adel Bog. Ilkley. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Penyghent.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Carlton Bank. Stokesley.

S.E.—Riccall Common. Newsholme.

406. **Cosmarium plicatum** Reinsch.

MID W.—Blubberhouses (W. B. Turner). Adel Bog.

N.W.—Mickle Fell. Great Shunnor Fell.

407. **Cosmarium sinuosum** Lund var. **decedens** (Reinsch) Nordst.

MID W.—Baildon Moor.

408. **Cosmarium sublobatum** (Bréb.) Arch.

S.W.—Ogden Clough.

MID W.—Penyghent. Oughtershaw Tarn.

N.W.—Cautley Spout.

409. **Cosmarium anceps** Lund.

S.W.—Ogden Clough.

MID W.—Baildon. Holden Ghyll, near Keighley. Penyghent.

N.W.—Mickle and Cronkley Fells. Cowgill Wold Moss, Widdale Fell.

This species is generally found on the dripping sandstone and grit rocks in the glens. In the N. Western Fells it is also found in springs on the grit above the limestone.

410. **Cosmarium pseudoexiguum** Racib.

N.E.—Strensall Common: a form somewhat attenuated towards the apices of the semicells. Length, 18 μ ; breadth, 7·7 μ ; thickness, 4·8 μ .

This species has not previously been recorded for the British Isles.

411. **Cosmarium obliquum** Nordst.

S.W.—Cullingworth.

MID W.—Malham Tarn Bog. Penyghent. Oughtershaw Tarn (forma *major* Nordst.).

N.W.—Mickle Fell. Birkdale Tarn Moss. Lund's Fell. Widdale Fell (2,000 ft.). Snaizeholme Beck. Cowgill Wold Moss, Widdale Fell.

N.E.—Peat deposit, Filey.

412. **Cosmarium rectangulare** Grun. 1868.

[Syn. *C. gotlandicum* Wittr. 1872].

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common! (Rev. W. Fowler).

413. **Cosmarium minimum** West & G. S. West.

N.E.—Pilmoor, near Thirsk.

Not previously recorded for the British Isles.

414. **Cosmarium succisum** West.

MID W.—Wigton Moor.

S.E.—Riccall and Skipwith Commons.

415. **Cosmarium Heimerlii** West & G. S. West.

[Syn. *C. minutissimum* Heimerl non Arch.].

Var. **tumidum** West & G. S. West.

A variety with the angles a little rounder; with an inflation on each side of the vertical view. Length, 9-10 μ ; breadth, 10-11·5 μ ; breadth of isthmus, 2·5-3 μ ; thickness, 5·5 μ .

S.W.—Greetland, near Halifax.

MID W.—Ingleborough. Ribbleshead.

N.W.—Lund's Fell. Cowgill Wold Moss, Widdale Fell.

416. **Cosmarium Sphagnicolum** West & G. S. West.

Very minute, a little broader than long, moderately constricted,

with a short and open sinus; semicells subtrapeziform, with the superior angles obliquely truncate, with the sides diverging upwards, apices broad, straight or very slightly retuse; from the side view subcircular; vertical view elliptic-oblong, with somewhat acute poles, slightly tumid on each side in the middle, on each side towards the poles furnished with a small papilla; pyrenoids single. Length, 10.5-11.5 μ ; breadth, 11-13.5 μ ; breadth of isthmus, 5.5-5 μ ; thickness, 6.5 μ .

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle Fell. Mossdale Moor, Widdale Fell.

This minute species occurs occasionally in immense quantity amongst *Sphagnum* in small, peaty pools. It is most nearly related to *C. Heimerlii* var. *tumidum* in vertical view, but the front view is quite distinct; it may also be compared with *C. Regnesii* var. *montanum* Schmidle.

417. **Cosmarium truncatellum** (Perty) Rabenh.

N.E.—Strensall (W. B. Turner).

418. **Cosmarium abruptum** Lund.

N.W.—Mickle Fell, very scarce.

419. **Cosmarium abbreviatum** Racib.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

Forma **minor**.

S.E.—Skipwith Common. Only half the size of the type; length, 8 μ ; breadth, 9 μ .

420. **Cosmarium pygmæum** Arch.

N.W.—Mickle Fell.

421. **Cosmarium impressulum** Elfv. [Syn. *C. crenulatum* (Ehrenb.) Bréb. var. *Reinschii* Schmidle 1893; *C. Meneghinii* Bréb. f. *Reinschii* Istv. 1887].

MID W.—Malham Tarn.

N.E.—Pilmoor, near Thirsk.

S.E.—Hornsea Mere.

422. **Cosmarium umbilicatum** Lütkem.

N.E.—Malton (viii. 1899).

423. **Cosmarium Regnellii** Wille.

N.E.—Pilmoor, near Thirsk.

424. **Cosmarium Meneghinii** Bréb.

S.W.—Doncaster. Ogden Clough. Cullingworth.

MID W.—Blubberhouses (W. B. Turner). Boston Spa. Malham Tarn. Penyghent. Arthington. Markington, with zygospores! (Rev. J. S. Tute). Adel Bog. Baildon. Rombald's Moor.

N.W.—Mickle and Cronkley Fells. Jervaulx Abbey.

N.E.—Gormire; Strensall (W. B. Turner). Pilmoor, near Thirsk. Saltburn.

S.E.—Riccall Common. Skipwith Common! (Rev. W. Fowler). Newsholme. Hornsea Mere.

Forma **octangularis** Wille.

S.W.—Denholme.

MID W.—Adel. Rombald's Moor. Ben Rhydding. Brearton, near Knaresborough. Malham Tarn.

N.W.—Jervaulx Abbey.

N.E.—Terrington. Malton.

S.E.—Riccall Common. Newsholme. Hornsea Mere.

Var. **Wollei** Lagerh.

S.E.—Riccall Common.

425. **Cosmarium angulosum** Bréb.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

426. **Cosmarium difficile** Lütkem.

S.W.—Cullingworth.

MID W.—Adel Bog.

N.W.—Mickle Fell.

N.E.—Carlton Bank. Stokesley.

Var. **sublæve** Lütkem.

S.W.—Cullingworth.

MID W.—Cocket Moss, near Giggleswick.

N.E.—Strensall Common. Pilmoor, near Thirsk.

S.E.—Skipwith Common.

427. **Cosmarium læve** Rabenh.

MID W.—Boston Spa. Cocket Moss, near Giggleswick.
Bog two miles south of Clapham. Ingleton. Ribbleshead.

N.W.—Mosssdale Moor, Widdale Fell.

Var. **septentrionale** Wille.

S.W.—Ogden Clough. Crimsworth Dean.

N.W.—Mickle and Cronkley Fells. Cotterdale.

N.E.—Scarborough Mere.

428. **Cosmarium elegantissimum** Lund.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

429. **Cosmarium Thwaitesii** Ralfs.

[Syn. *Calocylindrus Thwaitesii* (Ralfs) Schaarschm.]

S.W.—Thornton Moor. Frizinghall. Cullingworth.

MID W.—Adel Bog. Baildon. Rombald's Moor. Penyghent. Whernside.

N.W.—Mickle and Cronckley Fells. Bog near Widdale Beck.

N.E.—Strensall.

430. **Cosmarium Cucurbita** Bréb.

[Syn. *Calocylindrus cucurbita* (Bréb.) Kirchn.]

S.W.—Cragg Vale, towards Blackstone Edge. Cullingworth.
Doncaster. Keighley Tarn. Thornton Moor.

MID W.—Rombald's Moor. Black Hill, near Settle. Malham Tarn Bog. Ingleborough. Penyghent. Old Cote Moor. Oughtershaw Tarn. Cam Fell. Whernside (with zygospores).

N.W.—Baugh Fell. Mickle and Cronkley Fells. Great Shunnor Fell. Birkdale Tarn Moss. Lund's Fell (at 2,000 ft.). Mosssdale Moor, Widdale Fell. Bog near Widdale Beck. Hunter's Hole, Craydale Moor (1,900 ft.). Cowgill Wold Moss, Widdale Fell.

N.E.—Carlton Bank. Scarborough Mere. Strensall! (W. B. Turner). Pilmoor, near Thirsk.

431. **Cosmarium Palangula** Bréb.

MID W.—Cocket Moss, near Giggleswick. Cowside Beck, Arncliffe. Old Cote Moor.

N.E.—Peat deposit, Filey.

432. **Cosmarium parvulum** Bréb. [Syn. *C. obcuneatum* West 1892, and *C. obcuneatum* forma West 1892.]

N.E.—Pilmoor, near Thirsk. Carlton Bank.

Var. **pumilum** West & G. S. West. [Syn. *C. tetragonum* var. *pumilum* West 1894; *C. parvulum* var. *undulatum* Schmidle 1895; cfr. Journ. Bot., Sept. 1898.]

MID W.—Near Ilkley.

433. **Cosmarium tuberculatum** Arch.

[Syn. *Calocylindrus tuberculatus* (Arch.) Cooke].

N.W.—Mickle Fell: extremely rare.

434. **Cosmarium attenuatum** Bréb.

[Syn. *Calocylindrus attenuatus* (Bréb.) Racib.].

MID W.—Arncliffe.

N.W.—Mickle Fell. Cowgill Wold Moss, Widdale Fell.

GENUS COSMOCLADIUM Bréb. 1856.

435. **Cosmocladium constrictum** Arch. 1875.

N.E.—Pilmoor, near Thirsk (vi. 1898).

GENUS SPONDYLOSIUM Bréb. 1844.

436. **Spondylosium pulchellum** Arch.

MID W.—Adel (W. B. Turner).

N.E.—Strensall (W. B. Turner).

S.E.—Riccall and Skipwith Commons.

Var. **pyramidatum** West.

S.E.—Riccall Common.

437. **Spondylosium secedens** (DeBary) Arch.

[Syn. *Sphærozosma secedens* DeBary].

MID W.—Bog two miles south of Clapham (vi. 98).

438. **Spondylosium pygmæum** (Cooke) West 1892.

[Syn. *Sphærozosma pygmæum* Cooke 1886].

This is not *Sphærozosma pygmæum* Rabenh. 1868 = *Cosmarium pygmæum* Arch. 1864.

N.W.—Mickle Fell.

S.E.—Riccall Common.

439. **Spondylosium papillosum** West & G. S. West

1895. [Syn. *Spondylosium dcpressum* Kirchner, Mikr.

Pflanz. d Süssw., Theil I, 1891, p. 21, t. ii, f. 61].

This is not *Spondylosium depressum* Bréb. in Kütz. Spec. Algar. p. 189; Mém. Sci. Nat. Cherbourg, IV., t. i., f. 1, 1856.
S.E.—Skipwith Common.

GENUS STAURASTRUM Meyen 1829.

440. **Staurastrum aristiferum** Relfs.

N.W.—Mickle Fell.

441. **Staurastrum connatum** (Lund) Roy & Biss.

[Syn. *S. dejectum* var. *connatum* Lund].

N.E.—Strensall (W. B. Turner).

S.E.—Riccall Common.

442. **Staurastrum dejectum** Bréb.

S.W.—Cullingworth.

MID W.—Bramhope (J. Abbott). Malham Tarn. Ribbleshead.

N.W.—Mickle Fell.

N.E.—Scarborough Mere. Strensall; Gormire (W.B.Turner).
Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

Forma **punctata** West.

MID W.—Adel Bog.

443. **Staurastrum apiculatum** Bréb.

[Syn. *S. dejectum* var. *apiculatum* (Bréb.) Lund].

S.W.—Cullingworth.

MID W.—Adel Bog. Ingleborough.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

444. **Staurastrum mucronatum** Ralfs.

[Syn. *S. dejectum* var. *mucronatum* Ralfs].

S.W.—Cullingworth.

MID W.—Black Hill, near Settle.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

445. **Staurastrum megacanthum** Lund.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

446. **Staurastrum Dickiei** Ralfs.

S.W.—Cullingworth.

MID W.—Black Hill, near Settle. Wigton Moor. Adel. Bride Cross, above Farnley Moor. Ribbleshead. Cam Fell.

N.W.—Lund's Fell. Cowgill Wold Moss, Widdale Fell.

N.E.—Strensall. Carlton Bank.

S.E.—Riccall Common.

447. **Staurastrum glabrum** (Ehrenb.) Ralfs.

MID W.—Cam Fell, abundant (viii. 1896). Bog two miles south of Clapham (iv. 1898).

N.W.—Mickle Fell.

448. **Staurastrum brevispinum** Bréb.

MID W.—Malham Tarn.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

449. **Staurastrum cuspidatum** Bréb.

S.W.—Cullingworth.

MID W.—Ilkley (W. H. Dikes).

N.W.—Mickle Fell.

N.E.—Gormire (W. B. Turner).

S.E.—Riccall Common.

Var. **divergens** Nordst.

MID W.—Whernside.

Var. **maximum** West.

MID W.—Malham Tarn.

450. **Staurastrum O'Mearii** Arch.

MID W.—Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

451. **Staurastrum lunatum** Ralfs.

MID W.—Malham Tarn.

N.E.—Scarborough Mere.

S.E.—Riccall Common.

452. **Staurastrum subcruciatum** Cooke & Wills.

MID W.—Wigton Moor.

453. **Staurastrum Avicula** Bréb.

MID W.—Malham Tarn. Penyghent.

N.W.—Mickle Fell. Birkdale Tarn Moss.

N.E.—Strensall (W. B. Turner). Stokesley.

S.E.—Riccall Common.

Var. **subarcuatum** (Wolle) West. [Syn. *S. subarcuatum* Wolle 1880; *S. denticulatum* Elfv. 1881; *S. Avicula* var. *verrucosum* West 1892].

N.W.—Mosssdale Moor, Widdale Fell.

N.E.—Stokesley.

454. **Staurastrum aciculiferum** (West) Anders.

[Syn. *S. Avicula* var. *aciculiferum* West].

MID W.—Cocket Moss, near Giggleswick. Penyghent.

Whernside.

N.W.—Mickle Fell. Lund's Fell. Mosssdale Moor, Widdale Fell.

455. **Staurastrum monticulosum** Bréb.

N.W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

456. **Staurastrum furcatum** (Ehrenb.) Bréb. [Syn. *S. spinosum* Ralfs.; *S. De Tonii* Eichl. & Gutw.; *S. cornubiense* Benn.].

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

457. **Staurastrum furcigerum** Bréb.

MID W.—Bramhope (J. Abbott).

N.E.—Gormire. Strensall (W. B. Turner). Pilmoor, near Thirsk (with zygospores).

Forma **armigera** Nordst.

[Syn. *S. armigerum* Bréb.; *S. pseudofurcigerum* Reinsch].

N.E.—Gormire (W. B. Turner).

458. **Staurastrum oligacanthum** Bréb.

N.W.—Mickle Fell.

459. **Staurastrum cristatum** (Näg.) Arch.

[Syn. *S. Nordstedtii* Gutw. ?]

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

460. **Staurastrum Reinschii** Roy.

MID W.—Malham Tarn. Cocket Moss, near Giggleswick. Ingleborough. Cam Fell.

N.W.—Mickle Fell. Lund's Fell. Mossdale Moor, Widdale Fell.

461. **Staurastrum teliferum** Ralfs.

[Syn. *S. polytrichum* Perty var. *alpinum* Schmidle].

S.W.—Cullingworth.

MID W.—Adel Dam (W. B. Turner). Wigton Moor.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

462. **Staurastrum gladiusum** Turn.

Var. **delicatum** var. n.

A variety with more delicate spines, spines sometimes slightly curved and fewer away from the angles. Length without spines $38\ \mu$, with spines, $45\ \mu$; breadth without spines $39\ \mu$, with spines $49\ \mu$; breadth of isthmus $14\ \mu$.

MID W.—Malham Tarn.

The form of the cells and the number and length of the spines are nearer those of *S. gladiusum* than any other species. The semicells are more depressed than in *S. teliferum* and the spines are longer and more delicate.

463. **Staurastrum polytrichum** Perty.

[Syn. *S. Pringsheimii* Reinsch].

MID W.—Cocket Moss, near Giggleswick. Cautley Spout.

N.E.—Strensall (W. B. Turner).

464. **Staurastrum Saxonicum** Buln.

[Syn. ? *S. bullosum* Benn.].

S.W.—Denholme.

MID W.—Near Buckden. Cam Fell.

465. **Staurastrum pilosum** (Näg.) Arch.

S.W.—Cullingworth.

MID W.—Adel Dam! (W. B. Turner). Adel Bog. Malham Tarn. Bog two miles south of Clapham.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Hunter's Hole, Craydale Moor (1,900 ft.).

N.E.—Strensall (W. B. Turner). Carlton Bank,

466. **Staurastrum Strensallense** Turn.

N.E.—Strensall Common (W. B. Turner).

467. **Staurastrum hirsutum** (Ehrenb.) Bréb.

S.W.—Denholme. Cullingworth.

MID. W.—Adel. Bride Cross, above Farnley Moor. Bog two miles south of Clapham. Ingleborough. South of Cray Moss. Oughtershaw Tarn. Ribbleshead.

N.W.—Mickle Fell. Great Shunnor Fell. Lund's Fell. Mossdale Moor, Widdale Fell.

N.E.—Strensall! (W. B. Turner). Scarborough Mere.

468. **Staurastrum paxilliferum** G. S. West.

N.E.—Pilmoor, near Thirsk, abundant (vii. 1898).

This species is only known elsewhere from Wicken Fen, Cambridgeshire.

469. **Staurastrum muticum** Bréb.

Mid W.—Roundhay Park, Leeds, abundant (vi. 1898). Ilkley (W. H. Dikes).

N.W.—Cronkley Fell.

N.E.—Strensall.

S.E.—Riccall Common.

470. **Staurastrum orbiculare** (Ehrenb.) Ralfs.

S.W.—Near Wilsden. Cullingworth.

Mid W.—Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Gormire; Strensall! (W. B. Turner).

S.E.—Riccall Common.

Var. **extensum** Nordst.

S.W.—Ogden Clough.

Mid W.—Arncliffe (with zygospores). Cocket Moss, near Giggleswick.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Bog near Widdale Beck.

Var. **depressum** Roy & Biss.

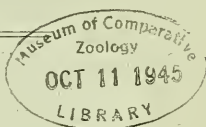
Mid W.—Malham Tarn. Bog two miles south of Clapham.

N.E.—Pilmoor, near Thirsk. Strensall.

S.E.—Riccall and Skipwith Commons.

S-Y
64.5

TRANSACTIONS OF THE YORKSHIRE NATURALISTS' UNION.
PART 24,
ISSUED TO MEMBERS FOR THE YEAR 1898.



THE
BIRDS OF YORKSHIRE:

COMMENCED BY

WM. EAGLE CLARKE, F.L.S., M.B.O.U.,

Museum of Science and Art, Edinburgh;

AND CONTINUED BY

THOMAS H. NELSON, M.B.O.U.,

The Cliffe, Redcar.

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OF FOURTH INSTALMENT (TWO SHEETS).

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LEEDS:

PRINTED FOR THE YORKSHIRE NATURALISTS' UNION
BY TAYLOR BROTHERS.

MAY, 1901.

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THE BIRDS OF YORKSHIRE.

The previous instalments have appeared as follows:

SHEET 1 in Trans. Y.N.U., part 1, 1877, published 1878.

SHEETS 2 and 3 in Trans., part 3, 1878, published 1880.

SHEET 4 in Trans., part 4, 1879, published 1882.

SHEET 5 in Trans., part 9, 1884, published March, 1886.

The present instalment includes the work of both authors, and for the sake of accuracy it may here be stated that the articles on *Accentor modularis*, *A. collaris*, and *Erithacus rubecula* were originally written by Mr. W. Eagle Clarke in 1887, and have been added to and brought down to date by Mr. Nelson. The article on *Daukias lusciniæ* is also printed as originally written in that year by Mr. Clarke, with Mr. Nelson's additions to bring the record down to date, the respective authors' paragraphs being in this case distinguished by their initials. The articles on *Cyanecula leucoçyana* and *C. suecica* are by Mr. Nelson, by whom future instalments of this work will be written.—ED. TRANS. Y.N.U.



80424

HEDGE ACCENTOR.

81

in size. I had no gun with me, or I could very easily have shot it. The bird got very shy at last, I having followed it up very closely. It finally disappeared in a plantation. The bird was a Rock Thrush. I was able to identify the species in a moment after seeing the coloured figure in Morris's British Birds.'

The specimen figured by Morris is an adult male, a bird which is, perhaps, the most unmistakable from its being the most showy of European species, and thus we are able to say that there can be no reasonable doubt as to Mr. Bedlington's identification of it.

ACCENTOR MODULARIS (L.).

Hedge Accentor.

Resident; generally distributed, there not being a district in the county from which it is not reported; common, except in moorland localities. A spring and autumn migrant.

'Accentor modularis, hedge sparrow.'—*Thomas Allis*, 1844.

As an abundant and familiar resident, the Hedge Sparrow, for as such it is best known to Yorkshiremen, demands but little attention. It is common or general in the wide-spread localities affording the usual simple haunts of the bird, namely gardens, shrubberies and hedge-rows; though in the dale and moorland districts of the county, where stone walls are in vogue, and the habitations of man are few and far between, it is not very abundant; but it is usually to be found where its requirements are existing. Mr. J. J. Baldwin Young informs us that he has noticed a great increase south of Sheffield during the last few years.

As an immigrant from the continent, however, it is worthy of further consideration at our hands. A summer visitant to northern Europe, seeking a southern winter abode, the bird occurs, though in varying numbers, on our sea-board in the autumn season, remaining through the winter, thus making it

much more numerous in localities near the coast during these seasons than at other times.

Mr. Cordeaux states in his 'Birds of the Humber District' that in autumn it is often very common in the bean and turnip fields near the coast; sometimes solitary or in pairs, but more frequently in small parties of twenty to thirty together. Respecting the migratory movements of this species we feel we cannot do better than quote the information bearing thereon contained in the Reports of the Migration Committee of the British Association, of which the east coast of England section was in charge of our late esteemed friend, Mr. John Cordeaux:—

1880. October 17th. Very abundant at Spurn Head (p. 37).
 1882. At Spurn and in east Lincolnshire great numbers were observed during the first fortnight of September.
 Spurn, October 8th. Most abundant and on the Lincolnshire coast at the same date in extraordinary numbers. . . . It may be stated that their extraordinary abundance at Spurn and in east Lincolnshire on October 8th corresponds with the enormous flights which crossed Heligoland at the same period, October 6th, 7th and 8th, as reported to Mr. Cordeaux by Herr Gatke (p. 33).
 1883. This autumn only five or six are recorded from Heligoland, and none on our east coast.
 1884. Spurn, August 20th and through September. Abundant at intervals. Tees L.V., 21st August. Two, with a Linnet, Redbreast and Titlark, on board; leaving to N.W. at 7 a.m. Spurn and Great Cotes 25th and 26th. Swarming (p. 46).
 1885. Not mentioned in the report.

Mr. J. Cordeaux, in the 'Naturalist' for 1893, in 'Autumn Notes from the Humber,' states: 'Mr. Haigh writes . . . a rush of small birds, Hedge Sparrows, etc.'

From the above records it is to be inferred that the movements of this species, both as regards numbers and constancy, are somewhat irregular; it is possible, however, that on some occasions this unobtrusive bird may escape observation; but that it varies considerably numerically is beyond question.

The ordinary period of nidification in Yorkshire usually commences early in April, and the young are hatched before the

end of that month. Instances are recorded of the nest and eggs being found in December and January; the earliest being on the 12th of December, 1879, near Stokesley, as noted by Mr. H. Kerr. A nest at Beverley (Zool., 1863, p. 1445), noted by Mr. W. W. Boulton, contained four eggs on the 4th of January, 1863. Mr. W. Eagle Clarke has found eggs on the 15th of March; and a nest with eggs on the point of hatching on the 7th of April came under his notice. There are also other instances in which singularly early nests have been found in exceptionally mild seasons. Although five to six is the usual number of eggs, Mr. Baldwin Young states (in litt.) it only lays three to four in his district (Richmond Park, Sheffield), five very rarely. Colourless examples of the eggs have occasionally been noticed.

Pale rufous varieties of the bird are on record, as observed or captured in the county (Zool., 1865, p. 9491; 1866, p. 29; 1877, p. 256). In the Leeds Museum is included an albino specimen, shot near that town in the winter of 1884 or 5, and Mr. Varley possessed an entirely black example obtained at Almondbury Bank, near Huddersfield, on the 14th of May, 1865.

The Hedge Accentor is one of the best known foster parents of the Cuckoo, the colour of whose egg is sometimes assimilated to that of the fosterer; and Mr. T. Stephenson, of Whitby, informs us that he once found a Hedge Sparrow's nest containing four of her own eggs and a cuckoo's, which latter was a little larger and nearly the same colour as the Hedge Sparrow's.

We have observed that this bird will occasionally eat grain which is scattered in a garden for the feeding of poultry.

An early allusion, perhaps the earliest, to this species as a Yorkshire bird is contained in the communication addressed by Dr. Martin Lister to John Ray and dated York, February the 8th, 1675, where it is thus alluded to: 'The *Currucca* or Hedge Sparrow, which I have often seen, lays sea-green or pale blue eggs, which neatly emptied and wired, fair ladies wear at their ears for pendants.'

Local names—Hedge Sparrow; Dünnoek; Dicky Dunnock (general); Cuddy (general among schoolboys); Billy or Billy Hedge Sparrow (Doncaster); Hedge Creeper (Thirsk); Shuffle Wings (Cleveland); it is also locally termed Hedge-Warbler or Hedge-Chanter; and Cuddy-Whooper is a name we have heard near Redcar.

ACCENTOR COLLARIS (*Scopoli*). Alpine Accentor.

An accidental visitant from central or southern Europe.

Like the Rock Thrush, this bird affects the mountainous districts of central and southern Europe, where it is, however, a resident and only to be considered migratory in so far as it passes the summer at considerable elevations and descends into the valleys for the winter. From some cause or another the Alpine Accentor occasionally finds its way into western Europe, and has on several occasions occurred in the British Isles, and once in Yorkshire.

The claim of this species to our attention as a Yorkshire bird is in virtue of a single occurrence only, at Scarborough, during the winter of 1862-3. This specimen now forms part of the collection of Mr. J. H. Gurney, at Northrepps, Norwich, where Mr. Wm. Eagle Clarke had the pleasure of seeing it.

It formerly had a place in Mr. W. W. Boulton's collection at Beverley; and that gentleman communicated the following account of it to the 'Zoologist' (1863, p. 8766), 'On the 22nd of August, at Mr. Roberts', bird stuffer, Scarborough, I saw a fine female specimen of the Alpine Accentor which had been shot near Scarborough. Last winter (1862-3) a poor man offered for sale to Mr. Roberts a string of larks and small birds he had shot. Mr. R. bought them and found this bird amongst the number. I purchased it and it is now in my collection.'

ERITHACUS RUBECULA (L.).

Redbreast.

A resident, widely distributed and abundant. A regular spring
and autumn migrant.

'*Erithaca rubicula*—resident.'—*Thomas Allis*, 1844.

Though generally distributed in the county the Robin is in the dale and moorland districts much less abundant, though by no means absent, save in the wilder and uninhabited localities where suitable haunts do not exist. In the populous manufacturing towns its presence is most familiar in the autumn and winter, for during the spring and summer months many retire to nest in the more secluded parts of their immediate neighbourhood. Usually described and considered a resident species, this bird can only partially be considered as such. True it is that we always have it with us, but the increased attention paid to that interesting and important branch of ornithology—migration—has made us aware of the fact that the Redbreast is undoubtedly a migrant to and from our shores. In the autumn months, from August to November, many migratory Robins are observed on our coast line, and often in very large numbers. As the bird is strictly a summer visitant to northern Europe, as well as migratory in the central countries of the continent, no doubt these immigrants are continental birds en route to their accustomed winter quarters, some of them probably remaining with us until the spring. It is not unlikely, however, that many of these migrants among the Robins are home-bred birds on the move to more genial climes, whose absence we scarcely notice, since their places are soon afterwards filled by the arrival of individuals from more northern British and, as we have stated, continental localities. In fact the Robin is to a greater or lesser degree a summer and winter migrant, but to what extent is not clearly established.

In connection with the migratory movements of this species on the Yorkshire coast we quote the following remarks, by Edw. Blyth, from Rennie's 'Field Naturalist,' November, 1833, p. 467:—'On the voyage from London northward, on the 16th of September, when off the coast of Yorkshire, and about ten or twelve miles from Redcliff,* several small birds alighted on the vessel; they were of different species. On the following day others made their appearance several . . . Robins, all . . . left the vessel on the first night after their appearance, except two Robins, which remained for some time, and which, with the characteristic effrontery of their species, stationed themselves, the one on the front of the vessel and the other at the stern, and fought at the least intrusion into each other's territory.'

Mr. F. Boyes, of Beverley, writing in the 'Zoologist' for February, 1877, remarks on the great number of Robins at Spurn, on October 23rd, 1876; he noticed several hundreds of new arrivals amongst the long grass and on the sands, and in all the ditches and hedge-rows away from the coast. He states that 'this migration of the Robin is not new, but, I believe, an annual occurrence; last year at this spot they were even more numerous.'

It may be useful here to detail the information respecting this bird which is furnished by the various Migration Reports issued by the British Association Committee:—

1879. Very numerous at Spurn on October 30th, wind blowing very fresh from N.E. (p. 176).
1880. March 1st. At Whitby L.H., daylight, a flock of Robins.
September 27th. At Whitby L.H., at 10 a.m., 'a large flock of small birds containing many Robins, remained a few hours and then went south' (pp. 27 and 37).
1881. March 5th. Whitby L.H., at daybreak, many Redbreasts.
October 2nd to 8th. At Spurn Head in large numbers; on the 3rd so worn out by a N.E. gale that they might be caught by the hand (p. 20).

* Rawcliff, or Rockcliff, between Saltburn and Staithes, is the highest sea cliff in England.

1882. October 6th to 25th. Between the Longstone L.H. (Farne Islands) and the East Goodwin L.V. in great numbers (p. 31).
1883. September 10th to October 14th. Occurred the 'main migration covering the entire [east of England] coast line; rushes on September 21st and 30th, October 6th and 7th (p. 38).
1884. Autumn. At stations between the Farnes and the mouth of the Thames; first at the Shipwash L.V. [Essex] on the 14th August, in large numbers at noon; lastly at the Hasborough L.V., November 12th, 'one at night on deck' (p. 44).
1885. Autumn. Considerable immigration between the Farne Islands and Guernsey, from September 8th to November 12th; rush on October 16th observed at Spurn L.H., Lincolnshire coast (very large numbers) and other stations to south (p. 41).
1886. Autumn. First at Whitby L.H., August 16th. . . . a heavy rush is indicated between the 3rd and 7th of October at Tees Mouth and Spurn; again on the 16th at Tees Mouth and 18th and 19th at Spurn (p. 31).
1887. March 26th. Whitby L.H., Robins, 10 a.m.
 April 5th. Spurn L.H., four Redbreasts, 9 a.m.
 September 16th. Spurn, several Redbreasts, 9 a.m.
 September 29th. Spurn L.H., great migration of Redbreasts.
 November 6th. Spurn L.H., Redbreasts, 9 a.m. (pp. 22—50).

I have for many years known the Robin as a regular autumn migrant between September and November to the Tees mouth district; at Redcar I noted a considerable number in mid-October and again in mid-November, 1887, in company with a constant stream of other migrants. In the 'Naturalist' for 1893, Mr. John Cordeaux, in his notes from the Humber, writes 'Robin, October 14, 15, 16. An immense arrival in the Spurn district. Thousands in the hedges and gardens. I counted up to fifty in one part of the Warren House garden. Many dropped in the long sea-grass on the sand hills, and some caution was necessary to avoid stepping on them, so reluctant were they to move. The movement extended also to Lincolnshire and Norfolk. The arrivals on the Holderness coast had all of them very pale coloured breasts. From Heligoland Herr Gatke also reported a great migration.' Mr. Cordeaux further writes (MS.): 'at Spurn Point I have watched them coming in direct from the

sea, on a bright sunny day, their red breasts being very conspicuous as they passed overhead. Along with other small migrants Robins frequently strike the lanterns of our light-vessels and light-houses during the night, or alighting on the former, leave again after a few hours' rest. They cross Heligoland also by thousands in the autumn and again in the spring; this return migration in the spring is early compared with that of some other birds, commencing by the first week in March.'

On the coast, during the autumn migratory period, Mr. Wm. Eagle Clarke has frequently observed this bird in considerable numbers in the most unsuitable localities, such as sand hills, where food of a congenial nature is almost unprocurable and it often has to resort to a marine 'omnium gatherum' at high-water mark in search of a meal. In such places and at such times it often falls a prey to the marauding Great Grey Shrike, which seems to have a penchant for a dish of redbreast.

There are very many recorded instances of this bird selecting unusual, nay extraordinary, nesting sites within the county, but I will allude to only two of these:—one, in which the nest, of the usual materials, was placed in the curtains of the drawing-room at Gilling Castle, where three eggs were laid and one young bird reared (Land and Water, 25th May, 1878, p. 478). The other is recorded in the 'Field' for 17th May, 1884, and refers to a nest built in a pot of maiden hair fern in a conservatory at Hull.

Early nesting, too, is very frequent in this species, but here again I will mention a single instance only, the earliest I find noted, namely, a nest with five eggs near York, on the 18th of January, 1848 (Zool., 1848, p. 2019). Mid-March is the usual period on which nidification may be said to commence, and occasionally unspotted eggs are recorded.

The tameness, or sociability, of the Robin is proverbial and need not here be commented on at length, though I recall an incident which occurred when out in a N.E. gale, during the

autumn migration, waiting for wildfowl on the sand hills near Redcar, of a Robin, doubtless a migrant, perching on the end of my gun barrels and remaining there for nearly a minute.

Of interesting Yorkshire varieties the following may be mentioned:—One, a bird of the year, shot on the 5th of October 1848, near Knaresborough, had the whole of the primaries and secondaries white, and the whole of the tail feathers the same with the exception of the tips, which were dirty grey or smoke colour (Garth, Zool., 1848, p. 2298). Mr. F. Boyes records a pale rufous example at Beverley (Zool., 1877, p. 256). Another, a female, in the collection of Mr. P. W. Loten, which I have seen, is of a light fawn colour, with the breast a shade lighter than usual. It was shot near Patrington on the 27th of February, 1884. Other varieties in Yorkshire include a pied example at Easington, at the latter end of 1884, also in Mr. Loten's collection; and another at Harrogate (F. R. Fitzgerald, Naturalist, March, 1887, p. 78). One creamy white, with breast red, was shot in the East Riding at Malton, on the 5th of January, 1885 (Field, 17th January, 1885). An albino specimen is mentioned in the 'Yorkshire Weekly Post' for the 6th of November, 1897, captured by Mr. Morris at Sedbergh.

Various superstitions are prevalent among country farm folks in some parts of Yorkshire as regards this bird; the strangest being that if a Robin is killed one of the cows belonging to the person guilty of the offence will give bloody milk. At Staveley, near Knaresborough, a saying goes that 'when a Robin sings on the ridge of a roof it foretells fine weather.'

The earliest reference to the Redbreast as a county bird is, perhaps, contained in the following interesting letter from Dr. Martin Lister to the renowned John Ray. This epistle is indited from York, and is dated 8th of February, 1675, running as follows:—'Dear Sir, . . . the Robin redbreast will not touch a hairy caterpillar, but will gladly take and eat any sort of smooth one that I have given to him, and there is no better way

speedily to tame or make wild birds sing than to give them a pleasing insect or two daily; neither this nor thick-billed birds but will gladly eat spiders as I have experienced in some kinds.'

Local names—Robin; Robin redbreast (general); and Ploughman's Bird (Lofthouse, near Wakefield) are the only ones known to the writer.

DAULIAS LUSCINIA (L.). Nightingale.

—

A local summer visitant to the south-eastern portion of the county.

—

'Philomela luscinia—Nightingale—was heard in the immediate suburbs of York last spring; has been met with at Skelton about five miles north of the city some years ago; it breeds every year in the wood at Caywood, near York; near Huddersfield; at Cinderfield Dyke Wood in Bradley; a few pairs are met with near Barnsley every year where, as in some other places, they soon fall a prey to the bird-catchers; it is occasionally heard near Sheffield; it occurs at Walton Hall and Bramham Park; and near Doncaster is common in Edlington and other Woods.'—*Thomas Allis*, 1844.

The Nightingale as a Yorkshire bird has peculiar attractions. To the ornithologist it possesses special interest, since it attains in this county the northernmost limit of its British range; while to the public generally quite a halo of romance surrounds the bird, probably because to many localities its visits are like those of the proverbial angels, few and far between.

In the closing years of the eighteenth century, and in the earlier decades of the one just passed away (the nineteenth), Doncaster—where Pennant in 1766 tells us they were met with in great plenty—was regarded by the recognised writers on British Ornithology as the most northern locality visited in England. In 1844 Mr. Thomas Allis, in his oft alluded to report, stated that it occurred with some regularity much further north, and informed the naturalists of his day that it had been heard in the suburbs of York in the spring of that year, and that it had been met with at Skelton about five miles north of that city

—a statement that has been reproduced in every book treating on British birds down to the present time.

In 1881, when I came to investigate the dates and make further enquiries regarding the haunts of this species for the bird-portion of Mr. Roebuck's and my joint work on the Yorkshire Vertebrata, I found that there was evidence of its occurrence and breeding in localities considerably further north of the ancient city referred to. This led me to suppose that we were justified in regarding this species as one of those which had gradually extended its range northwards in the county during the past hundred years. Further investigation, however, into Yorkshire ornithology made known to me that such has really not been the case, and it was with feelings of pleasure and of surprise that I read the statement, made at least a century ago, of Marmaduke Tunstall, F.R.S.—a Yorkshire naturalist and one of the best ornithologists of his day—which appears for some not easily explainable reason to have escaped notice. Writing to Dr. Latham, presumably about the year 1783, Tunstall remarks that 'The nightingale is never heard or seen here [Wycliffe, in Teesdale]. It is frequently heard near Boroughbridge, about 37 miles farther south; and a few miles farther, near Abberford, particularly at Hazlewood, the seat of Sir Walter Vavasor, is extremely lavish in song. . . .' This statement of Tunstall's is true to-day, for my friend the Rev. E. P. Knubley, M.A., rector of Staveley, near Boroughbridge, informed me that a pair nested in Gibbet Wood, two miles from Staveley, in 1870; that in 1881 a pair nested and reared their young in his rectory garden; and that he was told on reliable authority that a pair nested in Loftus Fox Cover in the parish, a mile from his house, in 1883. Boroughbridge, it may be remarked, is ten miles north of the latitude of York and lies sixteen miles north-west of that city.

In occasional instances, however, it has been known to visit during recent years slightly more hyperborean districts, but it is possible, and even probable, that these exceptional visits were also made in the far past, when, as it is important to remem-

ber, ornithology was not the popular study it now is, and when too there did not exist the numerous natural history journals wherein to record observations and hand down to us much information which would now be invaluable, and enable us to make more just comparisons between our present knowledge and that of the past.

Within the area of its regular summer range in the county, the Nightingale usually occurs in limited numbers only. Indeed it is only in the neighbourhood of Doncaster and on the southern fringe of the county bordering above Nottinghamshire it can be described as being fairly abundant. To certain secluded but more or less smoke-begrimed woodlands of the Yorkshire Coal-field, in some instances scarcely beyond the hum and 'racket' of the pit-bank, as in the neighbourhood of Barnsley, Wakefield, and Ackworth, this bird is an annual visitant; as also to pleasanter habitats in the neighbourhood of the picturesque Abbey of Roche. In the central plain it is regularly noted in the districts of Selby, Goole, York, Harrogate and Boroughbridge; and in Holderness in localities between Patrington on the Humber northwards and eastwards to Beverley.

Thus a line passing north by Rotherham and Barnsley, and east of Wakefield, Leeds, and Harrogate to near Boroughbridge; and then east through Skelton (five miles north of York), and sweeping round the southern spur of the Wolds up to Beverley and finally reaching the North Sea about Hornsea, circumscribes the portion of the county within which the Nightingale is an annual summer visitor, while an outer line from Sheffield, by Huddersfield, Bradford, Otley, and Ripon to Thirsk; thence east to Scarborough, includes all the localities for which there is satisfactory evidence of the bird's ever having bred or occurred;* and moreover accurately defines according to our present knowledge the extreme northern and north-western boundary of its distribution in the British Isles.

* See, however, the reference to a Nightingale nesting in Cleveland, p. 102.—T.H.N.

It is interesting to note that the whole Yorkshire distribution of the Nightingale lies strictly within the lowlands, and nowhere exceeds 250 feet above sea-level, except in the single instance of its breeding in the Spa Gardens at Harrogate. Indeed the foot-hills of the Pennine Range, of the Cleveland Hills, and even those of the Chalk Wolds, form fringing barriers of the bird's range, a fact which accounts, no doubt, for its rarity about Sheffield. These facts in the Yorkshire distribution of the Nightingale may throw some light on the conditions which determine the singular range of the bird in England.

On the fringe of its range in Yorkshire the Nightingale is not at all constant to one particular haunt, but would seem to divide its affections between several in the neighbourhood, and this, too, when it has succeeded in rearing its young in safety, and without receiving that undesirable attention from the 'madding crowd' so often attracted by its song. In some seasons it is more abundant in Yorkshire than in others. Thus in 1876 it was noted as absent from its accustomed haunts in the East Riding; while in 1879 it was particularly abundant in the county. This varying abundance may to some extent account for its intermittent appearance in the more northern and outlying districts within its range.

Regarding the dates of the bird's arrival and departure in the county, we have but few reliable data, for the species has hitherto escaped notice during the periods of its migrations. Its appearance may be expected in the last week in April, but the late Mr. Lister, of Barnsley, gives the average date of arrival for South Yorkshire as the 8th of May. A pair nesting at Brough, in 1880, departed with their young in August.

The earliest allusion to this species as a Yorkshire bird with which I am acquainted is the one made by Pennant in 1766, already mentioned. The first edition of Pennant's work was issued in that year, and the statement as to the abundance of this bird about Doncaster there given is repeated in subsequent editions.

We will now proceed to discuss the distribution of the Nightingale in the county in detail, commencing with the localities on the Yorkshire Coalfield. In the Barnsley district, Mr. Allis informs us, in his report already quoted, that a few pairs are met with every year; and Mr. Thomas Lister, of Barnsley, writes: 'I scarcely remember a year since 1842 that I have not heard one or two pairs of Nightingales. In the valleys of Dearne and Dove, in Cliff Wood, Day House, and Keresforth Woods—all three within a mile of Barnsley—they have been heard in various years.' He also mentions Oscar Wood, Cobear Wood, Kitroyd, Jump, Ethersley Wood, Needle Eye Wood, Dodworth Bottom, Sunny Bank, New Hall, Dark Lane and Tivy Dale at Cawthorne, Norroyd and Thornhill, as localities in the neighbourhood, where he has noted the bird from time to time.

In the neighbourhood of Wakefield, Neville Wood mentions it (*Naturalist*, 1838, p. 437) on the authority of Mr. Charles Waterton, as an annual visitor to Walton Hall, a statement that has been repeated by various writers to the present date. Mr. William Talbot, in his 'Birds of Wakefield,' tells us he first made its acquaintance in 1841 at Burnt Wood, about ten miles from Wakefield; and he noted it in 1870 at Coxley Valley; in 1871 at New Park Spring, Great Houghton, where they were nesting; in May 1873 a pair made their appearance at Haw Park, but unfortunately their career was cut short; in 1874 two others visited this neighbourhood, and in May 1875 he heard three singing within eight miles of Wakefield. About Lofthouse, Mr. George Roberts informed me that one was heard about the year 1836, and again in 1869, none occurring to his knowledge between these dates. In 1884 one appeared at Stanley.

Regarding the Leeds district, Mr. B. R. Morris recorded in *Morris' Naturalist* (1851, i. 46) the occurrence of a specimen at Killingbeck, near Leeds, early in May, 1849, which was at that time in the possession of Mr. Thomas Russell, of York

Road, Leeds. Mr. W. H. Hay informed me, in October, 1879, that he heard a Nightingale sing in Mosley Wood, Horsforth, some ten or twelve years before; it was shot by the keeper a short time after. Mr. W. C. Horsfall, of Horsforth, informed Mr. G. Roberts, of Lofthouse, in 1866, that 'The Nightingale visits us, but only at intervals; I know of only four instances of its having done so in fifteen years.' In the 'Zoologist' (1879, p. 413) Mr. Joseph Lucas wrote as follows: 'I venture to record two localities in which I have seen these birds—Esholt Woods, in Airedale, in the summer of 1868, and on May 8th, in Jonas Wood, near Farnley Hall, Wharfedale.' In the same periodical (Zool. 1869, pp. 1800-1) Mr. Geo. Roberts, of Lofthouse, tells us that 'on the 13th of May one commenced singing in a small wood called Bushy Cliff, situate about five miles south-east of Leeds . . . and began to sing each evening about half-past ten and continued in song till four in the morning. I, along with several others, walked about in the adjacent meadows most of the nights of the 15th and 16th listening to it. . . . I was somewhat surprised at its tameness: on the third evening many boys and young men from villages round about assembled and created some uproar without, however, disturbing it from its perch, and the game-watchers got within a few yards of it. Early in the morning of the 17th, four days after its appearance, it was captured with limed twigs by two Leeds bird fanciers: a few meal-worms were thrown down among the twigs, and in less than five minutes after the bait was laid the bird was secured.'

At Shipley, near Bradford, in 1850, Mr. Samuel Roberts, in Morris' Naturalist (1851, p. 165) says he heard about one singing last season in a wood about one mile from Shipley. It is said to have occurred at 'Apperley Bridge' (L. C. Miall, Guide to British Birds in the Leeds Museum).

In the Huddersfield district Allis (1844) quoted Cinderfield Dyke Wood in Bradley as a locality for it. Mr. Peter Inchbald, in his Huddersfield Catalogue (Hobkirk's Hist. and Nat. Hist. of

Huddersfield, 1859) tells us that two of these birds were noticed at the Grove, Dalton, in 1846. One commenced to sing in Mollicar Wood, Huddersfield, on the 5th of May, 1875, and continued until June 5th (Varley, *Nat.* 1875, p. 52; Palmer, *Zool.* 1875, p. 4499). The late Mr. James Varley informed me that he only knew of three occurrences in this district, one in Lockwood and those at Grove and Mollicar Woods above mentioned.—W.E.C.

Mr. S. L. Mosley (*Naturalist*, Aug., 1889, p. 225) mentioned that his daughter and he had heard a Nightingale singing near Anston Stones, adding that they 'had heard one on a previous visit, and were told that it is a regular visitor.'—T.H.N.

Mr. J. H. Salter wrote me in 1879 that it 'appears regularly within a few miles of Ackworth.' In the Rotherham district Mr. F. W. Dickinson tells me that it occurs in all the woods, and is far from uncommon in the delightful vicinity of Roche Abbey, which is just on the fringe of the Coalfield, and only a few miles from the Nottinghamshire border of the county.

Around Sheffield Mr. Allis reported in 1884 that it was occasionally heard near that town, and Mr. Charles Dixon, in 1879, informed the writer that it was 'a very rare visitor,' and that he had 'not known a bird of this species here for years.'—W.E.C.

Mr. J. J. Baldwin Young, writing from Richmond Park, Sheffield, on the 30th of December, 1900, states that 'Two or three pairs usually nest every year near here, and I have little doubt that there are other pairs in the same district. This bird is extending its range northward.'—T.H.N.

In the Halifax district it is said to have formerly visited Elland Woods, while Mr. C. C. Hanson told me that in Ainley Wood one was said to have occurred in 1845.

It has not been recorded to my knowledge from elsewhere on the Coalfield save in the columns of the daily press, which, in matters of this kind, cannot be regarded as reliable.

In the Central Plain, about York and district, Allis reported in 1844 that it 'was heard in the immediate suburbs of York last spring; has been met with at Skelton, about five miles north of the city some years ago, it breeds every year in the Wood at Caywood ; it occurs at and Bramham Park.' Regarding its occurrence within the city my friend Mr. James Backhouse, Junr. informed me that it has nested once in their garden at Holgate. The Rev. F. W. Hayden, of Skelton Rectory, wrote me in 1880, that 'the Nightingale is plentiful, comparatively speaking, in Skelton. I possess several eggs of that species taken here, and have had nests in my hand, but, as I have made no record, I can give no dates. . . . I know that it resorts to Mr. Dawnay's wood, called Skelton Springs, half-a-mile from my house on the north, and to a wood called Nova Scotia in this parish, one mile to the east of my house. . . . The Nightingale has been noticed in Skelton from of old. I have no reason to believe otherwise than that it is of annual occurrence. I only once *knew* of two pairs at the same time, but I have not sought for them.' To the Hon. Payan Dawnay the writer is indebted for the following interesting communication relating to the Nightingale at Beningborough, and other places in the neighbourhood; writing in November, 1880, he says: 'I have not heard a Nightingale at Beningborough [eight miles N.W. of York] for some years. The instance of one being heard for two years here some few years ago arose from one being caught in a small wood close to the railroad near Shipton and being brought to me as an unknown bird by the captor; I found it answered the description of a Nightingale and turned it out into the garden [at Beningborough]. The next year [1867], one of the last days of May, 28th or 29th, I forget which, I heard a Nightingale singing in a plantation about 300 yards from the place I turned out the one brought to me the year previous. This bird continued singing in June, for part of that month, that other people heard it as well as myself. The next year [1868] after this I heard a Nightingale in a small wood perhaps

100 yards from the place it sang in the year before, but it did not sing long, or was taken or frightened. This shows that they come to the same place again if it suits them. One year we had three Nightingales singing, two in Skelton Spring and one in Overton Wood, but I have not heard of any lately. . . . I find out on enquiry that the Nightingale was brought to me in 1866 and was heard the two following years, but never since that I am aware of close to this place. . . . There was one at Clifton, a suburb of York, in Mrs. Cattle's garden somewhat about the same time, and she was so annoyed at the lot of people who came late to hear it that she got some birdcatcher to take it, at least this is what I was told, I cannot say whether it is true or not. The Revd. J. Overton told me of one in Sessay Wood [eighteen miles N.W. of York], a few years ago [1875, W.E.C.], that people went to hear in the evening from Easingwold and the neighbourhood. Mr. Overton is now dead, so he cannot be appealed to, but he knew the note of the Nightingale well and was a very fair ornithologist. Sessay is five miles south of Thirsk. I cannot help thinking that a few Nightingales come north more frequently than is thought to be the case, but so many don't know the note, and if they did do not care.' In Gill's 'Vallis Eboracensis,' published in 1852, p. 412, the occurrence of the Nightingale near Easingwold is thus alluded to: 'about half-a-mile from Huby, near the road leading to Tollerton, are the fragments of a ruined mansion or monastery, called the Mote, presenting an area of about 600 square yards, surrounded by a deep dyke or fosse, twelve feet in width and seven feet deep. It is now overgrown with Oak and Ash, and for the last four years has been the solitary but favourite retreat, where, in summer evenings the Nightingale

"Sings darkling; and in shadiest covert hid,
Tunes her nocturnal note."

For the following information relating to the districts of Wetherby and Boston Spa I am indebted to the Rev. J. Chaloner, of Newton Kyme, who says: 'as far as I can re-

member—and that is sixty years ago—the appearance of the Nightingale in this district is very rare; the first was at Woodhall many years ago, the next time was at Stockheld Park. In 1846, one at Colonel Gunter's, Wetherby Grange, where, alas, I saw a blackguard at two o'clock in the morning with a cage, and two or three nights afterwards its song ceased, so I presume he caught it. The next I heard was here in 1866. The last here this spring.' Mr. John Emmet was told that a pair built in the vicarage hedge at Thorparch a number of years ago, but the nest was taken. Its nesting near Bramham has already been alluded to prior to 1844, and since more recent years it has been known to resort to that place and to Skewkirk by Mr. John Tennant. Tunstall, one hundred years ago, informed Latham that 'near Abberford, particularly near Hazlewood, the seat of Sir Walter Vavasour, is extremely lavish in song.'

Near Harrogate, Mr. Peter Inchbald told me he first noticed the Nightingale on the 21st of April, 1883, and that for three consecutive years it had made its appearance in the same copse in which it first nested. He believed the same pair of birds came back year after year. The nest, a remarkably flimsy structure, was built in a tuft of nettles and contained four eggs. The young were fully fledged on the 16th June and left the nest the next day, one egg remaining unhatched. Some days before they left the nest the notes of the male bird were changed into a call-note, and an angry jarring croak, which it uttered on a near approach. The young resemble young robins in the brown mottling of the feathers on the back. They were impatient of food and uttered harsh little notes till they were satisfied. The next year (1884) they appeared again on the 20th of April; this year they were evidently disturbed in their nesting operations by the crowds of people that visited the copse nightly. In 1885 the male bird only was seen, and he disappeared early in June. This year (1886) no Nightingale visited us; nor did I hear of any in the neighbourhood. I fear they have said good bye to

our copse on the Crimple which suited them so well, till they were so incessantly disturbed.' In 1884 a pair attempted to nest in the Spa grounds in Harrogate, and attracted much attention. Their fate, I am told, is shrouded in mystery.'—W.E.C.

The late Mr. Peter Inchbald wrote as follows in the 'Field' for the 14th of May, 1887: 'Two pairs of Nightingales have appeared at Knaresborough, about two miles from Harrogate, during the month of April. They were first heard about the 28th, and have taken up their summer home at Scriven Park, and on the banks of the River Nidd. The estate belongs to Capt. Slingsby. The soil is the Magnesian Limestone. So far as I can learn it is their first visit to Knaresborough. It is to be hoped that the birds will not be disturbed in their nesting operations. The warblers have been singing for the past fortnight, continuing their charming song till long after midnight.'

In the 'Naturalist' (December, 1889, p. 356), writing 21st of August, 1889, the Rev. E. P. Knubley gave corroborative evidence of the appearance of the songsters at Knaresborough, as follows: 'I have pleasure in being able to put on record the occurrence and nesting of two pairs of Nightingales in some woods within a short distance of Knaresborough. I am not at liberty to be more precise as to the locality, as I have given an undertaking not to do so.'

The latest information I have been able to procure as to the Knaresborough district is that contained in a letter from Mr. H. W. Carson, dated the 21st of February, 1901: 'A pair of Nightingales were here in the summer of 1892 or 1893. They settled in a bank of blackthorn and garden orchards below St. Robert's Chapel, on the banks of the River Nidd. Numbers of people went out at night to hear the male bird sing, I went one night . . . A number of rough lads then threw stones at the birds, and they disappeared. I have no information of any being seen in this district since.'

At Ripley, two or three miles N.W. of Knaresborough, Mr. Riley Fortune heard a Nightingale singing in 1889. Two things were particularly noticeable about the song, one being that at the beginning of many bars the bird uttered the alarm note of the Willow Wren, and so perfect was this that several times the observer was deceived and thought there was a Willow Wren in close proximity. The other was the dragging in now and then of the harsh note of the Sedge Warbler. The song had the 'water-bubble' note to perfection, and several long drawn-out notes were exquisite in their melody; they seemed to denote 'eternal passion, eternal pain.' One series of notes gave the impression that someone had the bird in his hand and was crushing the life out of its little body' (Naturalist, June, 1889, p. 176).—T.H.N.

In the district about Staveley we have already quoted the evidence of the Rev. E. P. Knubley bearing upon the three occurrences which have come under his notice; and Tunstall has told us that in his day it was 'frequently heard near Boroughbridge.'—W.E.C.

A more recent record is the following: 'In the spring of 1889 a pair of Nightingales took up their residence in a small wood about a mile from the village of Staveley. The song could be heard, on a still evening, when more than half-a-mile from the birds' haunt' (Rev. E. P. Knubley, Naturalist, June, 1889, p. 176).—T.H.N.

Regarding its occurrence near Ripon, Mr. J. F. Pratt says in a letter to the writer, 'among the rarer varieties of the family Sylviidæ, I have in my collection an egg of the Nightingale which was taken at Bishopton, about a mile [West] from Ripon, on May 22nd, 1878. They were brought me by some lads who wished to know what kind of eggs they were. I found on examining the nest that it was built in a bush about a yard or two feet from the ground, and at the first glance had the appearance of an untidy Blackbird's.'

The Nightingale has, however, occurred and bred more than once in the neighbourhood of Thirsk, the most northern limit of its range, save one, or perhaps two, exceptional instances to which allusion will be duly made.

Regarding its occurrence at Baldersby Park, the writer has been kindly informed by the Hon. Francis H. Dawnay that in the summer of 1868 a Nightingale was constantly heard to sing and attracted a large number of people in the evenings, some driving many miles to hear it. It always sang in the same part of the woods, and it is thought it had a nest near. But this gentleman says this is not the first time he has heard of its appearance here. In May and June 1881 one frequented a wood near Bagby, about three miles from Thirsk, as I was informed at the time by Mr. Robert Lee.

Finally, Sir Ralph Payne Gallway, Bart., tells me that a Nightingale frequented the home wood at Thirkleby Park about twelve years ago [1874]. He heard it himself, and the fact is particularly impressed upon his memory, for the people from Thirsk, three-and-a-half miles distant, used to make excursions to hear the bird.—W.E.C.

An instance of the Nightingale's nesting at Normanby in Cleveland, some seven miles W. of Redcar, in a locality much further north (indeed in almost the extreme N.E. corner of the county) than any recorded at the period referred to by Mr. Eagle Clarke, has been known to me for some time; I am indebted to the well-known veteran Yorkshire sportsman, Mr. Thomas Parrington, for a circumstantial account of the occurrence, which is so interesting that no apology is needed for quoting it in extenso. The letter is dated February 18th, 1901, and runs as follows:—'I will tell you all I know about the visit of the Nightingale to Normanby. The year I cannot remember, it would be in the early 'forties'; the two birds came and settled in the garden at Normanby House, the

hen bird made her nest in an evergreen oak just below Mr. Dryden's bedroom window, laid four eggs, hatched the young birds and got them all away. Mr. Dryden would not allow anyone to interfere with the nest, fearing it would cause the old birds to 'forsake;' as he thought, if permitted to breed and get away, they might return another year, which, however, they did not. The cock bird sang most vigorously until the hatching, after then we heard him no more. Hundreds of people came to hear the bird, and on a fine evening I have heard it quite half-a-mile away from Normanby. The 'concert' began at evening twilight, and continued all night. Great disappointment was caused to numbers of people who came to hear the bird after he ceased singing, i.e., after the young family required his attention.'

The supposed instance of a Nightingale at Tollesby, in Cleveland (*Naturalist*, Sept., 1890, p. 271) is doubtful. A closer investigation of the subject shews that, although Mr. Emerson frequently heard the bird sing after dark in a high thorn hedge, and had little doubt in his own mind as to its identity, he never obtained a view of it. We cannot, therefore, accept it as a true record.—T.H.N.

In the extreme southern-eastern position of the central plain, at the foot of the Wolds at Market Weighton, in June 1880, the Rev. C. S. Atkinson (*Field*, June 5th, 1880, p. 735) wrote that one had been singing every night in the wood at Harswell Rectory for a week or ten days; which he believes to be a most unusual occurrence so far north, though not without precedent in this neighbourhood. This last remark is correct, for the writer is indebted to the Hon. Francis H. Dawnay for the information that one was heard at Everingham Park, the seat of Lord Herries, a few years before 1880; while at Brough, Mr. L. H. West recorded in the *Zoologist* (1880, p. 406) the nesting of a pair, in 1880, which brought up their young safely and left in August.—W.E.C.

Mr. L. H. West informed me (8th of March, 1901) that the Nightingale had nested near Brough for four years previous to 1900. The nest was found on two occasions, and Mr. West shewed me an egg which had been taken.

At North Cave, Dr. Cameron, writing to the Rev. W. M. Tomlinson, on the 21st of March, 1901, says that 'the Nightingale appeared in 1896, and in 1897 was heard on the 16th of April, and the young were seen on the 2nd of June, in a large bush near the ground. In 1898 it was again heard, on April the 29th.' At South Cave, as Mr. F. Boyes states, 'a Nightingale was heard singing in the Vicarage grounds' (Field, 25th May, 1889).—T.H.N.

The bird is only an irregular visitant to the eastern part of central Yorkshire, and I am only acquainted with the following instances:—According to Mr. George Roberts one was heard at Castle Howard on the 13th of May, 1875, and at Stillingfleet about the same date. The Rev. F. O. Morris (Morris' Nat., 1851, p. 216) says he 'plainly heard it, 'ni fallor,' about a mile south of Malton, namely seventeen miles north-east of York. It was about eight years ago, when I was walking home one moonlight night.' There is most satisfactory evidence of its occurrence at Scarborough, the most northern record, as we have stated, for Britain.* Mr. William Robinson, of West Bank, Scarborough, wrote as follows in the 'Naturalist' (June, 1882, p. 185): 'It will interest ornithologists in Yorkshire to hear that we really have the Nightingale at Scarborough this year. On the 10th instant I listened to its unmistakable "jug, jug," and piping and other liquid notes, for half-an-hour between 11 p.m. and midnight. I lived, many years ago, in Surrey, and became very familiar with these notes, so can speak with confidence as to its not being a "peggy" this time.' I had the pleasure of making Mr. Robinson's acquaintance at the Yorkshire Naturalists' Union meeting at Scarborough in the following July, and heard from him an

* See, however, Cleveland record, ante.—T.H.N.

account of this bird. It was heard singing by him on the nights of the 10th and 11th of May, near Oliver's Mount.—W.E.C.

A later record for this district is that obligingly given to me by Mr. W. Gyngell, of Scarborough, who says (19th of March, 1901) he was first informed by Mr. H. Head, on May the 8th, 1896, that he had heard what he believed to be a Nightingale in Raincliffe Wood. Mr. Gyngell himself heard it on the 13th, near Throxenby Mere; and it was also seen and heard by Mr. W. J. Clarke up to the 29th of the month, on which day it was reported to have been shot (see also W. J. Clarke, *Zool.*, 1896, p. 304).

The late Mr. John Cordeaux mentions (*Zool.*, 1897, p. 332, and *Naturalist*, 1897, p. 240), that he saw a Nightingale, in the second week of June, 1897, within two miles of Filey, in a thicket near the roadside, with a caterpillar in its beak, and, within a few feet, a bird of the year.—T.H.N.

Passing now to the southern portion of central Yorkshire, Pennant (*Brit. Zool.*, 1st edit., 1766, p. 100) tells us in one of the earliest Yorkshire notices of this species that 'It is not found in North Wales, or in any of the English Counties north of it, except Yorkshire, where they are met with in great plenty about Doncaster.' Miller, in his *History of Doncaster* (1804), remarks that this 'most delightful songster visits us about the middle of May.' Allis and others down to the present time mention it as common in Edlington and other woods, and in the neighbourhood north of this town the editor of *Neville Wood's Naturalist* (1838, p. 437) says: 'we have ourselves heard it near Campsall, and in a wood adjoining Owston Hall.' . . . Wm. H. Rudston Read, Esq., of Frickley Hall, . . . informs us that several of these nocturnal choristers visit Hooton Pagnall Common.—W.E.C.

Mr. H. H. Corbett mentions a Nightingale singing in Regent Square, Doncaster (*Naturalist*, 1899, p. 292).—T.H.N.

About Goole, Mr. Thomas Bunker informs me that it has been repeatedly heard in the district; at Cowick in 1879, and at Rawcliffe in 1880 and 1881.—W.E.C.

Mr. Bunker informs me that the Nightingale appeared again at Rawcliffe in 1888 and 1889; also at Hook in 1893 and 1894.—T.H.N.

In Holderness, in the southern portion near the Humber estuary, the Nightingale occurs annually, but in varying numbers. The Rev. H. C. Casson (Field, June 21st, 1879) writes as follows on the extension of the range of this species in the neighbourhood of Patrington and tells us that 'Last Monday night, June 9th, I sat on a gate listening to four Nightingales at once, which sang against one another continuously during that time; and during a walk of a mile I heard three other Nightingales singing, besides the four together. Two years ago a single Nightingale was heard in the same lane, but none was noticed last year.' Mr. Casson, in reply to my enquiries in 1881, kindly communicated the following additional and interesting information: 'On the 24th May, 1880, and again on the 27th of the same month I heard (on each occasion) two Nightingales singing in pretty much the same spot each evening. The evenings were both warm ones. On several other occasions I listened for them but never heard them except on the nights mentioned. However, I have often noticed, when I lived in Cambridgeshire where Nightingales were very plentiful, that when the wind was in a cold quarter I seldom heard their song, and when I did so it was rather to be called a chirping and twittering than a song. And here in Yorkshire, both last year and this, when I have heard the song it has been on an exceptionally warm evening, for here we have seldom any wind but an E. or N.E. from the first of April to the middle of June. I am inclined to think, therefore, that the Nightingale may be much more common in these parts than is usually supposed, but that the evenings are rarely warm enough to induce them to

sing before the beginning or middle of June, by which time I imagine they have young and the parents have ceased singing. I was struck with this idea especially one evening in June, 1879. I heard, about 9 p.m., a Nightingale singing very clearly in a tree by the road side and listened to it for some ten minutes; I then went to a friend's house in order to bring other persons to listen to it; however, I stayed in the friend's house about an hour or more before we set off to listen to our songster and by this time, i.e., 11 or 11-30 p.m., the wind had changed into a cold quarter, and not even a chirp or a twitter could we hear.'

In mid-Holderness, in the neighbourhood of Beverley, Mr. Beverley R. Morris writing in 1846 (*Zool. iv.*, 1298) informed us, on the authority of a friend, that five or six years before [about 1840] some half-a-dozen specimens were shot or trapped in a thickety wood near this town, called Burton Bushes. There could be no doubt about the identity of the species, as the birds were heard singing when alive, and examined when dead, by persons well acquainted with them. Mr. Morris concludes with the remark 'I am sorry to say, it has never, as far as I can learn, appeared here since.' My friend, Mr. F. Boyes, has kindly furnished me with the following interesting notes on its occurrence in the Beverley district. 'The Nightingale, as you know, is an irregular summer visitor to this part of the county, in some years spread over a considerable area and at other times entirely absent. I scarcely know how to account for this uncertainty in occupying its previous haunts, unless it be that as we are on the extreme limit of its northern range we are dependent on the weather in the spring whether we have them or not. Should the spring be mild and genial at the time of their migration they probably push further north, whilst should the weather at that time be cold and cheerless they are kept more within their ordinary limits. We know the mildness or severity of the seasons have much to do with the movements of birds. The Nightingale has visited this district as far back as anyone can remember, but always has

been looked on as a rarity, often two, but seldom more, within the precincts of this borough. The first note I can find is in 1868, where I have put down that I went to hear a Nightingale sing on May 1st. In 1874 I have a note that two sang nightly in our public common, where they bred and I was told a pair of old ones and the young were taken. In 1875 one bird came to the same common (but not exactly to the same place) where it also bred, as I saw the old bird on the nest myself which had five eggs. It was afterwards taken. It has appeared at uncertain intervals since but I have not been able to find my note books. It has visited many places in the Riding but I believe always singly and generally uncertainly. At North Cliffe, Market Weighton, I was told by old Reynolds that it had appeared there several years in succession and he pointed out to me the particular wood where it came.'—W.E.C.

With regard to the present status of the species, Mr. Boyes' opinion, as expressed to me at Beverley, in March, 1901, may be summed up in these words:—'Time was when the Nightingale was pretty well known as a summer visitor to Beverley, but I fear the bird-catchers gave them very little peace: of late years its visits have been few and far between, and always intermittent. I have known some instances of the birds taking up their quarters in copses, etc., where they have not been molested and yet have not returned to them in the following summer; in fact, I never once knew a Nightingale to come the following year to a spot which had been occupied by one the previous season. This is strange when we remember that many birds return to their old haunts. In some seasons I have heard Nightingales sing for an evening or two in a particular spot and then never be heard again; not having found mates, they have gone elsewhere probably.'

Other instances in the Beverley district are at Cherry Burton in 1889 (F. Boyes, Field, 25th of May, 1889); at Walkington in 1892 (F. Boyes); at Middleton in 1898 (F. Boyes); and at Boynton in 1890 (W. Machen).—T.H.N.

In the extreme north of Holderness, at the foot almost of the Wolds, a pair nested at Littlethorpe, in 1876, in a plantation on the farm of Mr. W. F. Foster, and not one hundred yards from his house. The nest was taken on the 26th of May, and an egg kindly sent to the writer for his inspection. The birds built a second time in the same wood, but this nest was unfortunately destroyed. The male used to sing in Mr. Foster's garden continually and was both seen and heard by him and his friends.—W.E.C.

Mr. Foster's son afterwards lived at High Caythorpe, near Bridlington, and he informs me that he found a Nightingale's nest in the garden hedge there, in 1887.—T.H.N.

There is no satisfactory evidence regarding the occurrence of the Nightingale in north-west Yorkshire, but the following references to it for the district may be quoted as being on record. 'The Nightingale is a very rare visitor in Wharfedale, for I have constantly asked this question. A woodman told me that he *once* heard one when working in Grassington Wood, it was towards evening, and many years since.'—(F. Montagu, *Gleanings in Craven*, 1838, p. 57). From Whitaker's *Craven* (2nd ed., 1812, footnote, p. 491) I transcribe the following passage which is perhaps worthy of quotation here: 'As a trait of old ornithology, I must inform the reader, that Craven had formerly two very different birds, long since extinct, the Eagle and the Nightingale. The existence of the first . . . is proved by . . . ; that of the latter, in Ribblesdale, by Nichtgaleriding, the name of a place in the parish of Bolton, mentioned in the Coucher Book of Sallay.'—W.E.C., 1887.

The Nightingale has, within recent years, been reported at 'Wellbeck Wath in Yorkshire' (J. C. Walter, *Naturalist*, 1899, p. 279).—T.H.N.

CYANECULA LEUCOCYANA (*Brchm*).
White-Spotted Bluethroat.

An accidental visitant from Central and Western Europe, of extremely rare occurrence.

It breeds in France, Belgium, Holland, North Germany, and so throughout temperate Europe as far as the West of Russia. Its winter quarters are in the western and northern parts of Africa, Armenia and southwards to Afghanistan.

The only known instance of the visitation of this rare migrant to Yorkshire, and to Britain, is that communicated by the late Alfred Roberts, of Scarborough. Writing to Mr. Wm. Eagle Clarke on the 1st of January, 1880, he stated that 'a fine female specimen of the Blue Throated Warbler was found dead under the telegraph wires, near Scarborough, by the late John Young, gamekeeper to Lord Londesborough (April, 1876). The ovary contained eggs in a forward state. It had a white satiny spot in the centre of the blue throat. The specimen is in the possession of Mrs. Young.'

This example was recorded at the time by the Rev. Julian G. Tuck (*Zoologist*, June 1876, p. 4956; and *Field*, May 6th, 1876), thus: 'I have much pleasure in recording, for the first time in Yorkshire, the occurrence of the Bluethroat, or Blue-throated Warbler. A specimen of this rare little bird, which had been picked up dead under the telegraph wires at Seamer, near Scarborough, was taken to Mr. Roberts, of Scarborough, on the 12th of April. Its head and neck had been considerably damaged from coming in contact with the wires; in addition to which the man who found it kept it several days, and then carried it to Scarborough in his pocket. Mr. Roberts thought, when he first saw it, that it would be impossible to mount it, but with skilful handling and great patience he has now managed

to make it into a very presentable specimen. It is a female bird, in good plumage, and Mr. Roberts told me it contained well-developed eggs. The occurrence of this specimen is the more interesting as it is an example of the type which possesses a white spot in the centre of the blue on the throat (see the new edition of 'Yarrell,' p. 323.)

This interesting record has been overlooked by the authors of the various recent treatises on British ornithology; why, it is difficult to comprehend. The account furnished to Mr. Eagle Clarke by Mr. Roberts leaves, however, no doubt as to the identification of the species nor as to the authenticity of the record.

CYANECULA SUECICA (L.). Red-Spotted Bluethroat.

A rare visitant on migration in autumn from Northern Europe.

This bird nests in the northern portions of Scandinavia and the Russian Empire, and from there to the far east of Siberia and Kamschatka. In winter it migrates to India and the north-east of Africa as far as Abyssinia; it also occurs throughout China.

The Spurn promontory appears to be the only district where the Red-Spotted, or Arctic, Bluethroat can be said to have been actually obtained, and there no fewer than six examples have been procured, whilst several others were identified; it will be noticed that the majority of these appeared in the month of September. The situation of the headland at Spurn is well adapted for attracting the small over-sea migrants, and the wonder is that this rare warbler has for so long escaped detection.

The credit for first recording its occurrence belongs to my esteemed friend, and predecessor in this work, Mr. Wm. Eagle Clarke, who saw two near the Spurn Lighthouse on the 11th of September, 1882. One of these was shot in Mr. Eagle Clarke's

presence and sent to the late Henry Seebohm, who declared it to be a bird of the year, just moulted out of the young into first plumage, and probably a female (Migration Report, 1882, p. 31, and Zoologist, 1884, p. 174).

The other instances are:—One in the second week of September, 1883 (Thos. Winson in litt., and Migration Report, 1883, p. 38). Two seen, one shot, on the 15th of September, 1884; on the 18th three more were procured, one a male of the second year, the other two birds of the year. ‘These were all feeding on insects amongst the bent grass covering the headland. They could hop very fast. I sometimes put them up thirty or forty yards away from the spot where I had marked them down.’ (Theo. Fisher, Zoologist, 1884, p. 430, and Migration Report, 1884, p. 44). One in the autumn of 1892 (Cordeaux, Naturalist, 1893, p. 9).

From the Migration Reports the following additional entries are extracted:—

1885. Spurn, October 7th. Two (Red-Spotted Bluethroats) (p. 41).

1886. Spurn, September 14th. One young bird (Bluethroat). This was seen by Mr. Winson, who knows the bird well (p. 31). (See also Zoologist, 1891, p. 362).

The only other part of the county which can lay claim to this species figuring in its list, is the low-lying tract between the Tees Mouth and Redcar, where I have positive information as to its occurrence on more than one occasion, in the month of September; I noted one on the breakwater at the Tees Mouth, on the 20th of September, 1883 (this is mentioned by Mr. J. H. Gurney, Transactions of Norfolk and Norwich Naturalists’ Society, 1884, iii. 579–601, and Migration Report, 1883, p. 38).

It is quite possible, even probable, that this Bluethroat may be a regular autumn migrant to our shores when on passage from its summer haunts in Scandinavia, though often overlooked in the crowds of other birds which pass along the coast, or mistaken, from its red tail, for a Redstart, a species which it

closely resembles in habits as well as plumage. It has hitherto escaped notice in the spring on its return to its breeding quarters in N.W. Europe.

Herr Gätke states that it is common on Heligoland, both in spring and autumn. The White-Spotted form 'comes very rarely so far north, and when it turns up it always does so four to six weeks earlier than the *suecica* in the spring.'



The author will be glad to receive from ornithologists notes on the Chats and Warblers for the next instalment of this work. These, and indeed any information on Yorkshire birds, may be addressed

THOMAS H. NELSON, M.B.O.U.,
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May, 1901.

THE NATURALIST, a Monthly Journal of Natural History for the North of England, edited by WM. DENISON ROEBUCK, F.L.S., with the assistance in Special Departments of J. GILBERT BAKER, F.R.S., W. EAGLE CLARKE, F.L.S., ALFRED HARKER, M.A., F.G.S., CHAS. P. HOBKIRK, F.L.S., GEORGE T. PORRITT, F.L.S., JOHN W. TAYLOR, F.L.S., and W. BARWELL TURNER, F.C.S., F.R.M.S., 8vo., monthly, price 6d. (Annual Subscription, payable in advance, 6/6 post free; 5/- accepted in case of Subscriptions paid direct to the Leeds office on or before 31st March in each year).

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PART 25,

ISSUED TO MEMBERS FOR THE YEAR 1899.



THE
ALGA-FLORA OF YORKSHIRE:

A COMPLETE ACCOUNT OF THE KNOWN
FRESHWATER ALGÆ OF THE COUNTY.

BY

W. WEST, F.L.S.,

An Ex-President of the Yorkshire Naturalists' Union ;

AND

G. S. WEST, B.A., A.R.C.S.,

Hutchinson Research Student, and formerly Scholar of St. John's College,
Cambridge ; Professor of Natural History at the Royal
Agricultural College, Cirencester.

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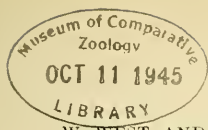
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PRINTED FOR THE YORKSHIRE NATURALISTS' UNION
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JULY, 1901.



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W. WEST AND G. S. WEST: ALGA-FLORA OF YORKSHIRE. 101

471. **Staurastrum suborbiculare** West & G. S. West.

MID W.—Cam Fell, abundant in a gelatinous mass of *Cylindrocystis crassa*, *Hyalotheca dissiliens*, etc.

472. **Staurastrum Bieneanum** Rabenh.

N.E.—Pilmoor, near Thirsk.

473. **Staurastrum dilatatum** Ehrenb.

S.W.—Cullingworth.

MID W.—Roundhay Park, Leeds. Ben Rhydding.

N.E.—Strensall Common. Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

Var. **obtusilobum** DeNot.

MID W.—Near Knaresborough.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

474. **Staurastrum alternans** Bréb.

MID W.—Blubberhouses (W. B. Turner). Cocket Moss, near Giggleswick.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common. Market Weighton.

475. **Staurastrum punctulatum** Bréb.

S.W.—Cragg Vale, towards Blackstone Edge. Rawcliffe Common. Crimsworth Dean. Halifax. Oxenhope. Allerton. Heaton. Frizinghall. Cullingworth. Keighley (with zygospores).

MID W.—Roundhay! (W. B. Turner). Adel Bog. Near Norwood Hall, above Lindley Wood Reservoir. Arthington. Rombald's Moor. Ilkley. Bolton Woods. Kildwick. Malham Tarn. Giggleswick Common. Black Hill, near Settle. Penyghent. Baildon.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Great Shunnor Fell. Bog near Widdale Beck.

N.E.—Strensall! (W. B. Turner). Carlton Bank. Near Scarborough.

476. *Staurastrum pygmæum* Bréb.

S.W.—Cullingworth. Near Keighley. Ogden Clough. Swill Hill. Near Hainworth! (T. Hebden).

MID W.—Markington! (Rev. J. S. Tute). Ingleborough. Penyghent. Near Buckden.

N.W.—Cautley Spout (with zygospores). Cronkley Fell. Great Shunnor Fell.

N.E.—Strensall. Pilmoor, near Thirsk.

Zygospore globose, mamillate; each conical elevation furnished with a long spine; apices of spines twice furcate (subdichotomous). Diameter of zygospore without spines 36–39 μ , with spines 64–67 μ .

We have had zygospores of this species from Leça in Portugal (cfr. 'Alg. Aq. Dulc. Lusitan,' Notarisia, vol. vii., 1892, p. 1503) and they agreed exactly with those from Yorkshire. We must, therefore, consider the zygospore figured in Ralfs' Brit. Desm. t. xxxv., f. 26 *c* as immature with regard to its spines.

The specimens obtained from Cautley Spout (with zygospores) were rather more depressed than usual and the lines of granulation were a little further apart.

477. *Staurastrum Kjellmanii* Wille.

N.W.—Mickle Fell.

Var. *rotundum* West & G. S. West.

S.W.—Ogden Clough.

Length 43 μ ; breadth 25–26.5 μ ; breadth of isthmus 13.5 μ .

478. *Staurastrum turgescens* DeNot.

S.W.—Crimsworth Dean.

Var. *arcticum* Wille.

S.W.—Ogden Clough.

479. *Staurastrum muricatum* Bréb.

S.W.—Ogden Clough. Near Wilsden. Nab Wood, near Bingley. Keighley Moor.

MID W.—Adel Bog. Rombald's Moor. Bog two miles south of Clapham. Near Buckden. Wherside.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Bog near Widdale Beck. Muker. Cowgill Wold Moss, Widdale Fell.

N.E.—Carlton Bank. Stokesley. Near Scarborough.

480. **Staurastrum pyramidatum** West. [Syn. *S. muricatum* Bréb. var. West in Journ. Bot., Oct., 1889; *S. muricatum* var. *acutum* West].

MID W.—Cocket Moss, near Giggleswick. Penyghent.

N.W.—Cautley Spout. Mickle and Cronkley Fells.

481. **Staurastrum Arnellii** Boldt.

N.W.—Mossdale Moor, Widdale Fell.

This rare species was described by Boldt in Ötvers. af. K. Vet.-Akad. Forh. 1885, no. 2, p. 112, t. v., f. 21. Roy describes a variety of it as extremely rare in Scotland, but the typical plant has only previously been recorded for Siberia. We have recently obtained it in abundance from Y Foel Fras, N. Wales.

Length 36·5–38·5 μ ; breadth 34·5–37 μ ; breadth of isthmus 9–12·5 μ .

482. **Staurastrum spongiosum** Bréb.

N.W.—Mickle Fell.

483. **Staurastrum Meriani** Reinsch., 1867

[Syn. *S. hexagonum* Racib., 1885].

MID W.—Blubberhouses (W. B. Turner). Baildon. Ingleton. Penyghent.

N.W.—Mickle Fell. Cowgill Wold Moss, Widdale Fell.

484. **Staurastrum tumidum** Bréb.

MID W.—Ilkley (W. H. Dikes).

485. **Staurastrum Cosmarioides** Nordst.

MID W.—Blubberhouses (W. B. Turner).

486. **Staurastrum brachiatum** Ralfs.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

487. **Staurastrum læve** Ralfs.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk, abundant (vi. 1898, with zygospores).

Zygospores globose, furnished with spines which are very slightly enlarged at the base and doubly bifid at the apex. Diameter of zygospore without spines 20 μ , with spines 33–35 μ .

488. **Staurastrum irregulare** West.

N.E.—Pilmoor, near Thirsk (vii. 1897).

489. **Staurastrum tetracerum** Ralfs.

MID W.—Roundhay Park, Leeds. Cocket Moss, near Giggleswick.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

490. **Staurastrum hexacerum** (Ehrenb.) Wittr., 1872.

[Syn. *Desmidiium? hexaceros* Ehrenb., 1835; *Staurastrum tricornis* Ralfs, 1848].

S.W.—Denholme. Cullingworth.

MID W.—Adel Bog. Bolton Woods. Malham Tarn. Ribbleshead.

N.W.—Mickle Fell. Cotterdale. Lund's Fell. Snaizeholme Fell.

N.E.—Gormire (W. B. Turner). Strensall.

S.E.—Riccall Common.

Var. β Ralfs.

S.W.—Cullingworth.

N.E.—Strensall.

Var. **semicirculare** Wittr.

MID W.—Baildon Moor. Roundhay Park, Leeds.

491. **Staurastrum pseudotetracerum** (Nordst.) West & G. S. West. [Syn. *S. contortum* Delp. var. *pseudotetracerum* Nordst.].

S.E.—Skipwith Common.

492.—**Staurastrum cyrtocentrum** Bréb.

N.E.—Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Riccall and Skipwith Commons.

493.—**Staurastrum inflexum** Bréb.

MID W.—Malham Tarn. Bog two miles south of Clapham.

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.
Stokesley.

494. **Staurastrum polymorphum** Bréb.

S.W.—Rawcliffe Common. Denholme.

MID W.—Rombald's Moor. Wigton Moor. Malham Tarn.
Bog two miles south of Clapham. Ingleborough. Penyghent.
South of Cray Moss. Cam Fell.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell.
Birkdale Tarn Moss. Great Sleddale. Keld. Near Moorcock
Inn. Mossdale Moor, Widdale Fell. Bog near Widdale Beck.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

495. **Staurastrum crenulatum** (Näg.) Delp.

MID W.—Roundhay Park, Leeds.

N.W.—Cautley Spout.

N.E.—Pilmoor, near Thirsk (with 5-rayed forms). Stokesley.

496. **Staurastrum eboracense** Turn.

N.E.—Strensall Common (W. B. Turner).

497. **Staurastrum Heimerlianum** Lütkem.

[Syn. *S. cruciatum* Heimerl.].

MID W.—Cam Fell (viii. 1896).

498.—**Staurastrum gracile** Ralfs.

S.W.—Rawcliffe (H. F. Parsons). Wakefield (W. H. Dikes).

MID W.—Malham Tarn. Bramhope (J. Abbott). Cocket
Moss, near Giggleswick. Ingleborough.

N.E.—Gormire; Strensall! (W. B. Turner). Pilmoor, near
Thirsk.

S.E.—Riccall Common.

Var. **nanum** Wille.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

499.—**Staurastrum paradoxum** Meyen.

MID W.—Blubberhouses (W. B. Turner). Bride Cross, above Farnley Moor. Ribbleshead.

N.E.—Strensall ! (W. B. Turner).

S.E.—Riccall Common.

Var. **longipes** Nordst.

N.E.—Strensall.

500. **Staurastrum oxyacanthum** Arch. 1859. [Syn. *S. scorpioideum* Delp. 1877 var. *brevis* Gutw. 1890.]

MID W.—Cocket Moss, near Giggleswick.

S.E.—Riccall Common.

501. **Staurastrum controversum** Bréb.

MID W.—Bog two miles south of Clapham.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

502. **Staurastrum aculeatum** (Ehrenb.) Menegh.

N.E.—Strensall (W. B. Turner).

503. **Staurastrum vestitum** Ralfs.

S.E.—Riccall Common.

504. **Staurastrum Pseudosebaldi** Wille.

N.E.—Pilmoor, near Thirsk (vi. 1898).

505. **Staurastrum Sebaldi** Reinsch.

MID W.—Malham Tarn.

N.E.—Gormire ; Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

Var. **ornatum** Nordst.

N.E.—Pilmoor, near Thirsk.

506. **Staurastrum Borgeanum** Schmidle.

N.W.—Bog near Widdale Beck.

This species was described and figured by Schmidle in Bihang till K. Sv. Vet.-Akad. Handl. 1898, Bd. 24, afd. iii., no. 8, p. 60, t. iii., f. 7. His figure is, however, a very poor representation of the species. It was only known previously from Lappmark.

Length, 45 μ ; breadth, 43-48 μ ; breadth of isthmus, 12 μ .

507. **Staurastrum proboscideum** Arch.

MID W.—Cam Fell (viii. 1896).

508. **Staurastrum asperum** Bréb.

N.W.—Mickle Fell. Mossdale Moor, Widdale Fell.

S.E.—Riccall Common.

509. **Staurastrum capitulum** Bréb.

Var. **amœnum** (Hilse) Rabenh. [Syn. *S. amœnum* Hilse].

MID W.—Old Cote Moor. Cam Fell.

N.W.—Bog near Widdale Beck.

We think there can be no question that *S. amœnum* Hilse is referable to *S. capitulum* Bréb. as a variety; it appears to be a more frequent and widely-distributed plant than typical *S. capitulum*.

Varieties of *S. capitulum* are easily distinguished from varieties of *S. pileolatum* by the lateral projection of the superior angles of the semicells, and by the broader, flattened apex; the granulation of the cells is also much coarser.

510. **Staurastrum pileolatum** Bréb.

N.W.—Mickle Fell.

Var. **Brasiliense** (Börg.) Lütkem. [Syn. *S. amœnum* var. *Brasiliense* Börg. in Vidensk. Medd. f. d. naturh. Foren. Kjöbenhavn, 1890, p. 45, t. iv., f. 44; West in Journ. Linn. Soc., Bot. vol. xxx., 1894, p. 179, t. xxiii., f. 9.]

N.W.—Bog near Widdale Beck.

We fully agree with Lütkemüller in regarding *S. amœnum* var. *Brasiliense* as a variety of *S. pileolatum* Bréb., as its characters are in every respect those of the latter species. The ring of verucations at the base of the semicells is by no means constant in character, and the specimens observed were somewhat intermediate between var. *Brasiliense* Lütkem. and var. *cristatum* Lütkem. with regard to this feature.

511. **Staurastrum scabrum** Bréb.

N.W.—Lund's Fell (iv. 1898).

512. **Staurastrum acarides** Nordst.

MID W.—Penyghent.

N.W.—Mickle Fell.

This rare species is only known from four other localities in the British Isles, all of which are in Scotland.

Forma **hexagona** West.

N.W.—Mickle Fell.

Var. **eboracense** West.

N.W.—Mickle Fell.

513. **Staurastrum sexcostatum** Bréb.

S.W.—Denholme.

N.W.—Mickle and Cronkley Fells.

Subsp. **productum** West.

MID W.—Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.W.—Cronkley Fell. Bog near Widdale Beck.

N.E.—Pilmoor, near Thirsk.

514. **Staurastrum margaritaceum** (Ehrenb.) Menegh.

Abundant, more especially in the upland districts; the commonest mountain form of this species is a 4-ended one.

S.W.—Rawcliffe Common. Keighley Moor.

MID W.—Adel. Bride Cross, above Farnley Moor. Rom-bald's Moor. Cocket Moss, near Giggleswick. Bowland Knotts. Ingleborough. Penyghent. Whernside. Old Cote Moor. Near Buckden. Oughtershaw Tarn. Cam Fell. Ribblehead.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell. Mossdale Moor, Widdale Fell. Bog near Widdale Beck. Dodd Fell (at 2,000 feet). Cowgill Wold Moss, Widdale Fell. Baugh Fell. Hunter's Hole, Craydale Moor.

N.E.—Strensall! (W. B. Turner).

515. **Staurastrum Arachne** Ralfs.

N.E.—Strensall (W. B. Turner).

GENUS **ARTHRODESMUS** Ehrenb., 1838.516. **Arthrodesmus convergens** Ehrenb.

MID W.—Bramhope (J. Abbott). Ilkley (W. H. Dikes). Wigton Moor. Penyghent.

N.E.—Gormire (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

517. **Arthrodesmus Incus** (Bréb.) Hass.

S.W.—Greetland, near Halifax (with zygospores). Cullingworth. Keighley Moor.

MID W.—Adel Dam (W. B. Turner). Bride Cross, above Farnley Moor. Malham Tarn. Cocket Moss, near Giggleswick. Bog two miles south of Clapham (with zygospores). Penyghent. Near Buckden.

N.W.—Cowgill Wold Moss, Widdale Fell. Mickle Fell. Lunds Fell.

N.E.—Gormire (W. B. Turner). Strensall Common. Pilmoor, near Thirsk. Moorland stream, near Scarborough.

Var. **Ralfsii** (West & G. S. West). [Syn. *A. Ralfsii* West].

S.W.—Cullingworth.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

518. **Arthrodesmus bifidus** Bréb. var. **truncatus** West.

N.E.—Strensall. Pilmoor, near Thirsk.

Length, 10–12 μ ; breadth, 10–11.2 μ ; breadth of isthmus, 4.5 μ .

519. **Arthrodesmus octocornis** Ehrenb.

[Syn. *Xanthidium octocorne* Ralfs].

MID W.—Bramhope (W. B. Turner). Ilkley (W. H. Dikes). Wigton Moor. Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

GENUS ONYCHIONEMA Wall., 1860.

520. **Onychonema filiforme** (Ehrenb.) Roy & Biss.

[Syn. *Tessararthra filiformis* Ehrenb.; *Spherozosma filiformis* (Ehrenb.), Rabenh.].

N.E.—Pilmoor, near Thirsk, abundant.

S.E.—Skipwith Common.

521. **Onychonema Nordstedtianum** Turn.

N.E.—Strensall ! (W. B. Turner).

S.E.—Riccall Common, abundant.

GENUS SPHÆROZOSMA Corda, 1835.

522. **Sphærozosma vertebratum** (Bréb.) Ralfs.

S.W.—Rawcliffe Common (W. B. Turner).

MID W.—Ingleborough.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk, abundant.

S.E.—Riccall Common.

523. **Sphærozosma excavatum** Ralfs.

S.W.—In horse-trough, Hainworth, near Keighley.

MID W.—Adel Bog (W. B. Turner). Near Selby. Bog two miles south of Clapham. Penyghent. Ribblehead.

N.W.—Mickle Fell.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

524. **Sphærozosma granulatum** Roy & Biss.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

GENUS DESMIDIUM Ag., 1824.

525. **Desmidium cylindricum** Grev.[Syn. *Didymoprium Grevillei* Kütz.].

MID W.—Adel Bog (W. B. Turner).

N.E.—Strensall (W. B. Turner).

526. **Desmidium Swartzii** Ag.

MID W.—Bramhope (J. Abbott). Ilkley. Cocket Moss, near Giggleswick.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

527. **Desmidium aptogonum** Bréb.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

Var. **Ehrenbergii** Kütz. [Syn. *Aptogonum diagonum* Delp.].

N.E.—Strensall Common.

Var. **acutius** Nordst.

N.E.—Pilmoor, near Thirsk.

GENUS GYMNOZYGA Ehrenb., 1840.

528. **Gymnozyga moniliformis** Ehrenb., 1840. [Syn. *Desmidiium Borreri* Ralfs, 1843; *Didymoprium Borreri* Ralfs, 1845; *Bambusina Brébissonii* Kütz., 1845].

S.W.—Cullingworth.

MID W.—Malham Tarn. Cocket Moss, near Giggleswick. Ingleborough.

N.W.—Mickle Fell. Lund's Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

GENUS HYALOTHECA Kütz., 1840.

529. **Hyalotheca dissiliens** (Sm.) Bréb.

S.W.—Greetland, near Halifax. Cullingworth. Keighley Moor.

MID W.—Markington, with zygospores! (Rev. J. S. Tute). Ilkley. Malham Tarn. Cocket Moss, near Giggleswick (with zygospores). Giggleswick Common (with zygospores). Bowland Knotts. Bog two miles south of Clapham. Ingleborough. Cam Fell. Near Buckden.

N.W.—Baugh Fell. Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell (with zygospores).

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington, very large forms (with zygospores). Carlton Bank (with zygospores). Stokesley (with zygospores).

S.E.—Riccall Common (with zygospores). Skipwith Common.

Forma **tridentula** Nordst.

N.W.—Cronkley Fell.

Var. **hians** Wolle.

MID W.—Horton-in-Ribblesdale.

N.W.—Cronkley Fell.

530. **Hyalotheca mucosa** (Dillw.) Ehrenb

MID W.—Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

N.E.—Decoy Pond, Gormire (W. B. Turner). Strensall (W. B. Turner). Pilmoor, near Thirsk.

ORDER SIPHONÆ.

FAMILY VAUCHERIACEÆ.

GENUS VAUCHERIA DC., 1803.

531. **Vaucheria sessilis** (Vauch.), DC.

S.W.—Ogden Clough.

MID W.—Baildon. Adel Bog (J. Abbott). Whernside.

N.E.—Carlton Bank.

S.E.—Loftsome Bridge, near Wressle. Newsholme. Market Weighton. Near Sutton. Meaux Abbey.

Var. **cæspitosa** (Vauch.), Rabenh.

MID W.—Markington (Rev. J. S. Tute). Arncliffe.

N.W.—Dent! (H. F. Parsons).

532. **Vaucheria aversa** Hass.

S.E.—Newsholme, near Howden.

533. **Vaucheria sericea** Lyngb.

N.W.—Great Shunnor Fell.

S.E.—Beverley.

534. **Vaucheria geminata** (Vauch.), DC.

S.W.—Bradford.

MID W.—Baildon. Headingley; Harrogate (J. Abbott).

Var. **racemosa** Walz.

MID W.—Meanwood (J. Abbott). Ingleborough.

535. **Vaucheria dichotoma** (L.), Ag. var. **submarina** Ag.

S.W.—Goole.

536. **Vaucheria terrestris** Lyngb.

S.W.—Common about Bradford. Keighley (T. Hebden). Grimescar.

MID W.—Holden Ghyll, near Keighley.

537. **Vaucheria hamata** (Vauch.), Lyngb

S.W.—Calverley, on damp mud.

A variety of this species was observed on wet limestone rocks at Boston Spa. It was smaller than the type with globose oogonia. Thickness of filaments, 25-30 μ .

FAMILY *HYDROGASTRACEÆ*.

GENUS *BOTRYDIUM* Wallr., 1815.

538. **Botrydium granulatum** (L.), Grev.

S.W.—Calverley (vi. 1893), in great profusion on mud turned out from the canal. Shipley (ix. 1895), on mud turned out from the canal. Near Gilstead, close to the river Aire.

MID W.—Adel Dam, on drying-up mud (J. Abbott); this was many years ago, and it has not been seen there since. Brearton, near Knaresborough.

ORDER *PROTOCOCCOIDEÆ*.

FAMILY *VOLVOCINEÆ*.

GENUS *VOLVOX* Ehrenb., 1832.

539. **Volvox globator** (L.), Ehrenb.

S.W.—Still waters, somewhat rare, but fairly general. Hatfield Chase (J. M. Kirk). Askern (Rev. F. H. Allen). Rawcliffe! (T. Hick). Frizinghall. Hunslet Old Race-course (J. Abbott).

MID W.—Markington! (Rev. J. S. Tute). Bramham Park (B. Saynor). Roundhay (R. Duncan). Bramhope; pool by the Ure at Ripon (J. Abbott). Harrogate (J. M. Kirk).

N.E.—Strensall (W. B. Turner).

S.E.—Kirkham Abbey (J. M. Kirk).

540. **Volvox aureus** Ehrenb.

S.W.—Goole; Midgeley Moor; Salterhebble, near Halifax; Thornhill Lees (T. Hick).

MID W.—Askham Bog; near Wetherby (T. Hick).

N.E.—Strensall (T. Hick). Pilmoor, near Thirsk.

GENUS *EUDORINA* Ehrenb., 1832.

541. **Eudorina elegans** Ehrenb.

S.W.—Frizinghall. Goole.

N.E.—Pilmoor, near Thirsk. Terrington.

S.E.—Skipwith Common.

GENUS GONIUM Müller, 1773.

542. **Gonium pectorale** Müller.

S.W.—Goole (H. F. Parsons). Wortley, near Leeds (W. B. Turner). Cullingworth.

MID W.—Markington ! (Rev. J. S. Tute).

N.W.—Great Shunnor Fell.

N.E.—Strensall ; Gormire (W. B. Turner). Scarborough Mere.

S.E.—Kirkham Abbey (J. M. Kirk). Brackenholme.

GENUS PANDORINA Bory, 1824 ; em Pringsh., 1869.

543. **Pandorina morum** (Müll.), Bory.

S.W.—Goole. Askern. Rawcliffe (H. F. Parsons). Bradford. Frizinghall.

MID W.—Markington ! (Rev. J. S. Tute). Rombald's Moor. Bride Cross, above Farnley Moor. Bramhope ; York (J. Abbott).

N.W.—Cronkley Fell.

N.E.—Gormire (W. B. Turner). Pilmoor, near Thirsk. Stokesley. Scarborough Mere ! (G. Masee). Saltburn.

S.E.—Brackenholme. Market Weighton. Hornsea Mere.

GENUS STEPHANOSPHERA Cohn, 1852.

544. **Stephanosphæra pluviæ** Cohn.

MID W.—Baildon Moor. Only obtained once, from a rain-pool in a hollow of grit-rock.

GENUS CHLAMYDOMONAS Ehrenb., 1833.

545. **Chlamydomonas Pulvisculus** (Müll.), Ehrenb.

S.W.—Frizinghall, abundant in pools (viii. 1896).

N.W.—Cowgill Wold Moss, Widdale Fell. Lund's Fell.

N.E.—Terrington.

546. **Chlamydomonas multifilis** Ehrenb.

S.W.—Near Doncaster. Frizinghall, abundant.

This species has not previously been recorded from the British Isles.

GENUS HÆMATOCOCCUS Ag., 1828.

547. **Hæmatococcus lacustris** (Girod.), Rostaf. [Syn. *Volvox lacustris* Girod. ; *Chlamydococcus pluviæ* (Flot.), A. Br.]

S.W.—More or less general in stagnant rain-water. Wibsey. Manningham. Keighley Moor.

MID W.—Baildon. Leeds (J. Abbott). Harrogate (T. Hick). Boston Spa.

N.W.—Cotterdale.

N.E.—Strensall! (W. B. Turner). Seamer. Scarborough Mere.

S.E.—Beverley.

FAMILY *PALMELLACEÆ*.

SUB-FAMILY *CÆNOBIEÆ*.

GENUS *HYDRODICTYON* Roth., 1800.

548. **Hydrodictyon reticulatum** (L.), Lagerh. [Syn. *Conferva reticulata* L.; *Hydrodictyon utriculatum* Roth.].

N.E.—Scarborough Mere! (G. Masee).

GENUS *CÆLASTRUM* Näg., 1849.

549. **Cælastrum sphæricum** Näg.

S.W.—Keighley Moor.

MID W.—Penyghent.

N.E.—Pilmoor, near Thirsk. Terrington.

S.E.—Riccall and Skipwith Commons.

550. **Cælastrum microporum** Näg.

MID W.—Adel. Malham Tarn.

N.E.—Scarborough Mere.

S.E.—Riccall Common.

551. **Cælastrum pulchrum** Schmidle.

MID W.—Roundhay Park, Leeds. Staveley Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

552. **Cælastrum cubicum** Näg.

N.E.—Pilmoor, near Thirsk.

553. **Cælastrum verrucosum** Reinsch.

N.E.—Pilmoor, near Thirsk.

GENUS SORASTRUM Kütz., 1845.

554. **Sorastrum spinulosum** Näg., 1849.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

GENUS PEDIASTRUM Meyen, 1829.

555. **Pediastrum angulosum** (Ehrenb.), Menegh.

S.W.—Wakefield (W. H. Dikes).

MID W.—Malham Tarn. Penyghent. Ribbleshead.

N.E.—Scarborough Mere.

556. **Pediastrum Boryanum** (Turp.), Menegh.S.W.—Doncaster. Rawcliffe. Askern (Rev. F. H. Allen).
Manningham. Calverley. Bingley.

MID W.—Markington! (Rev. J. S. Tute). Hawksworth. Wigton Moor. Austwick. Ben Rhydding. Malham Tarn. Langcliffe, near Settle.

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Malton. Stokesley. Scarborough Mere.

S.E.—Skipwith Common. Sandholme. Hornsea Mere.

Var. **granulatum** (Kütz.), A. Br.

MID W.—Adel (J. Abbott). Staveley Dam, near Knaresborough.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Sandholme. Market Weighton.

557. **Pediastrum glanduliferum** Benn.

N.W.—Near Jervaulx Abbey (vii. 1898).

558. **Pediastrum constrictum** Hass.

S.W.—Frizinghall.

N.E.—Strensall Common. Pilmoor, near Thirsk. Stokesley.

S.E.—Skipwith Common.

559. **Pediastrum duplex** Meyen, 1829.[Syn. *P. pertusum* Kütz., 1845].

S.W.—Wakefield (W. H. Dikes). Frizinghall.

MID W.—Roundhay Park, Leeds. Malham Tarn Bog.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Scarborough Mere.

560. **Pediastrum gracile** Ralfs.

MID W.—Markington! (Rev. J. S. Tute).

S.E.—Riccall Common.

561. **Pediastrum biradiatum** Meyen, 1829.

[Syn. *P. Rotula* (Ehrenb., 1838) A. Br., 1855].

N.E.—Scarborough Mere! (G. Masee).

562. **Pediastrum bidentulum** A. Br.

MID W.—Malham Tarn Bog (viii. 1896).

563. **Pediastrum tetras** (Ehrenb.), Ralfs.

[Syn. *P. Ehrenbergii* (Corda), A. Br.].

Forma *a*. Dispositio cellularum 4.

MID W.—Adel. Ribblehead.

N.E.—Near Rievaulx Abbey. Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Riccall Common.

Forma *b*. Dispositio cellularum 1 + 7.

S.W.—Rawcliffe Common (H. F. Parsons).

MID W.—Malham Tarn Bog.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington. Stokesley. Scarborough Mere.

S.E.—Skipwith Common.

Forma *c*. Dispositio cellularum 4 + 11.

MID W.—Malham Tarn Bog.

564. **Pediastrum integrum** Näg.

MID W.—Staveley Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

GENUS CRUCIGENIA Morren, 1830.

565. **Crucigenia rectangularis** Näg.

[Syn. *Staurogenia rectangularis* (Näg.), A. Br., 1855].

MID W.—Staveley Dam, near Knaresborough.

N.W.—Lund's Fell.

N.E.—Pilmoor, near Thirsk. Malton.

S.E.—Hornsea Mere.

566. **Crucigenia quadrata** Morren, 1830.

MID W.—Langcliffe, near Settle.

GENUS COHNIELLA Schröder, 1897.

567. **Cohniella staurogeniæformis** Schröder.

N.E.—Not uncommon in a pond near Rievaulx Abbey (vii. 1898).

The specimens agreed very well with Schröder's description and figures (Bericht. Deutsch. Botan. Gesellsch. 1897, xv., p. 373, t. xvii., f. 5). Diam. cells without spines 3—5.5 μ ; length of spines 2.5—3.8 μ . There were five spines on the exterior margin of each cell.

This plant has not been previously recorded for the British Isles.

SUB-FAMILY PSEUDOCENOBIEÆ.

GENUS MISCHOCOCCUS Näg., 1849.

568. **Mischococcus confervicola** Näg.

S.W.—Shipley (ix. 1896).

MID W.—Boston Spa (iv. 1897). Cam Fell (viii. 1896).

N.W.—Cowgill Wold Moss, Widdale Fell (iv. 1897).

N.E.—Pilmoor, near Thirsk (vi. 1898).

SUB-FAMILY RHAPHIDIEÆ.

GENUS DACTYLOCOCCUS Näg., 1849.

569. **Dactylococcus infusioformis** Näg.

S.W.—Bradford. Clayton.

MID W.—Harrogate.

N.E.—Near Scarborough.

S.E.—Market Weighton.

570. **Dactylococcus raphidioides** Hansg.

S.W.—Bradford.

The cells were mostly fusiform, sigmoid, or subulate, and were 2—2.5 μ in diameter.

It has not been previously recorded for the British Isles.

571. **Dactylococcus bicaudatus** A. Br.

[Syn. *Characium longipes* Reinsch].

N.W.—Cautley Spout.

Var. **exilis** West & G. S. West.

S.W.—Horton Park, Bradford, forming a mucous, green stratum on wet stones.

MID W.—Langcliffe, near Settle. Ingleton.

N.W.—Cowgill Wold Moss, Widdale Fell.

Var. **subramosum** West & G. S. West.

N.W.—Mossdale Moor, Widdale Fell, forming a green stratum on dripping rocks.

This variety is smaller than the type, and the cells are less attenuated, concatenate and ramose. Diam. cell 3·8—6·5 μ .

GENUS SCENEDESMUS Meyen, 1829.

572. **Scenedesmus antennatus** Bréb.

MID W.—Langcliffe, near Settle.

N.W.—Near Jervaulx Abbey.

N.E.—Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Skipwith Common.

573. **Scenedesmus obliquus** (Turp.) Kütz.

[Syn. *S. acutus* Meyen].

S.W.—Rawcliffe (H. F. Parsons). Heaton.

MID W.—Markington! (Rev. J. S. Tute). Bramhope (J. Abbott). Adel. Arthington. Hawksworth. Wigton Moor. Boston Spa. Malham Tarn. Arncliffe. Moughton Fell.

N.W.—Mickle and Cronkley Fells. Near Jervaulx Abbey.

N.E.—Near Rievaulx Abbey. Strensall! (W. B. Turner). Scarborough Mere. Scalby Beck.

Var. **dimorphus** (Turp.) Rabenh.

S.E.—Skipwith Common.

574. **Scenedesmus bijugatus** (Turp.) Kütz. [Syn. *S. obtusus* Meyen; *S. quadricauda* (Turp.) Bréb. var. *ecornis* (Ehrenb.) Ralfs].

S.W.—Rawcliffe (H. F. Parsons). Bradford. Cullingworth.

MID W.—Bramhope (J. Abbott). Arthington. Langcliffe, near Settle.

N.W.—Mickle Fell. Near Jervaulx Abbey.

N.E.—Pilmoor, near Thirsk. Scarborough Mere. Hayburn Wyke.

575. *Scenedesmus quadricauda* (Turp.) Bréb.

S.W.—Doncaster. Skelmanthorpe. Wibsey. Bradford. Frizinghall.

MID W.—Markington! (Rev. J. S. Tute). Bramhope (J. Abbott). Baildon. Arthington. Boston Spa. Oak Beck, Harrogate. Ilkley. Ben Rhydding. Roundhay Park, Leeds. Malham Tarn. Ribbleshead.

N.W.—Mickle Fell. Near Jervaulx Abbey.

N.E.—Near Rievaulx Abbey. Strensall! (W. B. Turner). Terrington. Pilmoor, near Thirsk. Stokesley. Scarborough Mere. Saltburn.

S.E.—Skipwith Common. Loftsome Bridge, near Wressle. Market Weighton. Hornsea Mere.

Var. *abundans* Kirchn.

MID W.—Bolton Woods.

N.E.—Scalby Beck.

576. *Scenedesmus denticulatus* Lagerh.

S.W.—Near Bradford.

Var. *linearis* Hansg.

S.W.—Askern.

MID W.—Roundhay Park, Leeds. Boston Spa. Staveley Dam, near Knaresborough. Wigton Moor. Penyghent.

N.E.—Pilmoor, near Thirsk. Terrington. River Derwent, Forge Valley.

S.E.—Skipwith Common. Market Weighton.

577. *Scenedesmus spicatus* West & G. S. West.

N.E.—Saltburn.

Cells generally binate, elliptical, about twice longer than broad, each furnished with a series of six or seven short spines on the exterior margin.

Length of cells 7·5—9 μ ; breadth of cells 4 μ ; length of spines 2—2·5 μ .

578. **Scenedesmus Hystrix** Lagerh.

S.E.—Skipwith Common.

This species has not previously been recorded for the British Isles.

579. **Scenedesmus acutiformis** Schröder.

MID W.—Staveley Dam, near Knaresborough.

N.E.—Near Rievaulx Abbey. Pilmoor, near Thirsk. Malton.

580. **Scenedesmus costatus** Schmidle.

N.E.—Pilmoor, near Thirsk (vii. 1898).

This species was described by Schmidle (Oesterr. botan. Zeitschrift, 1895, p. 6 (Sep.), t. xiv., f. 5) from the Alps.

It has not previously been recorded for the British Isles.

GENUS RHAPHIDIUM Kütz., 1845.

581. **Rhaphidium polymorphum** Fresen.

Var. **falcatum** (Corda) Rabenh. [Syn. *R. falcatum*].

S.W.—Bradford. Cullingworth. Keighley Moor.

MID W.—Baildon Moor. Chapel-Allerton; Adel (J. Abbott). Wigton Moor. Ilkley (W. J. Dikes). Bolton Woods. Cocket Moss, near Giggleswick. Penyghent. Harrogate. Boston Spa. Staveley Dam, near Knaresborough.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner). Near Rievaulx Abbey. Stokesley. Scarborough Mere.

S.E.—Riccall and Skipwith Commons.

Var. **aciculare** (A. Br.) Rabenh. [Syn. *R. aciculare* A. Br.; *Closterium subtile* Bréb.; *Cl. Griffithii* Berk.].

S.W.—Cullingworth! (T. Hebden).

MID W.—Markington! (Rev. J. S. Tute). Baildon Moor. Wigton Moor. Penyghent. Boston Spa. Brearton, near Knaresborough.

N.W.—Masham. Near Jervaulx Abbey. Muker.

N.E.—Scarborough Mere. Scalby Beck. Malton. Stokesley.

S.E.—Skipwith Common.

Var. **duplex** (Kütz.). [Syn. *R. duplex* Kütz.; *R. polymorphum* var. *sigmoideum* Rabenh.].

S.W.—Cullingworth.

MID W.—Moor-Allerton; Roundhay (W. B. Turner). Baildon.

Var. **spirale** West & G. S. West.

MID W.—Hawksworth, in immense quantities amongst *Myriophyllum spicatum*. Harrogate.

N.E.—Pilmoor, near Thirsk.

582. **Rhaphidium setigerum** (Schröder) Nob.

[Syn. *Reinschiella ? setigera* Schröder].

N.E.—Near Rievaulx Abbey.

The plants we observed agreed well with the description and figures given by Schröder ('Ueber das Plankton der Oder,' Bericht. Deutsch. Botan. Gesellschaft., 1897, Bd. xv., Heft 9, p. 492, t. xxv., f. 4) except that the setæ were a little shorter.

Length with setæ 75—88 μ ; without setæ 29—31 μ ; breadth 5.7—6.5 μ .

Quite recently Lemmermann has described a plant under the name of *Closteriopsis longissima* which is very closely allied to *R. setigerum* (Cfr. Plöner Forschungsberichten, Teil 7, p. 29, t. ii., f. 36—38). He places it in the Desmidiæ between *Closterium* and *Pleurotenium*, but in this he is quite wrong, as *Closteriopsis* is not a Desmid.

In the same paper Lemmermann places *R. polymorphum* var. *mirabile* West & G. S. West as a distinct species—*R. mirabile* Lemmerm. In this also he is quite wrong, as *R. polymorphum* var. *mirabile* occurred amongst hundreds of specimens of all forms of *R. polymorphum* and therefore could only be described as a peculiar form of it.

Species of *Rhaphidium*, *Scenedesmus*, and *Dactylococcus* very often (many of them as a rule) possess pyrenoids.

Rhaphidium setigerum has not been previously recorded for the British Isles.

583. **Rhaphidium convolutum** (Corda) Rabenh.

S.W.—Denholme.

MID W.—Arthington. Cowside Beck, Arncliffe.

N.W.—Cautley Spout.

584. **Rhaphidium biplex** Reinsch.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

GENUS SELENASTRUM Reinsch, 1867.

585. **Selenastrum gracile** Reinsch, 1867.

MID W.—Langcliffe, near Settle. Small forms, diam. cell
 $2-2\cdot3 \mu$.

586. **Selenastrum acuminatum** Lagerh., 1882.

S.E.—Skipwith Common.

GENUS CHODATELLA Lemmermann, 1898.

587. **Chodatella radians** (West & G. S. West), Lemmermann, 1898. [Syn. *Oocystis ciliata* Lagerh. var. *radians* West & G. S. West, 1896].

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

This plant was first described as a variety of *Oocystis ciliata* in Journ. Roy. Micro. Soc., 1896, p. 161, t. iii., f. 15. Shortly afterwards Chodat (Sur le genre Lagerheimia, Nuova Notarisia, 1895) referred *Oocystis ciliata* to his genus *Lagerheimia*, and finally both *Oocystis ciliata* and the var. *radians* have been referred by Lemmermann (Hedwigia, Bd. xxxvii., 1898) as separate species of the genus *Chodatella*.

GENUS TETRAEDRON Kütz., 1845.

588. **Tetraëdron regulare** Kütz., 1845.

[Syn. *Polyëdrium tetraëdricum* Näg., 1849].

MID W.—Wigton Moor. Markington! (Rev. J. S. Tute).
Cocket Moss, near Giggleswick.

N.W.—Cowgill Wold Moss, Widdale Fell. Mickle Fell.
Dodd Fell.

N.E.—Pilmoor, near Thirsk. Malton.

S.E.—Riccall Common.

589. **Tetraëdron enorme** (Ralfs, 1848) Hansg., 1888.
[Syn. *Staurastrum enorme* Ralfs, 1848; *Polyedrium enorme* (Ralfs) De Bary].

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

590. **Tetraëdron gigas** (Wittr., 1872), Hansg., 1888.
[Syn. *Polyedrium gigas* Wittr., 1872].

N.W.—Birkdale Tarn Moss.

591. **Tetraëdron lobulatum** (Näg., 1849), Hansg., 1888.
[Syn. *Polyedrium lobulatum* Næg., 1849].

N.E.—Gormire (W. B. Turner).

592. **Tetraëdron minimum** (A. Br., 1868), Hansg., 1888.
[Syn. *Polyedrium minimum* A. Br., 1868; *P. Pinicidium* Reinsch., 1867].

MID W.—Old Cote Moor. Roundhay Park, Leeds.

N.E.—Pilmoor, near Thirsk.

S.E.—Market Weighton.

593. **Tetraëdron trigonum** (Näg., 1849), Hansg., 1888.
[Syn. *Polyedrium trigonum* Næg., 1849].

N.E.—Pilmoor, near Thirsk.

594. **Tetraëdron tetragonum** (Näg., 1849), Hansg., 1888.
[Syn. *Polyedrium tetragonum* Næg., 1849].

S.W.—Frizinghall.

N.E.—Pilmoor, near Thirsk. Rievaulx Abbey.

595. **Tetraëdron octaëdricum** (Reinsch., 1867), Hansg., 1888.
[Syn. *Polyedrium octaëdricum* Reinsch., 1867].

MID W.—Cam Fell.

N.W.—Bog near Widdale Beck.

S.E.—Riccall Common.

This species has not previously been recorded for the British Isles.

596. **Tetraëdron caudatum** (Corda), Hansg., 1888.
[Syn. *Polyedrium pentagonum* Reinsch].

597. **Tetraëdron incisum** Lagerh.

N.W.—Jervaulx Abbey.

N.E.—Pilmoor, near Thirsk.

598. **Tetraëdron muticum** (A. Br.), Hansg. 1888.

N.E.—Strensall.

599. **Tetraëdron decussatum** (Reinsch. 1867) Nob.

[Syn. *Polyedrium decussatum* Reinsch, 1867].

N.E.—Pilmoor, near Thirsk. There were two forms agreeing with those figured by Reinsch in *Abhandl. Naturhistor. Gesellsch. Nürnberg.*, Bd. 3, p. 79, t. ii., f. iii. and iv. (f. *multilobum*). Hansgirk, in *Hedwigia*, 1888, p. 132, includes this species under *T. enorme*, but it is certainly distinct from any forms of *T. enorme* we have yet come across.

Diam., 46–55 μ .

This species has not previously been recorded for the British Isles.

GENUS CERASTERIAS Reinsch, 1867.

600. **Cerasterias longispina** (Perty 1852) Nob.

[Syn. *Polyedrium longispinum* (Perty), Rabenh. 1868].

N.W.—Mickle Fell.

601. **Cerasterias raphidioides** Reinsch, 1867.

MID W.—Pond, Boston Spa (iv., 1897).

SUB-FAMILY CHARACIÆÆ.

GENUS CHARACIUM A. Br., 1849.

602. **Characium ornithocephalum** A. Br., 1855.

MID W.—Baildon. Boston Spa.

603. **Characium longipes** Rabenh.

N.E.—Pilmoor, near Thirsk.

604. **Characium Sieboldi** A. Br.

S.W.—Keighley (T. Hebden). Bowling.

MID W.—Near Ilkley (Miss J. Town).

605. **Characium minutum** A. Br.

S.W.—Wibsey (vii. 1896).

This species has not previously been recorded for the British Isles.

606. **Characium tenue** Herm.

N.E.—Pilmoor, near Thirsk.

This species has not previously been recorded for the British Isles.

607. **Characium ensiforme** Herm.

Somewhat erect, almost straight, sometimes subarcuate, linear lanceolate, about twenty times longer than the diameter, apex acute, gradually attenuated downwards into a narrow stalk, base slightly dilated; chlorophyll pale-green, somewhat irregular, with few granules, not filling the whole cell.

Thickness, 2·5–3·8 μ ; length, 65–86 μ .

This agrees with the description of *C. ensiforme*, but the margin was never 'undulato-tumidula,' and the base was hardly 'nodoso-incrassato.'

N.E.—Pilmoor, near Thirsk, attached to *Ædogonium* sp.

This species has not previously been recorded for the British Isles.

608. **Characium acuminatum** (A. Br.).

[Syn. *Hydrocytium acuminatum* A. Br., 1855].

MID W.—Boston Spa.

N.E.—Gormire (W. B. Turner).

This species has not previously been recorded for the British Isles.

609. **Characium heteromorphum** (Reinsch).

(Syn. *Hydrianum heteromorphum* Reinsch].

S.W.—Near Mirfield. Greetland, near Halifax. Keighley Moor.

MID W.—Malham Tarn. Markington! (Rev. J. S. Tute). Wigton Moor. Boston Spa. Cam Fell.

N.W.—Mickle Fell.

N.E.—Scarborough Mere. Terrington.

S.E.—Newsholme.

610. **Characium** sp.

S.W.—Keighley Moor (cfr. Journ. Bot., 1899, p. 222, t. 395, f. 7).

GENUS STIPITOCOCCUS West & G. S. West.

611. **Stipitococcus urceolatus** W. & G. S. West.

Lat. cell., 3-4.2 μ ; altit. 6.5-10.5 μ ; long. stip. hyal. 4-6 μ .

MID W.—Oughtershaw Tarn (1,800 feet), epiphytic on *Mougeotia* sp.

N.E.—Pilmoor, near Thirsk (vi. 1898).

This interesting alga occurred in large numbers closely clustered round some filaments of *Mougeotia*; it seems to be allied to the genus *Peroniella* Gobi, which is an epiphyte on filamentous *Desmidiæ* (e.g., *P. hyalothecæ*), but is, however, much smaller and of a different form, the expanded and irregular apex being remarkable. The stalk is extremely hyaline, in fact barely visible, and it is very likely on account of its extreme tenuity that it was originally formed from the single cilium of a zoospore as in *Peroniella*, although it is comparatively much shorter. There was no trace of a lateral crack for the escape of the zoospore, as in *Peroniella*, and it is more probable that the zoospores would escape from the expanded apex of the cells.

The measurements of *Peroniella* in De Toni's *Sylloge Algarum* appear to be wrong according to Gobi's figures (*Scripta Botan., Horti Univer. Imper. Petropolitaneæ*, tom. 1, 1866-7, pp. 244-250, t. 1).

SUB-FAMILY ENDOSPHEREÆ.

GENUS CHLOROCHYTRIUM Cohn.

612. **Chlorochytrium Lemnæ** Cohn.

S.W.—On *Lemna trisulca*, Doncaster. On *L. minor*, Bradford.

SUB-FAMILY TETRASPOREÆ.

GENUS SCHIZOCHLAMYS A. Br., 1849.

613. **Schizochlamys gelatinosa** A. Br.

MID W.—Adel Bog. Bingley.

N.E.—Strensall.

S.E.—Very fine in a pond near Meaux Abbey.

614. **Schizochlamys delicatula** West.

MID W.—Bride Cross, above Farnley Moor. Cam Fell.

GENUS PALMODACTYLON Näg., 1849.

615. **Palmodactylon subramosum** Näg.

MID W.—Wigton Moor. Bog two miles south of Clapham. Cocket Moss, near Giggleswick.

N.W.—Great Shunnor Fell. Cronkley Fell.

616. **Palmodactylon simplex** Näg.

N.W.—Bog near Widdale Beck (iv. 1898).

GENUS APIOCYSTIS Näg., 1849.

617. **Apiocystis Brauniana** Näg.

S.W.—Frizinghall.

MID W.—Chapelton; Adel Bog (Abbott, Emsley, and Turner). Boston Spa. Malham Tarn Bog. Cocket Moss, near Giggleswick.

N.W.—Cowgill Wold Moss, Widdale Fell. Sedbergh.

N.E.—Scarborough Mere. Strensall (W. B. Turner). Pilmoor, near Thirsk. Terrington.

GENUS TETRASPORA Link, 1809.

618. **Tetraspora gelatinosa** (Vauch.) Desv.

MID W.—Gordale (C. B. Crawshaw). Adel Bog (Abbott, Emsley and Turner). Markington! (Rev. J. S. Tute). Trough, Malham.

N.W.—Sedbergh.

N.E.—Levisham.

S.E.—Newsholme, near Howden.

619. **Tetraspora lubrica** (Roth) Ag.

S.W.—Greetland, near Halifax.

N.W.—Great Shunnor Fell.

620. **Tetraspora bullosa** (Roth) Ag.

S.W.—Goole (H. F. Parsons). Askern (Rev. F. H. Allen). Frizinghall.

MID W.—Roundhay (Abbott, Emsley and Turner). Scotland Mill Beck (W. B. Turner).

GENUS PALMELLA Lyngb., 1817; Näg., 1849.

621. **Palmella mucosa** Kütz.

S.W.—Keighley. Doncaster. Goole.

MID W.—Beamsley Beacon.

N.W.—Cronkley Fell. Great Shunnor Fell. Cotterdale.

N.E.—Strensall! (W. B. Turner).

622. **Palmella hyalina** Bréb.

S.W.—Cullingworth (T. Hebden).

MID W.—Garforth (H. F. Parsons).

N.W.—Cotterdale.

N.E.—Strensall (W. B. Turner). Scarborough Mere.

GENUS BOTRYDINA Bréb.

623. **Botrydina vulgaris** Bréb.

MID W.—Harrogate (Abbott, Emsley and Turner). Head-ingley (W. B. Turner). Penyghent. Ingleborough. Whernside. Bolton Woods. Also in abundance on peat, Simon Seat.

N.W.—Howgill Fells. In profusion amongst *Tetraphis pellicida* and *Leucobryum glaucum*.

SUB-FAMILY DICTYOSPHERIEÆ.

GENUS TETRACOCCLUS West, 1892.

624. **Tetracoccus botryoides** West.

S.E.—Skipwith Common.

GENUS BOTRYOCOCCUS Kütz., 1849.

625. **Botryococcus Braunii** Kütz.

S.W.—Bradford. Cragg Vale, towards Blackstone Edge.

MID W.—Arthington. Cray Moss. Giggleswick Common. Two miles south of Clapham.

N.W.—Bog near Widdale Beck. Great Shunnor Fell.

N.E.—Gormire; Strensall (W. B. Turner). Pilmoor, near Thirsk. Near Scarborough.

S.E.—Hornsea Mere.

626. **Botryococcus calcareus** West.

MID W.—Malham.

GENUS DICTYOSPHERIUM Näg., 1849.

627. **Dictyosphærium Ehrenbergianum** Näg.

S.W.—Bradford.

MID W.—Baildon. Cam Fell.

N.W.—Mickle Fell.

N.E.—Scarborough Mere. Strensall.

S.E.—Hornsea Mere. Newsholme.

628. **Dictyosphærium pulchellum** Wood.S.W.—Near Bradford, in profusion amongst *Scenedesmus bijugatus*.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Terrington.

S.E.—Skipwith Common.

629. **Dictyosphærium oviforme** Lagerh.

MID W.—Abundant in pond near Boston Spa (iv. 1897).

N.E.—Pilmoor, near Thirsk.

This species has not previously been recorded for the British Isles.

GENUS INEFFIGIATA West & G. S. West, 1897.

630. **Ineffigiata neglecta** West & G. S. West, 1897.

S.W.—Near Bradford.

MID W.—Malham. Markington! (Rev. J. S. Tute). Wigton Moor. Bog, two miles south of Clapham. Roundhay Park, Leeds. Staveley Dam, near Knaresborough.

N.E.—Strensall. Pilmoor, near Thirsk. Malton.

S.E.—Riccall Common.

SUB-FAMILY GLÆOCYSTIDÆ.

GENUS OOCARDIUM Näg., 1849.

631. **Oocardium stratum** Näg., 1849. [Syn. ? *Lithonema crustacea* Hass.; *Rivularia crustacea* Carm.].

MID W.—On stones in stream, Gordale, abundant. Austwick.

GENUS NEPHROCYTIUM Näg., 1849.

632. **Nephrocytium Agardhianum** Näg.

N.W.—Mickle Fell.

N.E.—Gormire (W. B. Turner).

S.E.—Riccall Common.

633. **Nephrocytium Nägelii** Grun.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Newsholme.

634. **Nephrocytium lunatum** West.

MID W.—Staveley Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

635. **Nephrocytium ecdysiscepanum** West & G. S.
West, 1897.

N.E.—Pilmoor, near Thirsk (vi. 1898).

636. **Nephrocytium allantoideum** Bohlin, 1897.

N.E.—Pilmoor, near Thirsk (vi. 1898).

This species was described by Bohlin in *Bihang till K. Svenska Vet.-Akad. Handl.*, Band 23, afd. iii., no. 7.

It has not been previously recorded for the British Isles.

GENUS OOCYSTIS Näg., 1855.

637. **Oocystis solitaria** Wittr., 1879.

MID W.—Whernside. Penyghent. Near Oughtershaw. Cocket Moss, near Giggleswick.

N.W.—Sedbergh. Cronkley Fell. Birkdale Tarn Moss. Hunter's Hole, Craydale Moor (1,900 ft.). Mossdale Moor, Widdale Fell. Bog, near Widdale Beck. Jervaulx Abbey. Mickle Fell.

N.E.—Pilmoor, near Thirsk. Malton.

S.E.—Hornsea Mere. Market Weighton.

Forma **major** Wille, 1879.

N.W.—Mossdale Moor, Widdale Fell.

638. **Oocystis crassa** Wittr.

MID W.—Malham Tarn Bog. Abundant near Oughtershaw Tarn.

N.W.—Hunter's Hole, Craydale Moor (1,900 ft.). Dodd Fell (2,000 ft.). Snaizholme Beck.

639. **Oocystis asymmetrica** West.

MID W.—Wherside (2,000 ft.). Cam Fell.

N.W.—Cowgill Wold Moss, Widdale Fell.

640. **Oocystis elliptica** West.

N.E.—Strensall Common.

641. **Oocystis panduriformis** West.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

642. **Oocystis gigas** Arch.

N.W.—Mickle Fell.

GENUS *GLEOCYSTIS* Näg., 1849.643. **Glæocystis gigas** (Kütz., 1845) Lagerh., 1883.[Syn. *Protococcus gigas* Kütz., 1845; *Chlorococcum gigas* (Kütz.) Grun.; *Glæocystis ampla* (Kütz.) Rabenh.].

S.W.—Goole Moor. Near Keighley.

MID W.—Bramhope (J. Abbott). Adel Bog. Malham Tarn. Wigton Moor. Baildon. Penyghent. Bride Cross, above Farnley Moor. Oughtershaw Tarn. Near Buckden. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell. Great Shunnor Fell. Hunter's Hole, Craydale Moor (1,900 ft.). Lund's Fell.

N.E.—Strensall! (W. B. Turner). Gormire (W. B. Turner). Scarborough Mere. Pilmoor, near Thirsk. Terrington. Malton.

S.E.—Near Meaux Abbey. Newsholme. Riccall Common. Skipwith Common! (Rev. W. Fowler).

644. **Glæocystis regularis** West & G. S. West.[Syn. *Chlorococcum regulare* West].

MID W.—Wherside (2,000 ft.). Penyghent. Oughtershaw Tarn. Cam Fell. Old Cote Moor. Cocket Moss, near Giggleswick. Bowland Knotts.

N.W.—Hunter's Hole, Craydale Moor (1,900 ft.). Mossdale Moor, Widdale Fell. Bog near Widdale Beck.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common! (Rev. W. Fowler).

645. **Glæocystis frustulosa** (Carm.).

[Syn. *Chlorococcum frustulosum* (Carm.) Rabenh. ?].

N.W.—Cautley Spout.

646. **Glæocystis vesiculosa** Näg.

S.W.—Rawcliffe. Near Keighley.

MID W.—Baildon. Wigton Moor. Malham. Boston Spa. Ilkley. Cocket Moss, near Giggleswick. Bowland Knotts.

N.E.—Gormire (W. B. Turner). Strensall. On moist ground, Whitenab, Scarborough. Pilmoor, near Thirsk. Malton.

S.E.—Riccall Common. Newsholme. Routh.

647. **Glæocystis rupestris** (Lyngb., 1819) Rabenh. 1863.

[Syn. *Palmella rupestris* Lyngb., 1819].

S.W.—Horton. Bradford, on damp walls, etc. Bingley. Keighley.

MID W.—Meanwood (W. B. Turner). Wigton Moor. Baildon. Bolton Woods. Cowside Beck, Arncliffe.

N.W.—Frequent on rocks in glens, Cautley Spout.

N.E.—Strensall! (W. B. Turner).

648. **Glæocystis botryoides** (Kütz.) Näg.

S.W.—Near Keighley.

N.W.—Mickle Fell.

649. **Glæocystis infusionum** (Schrank) West & G. S.

West. [Syn. *Chlorococcum infusionum* (Schrank) Menegh.].

S.W.—Frizinghall.

MID W.—Boston Spa.

N.E.—Pilmoor, near Thirsk.

GENUS KIRCHNERIELLA Schmidle.

650. **Kirchneriella obesa** (West) Schmidle.

[Syn. *Selenastrum obesum* West].

N.E.—Pilmoor, near Thirsk.

Var. **pygmæa** West & G. S. West.

Smaller than the type. Cells narrower and less curved
Thickness of cell 2 μ .

S.W.—Keighley Moor.

This is a very marked variety.

GENUS UROCOCCUS Kütz., 1849.

651. **Urococcus Hookerianus** (Hass., 1845).

MID W.—Knaresborough Dropping Well (Prof. G. J. Allman).

652. **Urococcus Allmani** (Hass., 1845).

MID W.—Knaresborough Dropping Well (Prof. G. J. Allman).

653. **Urococcus insignis** (Hass., 1845) Kütz., 1849.

[Syn. *Chroococcus macrococcus* Rabenh., and var. *aureus* Rabenh.].

S.W.—Keighley Moor.

MID W.—Whernside. Holden Ghyll, near Keighley. Black Hill, near Settle. Cam Fell. Bowland Knotts. Ingleton.

N.W.—Great Shunnor Fell. Swaledale (up to 2,200 feet).

N.E.—Cornelian Bay. Pilmoor, near Thirsk.

S.E.—Near Sutton.

GENUS DACTYLOTHECE Lagerh., 1883.

654. **Dactylothece Braunii** Lagerh.

S.W.—Forming a gelatinous green stratum with *Mesotænium caldariorum* (Lagerh.) Hansg., in greenhouses, Bradford (ix. 1896).

MID W.—On wet rocks, Ilkley (vi. 1897).

This species has not previously been recorded for the British Isles.

SUB-FAMILY PROTOCOCCACEÆ.

GENUS STICHOCOCCUS Näg., 1849.

655. **Stichococcus bacillaris** Näg., 1849.

S.W.—Bradford. Saltaire, forming a dark-green stratum around the bases of trees. Damp, shady rocks near Bingley.

MID W.—Bolton Woods, on damp wood and stones. Langcliffe, near Settle.

N.E.—Gormire (W. B. Turner).

656. **Stichococcus variabilis** West & G. S. West, 1896.

S.W.—Horton Park, Bradford, forming a dark-green mucous stratum on stones subject to the spray of a waterfall.

657. **Stichococcus dissectus** Gay, 1891.

S.W.—Eccleshill, near Bradford; on damp ground, old wood, tree-pots, etc., Bradford. Swill Hill.

MID W.—Baildon Moor.

658. **Stichococcus flaccidus** (Kütz., 1849) Gay, 1891.

[Syn. *Ulothrix flaccida* Kütz., 1849].

S.W.—Bradford.

MID W.—Hawthorn. Boston Spa.

659. **Stichococcus fragilis** (A. Br.) Gay, 1891.

[Syn. *Arthrogonium fragile* A. Br.].

S.W.—In greenhouse, Bradford, forming a thin gelatinous stratum with *Dactylothece Braunii* Lagerh.

This species has not previously been recorded for the British Isles.

GENUS EREMOSPHERA DeBary.

660. **Eremosphæra viridis** DeBary.

MID W.—Malham Tarn Bog. Cam Fell. Bog two miles south of Clapham.

N.W.—Mickle Fell. Cronkley Fell. Bog near Widdale Beck.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

GENUS PLEUROCOCCUS Menegh., 1842.

661. **Pleurococcus vulgaris** Menegh.

S.W., MID W., N.W., N.E., and S.E.—On old wood, bark, etc., in moist situations, everywhere throughout the county.

662. **Pleurococcus angulosus** (Corda) Menegh.

MID W.—Penyghent.

663. **Pleurococcus rufescens** (Kütz.), Bréb.

MID W.—Forming a red stratum on wet limestone rocks, Boston Spa (iv. 1897). Ingleton. Jackdaw Crag, near Tadcaster.

Var. **sanguineus** West & G. S. West.

A variety forming a dense soft mucous layer of a bright blood colour, contents of cells granulose, and of the colour of arterial blood.

MID W.—Tennant Ghyll, a small tributary of Cowside Beck, Arncliffe (Aug., 1896).

This occurred in large brilliant blood-red patches, covering those stones and rocks which could not be displaced by the rapidity of the current, and which are often left dry. Some few cells had about a fourth-part of the contents still green.

664. **Pleurococcus nimbatus** Wildem.

N.W.—Abundant in a sphagnum bog, near Widdale Beck (iv. 1898).

N.E.—Terrington (vi. 1898).

GENUS TROCHISCIA Kütz., 1845.

665. **Trochiscia hirta** (Reinsch.) Hansg. 1888 [Syn. *Palmella hirta* Reinsch.; *Pleurococcus vestitus* Reinsch.].

MID W.—Arncliffe, on wet rocks. Boston Spa.

N.W.—Cowgill Wold Moss, Widdale Fell.

666. **Trochiscia aciculifera** (Lagerh.) Hansg. 1888.

[Syn. *Acanthococcus aciculifera* Lagerh., 1883].

N.W.—Hunter's Hole, Craydale Moor (1,900 feet).

N.E.—Pilmoor, near Thirsk (vi. 1898).

667. **Trochiscia reticularis** (Reinsch.) Hansg.

MID W.—Near Knaresborough (viii. 1898).

N.W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Terrington (vi. 1898).

GENUS PROTOCOCCUS Ag., 1824.

668. **Protococcus viridis** Ag.

[Syn. *Chlorococcum humicolum* (Näg.) Rabenh.].

S.W.—Frequent about Bradford.

MID W.—Common about Leeds (Abbott, Emsley & Turner).
Baildon.

N.W.—Common, Lund's Fell.

669. **Protococcus protogenitus** (Bias.) Hansg.

[Syn. *Microcystis protogenita* Rabenh.].

S.W.—Saltaire. Wigton Moor.

S.E.—Routh.

670. **Protococcus botryoides** Kütz.) Kirchn.

[Syn. *Microhaloa botryoides* Kütz.]

S.W.—On submerged twigs, Frizinghall (iii. 1897).

N.E.—Carlton Bank.

CLASS **MYXOPHYCEÆ.**

ORDER **HORMOGONEÆ.**

SUB-ORDER **HETEROCYSTEÆ.**

FAMILY **RIVULARIACEÆ.**

GENUS **AMPHITHRIX** Kütz., 1843.

671. **Amphithrix janthina** (Mont.) Born. et Flah.

MID W.—On inundated stones, Cowside Beck, Arncliffe.

N.W.—Mossdale Moor, Widdale Fell (iv. 1897) on dripping limestone rocks with *Dactylococcus bicaudatus* var. *subramosum*.

This species has not previously been recorded for the British Isles.

GENUS **CALOTHRIX** Ag., 1824.

672. **Calothrix parietina** (Nag., 1849), Thur., 1875.

MID W.—Simon's Fell (iv. 1892). On inundated stones, Cowside Beck, Arncliffe.

N.W.—Vertical face of dripping rocks, Hell Ghyll Beck.

673. **Calothrix balearica** Born. et Flah., 1886.

Var. **tenuis** West & G. S. West.

A variety with the filaments only about half the thickness of the type. The filaments are very tortuose and intricate, and heterocysts are absent. Thickness trich. 3·5–5 μ . The sheaths are mostly truncate, and in older filaments are of a characteristic smoky-brown colour.

MID W.—Simon's Fell (iv. 1892).

GENUS **RIVULARIA** (Roth.) Ag., 1824.

674. **Rivularia hæmatites** (DC., 1806) Ag., 1824.

[Syn. *Zonatrachia calcarea* Endl., 1843; *Z. rivularis* Rabenh., 1865; *Z. fluviatilis* Rabenh., 1865].

MID W.—Forming hard lumps on stones in streams in limestone districts. Abundant in Gordale. On rocks over which the water was running quickly. Penyghent. Ingleton, near Thornton Force.

N.E.—Moorland rill, near Scarborough.

675. **Rivularia Biosolettiana** Menegh., 1841.

MID W.—On stones in Cowside Beck, Arncliffe.

This species has not previously been recorded for the British Isles.

GENUS GLÆOTRICHIA J. Ag., 1842.

676. **Glæotrichia pisum** (Ag., 1824) Thur. 1875. [Syn. ? *Rivularia echinulata* Eng. Bot., 1814; *Echinella articulata* Eng. Fl.].

N.E.—Strensall (W. B. Turner).

677. **Glæotrichia natans** (Hedwig, 1798) Rabenh., 1847.

MID W.—Recorded in Lees' Flora of West Yorkshire, p. 767, for Malham, 1789; this record is very doubtful.

N.W.—Lund's Fell, in a ditch.

N.E.—Pilmoor, near Thirsk.

FAMILY SIROSIPHONIACEÆ.

GENUS HAPALOSIPHON Näg., 1849.

678. **Hapalosiphon Hibernicus** West & G. S. West, 1896.

N.W.—Bog near Widdale Beck.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

679. **Hapalosiphon intricatus** West.

MID W.—Cocket Moss, near Giggleswick.

GENUS STIGONEMA Ag., 1824.

680. **Stigonema ocellatum** (Dillw., 1809) Thur., 1875.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Near Sedbergh.

N.E.—Pilmoor, near Thirsk.

681. **Stigonema minutum** (Ag., 1817) Hass., 1845.

S.W.—Denholme.

MID W.—Ingleton.

682. **Stigonema turfaceum** (Eng. Bot., 1838) Cooke, 1884.

MID W.—Linn Gill.

N.W.—Cronkley Fell.

683. **Stigonema mamillosum** (Lyngb., 1819) Ag. 1824.

N.W.—Cronkley Fell.

684. **Stigonema panniforme** (Ag.) B. & F.

N.E.—Pilmoor, near Thirsk (vi. 1898).

685. **Stigonema informe** Kütz., 1849.

MID W.—Ingleborough.

N.W.—Cautley Spout; very fine with *Scytonema mirabile*.

FAMILY SCYTONEMACEÆ.

GENUS MICROCHAETE Thur., 1875.

686.—**Microchaete diplosiphon** Gomont, 1885.

N.E.—Strensall.

Thickness of filament up to 14 μ ; thickness of trichome 5.5–6 μ . The outer sheath in these specimens was often irregular and attained rather wider proportions than in the original French plants.

GENUS SCYTONEMA Ag., 1824.

687. **Scytonema Myochrous** (Dillw., 1802) Ag. 1812.

MID W.—Ingleton. Cowside Beck, Arncliffe (very fine masses).

N.W.—Cronkley Fell. Sedbergh.

688. **Scytonema mirabile** (Dillw.)

[Syn. *S. figuratum* Ag., 1824].

N.W.—Cronkley Fell. Lund's Fell. Cautley Spout.

MID W.—Linn Gill, on wet rocks.

689. **Scytonema alatum** (Berk., 1833) Borzi, 1879.

[Syn. *Petalonema alatum* Berk., 1833].

MID W.—Dripping rocks, Gordale. Linn Gill, on wet limestone rocks.

GENUS TOLYPOTHRIX Kütz., 1843.

690. **Tolypothrix distorta** (Fl. Dan., 1780) Kütz., 1843.

[Syn. *Plectonema Kirchneri* Cooke, 1882].

MID W.—Baildon.

N.E.—Pilmoor, near Thirsk; very fine.

691. **Tolypothrix lanata** (Desv., 1809) Wartm., 1858.
 [Syn. *T. muscicola* Kütz., 1843; *T. flaccida* Kütz.,
 1843; *T. coactilis* Kütz., 1843; *T. ægagropila* (Kütz.,
 1833) Rabenh., 1862].

MID W.—Dringhouses, near York, growing on *Hypnum giganteum*. Harrogate! (T. Hick). South Stainley! (Rev. J. S. Tute). Boston Spa.

N.W.—Sedbergh.

N.E.—Stokesley.

S.E.—Riccall Common.

692. **Tolypothrix tenuis** Kütz., 1843. [Syn. *T. pygmæa*
 Kütz., 1843; *T. Wartmanniana* Rabenh., 1858].

S.W.—Rawcliffe Common.

MID W.—Penyghent.

N.W.—Cronkley Fell.

N.E.—Near Scarborough.

S.E.—Riccall Common. Skipwith Common! (Rev. W. Fowler).

GENUS DIPLOCOLON Näg., 1857.

693. **Diplocolon Heppii** Näg., 1857.

MID W.—On the vertical face of dripping limestone rocks, Helln Pot, near Selside (vii. 1892).

This plant was growing amongst and agglutinated with several species of *Glaeocapsa*, and formed an irregularly-lobed subcartilagenous thallus of a dark brownish-green colour. The trichomes are about 8 μ in diameter, comparatively short, and tortuose-intricate. The margins of the outer sheaths could be seen only with difficulty, and in many cases not at all, but the trichomes were frequently seen both singly and in pairs in evidently inner lamellose sheaths; the latter were either colourless or, in older examples, of a pale yellow-brown colour. The branches arise between the heterocysts.

The cells are bright blue-green in colour, subglobose, and contain many large distinct granules; the heterocysts are also subglobose, single or occasionally in pairs, and are of a pale straw colour.

This species has not previously been recorded for the British Isles.

FAMILY *NOSTOCEÆ*.

GENUS *NOSTOC* Vauch., 1803.

694. ***Nostoc piscinale*** Kütz., 1843.

S.W.—Near Bradford.

695. ***Nostoc muscorum*** Ag., 1812.

MID W.—Near Ingleton. Heseltine Gill, on the eastern slope of Penyghent, and several gills on the western slope. Cowside Beck, Arncliffe.

N.W.—Lund's Fell.

N.E.—Strensall.

Var. **tenax** Thur., 1880.

MID W.—Cowside Beck, Arncliffe.

696. ***Nostoc humifusum*** Carm., 1883.

S.W.—Cullingworth.

N.W.—Mickle Fell.

697. ***Nostoc commune*** Vauch., 1803.

S.W.—Wentbridge (H. F. Parsons). Manningham.

MID W.—Ripon (F. A. Lees). Knaresborough (W. B. Turner). Wetherby (F. A. Lees). Arncliffe. Sherburn (F. A. Lees). Near Jennett's Cave, Malham (C. P. Hobkirk).

698. ***Nostoc macrosporum*** Menegh., 1843.

MID W.—Heseltine Gill, Penyghent.

N.W.—Deep Dale, Dent (iii. 1893).

699. ***Nostoc microscopicum*** Carm., 1833 [Syn. *Nostoc rupestre* Kütz., 1850; *N. hyalinum* Benn., 1886; *N. opalinum* Benn.].

S.W.—Halifax.

MID W.—Ingleborough. Clapham. Malham. Ribbleshead. Whernside. Old Cote Moor.

N.W.—Cautley Spout. Cronkley Fell. Lund's Fell.

N.E.—Carlton Bank.

S.E.—Riccall Common. Market Weighton.

700. **Nostoc cœruleum** Lyngb., 1819.

MID W.—Baildon.

N.W.—Mickle Fell. Great Shunnor Fell.

701. **Nostoc pruniforme** Ag., 1812.

MID W.—Beamsley Beacon. Penyghent (iv., 1896). Malham Tarn, 1789, recorded as *Ulva pruniformis* (see Camden's Britannia, enlarged edit., by R. Gough, iii. p. 101).

702. **Nostoc verrucosum** Vauch., 1803.

MID W.—On rocks, Malham Cove (H. F. Parsons).

N.W.—Mickle Fell.

703. **Nostoc sphæricum** Vauch., 1803.

S.W.—Near Bradford.

MID W.—Ingleton. Holden Gill, near Keighley.

GENUS ANABÆNA Bory, 1822.

Sterile species from Frizinghall; Cam Fell; Pilmoor, near Thirsk.

704.—**Anabæna Flos-aquæ** (Lyngb., 1819) Bréb., 1835.

S.E.—Hornsea Mere.

705.—**Anabæna circinalis** (Kütz., 1845) Rabenh., 1852.

N.E.—Strensall (W. B. Turner).

706.—**Anabæna oscillarioides** Bory, 1822.

[Syn. *Sphærozyga Ralfsii* Thwaites, 1849].

MID W.—Ilkley (vi., 1897).

S.E.—Newsholme.

Var. **elongata** (Kütz., 1849) Born. et Flah. [Syn. *Cylindrospermum elongatum* Kütz., 1849; *Sphærozyga elasticha* Ralfs, 1850; *S. leptosperma* Ralfs, 1850].

N.W.—Mickle Fell.

707. **Anabæna laxa** (Rabenh.) A. Braun.

S.W.—Cragg Vale, towards Blackstone Edge.

This species has not previously been recorded for the British Isles.

GENUS APHANIZOMENON Morren, 1838.

708. **Aphanizomenon Flos-aquæ** (L., 1753) Ralfs,
1850.

N.E.—Strensall Common.

A form a little smaller; cfr. West, Notes on F. W. A. of E.
Yorks. (Naturalist, July, 1893, p. 217).

S.E.—Riccall Common.

GENUS CYLINDROSPERMUM Kütz., 1843.

709. **Cylindrospermum stagnale** (Kütz., 1843) Born
et Flah., 1888. [Syn. *Anabaena stagnalis* Kütz.,
1843; *Cylindrospermum macrospermum* Kütz., 1845].

MID W.—Ribblehead, in peaty ditches and pools. Staveley
Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

710. **Cylindrospermum majus** Kütz., 1843. [Syn.
Cylindrospermum macrospermum Rabenh., 1860;
Cooke, Brit. Freshw. Alg., p. 243, t. 95, f. 1].

S.W.—Bradford. Halifax. Dewsbury (W. Narramore). Don-
caster! (Rev. W. Fowler).

N.E.—Terrington.

711. **Cylindrospermum catenatum** Ralfs, 1850.

S.W.—Goole (W. G. Tacey).

MID W.—Markington! (Rev. J. S. Tute).

SUB-ORDER HOMOCYSTEÆ.

FAMILY VAGINARIÆ.

GENUS SCHIZOTHRIX Kütz., 1843.

712. **Schizothrix Mülleri** Näg., 1849.

MID W.—Forming a brown expanded stratum amongst mosses
on wet rocks, Linn Gill.

713. **Schizothrix lardacea** (Cesati) Gomont.

MID W.—Amongst *Scytonema myochrous*, forming a dense
stratum, Cowside Beck, Arncliffe.

This species has not previously been recorded for the British
Isles.

714. **Schizothrix calcicola** (Ag., 1812) Gomont.

MID W.—Amongst *Scytonema* sp., on wet rocks, Linn Gill.
This species has not previously been recorded for the British Isles.

FAMILY *LYNGBYEÆ*.SUB-FAMILY *LYNGBYOIDEÆ*.GENUS *PLECTONEMA* Thur., 1875.715. **Plectonema Tomasinianum** (Kütz., 1836)
Bornet, 1889. [Syn. *Calothrix Tomasinianum* Kütz.,
1843; *Plectonema mirabile* Thur., 1875].

MID W.—Ingleton. Malham. Forming expanded greenish-brown tufts on wet rocks, Simon's Fell (iv., 1892). Thickness, filaments, 16—19 μ ; thickness, trichome, 12.5—15 μ .

At or near the base of a few of the branches peculiar rounded cells of a yellowish colour and with thick walls were occasionally noticed; these are most probably spores.

N.W.—Snaizholme Beck. Widdale Beck.

N.E.—Rievaulx Abbey.

GENUS *SYMPLOCA* Kütz., 1843.716. **Symploca muralis** Kütz., 1843.

S.W.—On damp ground, Frizinghall. Thickness, trichome, 3.7—4.5 μ .

GENUS *LYNGBYA* Ag., 1824.717. **Lyngbya Martensiana** Menegh., 1837. [Syn.
Oscillatoria turfosa Carm., 1841; *Lyngbya turfosa*
(Carm.) Cooke, 1884].

S.W.—Doncaster.

MID W.—Linn Gill.

N.W.—Vertical face of dripping rocks, Hell Gill Beck.

In 1888 we recorded *Lyngbya turfosa* from Doncaster. Since then M. Gomont's Monograph of this group has been issued (1893) and in it we find *Oscillatoria turfosa* in a list of "*Species inquirendæ*." We have re-examined this plant and find that it corresponds exactly with Cooke's figure (Brit. Freshw. Alg., pl. 102, f. 3) of *Lyngbya turfosa* which he states (l.c. p. 261) to be

drawn "from the original specimens." Our specimens also agree in every detail with *Lyngbya Martensiana* with the exception that the dissepiments are quite distinct, and we do not consider this fact to be of any specific value, more especially as some of the trichomes were breaking up into their component cells previous to the latter leaving the sheath; this condition of the plants might probably account for the distinctness of the dissepiments. From this we must regard *Oscillatoria turfosa* Carm. as synonymous with *Lyngbya Martensiana* Menegh.

718. **Lyngbya ærugineo-cœrulea** (Kütz., 1843)
Gomont, 1893.

S.W.—Horton Park, Bradford.

MID W.—Waterfall, Crook Gill near Buckden. Simon's Fell (iv. 1892). Boston Spa. On wet rocks, in stream, Penyghent. Linn Gill.

N.W.—On stones, waterfall in gill, Dodd Fell.

719. **Lyngbya subtile** West.

MID W.—Wigton Moor.

720. **Lyngbya ochracea** (Kütz., 1843) Thur., 1875.

[Syn. *Leptothrix ochracea* Kütz., 1843].

S.W.—Keighley. Hunslet (W. B. Turner). Frizinghall. Clayton.

MID W.—Blubberhouses (W. B. Turner). Harrogate. Cocket Moss, near Giggleswick.

N.E.—Strensall (W. B. Turner). Terrington.

721. **Lyngbya Lagerheimii** (Mœbius, 1889) Gomont, 1890.

MID. W.—Penyghent.

S.E.—Skipwith Common.

This species has not previously been recorded for the British Isles.

722. **Lyngbya major** Meneghini, 1837.

N.E.—Terrington.

This species has not previously been recorded for the British Isles.

723. **Lyngbya Rivulariarum** Gomont, 1893.

MID W.—Among the filaments of *Rivularia hæmatites*, on wet rocks, Penyghent.

724. **Lyngbya versicolor** (Wartm., 1861) Gomont, 1893.

MID W.—Among *Schizothrix Mülleri* Näg., on wet rocks, Linn Gill.

SUB-FAMILY OSCILLARIOIDEÆ.

GENUS PHORMIDIUM Kütz., 1843.

725. **Phormidium molle** (Kütz., 1849) Gomont, 1893.

[Syn. *Anabaena mollis* Kütz., 1849].

N.E.—Pilmoor, near Thirsk.

Forma **tenuior**. Thickness, trichome 2—2·4 μ ; long. artic. 2·2—3·5 μ .

S.W.—Bradford. This formed bright æruginose coatings on the roots and fronds of *Lemna minor*. It differs in no respect from the type except in the somewhat narrower trichomes.

726. **Phormidium luridum** (Kütz., 1849) Gomont, 1893. [Syn. *Leptothrix lurida* Kütz., 1849; *Hyphæothrix lurida* Rabenh., 1865.]

S.W.—Frizinghall. Horton Park, Bradford. Heaton. Thickness, filaments 1·6—2 μ ; long. artic. 2·5—4·2 μ .

MID W.—Boston Spa.

N.E.—Stokesley.

727. **Phormidium purpurascens** (Kütz., 1847) Gomont, 1890.

[Syn. *Leptothrix purpurascens* Kütz., 1847].

MID W.—Forming bright reddish-purple coriaceous patches, some square feet in extent, on the face of dripping limestone rocks, Linn Gill. The stratum has a smooth shining surface and consists of densely intricate and tortuose minute filaments (thickness, trichome 1·5—2 μ). Also on dripping limestone rocks, Cowside Beck, near Arncliffe. Ingleton.

This species has not previously been recorded for the British Isles.

728. **Phormidium valderianum** (Delp., 1857)
 Gomont, 1893. [Syn. *Leptothrix Valderiæ* Delp.,
 1857; *Hyphaothrix zonata* (Ces.) Rabenh., 1865.

MID W.—On the shady boulders of rapid stream, forming a thin dark olive-green stratum; Holden Gill, near Keighley. Thickness, trichome, 2—2·3 μ ; long. artic. 3·5—5 μ .

729. **Phormidium laminosum** (Ag., 1827) Gomont,
 1890. [Syn. *Oscillatoria laminosa* Ag., 1827].

MID W.—On stones in stream, Langcliffe, near Settle.

N.W.—Helln Pot, near Selside.

730. **Phormidium tenue** (Menegh., 1837) Gomont,
 1893. [Syn. *Anabaena tenuis* Menegh., 1837.

S.W.—Cragg Vale, towards Blackstone Edge. Clayton.

MID W.—Shipleigh Glen. Boston Spa.

N.W.—Cautley Spout.

731. **Phormidium inundatum** Kütz., 1849.

[Syn. *Lyngbya inundata* (Kütz.) Cooke, 1884].

S.W.—Bradford.

MID W.—Not uncommon on dripping rocks, stones in streams, lakes, etc. Wetherby. Chapel-Allerton. Selby. Penyghent.

732. **Phormidium Corium** (Ag., 1812) Gomont, 1890.

[Syn. *Oscillatoria Corium* Ag., 1812].

S.W.—Horton Park, Bradford. Cragg Vale, towards Blackstone Edge.

MID W.—Linn Gill.

N.W.—On rocks, in stream, Little Ing Gill, Dodd Fell.

733. **Phormidium Retzii** (Ag. 1812) Gomont, 1890.

[Syn. *Oscillatoria Retzii* Ag., 1812; *Phormidium rupestre* Kütz., 1849; *Phormidium papyrinum* Kütz., 1843; *Lyngbya rupestris* (Kütz.) Cooke, 1884].

MID W.—Ingleton! (H. F. Parsons). Blubberhouses (W. B. Turner). Holden Gill, near Keighley.

734. **Phormidium autumnale** (Ag. 1812) Gomont, 1893. [Syn. *Oscillatoria autumnalis* Ag., 1812; *O. antilaria* Martens, 1822; *Phormidium vulgare* Kütz., 1843; *Lyngbya vulgare* (Kütz.) Kirchn. ; *Oscillaria subfusca* Kütz., 1843].

S.W.—Horton Park, Bradford. Clayton. Shipley.

MID W.—Baldon. Markington! (Rev. J. S. Tute).

N.E.—Strensall. Scarborough! (G. Masee).

735. **Phormidium foveolarum** (Montague, 1849) Gomont, 1893.

MID W.—Boston Spa, forming a dark green stratum in holes of limestone rocks.

GENUS CLONOTHRIX E. Roze, 1896.

736. **Clonothrix gracillima** West & G. S. West.

Trichomes very narrow, alternately falsely branched; false branches flexuose and sometimes attenuate, elongate with alternate false branchlets; sheaths thin, firm, straight and colourless; cells three to four times longer than the diameter, cytoplasm bright æruginose. Trichomes 1.5μ in thickness.

S.W.—Trough, Shipley.

N.E.—Pilmoor, near Thirsk.

The false ramification of this plant is most peculiar; the apparent branches seem to be merely tangentially applied at their bases to the primary filaments, and are of the same thickness. The 'branches' appear to arise by the lateral protension of a few cells from the sheath; these cells remain attached laterally and grow quite independently into long flexible filaments. The cells were often seen to have left the sheath, the latter being empty for some distance.

The only other species of the genus is *C. fusca* E. Roze (Journ. de Botanique, Oct. 1896, p. 329-330), from which it is distinguished by its much narrower trichomes of uniform thickness, its more elongate false-ramifications, and by its bright blue-green colour.

GENUS OSCILLATORIA Vauch., 1803.

737. *Oscillatoria princeps* Vauch., 1803.

MID W.—Malham Tarn Bog; very fine, Aug. 1896.

N.E.—Pilmoor, near Thirsk; vii. 1898.

738. *Oscillatoria limosa* Ag., 1812.

[Syn. *Oscillaria Frælichii* Kütz., 1843].

S.W.—Bradford. Dewsbury. Frizinghall. Wibsey. Farnley.

MID W.—Wetherby (F. A. Lees). Baildon. Wigton Moor.

Malham. Moughton Fell. Penyghent. Pond at Pool.

Holden Gill, near Keighley. Eldwick. Boston Spa. Staveley

Dam, near Knaresborough. Ilkley.

N.W.—Masham. Near Moorcock Inn. Great Shunnor Fell.

Mickle Fell. Dodd Fell.

N.E.—Strensall. Scarborough Mere. Hayburn Wyke.

Stokesley.

S.E.—Waghen. Beverley. Routh. Loftsome Bridge, near

Wressle. Newsholme, near Howden.

739. *Oscillatoria irrigua* Kütz., 1843.

This species frequently forms dark purple velvety patches over which the water runs quickly.

S.W.—Keighley. Farnley. Near Halifax.

MID W.—Addingham. Arthington. Baildon. Oughtershaw Moss.

N.W.—River Ure. Duerley Beck near Hawes. Sedbergh.

740. *Oscillatoria tenuis* Ag., 1813.

[Syn. *Oscillaria tenuis* var. *viridis* Kütz., 1849].

S.W.—Wakefield. Bradford. Frizinghall. Halifax.

MID W.—Sherburn. Baildon. Leeds. Pond at Pool.

Staveley Dam, near Knaresborough. Ilkley.

N.W.—Sedbergh. Mickle Fell.

N.E.—Seamer. Malton.

741. *Oscillatoria amphibia* Ag., 1827.

[Syn. *Oscillaria tenerrima* Kütz., 1843].

S.W.—Bradford. Frizinghall. Kildwick. Doncaster.

MID W.—Above Eldwick. Cam Fell.

N.W.—Mickle Fell. Muker.

From above Eldwick there was a rather more slender form (thickness, trichome $1.3-2 \mu$) with markedly uncinat apices.

742. *Oscillatoria splendida* Grev., 1824.

[Syn. *Oscillaria leptotricha* Kütz., 1845.]

S.W.—Bradford. Calverley.

MID W.—Adel Bog.

N.W.—Near Moorcock Inn. Mickle Fell.

N.E.—Stokesley.

Var. *attenuata* West & G. S. West, 1896. Thickness, trichome $2-2.3 \mu$.

The apices of this variety are much more elongated and attenuate (up to 30μ) than the apices of the typical form, though like those they are subcapitate.

MID W.—In ditches, Baildon Moor (vii. 1895).

743. *Oscillatoria Okeni* Ag., 1827.

S.W.—Trough at Heaton.

This species has not previously been recorded for the British Isles.

744. *Oscillatoria chalybea* Mertens, 1822.

S.W.—Near Keighley.

N.E.—York! (F. Bewlay). Terrington.

745. *Oscillatoria formosa* Bory, 1827.

N.W.—Little Ing Gill, Dodd Fell.

N.E.—Scarborough.

746. *Oscillatoria simplicissima* Gomont, 1893.

S.W.—Marley.

MID W.—Cocket Moss, near Giggleswick (iv. 1898).

747. *Oscillatoria anguina* Bory, 1827.

MID W.—Cocket Moss, near Giggleswick (iv. 1898). Ingleton, amongst mosses.

This species has not previously been recorded for the British Isles

GENUS ARTHROSPIRA Stizberger, 1852.

748. **Arthrospira Jenneri** (Hass., 1845) Stizenberger,
1852. [Syn. *Spirulina Jenneri* Kütz., 1845-49].

S.W.—Askern (Rev. F. H. Allen).

SUB-FAMILY SPIRULINOIDEÆ.

GENUS SPIRULINA Turpin, 1827.

749. **Spirulina major** Kütz., 1843.

[Syn. *Spirulina oscillarioides* Kütz., 1845-49].

MID W.—Bramhope (Abbott, Emsley and Turner). Adel.
Arthington.

N.W.—Mickle Fell.

N.E.—Scarborough Mere. Strensall.

750. **Spirulina tenuissima** Kütz., 1836.

[Syn. *Spirulina subsalsa* CErsted, 1842].

S.W.—Holmfirth (C. P. Hobkirk).

ORDER CHAMÆSIPHONACEÆ.

FAMILY CHAMÆSIPHONÆÆ.

GENUS SPHÆROGONIUM Rostaf., 1883.

751. **Sphærogonium incrustans** (Grun.) Rostaf., 1883.

[Syn. *Chamæsiphon incrustans* Grun., 1868].

S.W.—Heaton, on *Vaucheria* sp. and *Rhizoclonium hieroglyphicum*. Keighley, on *Ædogonium* sp.

MID W.—Baildon, on *Cladophora crispata*. In stream near
Giggleswick, on *Chætomorpha*.

N.W.—Cautley Spout, on *Ædogonium* sp. Widdale Beck, on
Plectonema.

ORDER CHROOCOCCOIDEÆ.

FAMILY CHROOCOCCACEÆ.

SUB-FAMILY CHROOCYSTEÆ.

GENUS GLÆOCHÆTE Lagerh., 1883.

752. **Glæochæte Wittrockiana** Lagerh., 1883.

[Syn. *Schrammia barbata* Dangeard, 1889].

MID W.—Half-a-mile south of Cray Moss (viii. 1896).

N.E.—Pilmoor, near Thirsk, very fine (iv. 1897).

753. *Glœochæte bicornis* Kirchn.

MID W.—In pond, Boston Spa (iv. 1897).

This species has not previously been recorded for the British Isles.

SUB-FAMILY EUCHROOCOCCACEÆ.

GENUS CHROOTHECE Hansg., 1884.

754. *Chroothece Richterianum* Hansg.

MID W.—Cowside Beck, Arncliffe, forming reddish-yellow patches in the stratum of *Phormidium purpurascens*. Rather smaller than the type; diam. cell. c. integ. 13·5—18 μ .

GENUS GLÆOTHECE Næg., 1849.

755. *Glœothece linearis* Næg.

MID W.—Old Cote Moor (viii. 1896), very fine and abundant.

N.W.—Cowgill Wold Moss, Widdale Fell (iv. 1897).

N.E.—Strensall Common. Pilmoor, near Thirsk (vi. 1898).

756. *Glœothece confluens* Næg.

MID W.—Black Hill, near Settle. Linn Gill. Jackdaw Crag, near Tadcaster.

757. *Glœothece cystifera* (Hass.) Rabenh.[Syn. *Glœothece devia* Næg.].

MID W.—Ilkley (vi. 1897) on wet rocks.

GENUS APHANTHECE.

758. *Aphanothece saxicola* Næg.

S.W.—Horton Park, Bradford.

MID W.—Whernside. Wigton Moor. Helln Pot, near Selside. Linn Gill.

N.E.—Pilmoor, near Thirsk.

Var. *sphærica* West, 1893.

N.E.—Pilmoor, near Thirsk.

759. *Aphanothece microscopica* Næg.

S.W.—Ogden Clough.

MID W.—Penyghent. Helln Pot, near Selside.

760. *Aphanothece nidulans* Richter, 1884.

MID W.—Forming bright green subgelatinous patches, along with *Cosmarium speciosum* var. *biforme*, on constantly wet rocks, Cowside Beck, Arncliffe. Diam. cell 1 μ .

This species has not previously been recorded for the British Isles.

GENUS SYNECHOCOCCUS Näg.

761. **Synechococcus major** Schröter.

[Syn. *S. crassus* Arch.].

S.W.—Ogden Clough.

MID W.—Adel Bog. South of Cray Moss. Cowside Beck, Arncliffe.

N.E.—Pilmoor, near Thirsk.

762. **Synechococcus æruginosus** Näg.

MID W.—Cowside Beck, Arncliffe. Langcliffe, near Settle.

N.W.—Mossdale Moor, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

GENUS DACTYLOCOCCOPSIS Hansg.

763. **Dactylococcopsis montana** West & G. S. West.

Cells solitary or associated in families of about 4 to 16; cells elliptical, barrel-shaped or oblique, with attenuated poles which are slightly rounded at apex, about two to three times longer than the diameter; cells of the families generally somewhat distant from each other, after division approximate; cytoplasm pale æruginous. Length of cells, 8.6—11.5 μ ; breadth of cells 3.5—4 μ .

The form of the cells readily distinguishes this species from *D. rupestris* Hansg. and *D. raphidioides* Hansg. It also has a different habitat, and the families of cells, which appear to be surrounded by a small amount of mucus, attain a somewhat larger size than in either of the two species mentioned. The cell-walls are very firm and the division of the cells is in one direction only, being somewhat oblique (as in *Dactylococcus*!). The chromatophore does not entirely fill the cell, there being a clear space near to one margin (also as in *Dactylococcus*!); there

is also a more or less conspicuous granule towards each end of the chromatophore.

S.W.—Keighley Moor.

N.W.—Cowgill Wold Moss, Widdale Fell.

GENUS GLAUCOCYSTIS Itzigs., 1854.

764. **Glaucocystis Nostochinearum** Itzigs.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mossdale Moor, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

GENUS MERISMOPEDIA Meyen, 1839.

765. **Merismopedia glauca** (Ehrenb.), Näg.

S.W.—Cullinworth. Mirfield. Greetland, near Halifax.

MID W.—Adel Bog. Wherside. Ribbleshead.

N.W.—Mickle Fell. Lund's Fell. Jervaulx Abbey.

N.E.—Strensall. Scarborough Mere. Scalby Beck. Saltburn.

S.E.—Riccall Common. Peat deposit, Filey. Skipwith Common.

766. **Merismopedia punctata** Meyen.

N.E.—Rievaulx Abbey.

S.E.—Riccall Common.

767. **Merismopedia hyalina** Kütz.

S.W.—Pond, Frizinghall, among *Microthamnion Kützingianum* (iii. 1897).

768. **Merismopedia æruginea** Bréb.

MID W.—Crook Gill, near Buckden.

N.W.—Cowgill Wold Moss, Widdale Fell.

GENUS TETRAPEDIA Reinsch., 1867.

769. **Tetrapedia Reinschiana** Arch.

MID W.—Langcliffe, near Settle.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common. Skipwith Common.

770. **Tetrapedia glaucescens** (Wittr.) Boldt.

MID W.—Langcliffe, near Settle.

N.E.—Pilmoor, near Thirsk (iv. 1898).

GENUS CÆLOSPHÆRIUM Näg., 1849.

771. **Cæloosphærium Kützingianum** Näg.

MID W.—Ingleborough.

N.W.—Jervaulx Abbey.

GENUS GOMPHOSPHERIA Kütz., 1836.

772. **Gomphosphæria aponina** Kütz., 1836.

MID W.—Cam Fell (viii. 1896).

N.E.—Pilmoor, near Thirsk.

GENUS CLATHROCYSTIS Henfrey, 1856.

773. **Clathrocystis æruginosa** (Kütz.) Henfrey.

MID W.—Pond, Boston Spa (iv. 1897).

S.E.—Hornsea Mere, very fine.

774. **Clathrocystis roseo-persicinus** (Kütz.) Cohn.

[Syn. *Protococcus roseo-persicinus* Kütz.; *Polycystis roseo-persicinus* (Kütz.) Gutw., 1895].

S.W.—Bradford (ix. 1896).

N.E.—Pilmoor, near Thirsk. Malton.

GENUS POLYCYSTIS Kütz., 1845.

775. **Polycystis marginata** (Menegh.) Richter.

[Syn. *Microcystis marginata* (Menegh.) Kütz.; *Anacystis marginata* Menegh.].

MID W.—Old Cote Moor (viii. 1896).

776. **Polycystis elabens** (Bréb.) Kütz.

MID W.—Roundhay Park, Leeds.

N.E.—Pilmoor, near Thirsk. Carlton Bank.

777. **Polycystis Flos-aquæ** Wittr., 1879.

MID W.—Boston Spa.

778. **Polycystis viridis** A. Br., 1867.

N.E.—Pilmoor, near Thirsk.

This species has not previously been recorded for the British Isles.

GENUS GLÆOCAPSA Kütz., 1843; em. Näg., 1849.

779. **Glæocapsa didyma** Kütz.

MID W.—Helln Pot, near Selside.

780. *Glœocapsa æruginosa* (Carm.) Kütz.
MID W.—Helln Pot, near Selside.
781. *Glœocapsa caldariorum* (Suring.) Rabenh.
S.W.—Greenhouse, Cullingworth (T. Hebden). Horton,
Manningham Park.
782. *Glœocapsa polydermatica* Kütz.
S.W.—Keighley. Bingley.
MID W.—Harrogate. Otley. Baildon.
N.W.—Cautley Spout.
N.E.—Strensall.
783. *Glœocapsa arenaria* (Hass.) Rabenh.
MID W.—Holden Gill, near Keighley. Malham Tarn Bog.
N.E.—Strensall.
784. *Glœocapsa Ralfsiana* (Harv.) Kütz.
MID W.—Penyghent (iv. 1896). Ingleborough.

GENUS APHANOCAPSA Näg.

785. *Aphanocapsa rivularis* (Carm.) Rabenh.
N.W.—Mickle Fell.
N.E.—Scarborough Mere.
786. *Aphanocapsa Grevillei* (Berk.) Rabenh.
MID W.—Ingleborough. Baildon. Helln Pot, near Selside.
Linn Gill.
N.W.—Howgill Fells. Cautley Spout. Mickle Fell.
787. *Aphanocapsa testacea* (A. Br.) Näg.
MID W.—Settle (H. F. Parsons).
N.W.—Cautley Spout.
788. *Aphanocapsa Castagnei* (Kütz.) Rabenh.
N.W.—Cowgill Wold Moss, Widdale Fell.

This species has not previously been recorded for the British Isles.

GENUS PORPHYRIDIDIUM Näg., 1849.

789. *Porphyridium cruentum* (Ag.) Näg. [Syn.
Palmella cruenta Ag.; *Aphanocapsa cruenta* (Ag.)
Hansg.].

Forming dark purplish-red clots on damp earth, rocks, and stones.

S.W.—Sheffield (A. Carr). Bradford. Bingley. Idle. Shelf.

MID W.—Wetherby (F. A. Lees). Leeds district (J. Abbott). Selby (H. F. Parsons). Markington! (Rev. J. S. Tute).

GENUS CHROOCOCCUS Näg., 1849.

790. **Chroococcus turgidus** (Kütz.) Näg.

S.W.—Cullingworth. Steeton. Elslack.

MID W.—Holden Gill (T. Hebden). Wigton Moss. Ingleborough. Wherside. Baildon. Malham Tarn Bog. Penyghent. Cam Fell. Giggleswick Common.

N.W.—Baugh Fell. Snaizeholme Fell. Cautley Spout.

N.E.—‘Frequent.’ Pilmoor, near Thirsk.

S.E.—Riccall Common. Hornsea Mere. Sandholme. Market Weighton.

791. **Chroococcus helveticus** Näg.

S.W.—Ogden Clough.

MID W.—Wet rocks, Shipley Glen (vii. 1895). Holden Gill, near Keighley. South of Cray Moss.

N.W.—Lund’s Fell.

This species has not previously been recorded for the British Isles.

792. **Chroococcus giganteus** West.

N.W.—Hunter’s Hole, Craydale Moor (1,900 feet).

793. **Chroococcus cohærens** (Bréb.) Näg.

MID W.—Penyghent. Cocket Moss, near Giggleswick. Staveley Dam, near Knaresborough.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

794. **Chroococcus minor** (Kütz.) Näg.

S.W.—Ogden Clough.

MID W.—Kilnsey. Langcliffe, near Settle.

N.W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

Forma **major** West.

N.W.—Cronkley Fell.

795. **Chroococcus pallidus** Näg.

MID W.—On dripping rocks, Shipley Glen (iv. 1895). Near Buckden. Old Cote Moor. Helln Pot, near Selside. Linn Gill.

N.W.—Mossdale Moor, Widdale Fell. Lund's Fell.

796. **Chroococcus rufescens** (Bréb.) Näg.

MID W.—Holden Gill, near Keighley. Cowside Beck, Arncliffe.

N.E.—Pilmoor, near Thirsk.

797. **Chroococcus schizodermaticus** West.

S.W.—On wet rocks, near Bingley.

MID W.—Boston Spa. Linn Gill.

N.W.—Cautley Spout, very fine.

Var. **badio-purpureus** West & G. S. West.

MID W.—Helln Pot, near Selside.

BACILLARIEÆ.

ORDER RAPHDIEÆ.

FAMILY CYMBELLEÆ.

GENUS AMPHORA Ehrenb., 1831.

798. **Amphora ovalis** Kütz.

S.W.—Roche Abbey (E. Hunter). Marley, near Bingley. Cullingworth. Near Keighley. Doncaster. Askern, Cusworth and Hatfield districts; Firsby reservoir; Roche Abbey; Rossington (M. H. Stiles).

MID W.—South Milford (W. B. Turner). Baildon. Moughton Fell. Malham Cove (J. M. Kirk). Malham Tarn. Kilnsey. Otley. Boston Spa. Ingleton.

N.W.—Cotterdale. Jervaulx Abbey.

N.E.—Seamer. Scarborough Mere. Whitby. Staindale. Cornelian Bay. Saltburn.

S.E.—Routh. Beverley. Tickton. Loftsome Bridge, near Wressle. Market Weighton.

Var. **affinis** Kütz.

S.W.—Cusworth district (M. H. Stiles).

Var. **Pediculus** Kütz. [Syn. *Amphora Pediculus* (Kütz.)
Grun. ; *Amphora minutissima* W. Sm.].

S.W.—Heaton. Hatfield district ; Doncaster town water ;
Roche Abbey (M. H. Stiles).

N.W.—Mickle Fell.

N.E.—Staithes.

S.E.—Beverley ; Cottingham ; near Woodmancy ; Newbald
(G. Norman).

799. **Amphora Normanii** Rabenh.

S.E.—Hull (G. Norman). Growing on wall of greenhouse.

800. **Amphora hyalina** Kütz.

S.W.—Goole (E. Hunter).

GENUS CYMBELLA Ag., 1830.

801. **Cymbella Ehrenbergii** Kütz.

S.W.—Cusworth, near Doncaster ! (M. H. Stiles).

MID W.—Malham Tarn.

N.E.—Scarborough Mere. Seamer.

S.E.—Hornsea Peat Deposit ; Cottingham ; Spring Ditch
(G. Norman).

802. **Cymbella cuspidata** Kütz.

S.W. — Greetland, near Halifax. Roche Abbey (J. N.
Coombe). Swill Hill. Ogden Clough. Liversedge ! (Rev. W.
Fowler). Cragg Vale, towards Blackstone Edge. Askern and
Cusworth districts (M. H. Stiles).

MID W.—Adel Bog. Rombald's Moor. Harrogate ! (G. Nor-
man). Near Norwood Hall, above Lindley Reservoir. Eldwick.
Ribblehead. Boston Spa. Cocket Moss, near Giggleswick.
Hawksworth Springs. Ilkley.

N.E.—Levisham. Terrington. Saltersgate (G. Norman).

S.E.—Beverley. Tickton. Cottingham (G. Norman).

Var. **naviculiformis** Auersw.

S.W.—Cusworth, Hatfield, and Roche Abbey districts (M. H.
Stiles).

803. *Cymbella subæqualis* Grun.

S.W.—Cusworth district, Doncaster (M. H. Stiles).

804. *Cymbella delicatula* Kütz.

S.W.—Cusworth district, Doncaster (M. H. Stiles).

805. *Cymbella affinis* Kütz.

S.W.—Marley, near Bingley. Ogden Clough. Crimsworth Dean.

MID W.—Near Buckden. Penyghent. Harrogate.

N.E.—Rievaulx Abbey.

806. *Cymbella gastroides* Kütz.

S.W.—Goole; Roche Abbey Lake (E. Hunter). Askern and Hatfield districts; Firsby Reservoirs (M. H. Stiles). Marley, near Bingley.

MID W.—Baildon. Ribbleshead. Ingleton. Simon's Fell (iv. 1892).

807. *Cymbella lanceolata* (Ehrenb.), Kirchn.[Syn. *Cocconema lanceolatum* Ehrenb.].

S.W.—Cusworth district; Doncaster town water; Firsby reservoirs; Rossington; Hatfield district (M. H. Stiles). Askern (F. H. Allen; J. M. Kirk; M. H. Stiles). Hatfield Chase (J. M. Kirk). Roche Abbey (J. N. Coombe; M. H. Stiles). Nab Wood, near Bingley. Bradford.

MID W.—Birk Crag, Harrogate (G. Norman). Roundhay (W. B. Turner). Baildon. Moughton Fell. Holden Gill, near Keighley. Horton-in-Ribblesdale. Arthington. Malham Tarn Bog. Buckden.

N.E.—Staindale. Hayburn Wyke. Cleave Cliffs, north of Scalby. Carlton Bank, Stokesley.

S.E.—Beverley. Spring Ditch; Wawne; Risby Pond; Newbald; Hornsea Peat Deposit; Driffield (G. Norman).

Var. *Boechii* Ehrenb.; Rabenh. [non *Doryphora Boechii* W. Sm.=*Brebissonia Boechii* (Kütz.) Grun.].

S.W.—Roche Abbey (E. Hunter).

808. *Cymbella cymbiformis* (Kütz.) Bréb.[Syn. *Cocconema cymbiforme* (Kütz.) Ehrenb.].

S.W.—Woolley. Bradford. Ogden Clough. Roche Abbey (J. N. Coombe; M. H. Stiles). Askern and Cusworth districts; Firsby reservoir; Doncaster town water (M. H. Stiles).

MID W.—Roundhay (W. B. Turner). Baildon. Moughton Fell. Whernside (1900 ft.).

N.W.—Frequent. Great Sleddale.

S.E.—Riccall Common. Beverley. Hull. Spring Ditch; Newsholme Lake (G. Norman).

Var. **parva** (W. Sm.) V. H.

[Syn. *Cocconema parvum* W. Sm.].

S.W.—Askern district; Doncaster town water (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Bradford. Bingley. Denholme.

MID W.—Baildon. Wigton Moor. Holden Gill, near Keighley. Cowside Beck, Arncliffe. Cocket Moss, near Giggleswick.

N.E.—Common. Staindale. Hayburn Wyke. Saltburn.

N.W.—Dodd Fell.

S.E.—Anlaby Road (Dr. Munroe). Hull (G. Norman).

809. **Cymbella Cistula** (Hempr.) Kirchn.

[Syn. *Cocconema Cistula* Hempr.].

S.W.—Bradford. Roche Abbey (J. N. Coombe; M. H. Stiles). Askern, Cusworth, and Hatfield districts; Rossington; Firsby reservoirs and Doncaster town water (M. H. Stiles).

MID W.—Rombald's Moor. Moughton Fell. Arthington. Staveley Dam, near Knaresborough. Cowside Beck. Arncliffe. Linn Gill. Whernside.

N.W.—Dodd Fell. Cautley Spout.

N.E.—Common. Staindale.

S.E.—Beverley! Loftsome Bridge, near Wressle. Spring Ditch; Hornsea Peat Deposit; Skirlaugh; Wawne (G. Norman).

Var. **maculata** (Kütz.) Grun.

[Syn. *Cymbella maculata* Kütz.].

S.W.—Firsby reservoir (M. H. Stiles).

MID W.—Boston Spa.

N.W.—Lund's Fell.

S. E.—Ditch, Anlaby to Hessle Road; Beverley; Cottingham; Haltenprice; Reservoir Waterworks (G. Norman).

810. **Cymbella truncata** Rabenh.

MID W.—Esholt.

811. **Cymbella helvetica** Kütz.

MID W.—Ingleton. Shipley Glen. Cowside Beck, Arncliffe. Dropping Well, Knaresborough.

N. E.—Rievaulx Abbey. Saltersgate (G. Norman).

S. E.—Spring Ditch; Market Weighton Canal (G. Norman).

812.—**Cymbella lævis** Näg.

MID W.—Ingleton, on wet rocks, amongst *Cladophora glomerata*.

GENUS ENCYONEMA Kütz., 1834.

813. **Encyonema prostratum** (Berk.) Ralfs.

S. W.—Roche Abbey (J. N. Coombe; M. H. Stiles). Bradford. Firsby reservoirs; Hatfield district (M. H. Stiles).

MID W.—Harrogate (G. Norman). Malham Tarn (H. F. Parsons. Moughton Fell. How Hill, Markington (Rev. J. S. Tute!). Ribbleshead. Near Otley. Knaresborough. Ingleborough.

N. W.—Muker.

N. E.—Terrington. Ingleby Greenhow.

S. E.—Wawne; Reservoir Waterworks, Hull (G. Norman).

814. **Encyonema turgidum** (Greg.) Grun.

[Syn. *Cymbella turgida* Greg.].

S. W.—Wibsey. Denholme. Liversedge! (Rev. W. Fowler).

MID W.—Bolton Woods. Simon's Fell. Linn Gill. Rombald's Moor.

N. E.—Scalby Beck. Ingleby Greenhow.

815. **Encyonema cæspitosum** Kütz.

S. W.—Bradford. Allerton. Bingley. Mirfield. Roche Abbey (J. N. Coombe; M. H. Stiles). Firsby reservoirs. Rossington; Hatfield district (M. H. Stiles).

MID W.—Birk Crag. Harrogate (G. Norman). Ingleborough. Arthington. Rombald's Moor. Malham Tarn.

N.W.—Cautley Spout. Rombaldkirk. Rokeby.

N.E.—Rievaulx Abbey. Malton.

S.E.—Tickton. Routh. Beverley. Wawne; Hull (G. Norman).

816. **Encyonema ventricosum** (Ag.) Kütz.

[Syn. *Cymbella ventricosa* Ag.].

S.W.—Coley, near Shelf.

MID W.—Ingleton ! (H. F. Parsons); with sporangial valves, ix. 1898. Roundhay (W. B. Turner). Baildon. Ingleborough. Rombald's Moor. Ribblehead. Boston Spa. Harrogate. Moughton Fell.

N.W.—Dodd Fell. Mickle Fell.

S.E.—Routh. Near Sutton. Beverley. Skirlaugh; near Cottingham; Benningholme (G. Norman).

817. **Encyonema gracile** Rabenh.

S.W.—Cullingworth. Cragg Vale, towards Blackstone Edge.

MID W.—Wigton Moor. Kilnsey. Cocket Moss, near Giggleswick.

S.E.—Skipwith Common.

Var. **Scotica** (W. Sm.) Van Heurck.

[Syn. *Cymbella Scotica* W. Sm.].

N.E.—Saltersgate (G. Norman).

S.E.—Cottingham (G. Norman).

FAMILY *NAVICULÆÆ*.

GENUS *MASTOGLOIA* Thw., 1848.

818. **Mastogloia Smithii** Thw.

S.W.—Askern district (M. H. Stiles).

MID W.—Baildon, vii. 1893.

S.E.—Near Stone Ferry (G. Norman).

819. **Mastogloia Dansei** Thw.

S.E.—Outlet, Hornsea Mere (G. Norman).

GENUS *STAURONEIS* Ehrenb., 1843.

820. **Stauroneis Phoenicenteron** (Nitzsch) Ehrenb.

S.W.—Bradford. Keighley Tarn. Askern, Cusworth, and Hatfield districts (M. H. Stiles).

MID W.—Harrogate (G. Norman). South Milford (W. B. Turner). Malham Tarn. Wigton Moor. Bowland Knotts.

N.E.—Near Scarborough. Seamer. Strensall. Terrington. Pilmoor, near Thirsk. Saltersgate (G. Norman).

N.W.—Jervaulx Abbey.

S.E.—Tickton. Cottingham; Skirlaugh; Risby Pond; Market Weighton; Hornsea Peat Deposit (G. Norman).

821. **Stauroneis gracilis** Ehrenb.

S.W.—Hatfield district (M. H. Stiles). Doncaster.

MID W.—Shipley Glen. Langcliffe, near Settle.

S.E.—Near River Hull; Hornsea Peat Deposit; Spring Ditch; Haltenprice (G. Norman).

822. **Stauroneis acuta** W. Sm.

[Syn. *Pleurostaurum acutum* Rabenh.].

MID W.—Bog at the bottom of Shipley Glen, in abundance (iv. 1895).

N.W.—Great Shunnor Fell.

S.E.—Hornsea Peat Deposit; Risby Pond (G. Norman).

823. **Stauroneis salina** W. Sm.

S.E.—In brackish water, near Stoneferry; outlet, Hornsea Mere; ditch near River Hull (G. Norman).

824. **Stauroneis anceps** Ehrenb.

S.W.—Roche Abbey (J. N. Coombe; M. H. Stiles). Doncaster town water; Hatfield district (M. H. Stiles). Halifax.

MID W.—Baildon. Adel. Wigton Moor. Malham Tarn.

N.W.—Mickle Fell. Jervaulx Abbey.

N.E.—Whitby. Strensall. River Derwent at Forge Valiey.

S.E.—Routh. Tickton. Spring Ditch; Cottingham; Beverley; Wawne; Haltenprice; Hornsea Peat Deposit (G. Norman).

Var. **linearis** (Kütz.) Van Heurck.

[Syn. *Stauroneis linearis* Kütz.].

N.W.—Jervaulx Abbey.

S-X
64.5

THE
TRANSACTIONS
OF THE
YORKSHIRE
NATURALISTS' UNION.

Museum of Comparative Zoology
OCT 11 1895
LIBRARY

PART 26,
Issued to the Members for the year 1900.

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Supplement to ditto.

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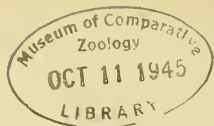
YORKSHIRE MACRO-LEPIDOPTERA
IN 1897:

BEING
THE REPORT OF THE ENTOMOLOGICAL SECTION
OF THE
YORKSHIRE NATURALISTS' UNION FOR 1897.

WILLIAM HEWETT,

HON. SECRETARY.

80424



YORKSHIRE MACRO-LEPIDOPTERA IN 1897 :

Being the Report of the Entomological Section of the Yorkshire Naturalists' Union for 1897.

WILLIAM HEWETT, HON. SECRETARY.

The season 1897 has come and gone, and entomologically speaking it has been one of the worst on record, but, fortunately, not the worst.

The experience of Messrs. Ash, Booth, Beanland, Brady, Brooks, Broadley, Boulton, Butterfield, Corbett, Harrison, Young, and myself, stated in these pages, fully confirms this statement, as also does the evidence of all the Yorkshire lepidopterists, and that of most of the British lepidopterists. The reason for this is, in my opinion, principally due to the long-continued drought, but there are of course other causes some of which will occur to my readers. The frost, rain, and high winds of late March and early April were responsible for the almost total failure of the sallow 'harvest.' I never in my twenty-one years' experience knew the 'palms' to be in better condition for favourable results than they were about the end of March, and on the only favourable night, viz., March 23rd, moths, especially *Teniocampa populeti* which at that early date was well out, swarmed, but first the rain, then the frost, and lastly the high winds soon spoil the usually attractive blossoms, so that one of the most exciting and productive means of capturing moths had to be abandoned. With a few exceptions, larvæ have been exceedingly scarce all the season, especially autumn larvæ; sugar in a few districts from 10th June to 10th July was more than usually productive, after that date an almost universal failure, even the ubiquitous and generally too conspicuous *Xylophasia polyodon* and *Triphaena pronuba* being rare visitors. Notwithstanding the bad

season, our county lepidopterists have, generally speaking, worked hard and with a perseverance worthy of better results. That energetic and enthusiastic lepidopterist, Mr. J. W. Boulton, of Hull, has had eighty outings in quest of Lepidoptera, viz., four bank-holiday excursions, twenty-seven Saturday afternoons, and forty-nine nights during the season of 1897. Nothing discourages Mr. Boulton; he is always like the immortal Mr. Micawber on the look out for something 'turning up.' His record for 1897 is not a particularly exceptional one, and I merely mention it in detail as an example for younger lepidopterists to go and do likewise.

Mr. J. Sumner, of Everingham, is another enthusiastic entomologist who has done remarkably good work during 1897, and we are indebted to him for many exceedingly interesting records. Mr. Sumner, at my suggestion, constructed a moth trap, after the pattern of that described by my friend, Mr. E. F. Studd, F.E.S., of Oxtou, Devon, in *The Entomologist* for 1893, xxvi., p. 114, and additional notes on it in *The Entomologist*, xxvii., p. 55. Mr. Studd in a letter dated December 13th, 1896, says:—'I have quite given up putting any laurel leaves in trap, but still retain drawer and muslin as being a convenient mode for extracting captures.' Mr. Sumner has made several slight improvements, suggested by practical experience. He has had it lit on 'all favourable nights from May until the end of November,' and has rarely found it without a tenant, occasionally finding as many as seventy or eighty specimens in the trap at once. The greatest number of different species in the trap on any one night was eight.

Contrary to what we should expect, Mr. Sumner has found that the greater majority of moths thus captured are in fine condition, and that they do not, as a rule, damage themselves whilst in the trap. It is remarkable, however, how very few female moths seem to be allured to the light.

I have recently had a moth trap constructed on the same pattern as Mr. Sumner's, and as Messrs. Ash and Porritt also

possess these traps and use them, I would suggest that at the end of a future season we compare notes as to the best evenings, highest number of specimens in the trap on any one night, and the greatest number of species, also the number of specimens and the number of different species of females captured. I would also suggest that where practicable a white sheet be placed behind the light, after the manner of that used at the lamps worked by the fen collectors. Very wet, very dark and very warm nights, with some wind, seem especially favourable for an abundant harvest ; fine starlight or moonlight nights very unfavourable.

With a view of making future reports something more than a mere recapitulation of species captured (not that I wish by any means to underrate the importance of these lists), I would suggest the following subjects as being especially interesting and worthy of the closest attention on the part of Yorkshire lepidopterists during the coming season ; they are all subjects on which reliable information is urgently needed. May I ask all my Yorkshire friends to help me in this great work ? I know they can and I feel sure they will.

Observations bearing upon these phenomena as observed in Yorkshire or in the North of England should be sent to *The Naturalist*, which is the organ of the Y.N.U., and I feel sure that the Editor would be pleased to have such communications for insertion.

1st.—Instances of one species pairing with another species, the sexes of each to be noted, time of day, and whether eggs were subsequently laid, and if so whether they were fertile, with particulars of the eggs, larvæ, pupæ, and resultant imagines if any.

2nd.—Where a number of any species of lepidoptera is bred, whether the males or the females emerge the first, together with the numbers of each where possible.

Charles Darwin thought the males emerged first, but

however true this may be *en moyenne* it is not always the case according to my experience.

- 3rd.—Time of emergence of each particular species bred, together with times of unusual emergence when noted.
- 4th.—The proportion of male to female moths of any species bred, whether the male or the female varies the most; state whether this latter information is supplied from wild or bred specimens; and numbers of each sex examined.
- Darwin states from information he received that the male moth is more liable to vary than the female, but my experience has taught me that to this rule there are many exceptions.
- 5th.—Instances where the male larvæ can be distinguished from the female, and by what means.
- 6th.—Records of the earliest and latest dates on which any particular species is seen.
- 7th.—Instances in which the male moth has copulated with more than one female, and whether the eggs resulting from each pairing were fertile or infertile.
- 8th.—The number of eggs laid by any particular species.
- 9th.—Any remarkable and not generally known protective resemblances occurring in the oval, larval, pupal, or imago state, with as full details as possible.
- 10th.—*Assembling*. Particulars of the different species of female moths found to be attractive to many males, together with the time of day or night when this attraction was at its height; whether the assembling ceases as soon as copulation takes place, and whether preference is shown by the female for any particular male.
- 11th.—The hours of flight of any particular species of moth; also the time of day or night at which the larvæ of any species feed, together with the names of any unusual food plant on which they are found.
- 12th.—When sugaring, to note the direction of wind, whether

sky clear or cloudy, and night warm or cool, with results as to abundance or scarcity of moths.

In concluding these preliminary remarks I wish to place on record my indebtedness to all my friends who have assisted me with particulars for this report.

Of the Diurni, the only species calling for special comment is *Thecla betulæ*, a rare species in Yorkshire. Amongst the Nocturni, *Zeuzera æsculi* and *Dicranura bifida* are the best; of the Noctuæ, the occurrence of *Hydræcia petasitis*, *Tæniocampa miniosa*, *Hecatera serena*, *Agrotis lucerneæ*, and the unusual abundance of *Calocampa solidaginis* and *Cirrhædia xerampelina* are remarkable. No very unusual species of Geometræ has been taken, but the varieties of *Abraxas ulmata* obtained by the York collectors has been, to quote Mr. G. T. Porritt's words, 'the event of the season.'

LIST OF YORKSHIRE ENTOMOLOGISTS

WHO HAVE SUPPLIED ME WITH DETAILS OF SPECIMENS CAPTURED
DURING 1897 IN YORKSHIRE.

Angel, Arthur	...	...	...	...	York.
Ash, Rev. C. D., B.A.	...	...	...	...	Skipwith Vicarage.
Beanland, J.	...	...	...	...	Saltaire.
Bloor, J.	...	...	...	...	Rotherham.
Booth, F.	...	...	...	...	Saltaire.
Boult, J. W.	...	...	...	...	Hull.
Brady, L. S.	...	...	...	...	Sheffield.
Brooks, W.	...	...	...	...	Rotherham.
Broadley, A.	...	...	...	...	Keighley.
Butterfield, E. P.	...	...	...	...	Bingley.
Charles, W. G.	...	...	...	...	Stanley, Wakefield.
Carter, W. L.	...	...	...	...	Halifax.
Corbett, H. H., M.R.C.S.	...	...	...	...	Doncaster.
Dennis, G. C., F.E.S. (the late)	...	...	...	...	York.
Dutton, R.	...	...	...	...	York.
Hague, J.	...	...	...	...	Rotherham.

Halliday, E....	...	...	...	...	Halifax.
Harrison, J....	...	...	...	...	Barnsley.
Hewett, W. ...	...	...	...	...	York.
Lofthouse, T. A. ...	...	...	...	...	Middlesbrough.
Lowther, J. ...	...	...	...	...	Beverley.
Lownsborough, T. W.	...	...	...	...	Scarborough.
Mosley, S. L. ...	...	...	...	...	Huddersfield.
Porritt, G. T., F.L.S., F.E.S.	...	...	...	...	Huddersfield.
Sumner, J. ...	...	...	...	...	Everingham.
Tordoff, J. ...	...	...	...	...	Bradford.
Walker, S. ...	...	...	...	..	York.
Waite, A. ...	...	...	...	...	Ripon.
Warwick, J. W. ...	...	...	...	...	Harrogate.
Young, C. ...	...	...	...	...	Rotherham.

Mr. W. Brooks, Grange Hall, Rotherham, says:—‘Season a very bad one.’

Mr. G. T. Porritt, F.L.S., F.E.S., Crosland Hall, Huddersfield:—‘Season very bad. Sugar an almost absolute failure until the autumn, and then not nearly so good as usual.’

Mr. L. S. Brady, of Sheffield:—‘I have not sugared in Sheffield more than half-a-dozen times this year, and when I did I got nothing.’

Dr. Corbett, M.R.C.S., of Doncaster:—‘In the early spring searching for imagines on the tree trunks gave very poor results. Sallows were of no use, but I heard of great numbers of *Tænocampidæ* being taken at sugar. Later in the season the spring larvæ were very abundant, many trees being stripped of their leaves; most of these larvæ were the ordinary pests. During the summer imagines were generally scarce. Sugaring throughout the year, with the exception of the early spring, has been very bad. The first evening that I tried the seductive sweets was June 17th, and I took twenty-seven species of *Noctuæ*. During the autumn but few moths came to the trees, and many usually common species were either altogether absent or only

represented by one or two specimens. Autumn larvæ were very scarce.'

Mr. Lownsborough, Scarborough, says :—'The year has been unusually bad. Both sallows and sugaring have been dead failures.'

Messrs. Booth and Beanland, of Saltaire :—'Not one good night sugaring during the year, and that the season has been a failure so far as collecting has been concerned'; they also note the 'unusual abundance of Ichneumons.'

Mr. Dutton, of York, 'on June 26th, in Askham Bogs, took thirty-two species of Noctuæ at sugar,' and says of this evening 'moths in profusion.'

Mr. C. Young, Rotherham 'never knew such a bad season before.'

Mr. E. P. Butterfield, Wilsden :—'Sugar is not usually attractive to moths in the Wilsden district, and this year has been no exception.'

Mr. J. Harrison, Barnsley :—'This year has been the worst I ever experienced, ramble after ramble have I come home with next to nothing; the commonest insects were not to be met with.'

Mr. J. Sumner, Everingham, has had seven or eight different species of moths in his light trap on one night, and as many as seventy or eighty specimens in on one night.

Rev. C. D. Ash, B.A., Skipwith, writes :—'Spring collecting very poor compared with last year; among early species the only plentiful one was *Hybernia progemmaria*, and of this no dark forms turned up.'

'The sallows were completely cut up by the storms and frost at the beginning of April, and I only had one good night at them. Sweeping and searching for larvæ was also rewarded with little success.

'Sugar yielded a few common species. During the latter part of May and the first fortnight in June I was away in the Isle of Man, so missed the early summer collecting. On return

ing things improved, moths being very abundant at flowers and at sugar during the latter part of June and the first ten days of July moths indeed swarmed at sugar in a way that I have not seen for years. From the third week of July, however, everything seemed to go wrong, neither sugar nor flowers seemed to have any attraction for moths, or else the moths themselves were absent. Larvæ beating was a mere waste of time and labour, three hours' hard work often yielding less than twenty individuals of all sorts, even the commonest species failing to put in an appearance.'

Mr. A. Broadley, Keighley:—'We have had a wretched season here; sugar has been an entire failure all through the season.'

Mr. J. W. Boulton, Hull, says:—'One of the worst seasons I have known.'

DIURNI.

Anthocharis cardamines. Fairly common. Beverley (*J.L.*); Malton Road, beyond Hopgrove (*W.H.*); Stanley (*W.G.C.*); Holtby (*W.H.*).

Gonopteryx rhamni. Grassington, August Bank Holiday (*F.B.*).

Argynnis selene. Askham Bogs, dark (*S.W.*); Sandburn (*W.H.*).

Argynnis aglaia. Grassington (*F.B.*); Kirbymoorside, common (*A.A.*).

Argynnis paphia. Helmsley, common (*A.A.*, *S.W.*).

Vanessa c-album. Two chrysalids and one larva taken on nettle at Helmsley (*A.A.*).

Vanessa atalanta. Middlesbrough (*T.L.*), only one specimen seen all season; Stanley (*W.G.C.*).

Venessa io. Stanley (*W.G.C.*).

Vanessa cardui. A few before hibernation, Boroughbridge Road (*S.W.*).

- Erebia æthiops** (Esp.). Grassington, in profusion (*E.P.B.*).
Mr. Butterfield writes :—‘ Whilst sat down on the top of one of the scars, *E. æthiops* frequently settled upon my hand, and they would remain for some time when I kept perfectly motionless; later on in another part of the wood the same habit was repeated.’ Grassington, common, August Bank Holiday (*F.B.*).
- Pararge egeria**. A few, Sledmere (*S.W.* and *W.H.*).
- Pararge megæra**. Grassington (*F.B.*).
- Satyrus semele**. Grassington (*F.B.*); Kirbymoorside (*A.A.*).
- Epinephele tithonus**. Grassington (*F.B.*); Everingham, several near station, August Bank Holiday (*C.D.A.* and *W.H.*).
- Epinephele hyperanthus**. Abundant, Sandburn (*W.H.*).
- Chortobius typhon**. Common, Thorne Moor, Jubilee Day (*J.W.B.* and *Porter*).
- Thecla betulæ**. Helmsley, three captured, two males and one female (*A.A.*).
- Thecla w-album**. Helmsley (*S.W.*).
- Lycæna argiolus**. Fairly common, Rotherham (*J.H.*).
- Lycæna astrarche** (Bgstr.). Sawdondale, August 3rd, Mr. Brittain, of Scarborough, communicated by *T.W.L.*, Scarborough; Sledmere (*W.H.*).
- Thanaos tages**. Common, Strensall (*S.W.*).
- Hesperia sylvanus**. Askham Bogs (*S.W.*); Sandburn Common (*S.W.* and *W.H.*); Strensall Common (*W.H.*) common, Doncaster (*H.H.C.*).

NOCTURNI.

- Acherontia atropos**. Scarce. *C.D.A.* writes :—‘ Out of six larvæ obtained at Skipwith last year two produced perfect specimens in August; these had not been forced.’ One sent to set for museum, and hear of another being taken, Middlesbrough (*T.L.*).

- Sphinx convolvuli.** Anlaby, Hull (*J.W.B.*); a specimen taken at Barnsley, Sept. 6th, and now in my possession (*J.H.*); one found at rest on a coke-heap at Rotherham, Sept. 25th (*C.Y.*).
- Chærocampa porcellus.** Everingham, a female, eggs obtained (*J.S.*).
- Chærocampa elpenor.** One specimen at Askham Bogs, June 10th (*R.D.*); Everingham (*J.S.*).
- Smerinthus ocellatus.** Pupæ, Hull (*W.J.B.*); larvæ, abundant, York (*S.W.*); larvæ, Everingham, August Bank Holiday excursion (*M.W.*); Stanley (*W.G.C.*).
- Smerinthus populi.** Pupæ, Hull (*W.J.P.*); Middlesbrough (*T.A.L.*); larvæ abundant, York (*S.W.*); one pupa obtained from roots of poplar in my own garden, York (*W.H.*), also specimens brought to me, obtained at York (*W.H.*); larvæ obtained at Everingham, August Bank-Holiday excursion (*M.W.*); Stanley (*W.G.C.*).
- Trochilium crabroniformis.** At rest on poplar between 8 and 9 a.m. on June mornings, Middlesbrough (*T.A.L.*).
- Ino statices.** Common, Doncaster (*H.H.C.*).
- Zygæna loniceræ.** Scarce, Strensall (*W.H.*). The field bordering Strensall Common where this species used to be obtained in great numbers has now been ploughed up, but odd specimens may still be taken on the outskirts of the field.
- Zygæna filipendulæ.** Common, Strensall, in one locality; also occurs near Warthill station, and on Sandburn and Strensall Common.
- Nola confusalis.** At rest on palings, Driffeld (*T.A.L.*).
- Lithosia mesomella.** Strensall and Sandburn Common, where some years it occurs in considerable numbers.
- Lithosia complana.** At light, Everingham (*J.S.*).
- Euchelia jacobææ.** Scarce, Beverley (*J.L.*).

- Nemeophila plantaginis.** Common, Drewtondale, June (*J.L.*); larvæ, Rombalds Moor (*J.T.*, *F.B.*, and *J.B.*).
- Arctia caja.** A five-winged specimen, Bradford, reported by *J.M.*, Huddersfield; larvæ scarce, York (*W.H.*); scarce, Beverley (*J.L.*); larvæ, Hull (*W.J.P.*); Rotherham, one very nice variety has the top wings very much rounded, quite blunt at the tips, and another variety with only two wings, both on one side, and only one antenna (*J.Br.*).
- Spilosoma fuliginosa.** Larvæ fairly common, Rombalds Moor (*J.T.*).
- Spilosoma mendica.** At light, Everingham (*J.S.*), three males: one May 6th, one May 22nd, and one May 23rd; one specimen, a female, Middlesbrough (*T.A.L.*).
- Spilosoma lubricipeda.** Larvæ common, Beverley (*J.L.*); larvæ scarce, York (*W.H.*).
- Spilosoma menthastri.** Common at light, Everingham, a pair taken in cop. on roadside close to Flamborough station, female, deposited some 180 eggs, and I now have the pupæ obtained from these (*W.H.*); Stanley (*W.G.C.*).
- Hepialus sylvinus.** Halifax (*W.L.C.*).
- Hepialus vellela.** Middlesbrough (*T.A.L.*); Halifax (*W.L.C.*); swarmed, Bradford (*F.B.* and *J.B.*).
- Hepialus hectus.** Middlesbrough (*T.A.L.*); Halifax (*W.L.C.*); Strensall (*W.H.*).
- Cossus ligniperda.** Several pupæ, Hull (*W.J.P.*).
- Zeuzera pyrina (æsculi).** Stanley (*W.G.C.*).
- Dasychira pudibunda.** Larvæ, Everingham (*J.S.*).
- Liparis salicis.** Stanley (*W.G.C.*).
- Pœcilocampa populi.** At light, Everingham (*J.S.*); one pupa obtained at root of elm tree, Oct. 28th, Beverley (*J.L.*); one on lamp, Nov. 2nd, Beverley (*J.L.*).
- Eriogaster lanestris.** Larvæ very common, and I had several nests brought me from Strensall, Sutton-on-Forest and Heworth; I also noticed a nest near Barmby (*W.H.*)

- Bombyx rubi.** Larvæ scarce, Baildon and Rombalds Moor, Bradford (*F.B.*, *J.T.*, and *J.B.*); larvæ and imago, larvæ common, Keighley (*A.B.*); scarce, Strensall Common (*W.H.*).
- Bombyx quercus.** Larvæ common, Hull (*W.J.P.*); larvæ commoner than usual, Beverley (*J.L.*).
- Bombyx quercus** var. **callunæ.** Larvæ and imago, Rombalds Moor (*W.H.*, *J.T.*, *F.B.*, and *J.B.*); olive-green variety, Bradford (*Mosley*).
- Odenestis potatoaria.** At light, Everingham (*J.S.*); larvæ common, Hull (*W.J.P.*); larvæ scarce, York (*W.H.*).
- Saturnia pavonia (carpini).** Common, Rombalds Moor (*W.H.* and *J.T.*); Strensall Common (*W.H.*).
- Drepana falcua.** Strensall (*W.H.*).
- Cilix glaucata (spinula).** Beverley (*J.L.*); Stanley (*W.G.C.*); Everingham (*J.S.*).
- Dicranura furcula.** Strensall (*W.H.*); ten from June 20th to July 1st on willows, Beverley (*J.L.*).
- Dicranura bifida.** One specimen, Beverley (*J.L.*); one on poplar trunk, June 2nd, Middlesbrough (*T.A.L.*).
- Dicranura vinula.** Beverley (*J.L.*); larvæ common, Keighley (*A.B.*); larvæ, Everingham, August Bank-Holiday excursion (*M.W.*); Stanley (*W.G.C.*).
- Lophopteryx camelina.** Beverley (*J.L.*); Middlesbrough (*T.A.L.*); Strensall (*W.H.*).
- Notodonta dromedarius.** Larvæ, Strensall (*W.H.*).
- Notodonta ziczac.** Larvæ, Everingham, August Bank-Holiday excursion (*C.D.A.* and *W.H.*).
- Notodonta trepida.** One female, May 9th, at light, Everingham (*J.S.*).
- Phalera bucephala.** Larvæ very common, Stanley (*W.G.C.*); Everingham (*J.S.* and *W.H.*); Kexby (*W.H.*).
- Thyatira batis.** Sandburn, at sugar (*W.H.*).

Cymatophora duplaris. Askham Bogs, sugar (*S.W.*).

Asphalia flavicornis. Shipley Glen (*J.T.*); scarce, Doncaster (*H.H.C.*).

NOCTUÆ.

Bryophila perla. York (*W.H.*).

Acronycta leporina var. **bradyporina.** 3rd June, ten at sugar, Askham Bogs (*R.D.*); six at sugar, June 29th, Askham Bogs, June 26th, also obtained by *S.W.*; three specimens at sugar, Askham Bogs, June 29th (*R.D.*).

Acronycta rumicis Saltaire (*F.B.* and *J.B.*); Stanley (*W.G.C.*).

Acronycta menyanthidis var. **salicis.** Strensall, York (*S.W.*); Sandburn, common (*J.H.*); one female at rest, one at sugar (*W.H.*); Saltaire (*F.B.* and *J.B.*).

Leucania conigera. Stanley (*W.G.C.*).

Leucania impudens (*pudorina*). Springly, June 10th, Askham Bogs (*R.D.*).

Tapinostola elymi. Common on one warm night, Tod Point, Middlesbrough (*T.A.L.*).

Nonagria arundinis (*typhæ*). Hull, pupæ (*J.W.B.*).

Calamia lutosa. One at light, Everingham (*J.S.*).

Gortyna ochracea (*flavago*). Bred, Middlesbrough (*T.A.L.*).

Hydrœcia nictitans. Everingham (*J.S.*).

Hydrœcia petasitis. Stanley (*W.G.C.*).

Hydrœcia micacea. August 16th, Beverley (*J.L.*); Middlesbrough (*T.A.L.*); York (*W.H.*).

Xylophasia lithoxylea. One, Halifax (*W.L.C.*).

Xylophasia sublustris. Three specimens obtained at sugar, Askham Bogs, June 29th (*R.D.* and *S.W.*).

- Xylophasia monoglypha (polyodon) var. infuscata.**
Sandburn (*W.H.*).
- Neuria reticulata (saponariæ).** Two, sugar, Hull (*J.W.B.*); sugar, Doncaster (*H.H.C.*); Everingham (*J.S.*).
- Neuronia popularis.** Common at light, Everingham (*J.S.*).
- Charæas graminis.** Halifax (*W.L.C.* and *E.H.*); Stanley (*W.G.C.*).
- Cerigo cytherea.** Sugar, Askham Bogs, July 23rd (*R.D.*); at light, Middlesbrough (*T.A.L.*); Hull, sugar (*J.W.B.*).
- Luperina cespitis.** Common, at light, Everingham (*J.S.*).
- Mamestra abjecta.** Sugar, a single specimen noticed but not secured, Middlesbrough (*T.A.L.*).
- Apamea gemina** and var. **remissa.** Sugar, Middlesbrough, (*T.A.L.*).
- Apamea unanimis.** Hull, sugar (*J.W.B.* and *W.J.P.*); sugar, Middlesbrough (*T.A.L.*); five at sugar, Askham Bogs, June 10th (*R.D.*); also obtained by *S.W.*; sugar, Doncaster (*H.H.C.*).
- Miana strigilis** and var. **æthiops.** Especially common, sugar, Middlesbrough (*T.A.L.*).
- Miana literosa.** Hull, sugar (*J.W.B.*).
- Miana bicoloria.** Hull, sugar (*J.W.B.*).
- Miana arcuosa.** Common, Middlesbrough (*T.A.L.*).
- Celæna haworthii.** Halifax, very few, season unfavourable (*E.H.*).
- Grammesia trigrammica (trilinea).** Everingham (*J.S.*).
Var. **bilinea**, female, captured at sugar, and obtained ova, Everingham (*J.S.*); larvæ feeding, Skipwith (*C.D.A.*).
- Caradrina morpheus.** Sugar, Askham Bogs, July 23rd (*R.D.*); Saltaire (*F.B.* and *J.B.*).
- Caradrina alsines.** Hull (*J.W.B.* and *W.J.P.*).
- Rusina tenebrosa.** Everingham (*J.S.*).
- Agrotis vestigialis.** Everingham, sugar, one very dark specimen obtained (*J.S.*).

- Agrotis suffusa.** Rare, Doncaster (*H.H.C.*); Stanley (*W.G.C.*).
- Agrotis exclamationis.** Abundant at sugar, Askham Bogs, and some nice varieties taken (*R.D.*); the moth of the year, and some interesting forms seen, Skipwith (*C.D.A.*); swarmed at sugar, Everingham (*J.S.*).
- Agrotis nigricans.** Sugar at Askham Bogs, July 23rd (*R.D.*); fairly common, sugar, Skipwith (*C.D.A.*).
- Agrotis agathina.** Larvæ scarce, Skipwith (*C.D.A.*).
- Agrotis strigula (porphyrea).** Larvæ scarce, Skipwith (*C.D.A.*); Strensall and Sandburn (*W.H.*).
- Agrotis obscura (ravida).** About twenty in Hull district (*J.W.B.*).
- Agrotis lucerneæ.** One, Halifax (*W.L.C.*).
- Noctua glareosa.** Common, Saltaire (*F.B.* and *J.B.*).
- Noctua augur.** Sugar, Askham Bogs (*R.D.* and *S.W.*).
- Noctua festiva.** Not common, York (*W.H.*).
- Noctua rubi.** Fine yellow variety at sugar, June 29th, Askham Bogs (*R.D.*).
- Noctua umbrosa.** Common, Hull (*J.W.B.*).
- Triphæna janthina.** Rotherham (*J.H.*); Stanley (*W.G.C.*).
- Triphæna fimbria.** A few larvæ obtained at Rotherham (*J.H.*); one at sugar, Sandburn (*W.H.*).
- Triphæna orbona.** Fairly common, Skipwith (*C.D.A.*); one at sugar, Sandburn (*W.H.*); Stanley (*W.G.C.*).
- Mania maura.** Sugar, Apperley Bridge (*J.T.*); Stanley (*W.G.C.*).
- Panolis piniperda.** A few at sallows, Strensall (*W.H.*); at rest on pine-trees, Wheldrake (*W.H.*).
- Pachnobia leucographa.** Three at sallows, Bishops Wood (*W.H.*); two at sallows, Bishops Wood (*C.D.A.*).
- Pachnobia rubricosa.** Saltaire, sallows (*F.B.* and *J.B.*); Bishops Wood, sallows (*W.H.*).
- Tæniocampa opima.** Four specimens at sallows, Skipwith (*C.D.A.*).

- Tæniocampa populeti.** Everingham, shallows (*J.S.*); larvæ common, Doncaster (*G.T.P.*); four at shallows, Bishops Wood, March 29th (*R.D.*); larvæ common at Bishops Wood, June 7th (*R.D.*); very common at shallows, Bishops Wood, males swarming at light (*W.H.*).
- Tæniocampa gracilis.** At shallows, Wadworth (*J.N.Y.*).
- Tæniocampa miniosa.** One larva, Wadworth (*J.N.Y.*).
- Tæniocampa munda.** At shallows, Wadworth (*J.N.Y.*); and at shallows, Strensall (*W.H.*).
- Orthosia suspecta.** At sugar, Askham Bogs, July 23rd (*R.D.* and *S.W.*); two at Halifax (*W.L.C.*); and one at Sandburn (*W.H.*).
- Orthosia upsilon.** Sugar, Apperley Bridge (*J.T.*).
- Anthocelis pistacina.** Middlesbrough (*T.A.L.*); Everingham (*J.S.*); Hull (*J.W.B.*).
- Xanthia fulvago (cerago).** Middlesbrough (*T.A.L.*); var. *flavescens*, one specimen, Middlesbrough (*T.A.L.*).
- Xanthia silago (flavago).** Bred from willow catkins, Middlesbrough (*T.A.L.*).
- Xanthia gilvago.** Several imagos beaten from ash; also several obtained at sugar, Everingham (*J.S.*); Everingham, one specimen beaten from elm, end of September, 1897 (*W.H.*); one obtained at sugar, Castle Howard (*G.C.D.*).
- Cirrhœdia xerampelina.** Beverley (*J.L.*); sixty-two in one hour and a half, August 22nd, Everingham (*J.S.* and *W.H.*) (2); larvæ, Hull (*J.W.B.* and *W.P.*), York, Hull Road, several at roots of ash trees (*W.H.*); at ash trees not common, several cripples noticed, Skipwith (*C.D.A.*).
- Not one specimen of the var. *unicolor* has been captured, although some four hundred specimens have been obtained.
- Tethea subtusa.** Larvæ commonly, Doncaster (*G.T.P.*); a few larvæ, Bishopswood, June 7th (*R.D.*); bred *subtusa*, July 23rd (*R.D.*); Stanley (*W.G.C.*).

- Hecatera serena.** Anlaby, Hull (*Mr. Porter*); Mr. G. T. Porritt, in his list of Yorkshire Lepidoptera, states, page 91: 'Mr. Dobrée says it occurs at Beverley, but is scarce; we have no other recorded locality.' This species has also been taken at Brough many years ago. Also captured in 1893 at Drewton Dale by Mr. Johnston; Stanley (*W.G.C.*).
- Polia chi.** Fairly common, Saltaire (*F.B.* and *J.B.*); very common, Keighley (*A.B.*). Var. **olivacea**, Richmond (*T.A.L.*); var. **suffusa**, Rotherham (*J.H.*).
- Polia flavocincta.** Two specimens, Skipwith (*C.D.A.*); Beverley (*W.H.* and *J.L.*).
- Dasypolia templi.** At light, Bradford (*J.T.*), Sept. 30th; Halifax, over one hundred specimens at light (*E.H.* and *W.L.C.*); Saltaire (*F.B.* and *J.B.*).
- Cleoceris viminalis.** Larvæ, Strensall (*W.H.*).
- Miselia oxyacanthæ.** Everingham (*J.S.*); Stanley (*W.G.C.*). Var. **capucina**, several at sugar, Undsworth Woods (*J.T.*).
- Agriopsis aprilina.** Doncaster, rare (*H.H.C.*).
- Aplecta prasina (herbida).** One bred from pupa, June 13th, found under moss, Drewton Dale (*J.L.*); sugar, Doncaster, June 17th (*H.H.C.*); Everingham (*J.S.*) and eggs obtained, larvæ feeding Jan. 15th, 1898.
- Aplecta occulta.** Two at sugar, Grange Hall, and ova obtained from one; Doncaster (*H.H.C.*); July 18th, addition to local list, Skipwith, and ova obtained (*C.D.A.*). Mr. G. T. Porritt writes: 'I am now breeding a few lovely moths from eggs laid by Skipwith specimen, the larvæ forced, of course'; several at light, Everingham (*J.S.*).
- Mr. Harrison, of Barnsley, writes: 'A friend of mine took a specimen (a female) at Wharnccliffe, in August, and I have a few of the larvæ hibernating.'
- Aplecta nebulosa.** Everingham (*J.S.*).

Hadena protea. Everingham (*J.S.*).

Hadena glauca. Fairly common. One exceptionally dark variety taken, Harden Moss, Huddersfield (*G.T.P.*); Saltaire (*F.B.* and *J.B.*).

Hadena dentina. Fairly common, Saltaire (*F.B.* and *J.B.*); one specimen, Cotherstone (*W.H.*).

Hadena suasa. Mr. G. T. Porritt, in his List of Yorkshire Lepidoptera, published July, 1883, says of this species 'rare, but rather widely distributed.'

The species is taken annually at Askham Bogs, York, where some years (as 1897) it is by no means uncommon. Hull, however, is its head-quarters in Yorkshire, and there it is generally common. The late Mr. J. Hames, of Hull, a practical and enthusiastic entomologist, usually obtained it in considerable numbers at sugar, and from eggs deposited by captive females reared large numbers of the moth.

The larvæ are very easily reared. Mr. W. J. Pickering, of Hull, another experienced entomologist, also obtains this species in abundance. Askham Bogs, June 10, sugar (*R.D.*); sugar, Doncaster (*H.H.C.*); six specimens, sugar, Skipwith, new to local list (*C.D.A.*). Askham Bogs, sugar, common (*S.W.*).

Hadena thalassina. Common, at sugar, Hull (*W.J.P.*); Middlesbrough, sugar (*T.A.L.*).

Xylocampa areola (lithoriza).

Calocampa exoleta. Everingham (*J.S.*).

Calocampa solidaginis. 'More abundant than we have ever found it before, Harden Moss' (*G.T.P.*); plentiful at Sheffield on hawthorn trees (*L. S. Brady*); freely at rest on firs, Middlesbrough (*T.A.L.*); more abundant than in 1896, Wilsden (*E.P.B.*), previous to which it had not been observed in the district, although Mr. Butterfield and his brother had worked the locality for a good many years, where it has been abundant this and last year,

Mr. J. A. Butterfield, B.Sc., of London, mentions (*Entomologists' Record*, vol. 9, p. 327), a very interesting instance of protective resemblance in connection with this species. He says: 'At rest it has a most remarkable resemblance to the excrement of grouse, the male particularly so. It folds its wing round the body, clasps a stone with its legs, and raises its body to an angle of about 30 deg. Its markings, colour, shape, and mode of attachment make the imitation almost perfect.'

- Sphinx cassinea.** Common at light, Everingham (*J.S.*).
Cucullia verbasci. Larvæ common, July, Beverley (*J.L.*).
Cucullia umbratica. Everingham (*J.S.*).
Gonoptera libatrix. Stanley (*W.G.C.*).
Plusia chrysitis. Very scarce, Beverley (*J.L.*); rare, Grange Hall (*W.B.*); Stanley (*W.G.C.*); rare, Saltaire (*F.B.* and *J.B.*).
Plusia festucæ. At flowers of sunflower, Sept. 15, Skipwith, an addition to local list (*C.D.A.*); Sandburn Common (*W.H.*), August; Askham Bogs, several (*R.D.* and *S.W.*).
Plusia iota. Very scarce, Beverley (*J.L.*); rare, Grange Hall (*Brooks*); rare, Saltaire (*F.B.* and *J. Beanland*); Stanley (*W.G.C.*).
Plusia pulchrina (v-aureum). Scarce, Grange Hall (*W.B.*).
Plusia gamma. Very common, Beverley (*J.L.*).
Anarta myrtilli. Middlesbrough (*T.A.L.*); Rombald's Moor (*W.H.*); Strensall Common (*W.H.*); Halifax (*E.H.*).
Heliacia tenebrata. Anlaby (*Porter*).
Euclidia mi. Common, Drewton Dale, June (*J.L.*).

GEOMETRÆ.

- Uropteryx sambucaria.** Fairly common, Beverley (*J.L.*); Middlesbrough (*T.A.L.*); Sandburn, fairly common, July 27 (*R.D.*); Saltaire (*F.B.* and *J.B.*); Stanley (*W.G.C.*).

Epione paralellaria (vespertaria). Imagos fairly common, July 27, also larvæ obtained, Sandburn (*R.D.*); larvæ obtained (*C.D.A.* and *S.W.*); imagos common (*W.H.* and *J.H.*). Mr. G. T. Porritt, in his List of Yorkshire Lepidoptera, says: 'Sandburn, about six miles from York, is now the only British habitat for this pretty species.' I have taken specimens on various parts of Strensall Common, which is situate close to Sandburn Common. I have also taken it on Rawdons Common, on the left-hand side of Towthorpe Lane, fully a mile from Sandburn Common. Strensall is on the right-hand side of Towthorpe Lane going in the direction of Strensall Common.

Mr. G. Bolam, of Berwick-on-Tweed, in the February (1897) number of *The Entomologist*, records having captured a female on Newham Bog in North Northumberland on August 20, 1890; also captured at Learmouth Bog on July 30, 1863. Learmouth is eighteen miles from Newham and a mile from the Scottish border.

I have also the extreme pleasure of being able to record this species for the first time for Scotland.

My friend, Mr. W. Renton, of Hawick, Roxburghshire, captured on the 26th August, 1897, one male and two female specimens in Adderston-Lea Moss, situate four miles from Hawick. These specimens were sent me for verification; Mr. Renton has since taken the species fairly commonly each season in the same locality. In May, 1898, in company with Mr. Renton, I visited the Moss. It is a most likely place for *E. vespertaria* to occur, and the food plant, dwarf sallow, is abundant.

Epione apiciaria. At light, Everingham (*J.S.*); Askham Bogs, July 23 (*R.D.* and *S.W.*); Sandburn Common (*W.H.*); Stanley (*W.G.C.*).

Venilia macularia. Grassington (*F.B.* and *J.B.*).

Metrocampa margaritaria. One very green specimen Middlesbrough (*T.A.L.*); Halifax (*W.L.C.*).

- Ellopia prosapiaria (fasciaria).** Everingham, at light (*J.S.*); Middlesbrough (*T.A.L.*).
- Eurymene dolobraria.** One at light, Everingham (*J.S.*). Beverley, Westwood (*W.J.*).
- Pericallia syringaria.** One female obtained at light, Everingham (*J.S.*) and eggs obtained from it; larvæ now (Jan. 15, 1898) hibernating on privet.
- Selenia bilunaria (illunaria).** At shallows, Strensall (*W.H.*).
- Odontopera bidentata.** Three specimens captured at light, Everingham, two of these much darker than the type (*J.S.*); Strensall (*W.H.*); one beautiful black specimen sent me from Wakefield by Mr. G. Parkin, who had bred it from a larva obtained in that neighbourhood; Mr. Parkin has previously obtained black specimens; Stanley (*W.G.C.*).
- Crocallis elinguararia.** At light, Everingham (*J.S.*); Stanley (*W.G.C.*); Sandburn Common (*W.H.*).
- Eugonia alniaria (tiliaria).** Everingham (*J.S.* and *W.H.*).
- Eugonia fuscantaria.** Everingham, several imagos beaten from ash trees, also one larva beaten out, which produced a fine male specimen (*J.S.*); two larvæ beaten out by *C.D.A.*, August Bank Holiday Excursion; one male beaten from ash trees, Everingham (*W.H.*).
- Eugonia erosaria.** Everingham, and eggs obtained (*J.S.*).
- Eugonia quercinaria (angularia).** At light, Everingham; also beaten out of oak trees, one female laid sixty eggs (*J.S.*); Beverley (*J.L.*).
- Himera pennaria.** Common at light, Everingham (*J.S.*); Stanley (*W.G.C.*).
- Phigalia pedaria (pilosaria).** One specimen at Beverley, Jan. 20 (*J.L.*); scarce at Grange Hall (*W.B.*); several olive forms taken, Huddersfield (*G.T.P.*); several olive and unicolorous smoky coloured forms taken in Shipley Glen by *W.H.*, *J.T.*, *F.B.*, *J.B.*, and *E.P.B.*; a dark male

bred from larva obtained at Bishopswood in 1896 by *S.W.*; larvæ very common at Bishopswood, June 7 (*R.D.*); a few, Doncaster (*H.H.C.*); very curious suffused ones were bred by Mr. Rose, of Barnsley (*J.M.*).

Nyssia hispidaria. A few, Doncaster (*H.H.C.*); Grange Hall (*W.B.*).

Amphidasys strataria (prodromaria). Several specimens obtained at rest, Everingham (*J.S.*); one male at rest on pine tree, Wheldrake (*W.H.*).

Amphidasys betularia. At light, Everingham, May 23 (*J.S.*); Sledmere (*W.H.*); Keighley, a female (*A.B.*). An old collector at Keighley says it is sixteen years since he took the type. Mr. Broadley says he has never taken the type before. Var. ***doubledayaria***, Sledmere (*W.H.*); Middlesbrough (*T.A.L.*).

Boarmia repandata. Everingham (*J.S.*); Saltaire (*F.B.* and *J.B.*); Sledmere (*W.H.* and *S.W.*); black forms very scarce, Huddersfield, ordinary form not noticed (*G.T.P.*); black forms reared from larvæ obtained near Rotherham (*J.H.*).

Tephrosia crepuscularia (biundularia). At light, Everingham (*J.S.*); May 7 to May 30 'bred a large number of type and variety, also many intermediate forms from eggs obtained from typical specimen at Sandburn in 1896' (*R.D.*); numerous specimens of type and variety obtained at Strensall at rest on tree trunks, principally beech and birch (*W.H.*). In January I read a paper on this species before the South London Entomological Society; the paper was illustrated by numerous specimens obtained from various Yorkshire localities. Four specimens, Skipwith (*C.D.A.*).

Var. ***delamerensis***, three specimens, Skipwith (*C.D.A.*); on tree trunks, Strensall (*W.H.*); Everingham (*J.S.*).

Tephrosia punctularia. Very common on birch trunks at Strensall (*W.H.*).

- Geometra papilionaria.** Larvæ, Doncaster (*G. T. P.*); larvæ fairly common, Doncaster (*H. H. C.*); imago, Sandburn Common (*W. H.* and *J. H.*); Askham Bog (*S. W.*).
- Phorodesma pustulata (bajularia).** One male at light, Everingham (*J. S.*).
- Zonosoma linearia (trilinearis).** Several obtained at Sledmere (*W. H.*, *S. W.*, and *R. D.*); I succeeded in getting a batch of fertile ova from one, and reared the larvæ (which were of two colours, green and brown, the green larvæ changing into green pupæ and the brown larvæ into brown pupæ) on beech.
- Zonosoma pendularia.** Strensall (*W. H.*).
- Asthena luteata.** Several, Strensall (*W. H.*); Sledmere (*W. H.*).
- Asthena blomeri.** Sledmere, common (*W. H.*, *S. W.*, *C. D. A.* and *R. D.*).
- Eupisteria obliterata (heparata).** Middlesbrough (*T. A. L.*); Strensall (*W. H.*); Halifax (*W. L. C.* and *E. H.*); Grassington (*F. B.* and *J. B.*).
- Venusia cambrica.** Scarce, Sledmere (*W. H.* and *S. W.*); darker than usual, some being nearly black, Middlesbrough (*T. A. L.*); Halifax (*E. H.*); very common, Keighley (*A. B.*).
- Acidalia dimidiata (scutulata).** Everingham (*J. S.*).
- Acidalia remutaria.** Grassington (*F. B.* and *J. B.*).
- Acidalia bisetata.** As usual, common, Everingham (*W. H.* and *J. S.*); a beautiful variety, resembling *trigeminata*, also occurred (*W. H.*).
- Acidalia virgularia.** Middlesbrough (*T. A. L.*); and Everingham (*J. S.*).
- Acidalia fumata.** Middlesbrough (*T. A. L.*); more than usually common, Wilsden (*E. P. B.*); Sandburn (*W. H.*).
- Acidalia inornata.** One specimen August 10, about seven larvæ hibernating, Barnsley (*J. H.*).
- Acidalia emarginata.** Sandburn (*W. H.*).

- Timandra amataria.** At light, Everingham (*J.S.*); Hull, larvæ obtained (*J.W.B.*).
- Macaria liturata.** Sledmere (*W.H.*); Strensall (*W.H.*); Middlesbrough (*T.A.L.*).
- Halia wavararia.** Halifax (*W.L.C.* and *E.H.*); Stanley (*W.G.C.*); Saltaire (*F.B.* and *J.B.*).
- Strenia clathrata.** Skipwith, an addition to local list (*C.D.A.*).
- Panagra petraria.** Saltaire, fairly common (*F.B.* and *J.B.*); swarmed over bracken in park at Everingham (*J.S.*).
- Numeria pulveraria.** Everingham (*J.S.*).
- Scodiona belgaria.** More than usually common, Wilsden (*E.P.B.*); Greetland Moor, Halifax (*W.L.C.* and *E.H.*); larvæ almost absent, Skipwith (*C.D.A.*).
- Bupalus piniarius.** Strensall (*W.H.*); very common, Keighley (*A.B.*).
- Aspilates strigilaria.** Common, Strensall Common, flying in bright sunshine (*W.H.*).
- Abraxas grossulariata.** Larvæ not so common as usual, York and neighbourhood (*W.H.*); not common, Beverley (*J.L.*); not common, Bradford; very common, had a large quantity of pupæ, but got no varieties, Keighley (*A. Broadley*).
- Abraxas sylvata (ulmata).** Swarmed at Grassington (*F.B.*); common, Drewton Dale (*J.L.*); rare, Grange Hall (*W.B.*); Sledmere, very common (*R.D.*, *S.W.*, *T.M.*, *W.H.*). Var. *suffusa*, not uncommon (*R.D.*, *W.H.*, *S.W.*, *T.M.*, and *A.H.*). Var. *intermedia*, not uncommon (*R.D.*, *S.W.*, *W.H.*, *T.M.*, and *A.H.*). Var. *obscura* not uncommon (*R.D.*, *S.W.*, *W.H.*, *T.M.*, and *A.H.*). Var. *transversa*, several taken (*W.H.*, *R.D.*, *S.W.*, *T.M.*, and *A.H.*), 'larvæ in countless thousands, all the trees (elms) in the woods were entirely stripped of their leaves, Keighley' (*A. Broadley*).

Melanic and Intermediate Aberrations of *Abraxas sylvata (ulmata)* in Yorkshire, by W. Hewett (*Entomologist's Record*, vol. 9, p. 304):—‘During the present season melanic forms of *A. sylvata (ulmata)* have been by no means rare in one particular locality in Yorkshire, and I have secured a number of these, as well as many intermediate aberrations, as the result of four visits paid to the district this season. Messrs. Maddison, Head, Walker, and Dutton have also obtained these aberrations in some numbers. None of them have been obtained from larvæ collected in the neighbourhood of York, as stated by one of your contemporaries, but all were secured in the imago state, occurring amongst the typical form, which in this particular locality is found in profusion. I kept a number of melanic females (principally cripples) for eggs, which several deposited. The majority of these were fertile. Dr. Riding very kindly undertook to rear them, and in a letter dated Aug. 24th, says: ‘I am glad to be able to write that almost all the *Abraxas sylvata (ulmata)* have gone down; there have been three or four pupæ on the surface, so there is little doubt but that the others that have disappeared into the cocoa-fibre have pupated also. There are about ten larvæ still feeding, and I think altogether I have not found half-a-dozen dead ones. Not one ‘spun a web in the tree,’ as stated by Stainton to be the habit of the genus *Abraxas*.’ I may add that Dr. Riding fed the larvæ on wych-elm. We are now looking forward to the rearing for the first time of melanic forms of *A. sylvata (ulmata)* from the egg.

‘The history of these forms in this locality may prove interesting. Messrs. Head, Walker, and myself have each collected in the locality for years, more especially whilst *A. sylvata (ulmata)* has been out, and although we have each made special search for aberrations, not one of us had ever observed a melanic specimen in this locality prior to the present year. The simultaneous appearance of a con

siderable number of this particular aberration in the same locality will, I firmly believe, save this fine aberration from the danger of being swamped by intercrossing, and completely refutes Professor G. J. Romanes' statement, viz. : 'That the same variation does not occur simultaneously in a number of individuals inhabiting the same area, and that it is mere assumption to say it does.' He further adds : 'If the assumption were granted there would be an end of the present difficulty, viz., the swamping effects of intercrossing, for if a sufficient number of individuals were thus simultaneously and similarly modified, there need be no longer any danger of the variety becoming swamped by intercrossing.' I do not believe there is any danger of this variety being swamped, but confidently look forward to its occurring in still greater numbers next season, and that intermediate forms will also be much more numerous.

'Melanic forms of this species have only previously been recorded from Edlington Wood, Doncaster, where they are of extremely rare occurrence. I took one there some six years ago. I am also aware of its occasional occurrence at Drewton Dale, Yorkshire, and have in my collection a specimen of this aberration from that locality obtained in 1895.

'Unfortunately a large proportion of the melanic forms were cripples, or partially so, especially the left fore and hind wings.' The editor, Mr. Tutt, adds to this : 'Recorded also from Bamford's Wood, near Rochdale, by Bentley, June 22, 1880.'

With regard to Mr. Porritt's statement at the Entomological Society of London, on Oct. 6th, 1897, to the effect that 'melanic aberrations were not unusual, but that it was very exceptional for a large number to occur in any one year, as had been the case during the last summer' (*Entomologists' Record*, vol. 9, p. 306). Mr. Porritt assures me that 'the late Mr. W. Prest, of York, used to take

the variety *suffusa* in Edlington Wood, near Doncaster, 'lodging at the woodman's house and working specially for it, and sometimes obtaining several during a visit' (in litt.). Mr. Porritt further thinks the reason that it has not been taken there since is because it has not been specially looked for. During the past twenty years I have frequently visited Edlington Wood at the time *A. ulmata* was out, some seasons going three, four, and five times, and like Mr. Prest I devoted much of my time to searching for varieties, but only succeeded in getting one var. *suffusa*. My friend, Mr. W. Mansbridge, of London, when in Yorkshire, also occasionally visited the wood whilst *A. ulmata* was out, but did not see any var. *suffusa*. The Barnsley, Rotherham, and Doncaster collectors also regularly visit the wood, but none of them have captured var. *suffusa*.

I therefore have no hesitation in repeating my assertion that during the past twenty years this variety has been *extremely rare* at Edlington and elsewhere in Yorkshire.

The following varietal nomenclature is suggested by Mr. Tutt for the aberrations of *A. sylvata (ulmata)* (*Entomologists' Record*, p. 307):—

- 1.—With the whole of the wings and body suffused with paler or darker slaty-grey—*suffusa* n.ab.
- 2.—With the wings or some part of the wings irregularly or unequally suffused with slaty-grey patches—*intermedia* n.ab.
- 3.—With the wings or part of the wings suffused with dirty-ochreous or cream colour—*obscura* n. ab.
- 4.—With the discoidal and central slaty-gray shades forming a central transverse band across the forewings—*transversa* n. ab.

Lomaspilis marginata. Middlesbrough (*T.A.L.*); Strensall (*W.H.*).

Hybernia leucophearia. Beverley (*J.L.*); Shipley Glen (*W.H.*, *J.T.*, *F.B.*, and *J.B.*); Strensall (*W.H.*). Var.

marmorinaria Esp., Shipley Glen (*W.H.*, *J.T.*, *F.B.*, and *J.B.*). Generally very common, this year quite rare, Doncaster (*H.H.C.*).

Hybernia marginaria (*progemmaria*). Var. *fuscata*, almost black specimens taken, Halifax (*W.L.C.*); very abundant and the specimens very dark unicolorous brown, Huddersfield (*G.T.P.*).

Hybernia defoliaria. Abundant, Shipley Glen (*F.B.*, *J.T.*, and *J.B.*); 'as many as twenty females on one tree trunk on a space of three feet in length' (*F.B.* and *J.B.*); common, Everingham (*J.S.*); at light, Stanley (*W.G.C.*).

Hybernia aurantiaria. Abundant, Shipley Glen (*F.B.*, *J.B.*, and *J.T.*); Everingham (*J.S.*).

Anistopteryx æscularia. Beverley, at light (*J.L.*); Shipley Glen (*J.T.* and *W.H.*); Strensall (*W.H.*); Stanley (*W.G.C.*).

Cheimatobia boreata. 'In thousands,' Keighley (*A.B.*).

Oporabia dilutata. Middlesbrough (*T.A.L.*); fairly common, Saltaire (*F.B.* and *J.B.*); common at light, Everingham (*J.S.*); Stanley (*W.G.C.*).

Oporabia filigrammaria. Ogden Moor, Halifax (*E.H.*); plentiful, Harden Moss, Huddersfield (*G.T.P.*).

Larentia multistrigaria. Saltaire (*F.B.* and *J.B.*).

Larentia cæsiata. Saltaire (*F.B.* and *J.B.*); Middlesbrough (*T.A.L.*); dark specimens, Halifax (*W.L.C.*).

Larentia olivata. Saltaire (*F.B.* and *J.B.*).

Larentia viridaria (*pectinitaria*). Grassington (*F.B.* and *J.B.*); Strensall (*W.H.*); Sledmere (*W.H.*); Middlesbrough (*T.A.L.*).

Emmelesia alchemillata. Grassington (*F.B.* and *J.B.*).

Emmelesia albulata. Common, Saltaire (*F.B.* and *J.B.*).

Emmelesia decolorata. Everingham (*J.S.*); Stanley, (*W.G.C.*).

Eupithecia venosata. Larvæ obtained in seeds of bladder campion, Halifax (*W.L.C.* and *E.H.*).

- Eupithecia satyrata.** Strensall (*W.H.*).
- Eupithecia lariciata.** Sledmere (*W.H.*).
- Eupithecia albipunctata.** A few larvæ obtained at Bishops Wood (*W.H., R.D. and S.W.*). Var. **angelicata**, for the first time, Keighley (*A.B.*).
- Eupithecia fraxinata.** Skipwith (*C.D.A.*). An addition to local list.
- Eupithecia castigata.** Skipwith (*C.D.A.*). An addition to local list.
- Eupithecia indigata.** Several, Strensall (*W.H.*).
- Eupithecia nanata.** Middlesbrough (*T.A.L.*); at rest on wall bordering Rombald's Moor (*W.H.*); Strensall and Sandburn Common (*W.H.*).
- Eupithecia tenuiata.** Bred from sallow catkins, Middlesbrough (*T.A.L.*).
- Eupithecia abbreviata.** At sallows, Everingham (*J.S.*).
- Lobophora lobulata.** Strensall (*W.H.*).
- Thera variata.** Bred a series from East Yorkshire, almost black (*J.M.*); Huddersfield, Strensall, and Sandburn (*W.H. and S.W.*).
- Thera firmata.** Strensall (*W.H.*).
- Hypsipetes ruberata.** Bred from larvæ collected at Hayburn Wyke, 1896 (*G.T.P.*).
- Hypsipetes trifasciata (impluviata).** Middlesbrough (*T.A.L.*); Strensall, where an almost black form occurs (*W.H.*).
- Hypsipetes elutata.** Almost black and beautifully mottled red and brown, from South Yorkshire moors (*J.M.*); Sandburn (*W.H.*).
- Melanthia rubiginata.** One specimen of var. **plumbata**, Middlesbrough (*T.A.L.*); York, common, but local (*W.H.*); Saltaire (*F.B. and J.B.*).
- Melanthia ocellata.** Everingham (*J.S.*); Middlesbrough (*T.A.L.*).

- Melanthia albicillata.** Sledmere (*W.H.*, *S.W.*, and *R.D.*).
I obtained two batches of eggs, the larvæ being fed on
bramble (*W.H.*); very common, Keighley (*A.B.*); Grass-
ington (*F.B.* and *J.B.*).
- Melanthia hastata.** Middlesbrough (*T.A.L.*).
- Melanippe montanata.** Very rare, Grange Hall (*W.B.*);
very rare, Strensall and Sandburn (*W.H.*).
- Melanippe galiata.** Saltaire (*F.B.* and *J.B.*); at rest on
stone walls bordering Rombald's Moor (*W.H.* and *J.T.*).
- Anticlea badiata.** Saltaire (*F.B.* and *J.B.*); on lamp, near
Milford Junction Station (*W.H.*).
- Anticlea derivata.** At light, May 7, Everingham (*J.S.*);
Driffeld (*T.A.L.*); Strensall (*W.H.*).
- Coremia munitata.** Ling Gill, Penyghent (*J.B.*).
- Coremia propugnata.** Middlesbrough (*T.A.L.*).
- Coremia ferrugata.** Strensall (*W.H.*).
- Coremia unidentaria.** Strensall (*W.H.*).
- Phibalapteryx vittata (lignata).** Sparingly, June 10,
Askham Bogs (*R.D.*); both broods, Askham Bogs (*S.W.*).
- Triphosa dubitata.** At dusk, Halifax (*E.H.*).
- Scotosia vetulata.** Askham Bogs (*S.W.*).
- Scotosia rhamnata.** Askham Bogs, July 23 (*R.D.*).
- Cidaria corylata.** Strensall (*W.H.*); Stanley (*W.G.C.*);
Sledmere (*W.H.*).
- Cidaria truncata (russata).** Middlesbrough (*T.A.L.*); black
female captured, ova deposited, bred about seventeen
imagines, August, Barnsley (*J.H.*); Everingham (*J.S.*);
several black specimens obtained, Strensall (*W.H.*).
- Cidaria immanata.** Shipley Glen (*J.T.*); Strensall (*W.H.*);
Middlesbrough (*T.A.L.*).
- Cidaria suffumata.** Halifax (*E.H.*); Sledmere (*W.H.*).
Var. *piceata*, Sledmere (*W.H.*).
- Cidaria silaceata.** Several, Sledmere (*W.H.*, *S.W.*, and
R.D.).

- Cidaria prunata (ribesiaris).** Saltaire (*F.B.* and *J.B.*);
Kirbymoorside (*A.H.*).
- Cidaria testata.** Middlesbrough (*T.A.L.*); larvæ, Sandburn,
on dwarf sallow at night (*J.H.* and *W.H.*).
- Cidaria populata.** Middlesbrough (*T.A.L.*); Halifax
(*W.L.C.*); Saltaire, common (*F.B.* and *J.B.*).
- Cidaria fulvata.** Middlesbrough (*T.A.L.*).
- Cidaria dotata (pyraliata).** Everingham (*J.S.*); Halifax
(*W.L.C.* and *E.H.*); Stanley (*W.G.C.*).
- Eubolia mensuraria.** Sandburn and Strensall (*W.H.*).
- Eubolia plumbaria (palumbaria).** Middlesbrough
(*T.A.L.*); Rombald's Moor (*F.B.* and *J.B.*).
- Tanagra atrata (chærophyllata).** Sandburn (*W.H.*);
Stanley (*W.G.C.*).
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REPORT ON YORKSHIRE BOTANY FOR 1890: PHANEROGAMIA.

C. P. HOBKIRK, F.L.S., AND P. F. LEE,

*President and Phanerogamic Secretary of the Botanical Section of the
Yorkshire Naturalists' Union.*

THE following report on Yorkshire Phanerogamic Botany was read to the Annual Meeting at Halifax on the 18th Nov., 1890.

The first meeting of the Yorkshire Naturalists' Union for 1890 was held at Driffild on Whit-Monday, May 26th, for the investigation of Lowthorpe, Kilham, Ruston Parva, and the valley of the Kelk Beck to Brace Bridge. The weather was beautiful, and a fair number of the early blooming plants was observed. During the day 112 flowering plants and ferns were noted or gathered, among them the following interesting species:—

Iris Pseudacorus in flower, swampy ground, near Lowthorpe.

Anthyllis Vulneraria L.,

Habenaria viridis Br.,

Onobrychis sativa Lam.,

Carex paniculata L.,

Geum rivale L.,

Carex pendula and three species

Hippuris vulgaris L.,

of *Potamogeton*.

At the second meeting, on Saturday, June 14th, the Dewsbury district was visited (for the first time in the history of the Union), the ground worked being Bretton Park and the wooded uplands in its vicinity, Stocks Moor, and Coxley Valley, with Dewsbury as headquarters. Although the whole of the places visited had, on previous occasions, been pretty well worked, two additions to the local flora were made (both Sedges), namely—*Carex fulva* Good. and *C. chrysites* Link. (*C. Œderi* Auct. Angl. non Ehrh., *C. flava* var. *cyperoides* Marsson). About 185 out of the nearly 600 species and varieties known in the district were seen either in flower or fruit, the best of these being—

Viola odorata L.,

Hottonia palustris L.,

Saponaria officinalis L.,

Salix pentandra L.,

Hydrocotyle vulgaris L.,

Listera ovata Br.,

Aloxa Moschatellina L.,

Scirpus sylvaticus L.,

Campanula latifolia L.,

Acorus Calamus L.,

Primula vulgaris Huds.,

Nephrودیум spinulosum Desv.

The third meeting was in Cleveland, on the 12th July, and the district explored included the valley of the Leven, from Kildale downwards to Battersby and Ayton, with the adjoining moorland. About 100 species of flowering plants were noted, chiefly of general distribution in the North of England. The most interesting plant met with was *Agrimonia odorata* Mill., a good addition to the North Yorkshire Flora.

The next meeting extended over three days, from Saturday, 2nd August, to Monday, 4th August, in Upper Swaledale, at Muker, Gunnerside, Keld, etc.

Among the list of Phanerogamia observed at Keld and other places during this excursion, furnished by Mr. Thos. F. Ward, of Middlesbrough, the following are those mostly deserving of notice:—

<i>Thalictrum minus,</i>	<i>Gentiana Amarella,</i>
<i>Ranunculus Flammula,</i>	<i>Habenaria bifolia,</i>
<i>Draba incana,</i>	<i>Cynosurus cristatus,</i>
<i>Arenaria verna,</i>	<i>Polypodium vulgare,</i>
<i>Stellaria glauca,</i>	<i>Polypodium Phegopteris,</i>
<i>Geranium sylvaticum,</i>	<i>Polypodium Dryopteris,</i>
<i>Geranium lucidum,</i>	<i>Polypodium Robertianum,</i>
<i>Saxifraga tridactylites,</i>	<i>Polystichum aculeatum,</i>
<i>Parnassia palustris,</i>	<i>Asplenium Trichomanes,</i>
<i>Peucedanum Ostruthium,</i>	<i>Asplenium Adiantum-nigrum,</i>
<i>Galium uliginosum,</i>	<i>Asplenium viride,</i>
<i>Scabiosa succisa,</i>	<i>Asplenium Ruta-muraria,</i>
<i>Carduus heterophyllus,</i>	<i>Ophioglossum vulgatum.</i>
<i>Hieracium pallidum,</i>	

The last meeting of the year was held at Malham, on Thursday, September 11th, in connection with the Leeds meeting of the British Association. No new records were made, the Botany of the district being already well known.

NEW RECORDS, ETC., FOR YEAR 1890.

The names and numbers are those of the 8th Edition, London Catalogue.

176. **Viola lutea** Huds. Springly at Waterfall Gill, nr. Skipton. T. W. Edmondson, 9th July, 1890. New locality record.
- 236.* **Arenaria gothica** Fries. Found by Dr. Sylvanus P. Thompson, a few miles from the original recorded locality of Ribbleshead, on 18th August, 1890. There seems to be no further doubt that this plant is *A. gothica*, not *A. norvegica*.

294. **Geranium phæum** L. On 20th May, 1890, in flower (only one plant) by Rev. W. A. Shuffrey, in Littondale. Alt. 650 feet. New record for Mid W. York.
502. **Agrimonia odorata** Mill. Near an old Bleach Mill in Kildale in Cleveland (Y.N.U. Exc.) 12th July, 1890, recognised by Mr. W. W. Reeves of London, who had gathered it also in Forge Valley. New to North Yorkshire.
783. **Senecio viscosus** L. Found by Mr. P. Fox Lee, at Savile Town, near Dewsbury, 30th July, 1890 (possibly a casual). New locality record.
1607. **Carex strigosa** Huds. Forge Valley in July 1889, by Messrs. W. W. Reeves and M. B. Slater, and recorded in 'Naturalist' (Jan. 1890, p. 16) by Mr. J. G. Baker, F.R.S. New species for North Riding.
1614. **Carex fulva** Good. Emley Woodhouse. Y.N.U. Excur., June 14th, Dewsbury, P. F. Lee. New locality record.
- 1616* **Carex chrysites** Link. (*C. Œderi* Auct. Ang. non Ehr.—*C. flava* var. *cyperoides* Marsson), determined by Mr. A. Bennett. Coxley Valley, near Dewsbury, P. F. Lee, Y.N.U. Exkurs., June 14th, 1890. New to West Yorkshire.

The following plants are recorded from Market Weighton district (York S.E.) by Mr. J. J. Marshall:—

Goodyera repens. The only Yorkshire locality.

Carduus pycnocephalus Jacq.

Radiola millegrana Sm.

Teesdalia nudicaulis R. Br.

Alyssum calycinum L.

Potamogeton lucens L.

Potamogeton plantagineus Du Croz.

REPORT ON YORKSHIRE BOTANY FOR THE SEASON OF 1894.

A. H. PAWSON,

*Honorary Secretary for Phanerogamia to the Botanical Section of the
Yorkshire Naturalists' Union.*

THERE has not of late years been a season of greater promise in the vegetable world than that of 1894. The glorious sunshine of last year had so ripened the twigs and filled the buds of all shrubs and trees, and stored up such abundance of starch and other plant-foods in rhizome, rootstock, bulb and tuber, that a harvest of unusual plenty in every sort of flower and fruit seemed assured. The winter, too, was short and not severe. In February and March the sun shone brightly, and the season was so forward, that by the end of the latter month we found ourselves in the middle of Spring. In favoured spots the air was heavy with the scent of violets, whom envious primroses and wood anemones were endeavouring to supplant. In April the pageant of Spring (to borrow Richard Jefferies' excellent phrase) proceeded with extraordinary splendour. Probably never again shall we see in such perfection of loveliness the great Rose-tribe, to whom we owe so much of the beauty of these early months—and here the influence of the last summer was felt to the full. In all parts of the country the hawthorn bloomed as it has hardly ever been seen to bloom before. In many places the tall hedge-rows presented irregular, but unbroken, walls of white blossom. It was a subject of common remark, that hardly a green leaf was to be seen on them. Our northern bird-cherry, which is so abundant on Silurian rocks, was equally profuse. The mountain-ash is always to be depended on, but this year its cousin *Aria* was almost as bountiful. The orchards were all masses of snow. Even quinces and medlars, which flower but sparingly under our chilly Yorkshire skies, were starred over with big delicate blossoms as they are in Hampshire and Surrey.

But soon the merry month of May began to make cruel sport with all this plenty. The weather grew colder as the days went on, and we felt with amazement the bleak winds of March when we were within a month of the summer solstice—then, almost before

we could realise our peril, came the fatal nights of the 20th, 21st, and 22nd, when the thermometer fell 10° below the freezing point, and blighted in an hour all the labour of last year's sunshine, and all the promise of our forward Spring. Vegetation everywhere was struck as by a murrain. The damage done was not all apparent in a moment : for weeks afterwards every day discovered some new loss in wood and field. It was noticeable that, in the wholesale destruction of garden fruits, when every potato stem lay blackened on the ground, and the half-grown currants and gooseberries hung withered on the bushes, in the orchards the pears and apples were destroyed almost to the last unit, while many of the plums and cherries preserved their fruit uninjured. This brings into prominence the disadvantage which a plant suffers from an inferior or unprotected ovary. It was no doubt the floral envelopes of the plum and cherry which shielded their offspring in this time of stress. Therefore if plants really possess the intelligence which is now assigned to them, *Pyrus* will no doubt make use of this sad experience and begin to adapt itself better to our fickle climate—otherwise in our island *Prunus* is likely to push it out of the order.

It is a painful thing to dwell upon this heartless work of May. It took the life out of the Summer, which was never afterwards able to recover itself. A low temperature, spare sunshine, dull skies and frequent, although not extraordinarily abundant, rain, pursued us until near Midsummer. Then about the middle of June until mid July we felt the warmth of the sun once more, and our hearts again swelled with hope that we should be able to garner with safety such fruits of the earth as were yet uninjured. But now St. Swithin arrived in surly guise. The ill-conditioned Saint did not disdain to strike one already down, and completed the almost anticipated catastrophe. August saw wet harvest-fields : the chilled earth could not regain its heat, and September ushered in an autumnal cold which the sun's now slanting rays were powerless to dispel. Such is the ending of a season which opened with prospects of almost unexampled brightness.

We are not farmers, however, nor gardeners at this moment, but botanists ; and our English plants are, for the most part, very well able to bear with the vicissitudes of our climate. I do not suppose that our botanizing has suffered much in all this luckless summer, and although next year we must not expect the same riotous profusion of hawthorn, or crab blossom, or heather, or gorse, we may still

promise ourselves in meadow and pasture, hedgerow, moor, and woodland, far more than enough of beauty in leaf and flower to satisfy us—ininitely more than we can properly appreciate, a thousand times more than we shall be able to study and examine.

The excursions of the past season have been chiefly to the eastern half of the shire, but the most notable one was that of May, when Sedbergh was visited. The time of the year was too early for the proper examination of this remote and extremely interesting corner of our county, where alone in Yorkshire the Silurian rocks are exposed and exhibit a characteristic flora which is nearly that of the Lake country. It is to be hoped that a July meeting may be soon held here. Since the soil and the plants are distinct and unusual, the district ought to receive quite peculiar attention. The favourite Permian tract received two visits. At Ferrybridge the number of fine water-plants attracted great attention. At Knaresborough we were gratified to find the rare Nottingham Catch-fly so well established. The South Cave excursion was very interesting, and at Whitby we were again in a delightful district. It is to be regretted that the time spent in travelling and in the various meetings should leave so small a part of even a long summer's day free for investigation and work on these one-day excursions. When, as is often the case, a few members can arrange to be on the spot the evening before, the result of the meeting is usually much more satisfactory. However, there has been no want of enthusiasm and good comradeship in our common pursuit; and I have, on my own part, to express my sincere thanks to my friends here present for much help and information on botanical matters, lacking which I feel that I should have proved myself but an indifferent secretary.

REPORT ON THE BRYOLOGICAL FLORA OF YORKSHIRE FOR THE YEAR 1897.

J. J. MARSHALL,

*Bryological Secretary to the Botanical Section of the
Yorkshire Naturalists' Union.*

It is very gratifying to find that the sustained interest and successful work on the part of Yorkshire bryologists during recent years has given occasion to your executive to propose the formation of a new committee to further research in this branch of botanical knowledge.

The arrangement for a bryological foray in connection with the annual meeting is also a subject for congratulation amongst your members. It occurs at a season when large numbers of mosses are in a state of perfection, and also at a time when little or no opportunity has been given to your members for combined investigation of the moss flora of the county.

Several extremely interesting additions have been made to the Yorkshire moss flora during the past year. The most unexpected is *Jubula Hutchinsiae*, an Irish hepatic, discovered by Mr. Jas. Needham near Hebden Bridge. It was first found by Miss Hutchins in the south of Ireland, and has since been gathered in several places on the west coast of England, Wales, and Scotland. It is very remarkable that within a few weeks Mr. L. J. Cocks, of Harrogate, should discover another Yorkshire locality, viz., Ravengill, near Pateley.

Mr. W. Ingham, B.A., of York, has added many varieties of mosses to the Teesdale records, as well as several new to the vice counties. His best find is *Ceratodon conicus*, believed to be the first record for Yorkshire. He has discovered two stations for it, one during the Hackness excursion and subsequently at High Force, both in fine fruiting condition. His list also includes:—*Polytrichum gracile*, *Cynodontium Bruntoni*, *Campylopus atrovirens*, *Tortula lamellata*, *Bryum concinnum*, *Brachythecium cæspitosum*, *Hypnum ochraceum* var. *flaccidum*, and *H. giganteum* on Skipwith Common (new to the East Riding), and many other good plants.

Mollia calcarea, a very rare British moss, is also new to the county. It is recorded by Mr. Cocks from Knaresborough, the only previous British habitat being Cheedale in Derbyshire, where it was found by Mr. W. West in 1880.

Ephemerum minutissimumi has been gathered by your Secretary in the East Riding, near Market Weighton. It is, however, scarcely a new record, for Dr. Spruce gathered it in several localities on sandy ground. At that time it was included as a variety of *Ephemerum serratum*, and has only been recently separated as a species by Lindberg, and is so described in Dr. Braithwaite's admirable 'Moss Flora.' Still it is worthy of notice in this report.

There is little to report in connection with the excursions of the year, owing to the very dry state of the atmosphere.

At the Boston Spa meeting on Easter Monday about forty mosses and hepatics were secured. The most interesting was *Pottia Heimii*, usually a maritime species. Dr. Spruce placed it on record there many years ago.

The Skelmanthorpe meeting proved rather barren. Thirty mosses and two hepatics were noticed, but none of special rarity.

Records of the Cotherstone meeting are not to hand.

The Hackness meeting yielded fifty-two mosses, but the dry state of the atmosphere again prevented much work being done in this section. The *Ceratodon conicus* previously mentioned was the great find of the meeting.

The Everingham excursion proved the most barren of the year; only very common species were noticed.

The year's work, however, is most satisfactory, and the section is to be congratulated on having such an enthusiastic band of students constantly at work in the county.



80424

METEOROLOGY OF BRADFORD FOR 1896.

SHEET I.

Computed from daily observations made at the Exchange, Bradford, by JOHN M. LANDBOROUGH, M. Inst. C. E. retired, F.R.A.S., F.R. Met. Soc., F.G.S., and HENRY ARTHUR JOHNSON, Assoc. M. Inst. C. E.

Latitude, 53deg. 47min. 38sec. N.; longitude, 1deg. 15min. 4sec. W. Height above mean sea level, 366ft.

Table with columns for MONTHS, PRESSURE OF ATMOSPHERE IN MONTHS, TEMPERATURE OF AIR IN SHADE DURING MONTHS, and VAPOR. Includes sub-columns for Daily Mean, Adopted Mean Temperature, and Degree of Humidity.

Table with columns for MONTHS, BRIGHT SUNSHINE, TEMP. OF AIR IN SUN'S RAYS, WIND (Direction, Velocity, Pressure), and RAIN. Includes sub-columns for Relative Proportion of at 9 a.m., Velocity, and various rain-related metrics.



80424

METEOROLOGY OF BRADFORD FOR 1896

SHEET 2.

YEARLY MAXIMUM AND MINIMUM ATMOSPHERIC PRESSURE, TEMPERATURE, HUMIDITY, BRIGHT SUNSHINE, WIND PRESSURE, AND RAINFALL.

Table with columns for Year, Pressure, Temperature, Humidity, Bright Sunshine, Wind Pressure, and Rain. It contains a detailed record of meteorological data from 1869 to 1896, including monthly and yearly averages for various atmospheric and weather-related metrics.

EXPLANATION.

The observations are made at nine a. m., and, with the exception of maximum and minimum thermometer readings, again at three p. m.

The highest and lowest barometric readings for each month, also the monthly range, are given as recorded; while the mean pressure is deduced from bi-daily observations corrected for index error, capillarity, temperature, and diurnal range. To correct for altitude or reduce to sea level (the air temperature being 49 degrees and barometer 30 inches at sea level), add 400 inch to the heights given.

A remarkable instance of barometric depression occurred on the 8th December, 1888, when at 8 40 p. m. the mercury of the Exchange barometer had fallen to 27 486 inches only—the lowest reading on record here. The cyclone indicated by this depression was the cause of great loss of life and property, extending over an unusually large district.

All thermometer observations and deductions are given in degrees Fahrenheit. The adopted mean temperature of air is deduced from the dry bulb and the maximum and minimum readings; the temperature of evaporation from the dry and wet bulb and the maximum and minimum readings. The dew point, elastic force of vapour, humidity, &c., are deduced from bi-daily readings of the dry and wet bulb hygrometer, by Glaisher's Hygrometrical Tables, sixth edition.

Bright sunshine is recorded in hours and minutes by glass sphere on cards, known as Campbell's recorder, fixed on Professor Stokes's solarium frame.

The solar thermometer has a black bulb shaded in a vacuum.

The direction, velocity, and pressure of wind are recorded as indicated by anemometers fixed 160 feet above the ridge of roof of Exchange. The velocity per hour and as it is determined from anemometer readings made one minute and a half before and a half period after that hour, by multiplying the difference thereof by 20. The pressure is given in pounds avoirdupois per square foot.

The amount of cloud is estimated by a scale ranging from 0 to 10.

Rainfall includes melted snow and hail.

The rain gauge is fixed upon the top of central roof of the Exchange, at an elevation of 664 feet above the surface of the ground and 395 feet above mean sea level. As rain gauges on the summit of buildings are generally found to collect less rain than when placed upon the surface of open ground adjacent thereto, steps were taken in 1876 to determine to what extent this was the case with the Exchange rain gauge, when two additional gauges were provided and fixed upon the surface of adjacent open spaces, one near to the Town Hall, the other near to the Midland Railway Station, between which the Exchange gauge is situate about midway, and the readings of all gauges about the same height. At both of these gauges, as well as at the Exchange gauge, daily observations were made from the commencement

of 1876 to the end of 1889, a period of seven years, when the surface gauges were removed in consequence of the ground they occupied being no longer available for the purpose. The particulars of these gauges are set forth in tables. The results show that the mean yearly rainfall on the surface of ground for the seven years ending with 1889 is 3 88 inches, or 11 08 per cent, greater than at the summit of the Exchange. The mean yearly rainfall recorded at the Exchange for the twenty-seven years ending with 1896 is 29 622 inches. By adding 11 08 per cent. thereto the mean normal rainfall of central Bradford for each period is found to be 32 694 inches per annum. There are good grounds for concluding that the smaller amount of rainfall collected on the Exchange—and on buildings generally then on the surface of ground is due to the varying direction and force of wind there producing different currents and eddies, which prevent the precipitation on the top or ridge of roof where the gauge is fixed. The rainfall of 1889 was collected by a gauge placed on the ridge of outer roof of Exchange, near to the north-west corner thereof. This position not being deemed quite satisfactory, the gauge was removed at the end of that year to the ridge of central roof—the place it has since occupied. To avoid risk of inaccurate results, the rainfall of 1889 is omitted from these returns.

The instruments with which the observations are made have been verified by comparison with the standards at Kew Observatory, excepting those which can be verified by measurement.

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THE 129TH MEETING

WILL BE HELD AT

BOSTON SPA,

FOR THE INVESTIGATION OF

THE BANKS OF THE WHARFE,

From FLINT MILL to WHITE CRAG,

ON

EASTER MONDAY, April 19th, 1897.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.N., H. & B., L. & Y., L. & N. W., M. S. & L., Midland, and N.E. Railways which have booking arrangements for Thorp Arch to Members and Associates of the Y.N.U. producing their signed card of Membership. Tickets taken on Friday, April 16th, or any day from Thursday 15th to Monday, 19th, will be available for return up to Tuesday, April 20th. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available each stage of the journey.

HOTEL ACCOMMODATION.—Members desiring accommodation should communicate with Mr. Geo. Halliday, Royal Hotel, Boston Spa.

BOOKS AND MAPS.—The district for investigation is included in Sheet 70 (93 S.W.) one-inch Ordnance Map (also published geologically coloured), and almost entirely falls within the limits of Sheet 189 N.E. of the six-inch map. Reference may be made to Davis and Lees' West Yorkshire (1878), pp. 316-317, also to Y.N.U. Circular, July 2nd, 1880.

PERMISSION to visit their properties has been kindly granted by Capt. J. R. Lane-Fox and Mr. T. B. Matthews.

THE DISTRICT for investigation includes both sides of the Wharfe from Flint Mill down to White Crag and the Railway Bridge, also the woods on the Bramham Estate. The ground to be traversed is remarkably rich botanically. The sub-soil throughout is Magnesian Limestone, which, on the south bank of the river forms in places precipitous crags inaccessible except by boat. An opportunity will be given of exploring these crags from the river.

ROUTES.—Thorp Arch is the station for Boston Spa.

1.—Members arriving at Thorp Arch by the 11-4 and 11-7 trains, will at once proceed to Thorp Arch Bridge and enter the Park by the lower gate (near the Bobbin Mill). After exploring the rough ground about the site of the Old Castle the route will lie along the river bank through the Hall Wood to Flint Mill and Horn Bank. Those members who wish to return by the right bank can cross from Flint Mill by ferry boat. This party will be led by Messrs. John Jackson and F. Arnold Lees.

Mr. Matthews kindly offers the use of his boat to enable members to explore the precipitous crags on the south bank of the river.

2.—Conchologists will in the afternoon visit the White Crag (for *Cyclostoma*) and the Wood behind the Church (for *Aeme*), under the guidance of Mr. John Emmet, F.L.S.

GEOLOGY.—

Rev. W. Lower Carter, M.A., F.G.S., writes that the district chosen for this excursion does not afford the geologist many opportunities. The Magnesian Limestone is exposed in the gorge of the Wharfe and consists of the Upper Magnesian Limestone, several outliers of which occur in the neighbourhood, underlaid by the Middle Marls, which fringe the aforesaid outliers, and underneath comes the Lower Magnesian Limestone which forms the surface stratum of most of the country round Boston Spa. The Permian beds here do not present any features of special interest for the geologist.

Mr. P. F. Kendall, F.G.S., suggests that those geologists who are interested in glacial geology should tramp over the country to the north of Thorp Arch to investigate the long gravel ridges about and beyond Walton. These are the lateral moraines of the Vale of York Glacier, and belong to the same series as the Healaugh mounds.

BOTANY.—The Botanical section will be officially represented by its President, Mr. Albert H. Pawson, F.L.S., and its Secretaries, Messrs. John Farrah, F.L.S., and J. J. Marshall, and the Mycological Committee by Mr. Charles Crossland.

Flowering Plants.—Mr. F. Arnold Lees, M.R.C.S., writes that vegetation does not visibly advance 'by leaps and bounds' in the latitude of York until May-day has been reached; so that be the season an 'early' or 'late' one, Phanerogamic botanists will have to be satisfied with that rainbow of Promise viewed on Earth in verdurous tufts and buds burgeoning in an almost infinite variety of shape alone. The *Clematis vitalba* of the railway bank beyond Thorp Arch station will be little more than a net of grey lianes, shedding its bark in string-like strips of 'bast.' The great Meadow Rue (*Thalictrum majus*), and the *Aconitum napellus* of the Wharfe bank in the Hall demesne, alike with the *Actea spicata* of the hangers on the south bank, will only be observable as virid knobs pushing up through the

umber humus of dead leaves. The rock *Pyrus* tree will only be flaunting its silk-cotton buds; and the Wild Lettuce of the crumbling scarp above the highway just north of the bridge will probably be hardly discernible. But the Daffodil of the ings liable to flood will still be hanging pensively its egg-yellow trumpets frilled with perianthal segments of chillier jaune. Yet a few earlier wildings will be in their first bloom, although, significant of their alien origin, they will be mostly denizens where found, not true indigenes. The Periwinkle (*Vinca minor*) and the Sweet Coltsfoot (*Petasites fragrans*) should be seen in flower by the pathways of the Hall grounds. The Mezerion and the Laurel Daphne, too. The inconspicuous Moschatel will be found where sought for in warm sheltered hedge-bottoms, and three sorts of Violet (*hirta*, *odorata*, and *riviniana*) should be 'on view'—perfect pictures tho' 'hung' far below 'the line' on the cinereous background of Nature's gallery. The tasselled Water-Crowfoot in the goit by the 'dam-stones' near the Bobbin Mill, may be showing a few blossoms chilly and fugacious; but neither it nor *Stellaria nemorum*, nor yet the Woodruffe, will be in evidence conspicuously. The rare spring flower of the district—*Gagea lutea*—in the little dene by the Paper Mill on the road running east from Boston towards Newton and the White Crag, investigated by Dr. Martin Lister—one of the fathers of Yorkshire science—over 200 years ago, may be detected by its yellow stars (green outside) if the season is a late one and the day bright and sunny. Out of bloom its unicolorous ribbed grass-like foliage is very difficult to see among the herbage of such shady slopes as it affects. The Yew trees of the adjoining ings (Oglethorpe) are a salient feature of the landscape—uncommon tree as it is, out of planted shrubberies, in most parts of Yorkshire. In the lanes near Flint Mill *Geranium columbinum* grows in plenty, and the silver-plate *Cerastium arvense* in many spots adjacent, but both show preferences for a sandy soil, and the date is full early for either.

Mosses and Hepatics.—Mr. L. J. Cocks writes that the following are among the more interesting of the Mosses mentioned in Lees' West Riding Flora as occurring at Boston Spa and Thorp Arch:—*Gymnostomum tenue*, *Pottia heimi* (gathered here by Dr. Spruce), *Barbula spadicea*, *Scleropodium caspitosum*, *Eurhynchium crassinervium*, *Hypnum polymorphum*. Reference may be made to a paper contributed by the late J. S. Wesley to the 'Naturalist,' of September, 1879, on the Mosses of Wetherby and four miles round—which embraces the district now to be explored. The **Hepatics** have apparently received very slight attention and it is to be hoped that there will be some students of this class present as there is no doubt that an investigation of the slopes about Flint Mill and Horn Bank would yield good results.

Lichens.—No records apparently.

Fungi.—No records available.

Algæ.—There are no records, but a pond between Hall Wood and the Wharfe should afford plenty of material for examination.

VERTEBRATE ZOOLOGY.—

‡ **Birds.**—Ornithologists will find numerous species of birds along the banks of the river and in the Bramham Woods; the presence of the earlier spring migrants and the nidification of various resident species will be matter for observation and record.

Mammals.—The Otter inhabits the river; the Badger has occurred, the Dormouse may be looked for in secluded thickets; the Water Shrew and Water Vole, Stoat, Fomart, Hedgehog, Squirrel, and various Bats, all occur in greater or less plenty.

Fishes.—The fishes include Trout and Grayling in the Wharfe; various coarse fish also, and in the streams may be taken such minor fish as the angler despises but which are full of interest to the Naturalist.

Reptiles.—The Ringed Snake, Slow Worm and Viper all occur, the latter being the rarest of the three. The batrachians also occur, and the Palmated Newt (not yet on record) should be looked for.

CONCHOLOGY.—The Conchological section will be officially represented by its President, Mr. W. Denison Roebuck, F.L.S., and Mr. John W. Taylor, F.L.S., and other conchologists.

The conchologist will find the district a very good one, and the time of the year very suitable for collecting the terrestrial species. The work for the day will include a visit to the identical spot where *Cyclostoma elegans* was collected by the great pioneer of Yorkshire Natural History research, Dr. Martin Lister, who records that he 'found them plentifully in a woody high cliff upon the River Wharfe near Oglethorp' (Hist. Anim. Angl., 1678, p. 120), the cliff now known as the White Crag; then a search for *Acme lineata* in its sole station in a wood near the church; a search for living examples of *Achatina acicula*, should they be discoverable of a species which simply swarms as dead shells all over the magnesian limestone tract in the vicinity; and an endeavour to add to the recorded fauna of the district such few species (which will be almost exclusively slugs) as have eluded the keen eye of Mr. John Emmet, to whom we owe nearly all our knowledge of almost the whole fauna and flora of the immediate neighbourhood. Should *Testacella* be obtained, its specific determination is required, for although Mr. Emmet has seen various specimens from the district they have not been examined by slug-specialists. Among the species recorded by Mr. Emmet we may cite as a selection the following:—*Sphaerium lacustre* and other species, *Pisidium amnicum* and others, *Anodonta cygnea*, *Neritina*, both *Valvate*, *Planorbis nautilus*, *Pl. albus*, *Pl. spirorbis*, *Pl. vortex*, *Pl. carinatus*, *Pl. contortus*, *Physa hypnorum*, *Limnaea peregra*, *L. stagnalis* (not nearer than Catterton), *Ancylus fluviatilis*, *Limax flavus*, *L. maximus*, *L. lewis*, *Arion ater*, *A. hortensis*, *A. circumscriptus*, *Succinea putris*, *S. elegans*, *Vitrina*, *Hyalinia cellaria*, *H. alliarum*, *H. nitida*, *H. nitidula*, *H. pura* var. *margaritacea*, *H. fulva*, *H. crystallina*, *Helix aculeata*, *H. aspersa*, *H. nemoralis* in great variety, *H. arbustorum*, *H. cantiana*, *H. concinna*, *H. hispida*, *H. granulata*, *H. fusca*, *H. caperata*, *H. itala*, *H. pulchella*, *H. lapicida*, *Buliminus obscurus*, *Pupa cylindræa*, *P. muscorum*, *Vertigo pygmaea*. *V. edentula*, *Clausilia bidentata*, *Cl. laminata*, *Azeca tridens*, *Cochlicopa lubrica*, and other species.

ENTOMOLOGY.—The Entomological section will be officially represented by its Secretary, Mr. Wm. Hewett.

Lepidoptera.—The woods and plantations on the Bramham Estate are very rich in Lepidoptera, and lepidopterists should make careful investigation for such species as are likely to be in evidence at the date of the excursion.

Coleoptera.—The district does not appear to have been examined by coleopterists.

Other Orders.—No records available.

WORK TO BE DONE by members who have no special object of investigation. **Worms** (especially the small aquatic and mud-haunting species) to be collected and sent to Rev. Hilderic Friend, 7, Fern Bank, Cockermouth; **Diptera** to P. H. Grimshaw, F.E.S., 26, Montpellier Park, Edinburgh, or R. H. Meade, 1, Mount Royd, Manningham; **Orthoptera**, **Trichoptera**, **Neuroptera**, to G. T. Porritt, F.L.S., Crosland Hall, Huddersfield; and Tubes of Water containing **Freshwater Algæ**, to W. West, F.L.S., 15, Horton Lane, Bradford.

PROGRAMME OF MEETINGS.—

5-0	p.m.—Meat Tea, 2/- each	} All at Halliday's Royal Hotel, Boston Spa.
6-0	p.m.—Sectional Meetings	
6-30	p.m.—General Meeting	

The Chair at the General Meeting will be taken by Mr. A. H. Pawson, F.L.S.

Yorkshire Naturalists' Union.

President :

PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.

Ex-Presidents :

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R. H. TIDDEMAN, M.A., F.G.S., H.M. Geol. Survey, Bridgend.
ROBERT BRAITHWAITE, M.D., F.L.S., F.R.M.S., London.
JOHN CORDEAUX, M.B.O.U., Great Cotes, Lincolnshire.

Hon. Secretary :

W. DENISON ROEBUCK, F.L.S., Sunny Bank, Leeds.

Hon. Secretary for this Meeting :

ARTHUR CRABTREE, West Hill, Halifax.

THE 130TH MEETING

WILL BE HELD AT

SKELMANTHORPE,

FOR THE INVESTIGATION OF

THORPS, MIRY GREAVES WOOD, BAGDEN PARK,
DEFFER WOOD, and ELMLEY PARK,

ON

THURSDAY, May 13th, 1897.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G. N., H. & B., L. & Y., L. & N. W., M. S. & L., Midland, and N. E. Railways which have booking arrangements for Clayton West or Skelmanthorpe to Members and Associates of the Y. N. U. producing their signed card of Membership. Tickets taken on Wednesday or Thursday, May 12th or 13th, will be available for return up to Monday, May 17th. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION.—Members desiring accommodation should communicate with Mrs. Kate Hinchcliffe, Three Horse Shoes Inn, Skelmanthorpe, via Huddersfield.

BOOKS AND MAPS.—The district for investigation is included in Sheet 88 S.E. one-inch Ordnance Map (also published geologically coloured), and almost entirely falls within the limits of Sheets 261 S.E. and S.W., 273 N.E. and N.W., of the six-inch map. Reference may be made to Davis and Lees' West Yorkshire (1878).

PERMISSION to visit their properties has been kindly granted by Col. Stanhope, C.B., Mr. T. Norton, J.P., D.L., Mr. H. Jagger, and Mr. W. Lipscombe.

THE DISTRICT for investigation includes Thorps Lane, Miry Greaves Wood, Bagden Park, Deffer Wood, and Elmley Park. The Thorps is a fine old green lane, which leads to Jacob's Well, a deep pond, on whose banks are to be found the Natter-jack and the Kingfisher, and where the Grasshopper's chirp may be heard. Miry Greaves Wood and Bagden Wood, two fine old woods, where those who take especial interest in Mosses, Hepatics, Lichens, and Fungi should be on the look out. Deffer Wood, of entomological repute, though unfortunately the excursion is a month too soon for good work to be done in that line. In other studies this extensive wood will doubtless amply repay investigation, not having been previously explored by naturalists.

ROUTES.—

1.—The general body of naturalists will leave Skelmanthorpe Station at 10.30 a.m., and proceed to the Thorps and through Miry Greaves Wood to Bagden Park, thence through Bagden Wood to the Toppit entrance of Deffer Wood, and back. Distance four miles. This party will be led by Messrs. Fred Lawton and Ben Morley.

2.—(**For Flowering Plants only**).—Botanists in search of flowering plants will leave the general body at Thorps and proceed to Far Thorps, Lower Cumberworth, Broggs, Shelley Woodhouse, Engleman Wood, Elmley Park, returning by way of Blacker Wood and Parkgate Dyke. Distance optional, four miles or six. This party will be led by Messrs. Charles Oates and Luther Tyas.

3.—**Geologists** will be under the leadership of Mr. James Spencer and Mr. George Hey. They will first visit a new coal line near Skelmanthorpe Station, which Messrs. Jagger are constructing, and where there are fifty yards of new tipping worth inspection. The coal line will then be followed to Nine Cloggs Pit-hill (Mr. Harry Jagger having given permission). Then across about two fields to what is called Teapot and Kettle, an old dead yew-tree in the middle of a field, which gives an extensive view of the whole neighbourhood, including Wakefield, Woolley Edge, High Hoyland, Stainborough, the moors beyond Penistone, Barrow Stones in Derbyshire, the Holmfirth district, and Meltham, with Skelmanthorpe, Clayton West, Denby, Cumberworth, Shelley, Shepley, etc., in the foreground. Leaving this the party will go towards Warburton which gives a fine view of the Dearne Valley. Then along a footpath to Park Mills Colliery, where Mr. Scott, the manager, will give geological notes on the pit and neighbourhood. If time permits the party could then go through Clayton West towards Toppit, then through Bagden Park, Miry Greaves, and Thorps Lane to Skelmanthorpe. In Skelmanthorpe village there is a deep open quarry where the Penistone flagrock is worked and is sent to various parts of England for steps and flagging.

GEOLOGY.—The Geological section will be represented by Mr. James Spencer.

We have not been able to collect any further information in regard to the geology of the district than is given under routes, but are given to understand that it is well worth working. Mr. James Spencer will lead the geological party.

BOTANY.—The Botanical section will be officially represented by one of its Secretaries, Mr. John Farrah, F.L.S., (on Wednesday, 12th May) and the Mycological Committee by Mr. Charles Crossland. Mr. Ll. J. Cocks will represent the Bryologists.

Flowering Plants.—Mr. F. Lawton writes that the carboniferous rocks are nowhere noted for an exuberant flora, but in the green lanes, along the streams, and in the deep woods to be traversed, some uncommon plants should be gathered.

The following among others will be met with:—*Ranunculus auricomus*, *R. flammula*, *R. hederaceus*, *R. lenormandi*, *Adoxa moschatellina*, *Fragaria vesca*, *Galium verum*, *Pedicularis sylvatica*, *Polygala vulgaris*, *Viola palustris*, *Hydrocotyle vulgaris*, *Genista anglica*, *G. tinctoria*, *Listera ovata*, *Habenaria viridis*, *Ophioglossum vulgatum*, *Orchis mascula*, *O. maculata*, *O. morio*, *Cardamine amara*, *C. hirsuta*, *Chrysosplenium oppositifolium*, *Epilobium angustifolium*, *E. hirsutum*, *Campanula latifolia*, etc.

Mr. S. L. Mosley notes that *Viola odorata* and *Asplenium ruta-muraria* also occur.

Mosses and Hepatics.—No records.

Lichens.—Mr. Lawton has gathered the following lichens in the district:—*Parmelia saxatilis*, *P. caperata*, *P. perlata*, *Lecidea leucantrica*, *Peltusaria amara*, *Cladonia pyxidata*, *Physcia parietina*, etc.

Fungi.—No records. Any specimens met with should be sent to Mr. Charles Crossland, 4, Coleridge Street, Halifax.

Algae.—Mr. S. L. Mosley, F.E.S., notes that *Volvox globator* has been found plentifully not far from Deffer Wood, otherwise there are no records, but there are ponds which should afford material for examination. Tubes should be sent to Mr. W. West, F.L.S., 15, Horton Lane, Bradford, who is preparing an Alga-Flora of Yorkshire for publication, and notes that this is a district for which he has no material.

VERTEBRATE ZOOLOGY.—The Vertebrate section will be represented by its President, Mr. Thomas Bunker.

Mr. Fred Lawton writes that the district has never been systematically worked and that consequently members should keep a sharp look out and record *all* species.

Birds.—The Wood Wren and Blackheaded Bunting breed in Miry Greaves, and the Hawfinch breeds every year in Bagden Park. The following are likely to be met with:—Kestrel, Sparrow Hawk, Jay, Magpie, Whitethroat, Sedge Warbler, Grasshopper Warbler, Wood Wren, Bullfinch, Nightjar (common in Deffer Wood), Goldfinch, Pied, Grey, and Yellow Wagtail, Lesser and Mealy Redpole, Black-cap Warbler (in Bagden Wood), Sand Martin, Water Hen, Land Rail, Redstart, Lapwing, Tree Sparrow, Blue Tit, Great Tit, and Cole Tit.

Mr. S. L. Mosley notes that the Great and Lesser Spotted Woodpeckers breed, and that the Green Woodpecker and Chiffchaff occur.

Mammals.—Mr. F. Lawton notes that among others the Fox, Hedgehog, Mole, Weasel, Stoat, Squirrel, Shrews, Water and Field Voles, Dormouse, and several species of Bats occur; and Mr. S. L. Mosley, F.E.S., has seen the Lesser and Water Shrews.

Fishes.—Trout, Roach, and Three-spined Stickleback.

Reptiles.—About 20 years ago the Natterjack Toad was common in the centre of the village, but now there only a few left in the neighbourhood of Jacob's Well. The Frog, Toad, Great, Smooth, and Palmate Newts, Ringed Snake, and Blind-worm are also found.

CONCHOLOGY.—The Conchological section will be officially represented by its President, Mr. W. Denison Roebuck, F.L.S.

Mr. Fred Lawton says little is known of the Land and Freshwater Shells of the district, but he has taken the following:—*Zonites alliarius*, *Helix nemoralis*, *H. hortensis*, *H. hispida*, *H. rotunda*, *Clausilia rugosa*, *Cothlicopa lubrica*, *Sphaerium corneum*, *Unio pictorum*, *Anodonta cygnea* vars. *pallida* and *radiata*, *A. anatina*, *Planorbis albus*, *Pl. carinatus*, *Limnaea peregrina*, *L. stagnalis*, *L. auricularia*, *L. truncatula*, *Ancylus fluviatilis*, and *A. lacustris*.

ENTOMOLOGY.—The Entomological Section will be officially represented by its President, Mr. H. H. Corbett, M.R.C.S., and its Secretary, Mr. Wm. Hewett; Mr. Geo. T. Porritt, F.L.S., also hopes to be present.

Lepidoptera.—The district is rich in Lepidoptera, and lepidopterists should make careful investigation in all the woods visited.

Mr. B. Morley writes that the following should be found at the date of the Excursion:—*Selenia illunaria*, *Odontopera bidentata*, *Hepialus hectus*, *Lomaspilis marginata*, *Melanippe hastata*, *M. tristata*, *Cidaria suffumata*, *Hadena dentina*, etc.

The following larvæ should be found:—*Epunda viminalis* (the imago of which is almost black in this district), *Agriopsis aprilina*, *Metrocampa margaritaria*, *Nudaria mundana*, *Xanthia citrigo*, etc.

Mr. S. L. Mosley, F.E.S., adds that *Cidaria suffumata* var. *porritti*, *Xanthia citrigo*, *Thyatira batis*, *Gortyna flavago*, *Zeuzera asculi*, and *Odonestis* also occur.

Coleoptera.—Mr. F. Lawton writes that *Saperda carcharias* and *Silpha quadrimaculata* were taken in Deffer Wood last year.

Mr. S. L. Mosley, F.E.S., writes that the district needs working for Coleoptera, and that the following have been found:—*Bembidium brunnipes*, *Astynomus adilis* (probably imported in pit props), *Clivina fossor*, *C. collaris*, *Necrophorus interruptus*, *Grammoptera ruficornis*, *Rhagium bifasciatum*, and *R. indagator*. *Lampyris noctiluca* (the glow-worm) used to occur, and may possibly still do so.‡

Trichoptera.—Mr. B. Morley notes that *Grammataulius atomarius*, *Limnophilus extricatus*, *Stenophylax stellatus*, *S. vibex*, and *Micropterna sequax* occur.

Any specimens of **Orthoptera**, **Neuroptera**, and **Trichoptera** would be gratefully received by Mr. Geo. T. Porritt, F.L.S., Crosland Hall, Huddersfield, for examination and report.

Diptera.—Specimens should be sent for determination either to Mr. R. H. Meade, Mount Royd, Manningham, Bradford, or Mr. P. H. Grimshaw, F.E.S., of the Museum of Science and Art, Edinburgh; the latter is collecting specimens and notes for an account of Yorkshire Diptera.

WORMS.—Any examples collected should be sent to Rev. Hilderic Friend, Ocker Hill, Tipton, for examination.

PHOTOGRAPHERS taking views on or in connection with the excursion are invited to present prints to the Union; and any willing to take special views to reproduce in the account to be afterwards published of the excursion should communicate with the Secretaries.

PROGRAMME OF MEETINGS.—

5-0 p.m.—Meat Tea, 2/- each, at Three Horse Shoes Inn, Skelmanthorpe.
6-0 p.m.—Sectional Meetings } At the Primitive Methodist Sunday School.
6-30 p.m.—General Meeting }



Yorkshire Naturalists' Union.

President:

PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.

Hon. Secretary:

W. DENISON ROEBUCK, F.L.S., Sunny Bank, Leeds.

Hon. Secretary for this Meeting:

ARTHUR CRABTREE, West Hill, Halifax.

THE 131ST MEETING

WILL BE HELD AT

COTHERSTONE,

FOR THE INVESTIGATION OF

THE VALLEY OF THE BALDER,

ON

WHIT-MONDAY, JUNE 7th, 1897.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G N., H. & B., L. & Y., L. & N.W., M. S. & L., Midland, and N. E. Railways which have booking arrangements for Barnard Castle, Lartington, Bowes, Cotherstone, Romalldkirk, Mickleton, or Middleton-in-Teesdale, with leave to break journey at any of these stations, to Members and Associates of the Y.N.U. producing their signed card of Membership. Tickets taken on Friday, Saturday, Sunday, or Monday, June 4th to 7th inclusive, will be available for return up to Tuesday, June 8th. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION.—As this is limited and the district much visited at holiday times, Members should write for rooms for the week-end **at once**.

At Middleton-in-Teesdale are 'Ye Cleveland Arms,' the 'Foresters' Arms,' the 'King's Head,' the 'Talbot,' and the 'Temperance Commercial' Hotels. The Inns at and near High Force are probably already booked, and Barnard Castle should be avoided altogether by reason of the Cyclists' Meet there on Whit-Monday.

The **headquarters** of the Union will be at 'Ye Cleveland Arms,' where the Secretaries have already had reserved the available accommodation from Saturday to Monday. Application for this to be **at once** made to Mr. Crabtree, Halifax.

Members desiring to pass the week-end at Cotherstone itself should communicate with the Station-Master there **at once**.

BOOKS AND MAPS.—

Cotherstone and the Lower Balder and Lower Teesdale are in Sheet 32 (103 S.W.), of the one-inch Ordnance map, which is also published geologically coloured (both 'solid' and 'drift'). The upper parts of the Balder and of Upper Teesdale are in Sheet 31 (102 S.E.), and Cronkley is in Sheet 25 (102 N.E.). The Balder Valley is in Sheets 4 and 5 of the Six-inch Map. Reference may also be made to Baker's North Yorkshire, both editions; 'The Flora of Teesdale,' 1883 (Atkinson, Market Place, Barnard Castle); 'The Musci and Hepaticæ of Teesdale,' by Richd. Spruce (Trans. Bot. Soc. Ed.); 'Teesdale Botany,' by James Backhouse (Nat., 1884, p. 10); 'Avi-Fauna of Upper Teesdale,' by James Backhouse (Nat., 1885, p. 353, and 1888, p. 79); and to James Backhouse's recently published 'Upper Teesdale, Past and Present,' 1896, price 1/- (Atkinson, Barnard Castle). For Geology refer to Phillips' 'Rivers, Mountains, and Sea-Coast of Yorkshire,' pp. 17, 18, 45, 51, 190 of Ed. 2; 'Geology of High Teesdale,' by Prof. Sedgwick

(Camb. Phil. Trans., 1824, ii., 174); and Discovery of Silurian Beds in Teesdale (Q.J.G.S.Lond., 1877, pp. 27—34).

PERMISSION to visit their properties has been kindly granted by Lord Strathmore, Monsignor Witham, and Mr. T. Hutchinson.

THE DISTRICT for investigation is the picturesque valley of the Balder and the gorge through which it flows. Three miles above Cotherstone it is occupied by the reservoirs of the Stockton and Middlesbrough Water Board.

SATURDAY'S PROGRAMME.—Members arriving early will find much to interest them at Middleton-in-Teesdale.

On Saturday Evening Mr. W. Herdman, F.G.S., will read a few notes on the Geology of Upper Teesdale, including the Whin Dykes.

MONDAY'S ROUTES.—

1.—The general body of naturalists will leave Cotherstone station upon the arrival of the 11-19 a.m. train, and investigate the Balder valley as far up as convenient in the time at their disposal, under the leadership of Mr. J. G. Brass and Mr. Ridley.

2.—The **Geological** party will be led both on Saturday and on Monday by Mr. W. Herdman, F.G.S., of Newbiggin. Mr. W. Y. Veitch also hopes to accompany the party.

GEOLOGY.—The Geological section will be officially represented by its President, Mr. Wm. Horne, F.G.S.

Mr. W. Y. Veitch, of Middlesbrough, writes:—Near Mickleton in Teesdale we come upon the beginning of the disturbance produced by the intrusion of the great Whin Sill of Upper Teesdale, making its appearance in varying masses and at different horizons from under the Lower Carboniferous rocks, fashioning the scenery up the Tees valley, giving us such beautiful examples as Cronkley Scar, High Force, and Cauldron Snout, and embracing Mickle Fell. Exposures of its basalt rocks and dykes are observable on the right side as we pass up Lunesdale. On the same side are to be seen sections of the Lower Carboniferous series from Scar Limestone to the Main Limestone, and it is in this neighbourhood that the Yoredale Rocks reach their highest point in Great Britain.

The South or Kelton Fell side of the Lune is occupied with the Millstone Grit series.

There is also on the north side of the valley a fault, several miles long, which runs parallel to and a short distance from the Lune. The other dales in the district, generally speaking, have the strata upon their opposite sides corresponding, and are evidently carved by ordinary erosion.

The more common fossils found in the quarries are *Producta*, *Spirifer*, *Terebrata* and *Lithostroton*.

BOTANY.—The Botanical section will be officially represented by one of its Secretaries, Mr. John Farrah, F.L.S. The Bryologists will be represented by Mr. M. B. Slater, F.L.S., and Mr. R. Barnes.

Mr. F. A. Lees writes that his recollections of Balderdale date back twenty years, when, with 'Baker' in hand, he pilgrimaged from Middleton-Teesdale where he was resident, to the habitation of *Saxifraga Hirculus* and the country of Rokeby, fairy Thorsgill, and the dale of Balder the beautiful, made classic for the botanist as well as the antiquarian not less by Gilbert Baker than Walter Scott. We cannot emphasise too strongly or too often the elementary proposition that upon the rock-character and sculpture of any river valley and hill-ridge its 'flora' depends—that is the plants that find its aspects as to shelter and its relative moisture of soil agreeable and not inimical to their well-being. This being so, when it is said that in Balderdale the porous not-absorbent rocks of the Millstone Grit series form the mass of surface and overlie the claggier limestone shales of the Yoredale so supremely that these are only visible in a few places in the bed of the stream, it follows that the flora of the district is *not* one of great variety, but of a sylvan uniformity that however lovely in the scenic sense, with its fairy Birches, its opulent Rowans creaming over with bloom, and its Heckberries (*Prunus Padus*) tasselled with flower-falls like miniatures of the silver rills of its hillsides in spate, offers no great attraction to the collector who would tot up as many different species as there are minutes in his eight-hours' day. Yet, as Mr. T. Chipchase, Mr. Hy. Waud, Mr. D. L. Smith,

point out in the lists they have severally furnished for the purpose of this summary, a goodly number of interesting grit-stone preferring, shade-loving and hygrophilous plants are found in Balderdale, and most of those whose names follow may be found in bloom:—*Trollius*, *Stellaria nemorum*, *Saxifraga granulata*, *Parnassia* (but too early), *Rosa spinosissima* (last field before Tees), *Epilobium angustifolium*, *Valeriana dioica*, *Solidago Virgaurea*, *Lathraea squamaria*, *Teucrium Scorodonia*, *Orchis mascula* and (*latifolia*, open boggy pastures, F.A.L.), *Habenaria bifolia*, *H. chlorantha* (F.A.L.), *Listera Nidus-avis*, *Epipactis latifolia*, *Primula farinosa*. The dale is a good one for Ferns, and the following have all been found. The *Lastrea recurva* near Hury. it would be as well to re-examine; it is additional to Mr. Baker's 'North Yorkshire,' (old ed.). *Polypodium phegopteris*, *P. dryopteris*, *Aspidium angulare*, *A. lobatum*, *Lastrea recurva* (near Hury), *Asplenium adiantum-nigrum*, *A. viride*, *Lycopodium clavatum*, *L. selago*. Mr. Hy. Waud's list of plants found near Cotherstone, mostly by the junction of the Balder with the Tees, includes *Saxifraga aizoides*, *S. granulata*, *Ribes petraeum*, *Pyrola minor*, and *Myrrhis*.

Mosses and Hepatics.—Mr. M. B. Slater, F.L.S., writes that in Baker's 'North Yorkshire' *Orthotrichum rivulare* and *Rhynchostegium depressum* are cited as found near Cotherstone, and adds that the Tees valley is rich in mosses and hepatics, and the season is a favourable one for collecting the spring fruiting mosses also the hepaticæ. We may observe that the shady sides of walls and damp places by the stream-side, also trunks of trees in shady places, are the best habitats for mosses. Hepatics prefer sheltered moist glens where drying winds do not penetrate, and some of the rarer ones are found often in the vicinity of waterfalls.

The following are some of the rarer species that are to be met with in Teesdale; it is fairly certain that the greater portion mentioned should be found also in the Balderdale tributary of the Tees. **Mosses.**—*Antitrichia curtispindula*, *Barbula vinealis*, *B. ruralis*, *B. tortuosa*, *Bryum albicans*, *B. alpinum*, *B. obconicum*, and *B. pallescens*, *Dicranum fuscescens*, *D. majus*, *Ulota drummondii*, *Orthotrichum obtusifolium*, *O. stramineum*, *O. rupestre*, *O. pulchellum*, *Amblystegium sprucei*, *Pterogonium gracile*, *Homomallum incurvatum*, *Hypnum giganteum*. **Hepatics.**—*Jungermania bantriensis*, *J. laxifolia*, *J. lyoni*, *J. incisa*, *J. cordifolia*, *J. triobinata*, *Scapania nemerosa*, *S. equiloba*, *Porella lævigata*, *P. platyphylla*, *Plagiochila spinulosa*, *Mitzeria conjugata*, *M. pubescens*, *Preissia commutata*.

Mr. R. Barnes writes that *Orthotrichum rivulare*, *Hypnum multiflorum* Tayl., *H. resupinatum* Wils., and *Jungermania polyanthos* are mentioned for the Dale in Spruce's list, and that *Gymnostomum tenue*, *Dicranella rufescens*, *D. schreberi*, *Trichostomum nitidum*, *Orthotrichum stramineum*, *Bryum concinatum*, *B. lacustre*, and *Bartramia ithyphylla* which occur in Deepdale, should also be found.

Lichens.—No records available.

Fungi.—No records. Any specimens met with should be sent to Mr. Charles Crossland, 4, Coleridge Street, Halifax.

Algæ.—No records. Tubes should be sent to Mr. W. West, F.L.S., 15, Horton Lane, Bradford, who is preparing an Alga-Flora of Yorkshire for publication, and notes that this is a district for which he has no material.

VERTEBRATE ZOOLOGY.—The Vertebrate section will be represented by one of its Secretaries, Mr. Oxley Grabham, M.A., M.B.O.U.

Birds.—Lists have been furnished by Mr. J. W. Geldard, of Darlington; Mr. Joseph Wearmouth, of Ravenstonedale (formerly resident in Upper Teesdale); Mr. Little (native of Barnard Castle, whose father and himself have collected eggs in the district for many years); Mr. Borrowdale, of Barnard Castle, and Mr. Chipchase, of Cotherstone. Altogether notes are given of about 108 birds. Characteristic of the district are such as the Red and Black Grouse, Golden Plover, Redshank, Dunlin, Curlew, Ring Ouzel, Short-eared Owl, and Merlin of the moorlands, and the Dipper and Sandpiper of the stream sides. Woodpeckers are scarce, and among the more uncommon species included in the lists are the 'Wall Creeper,' Grasshopper Warbler, 'Marsh Warbler,' Reed Warbler, Mealy Redpoll, Tree Sparrow, Cirl Bunting, Rockdove, Storm Petrel, Pied Flycatcher, Dotterel, Goldfinch, Stonechat, Common and Rough-legged Buzzards, Goldcrest, Creeper, Waxwing, Wood Lark, Hawfinch, Crossbill, etc. Of water birds are noted the Lesser Grebe, Moorhen, Coot, Wild Duck, and Water Rail.

Mammals.—Mr. Geldard sends the following list of Mammals:—Fox, Polecat (formerly common, now almost extinct), Stoat, Weasel, Water Vole, Norway Rat, Long and Short Tailed Field Mouse, Hare, Rabbit, Hedgehog, Squirrel. Mr. D. L. Smith adds the Otter, Fox, and Badger.

Fishes.—Mr. D. L. Smith states that Trout, Salmon, and Perch are to be found in the river.

Reptiles.—Mr. J. W. Geldard notes the occurrence of the Ringed Snake, occasionally in the woods; Blind Worm; the Adder occurs abundantly on the moors, notably at Battle Hill.

CONCHOLOGY.—

Mr. J. G. Brass writes that the following species occur at (or near) Balderdale:—*Sphaerium corneum*, *Pisidium nitidum*, *Anodonta cygnea* (Lartington fishponds), *Limnæa peregra*, *L. truncatula*, *Ancylus fluviatilis*, *Arion ater*, *Limax flavus*, *L. arborum*, *L. agrestis*, *L. maximus*, *Succinea putris*, *S. elegans*, *Vitrina*, *Hyalinia cellaria*, *H. aliiaria*, *H. nitidula*, *H. crystallina*, *Helix lamellata*, *H. aspersa*, *H. nemoralis* (rare), *H. hortensis*, *H. arbustorum* (vars. *flavescens*, *major*, *conoidea*, and *fusca*), *H. rufescens*, *H. hispida*, *H. sericea*, *H. caperata* (one specimen only), *H. ericetorum*, *H. rotundata*, *H. pulchella*, *Bulimus obscurus* and var. *albinus* (numerously at Cotherstone), *Pupa umbilicata*, *P. marginata*, *Vertigo edentula*, *Balea*, *Clausilia dubia*, *Cl. laminata*, *Cochlicopa lubrica*, *Carychinum*, *Azeca*.

ENTOMOLOGY.—The Entomological section will be officially represented by its Secretary, Mr. Wm. Hewett.

Lepidoptera.—Mr. T. Scarre states that Cotherstone is a rich district for Lepidoptera, but has not been much worked; the following amongst others have been taken there, or in the immediate vicinity. **Moths.**—*Arctia fuliginosa*,

Chelonia plantaginis, *C. caja*, *Bombyx rubi*, *B. callume*, *Saturnia carpini*, *Smerinthus populi*, *S. tilia*, *Fidonia atomaria*, *F. piniaria*, *Abraxas grossulariata*, *Larentia cesiata*, *Melanippe tristata*, *M. montanata*, *M. fluctuata*, *Dicranura vinula*, *Pygæa bucephala*, *Acronycta rumicis*, *A. menyanthidis*, *Dasyptera templi*, *Charæa graminis*, *Tryphæna pronuba*, *Anarta myrtilli*. **Butterflies.**—*Pieris brassicæ*, *P. napi*, *Euchloe cardamines*, *Vanessa urticae*, *V. io*, *V. atalanta*, *Epinephele janira*, *Cænonympha pamphilus*, *Lycæna icarus*.

Mr. Joseph Wade of Barnard Castle, writes that those marked * above, and also the following among many others, will be met with in Whit-week, in the Balder valley and near:—*Hadena glauca*, *H. dentina*, *Coremia propugnata*, *Notodonta ziczac*, *Cidaria suffumata*, *Hepialus lupulinus*, *Nola strigula*. Larvæ of *Anisopteryx æscularia*, *Hybernia leucophaæaria*, and a good many larvæ on sallows, catkins, Mountain Ash and Birch, viz. *Epunda viminalis*, *Gortyna flavago*, *Euperia fulvago*, *Cidaria immanata*, *C. miata*, many *Tortrices*, etc.

Coleoptera.—No records. **Other Orders.**—No records.

Any specimens of **Orthoptera**, **Neuroptera**, and **Trichoptera** would be gratefully received by Mr. Geo. T. Porritt, F.L.S., Crosland Hall, Huddersfield, for examination and report.

Diptera.—Specimens should be sent for determination either to Mr. R. H. Meade, Mount Royd, Manningham, Bradford, or Mr. P. H. Grimshaw, F.E.S., of the Museum of Science and Art, Edinburgh; the latter is collecting specimens and notes for an account of Yorkshire Diptera.

WORMS.—Any examples collected should be sent to Rev. Hilderic Friend, Ocker Hill, Tipton, for examination.

PHOTOGRAPHERS taking views on or in connection with the excursion are invited to present prints to the Union; and any willing to take special views to reproduce in the account to be afterwards published of the excursion should communicate with the Secretaries.

PROGRAMME OF MEETINGS.—

4-0 p.m.—Meat Tea, 2/- each	} All at the Temperance Hall, close to Cotherstone Station.
4-45 p.m.—Sectional Meetings	
5-0 p.m.—General Meeting	
5-40 p.m.—Train leaves Middleton.	
5-55 p.m.—Train leaves Cotherstone.	
6-52 p.m.—Train arrives at Darlington.	

Yorkshire Naturalists' Union.

President :

PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.

Hon. Secretary :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

Hon. Secretary for this Meeting :

JAMES HENRY ROWNTREE, Westwood, Scarborough.

THE 132ND MEETING

WILL BE HELD AT

SCARBOROUGH,

FOR THE INVESTIGATION OF

LANGDALE RIGG

BARNSCLIFF, AND THE ADJOINING VALLEYS AND
MOORLANDS ABOVE HACKNESS,

ON

THURSDAY, July 8th, 1897.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G. N., H. & B., L. & Y., L. & N. W., M. S. & L., Midland, and N. E. Railways which have booking arrangements for Scarborough, Scalby, Forge Valley, Cayton, or Gristhorpe Stations, with leave to break journey at any of these stations, to Members and Associates of the Y. N. U. producing their signed card of Membership. Tickets taken on Wednesday, Thursday, Friday, Saturday, or Sunday, July 7th to 11th inclusive, will be available for return any day up to Monday, July 12th. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION.—As this is plentiful at Scarborough, none need be specified. There is a small inn at Low Langdale End, and the 'Everley Hotel' is about a mile south of Hackness.

BOOKS AND MAPS.—The district for investigation is comprised wholly within Sheet 95 N.W. of the one-inch Ordnance Map, which may be had geologically coloured; and it is in Sheets 76 and 77 of the six-inch map.

PERMISSION to visit their properties has been kindly granted by the Right Hon. Lord Derwent, the Duchy of Lancaster, and Lady Downe.

THE DISTRICT for investigation includes both sides of the Derwent above Langdale End to its junction with the Harwooddale beck, and the high moorland known as Langdale Rigg; also Barnscliff and the valleys of Highdales and Lowdales leading down to Hackness.

The Geological Section will probably extend their investigations over a wider range, and will work in conjunction with the members of the Yorkshire Geological and Polytechnic Society, whose July Excursion is planned for the two following days.



The Yorkshire Geological and Polytechnic Society have also arranged Coast Excursions for Friday and Saturday, July 9th and 10th, and will be pleased to have the company of any members of the Y.N.U. Full particulars can be obtained from the Rev. W. L. Carter, Hopton, Mirfield.

ROUTES.—

- 1.—The general body of naturalists will be led by Mr. J. H. Rowntree and Mr. D. W. Bevan, and will proceed in char-a-bancs (2/- each) from the station yard at 11-30 a.m., through Raincliffe and Everley to Langdale End, whence the party will walk up the Derwent valley to Barnscliff, and thence down Highdales and Lowdales to Hackness Church, where they will rejoin the waggonettes.
- 2.—The Marine Zoology Committee will find the rocks north of Scarborough Castle worthy of their attention. Low Tide is at 3-50 p.m. Mr. J. C. Harrison will meet the party at the south end of the Royal Albert drive in the North Bay, at 2-30 p.m. Mr. F. W. Fierke also hopes to be present.
- 3.—The Geological party will be led by the Rev. E. Maule Cole, M.A., F.G.S. Waggonettes (2/- each) will leave the Pavilion Hotel, Scarborough, at 11-30 a.m., and the party will drive over Hay Brow to Suffield Heights, thence walk to Suffield and Silpho Quarries, and rejoin the conveyances at Hackness; the return journey will be through Forge Valley to Ayton Quarry, and back to Scarborough.

GEOLOGY.—The Geological section will be officially represented by its Secretaries, Rev. W. Lower Carter, M.A., F.G.S., and Mr. J. W. Stather, F.G.S. The following notes have been supplied by the Rev. W. Lower Carter:—The district round Hackness, denuded into deep and picturesque valleys by the river

Derwent and its tributaries, gives good opportunities for the examination of the Middle Oolites from the Kelloway Rock to the Upper Calcareous Grit. The beds of the Coral Rag exposed in the quarries of Sufield, Silpho and Ayton are very fossiliferous, and will afford excellent opportunities to the collector. Forge Valley is an interesting physical feature, being a gorge cut by the Derwent when its drainage valley at Scalby was stopped during the Ice Age by the North Sea glaciers. Owing to the same cause the exit at Filey was closed, the Vale of Pickering became a lake, and the waters finally found their way over the low watershed at Malton and became tributary to the Ouse.

BOTANY.—The Botanical section will be officially represented by its Secretaries, Mr. John Farrah, F.L.S., Mr. J. J. Marshall, and Mr. Charles Crossland.

Flowering Plants.—Mr. E. R. Cross says :—As the district is rich in natural beauty so also it is abundantly rich in flowering plants. Not far from Hackness grows the rare May Lily (*Maianthemum bifolia*), robust and healthy, blooming in abundance from year to year. The valleys running at right angles from Hackness abound in many species of fern; amongst others are *Polypodium phegopteris*, *P. vulgare*, *P. dryopteris*, *Asplenium viride*, *A. trichomanes*, and *A. ruta-muraria*, also *Osmunda regalis*, almost gone, alas, by the depredations of the fern gatherer and the so-called botanical fern lover. Whilst above on the moors *Botrychium lunaria* and *Ophioglossum vulgatum* are abundant. Near Langdale End the beautiful dwarf Cornel (*Cornus suecica*) reaches its southern limit, and will now be looking its best. In addition the following plants should be seen, *Actæa spicata*, *Aquilegia vulgaris*, *Hypericum montanum*, *Euonymus Europæus*, *Rhamnus catharticus*, *Prunus padus*, *Chrysosplenium alternifolium*, *Antennaria dioica*, *Campanula latifolia*, *Pyrola media*, *P. minor*, *Gentiana campestris*, *Carex digitata*. On the moors in a pine wood is a locality which some years ago was given for *Linnaea borealis*, and although it has not been found recently a thorough search should be made, as being rather out of reach it is not often visited by botanists. Near here also on the moor a few specimens of the dwarf Twayblade (*Listera cordata*) can always be found by careful looking.

Mosses and Hepatics.—No records.

Lichens.—No records.

Fungi.—No records. Any specimens met with should be sent to Mr. Charles Crossland, 4, Coleridge Street, Halifax.

Algæ.—No records. Tubes should be sent to Mr. W. West, F.L.S., 15, Horton Lane, Bradford, who is preparing an Alga-Flora of Yorkshire for publication, and notes that this is a district for which he has no material.

VERTEBRATE ZOOLOGY.—The Vertebrate section will be represented by one of its secretaries, Mr. Oxley Grabham, M.A., M.B.O.U.

Birds.—On moors above Langdale Rigg: Curlew, Golden Plover, Red Grouse, Nightjar, Snipe, Ring Ouzel, and Merlin, all of which nest here. In Barnscliff and along the Derwent may be found the Dipper, Kingfisher, Common Sandpiper, Carrion Crow, Kestrel, Sparrowhawk, Green Woodpecker, Great Spotted Woodpecker, Moorhen, Brown Owl, and most of the commoner species. The Pied Flycatcher occurs occasionally.

Mammals.—Fox, Rabbit, Stoat, Weasel, Otter, Squirrel, Water Vole.

Fishes.—Trout, Grayling, Chub, Minnow, Loach, Miller's Thumb, Eel.

Reptiles.—Viper, Common Lizard.

CONCHOLOGY.—The Conchological section will be officially represented by its President, Mr. W. Denison Roebuck, F.L.S., and its Secretary, Mr. F. W. Fierke.

Mr. J. A. Hargreaves says the Hackness district is rich in species of land and freshwater mollusca. Amongst recent records are *Limax marginatus*, *Arion ater* (several varieties), *Hyalinia pura* with its var. *margaritacea*, *H. fulva*, *Helix fusca* (abundant), *H. aculeata*, *H. lamellata*, *H. hispida*, *H. itala*, *Vertigo edentula*, *Acicula lineata*, *Balea perversa*, *Limnaea glabra*, *L. auricularia*, etc.

ENTOMOLOGY.—The Entomological Section will be officially represented by its President, Mr. H. H. Corbett, M.R.C.S., and its Secretary, Mr. Wm. Hewett; and the Coleopterists by Mr. M. L. Thompson.

Lepidoptera.—Mr. T. W. Lownsbrough supplies a lengthy list of species, amongst which may be mentioned the following: *Argynnis selene*, *A. aglaia*, *Thecla rubi*, *Macroglossa stellatorum*, *Nemophila plantaginis*, *N. russula*, *Saturnia carpini*, *Bombyx quercus* var. *calluna*; and larvæ of *Dicranura furcula*, *D. bifida*, *Lophopteryx camelina*, *Notodonta ziczac*, *Chaonia dodonea*, *Anarta myrtilli*, *Plusia pulchrina*, *P. interrogationis*, *Eurymene dolobraria*, etc.

Coleoptera.—Mr. R. J. Fryer says: Hackness district has not been worked much for Coleoptera but should prove fairly good ground. The Tiger Beetle (*Cicindela campestris*) is common on the moors but varieties are difficult to meet with. *Melolontha vulgaris* and *Rhizotrogus solstitialis*, *Rhagium*, *Clytus*, *Endomychus coccineus* are amongst those taken; and Mr. E. J. Bayford also mentions the following species as having been taken in the Scarborough district:—*Rhinosimus ruficollis*, *R. viridipennis*, *R. planirostris*, Spring Hill Wood, Oliver's Mount, Scarborough Mere, *Lionychus quadrillum*, Raincliff Wood, *Micropeplus staphylinioides* Scarborough.

Hymenoptera.—Large hills of the black Wood Ant will be seen on Barnscliff.

Any specimens of **Orthoptera**, **Neuroptera**, and **Trichoptera** would be gratefully received by Mr. Geo. T. Porritt, F.L.S., Crosland Hall, Huddersfield, for examination and report.

Diptera.—Specimens should be sent for determination either to Mr. R. H. Meade, Mount Royd, Manningham, Bradford, or Mr. P. H. Grimshaw, F.E.S., of the Museum of Science and Art, Edinburgh; the latter is collecting specimens and notes for an account of Yorkshire Diptera.

WORMS.—Any examples collected should be sent to Rev. Hilderic Friend, Ocker Hill, Tipton, for examination.

PHOTOGRAPHERS taking views on or in connection with the excursion are invited to present prints to the Union; and any willing to take special views to reproduce in the account to be afterwards published of the excursion should communicate with the Secretaries.

PROGRAMME OF MEETINGS.—

5-30 p.m.—Meat Tea, 2/- each.
6-30 p.m.—Sectional Meetings. } At the Albemarle Hotel, Scarborough.
7-0 p.m.—General Meeting.

AN ENTOMOLOGICAL CONVERSAZIONE

WILL BE HELD IN THE

Scarborough Philosophical Society's Museum,

THE SAME EVENING,

From 7-30 to 10 p.m.,

Under the auspices of **THE FIELD NATURALISTS' SOCIETY,**

WHEN THERE WILL BE

SEVERAL EXHIBITIONS

OF

Living Specimens & Collections,

And **SHORT PAPERS** will be Read.

ADMISSION (INCLUDING LIGHT REFRESHMENTS), 6d. EACH.

Yorkshire Naturalists' Union.

President :

PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.

Hon. Secretary :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

Hon. Secretary for this Meeting :

J. J. MARSHALL, Market Weighton, R.S.O., York.

THE 133RD MEETING

WILL BE HELD AT

MARKET WEIGHTON,

FOR THE INVESTIGATION OF

EVERINGHAM PARK, WOODS, and CARRS,

ON

Bank-Holiday Monday, Aug. 2nd, 1897.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G. N., H. & B., L. & Y., L. & N. W., M. S. & L., Midland, and N. E. Railways which have booking arrangements for Everingham, Market Weighton, or Holme-on-Spalding-Moor Stations, with leave to break journey at any of these stations, to Members and Associates of the Y.N.U. producing their signed card of Membership. Tickets taken on Friday, Saturday, Sunday, or Monday, July 30th to August 2nd inclusive, will be available for return any day up to Tuesday, August 3rd. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION.—There is a limited amount of accommodation at the Temperance Hotel at Everingham (the only inn in the village), which may be ordered of Mr. Robert Drake. Members wishing to put up in Market Weighton (5 miles away) should apply to Mr. J. J. Marshall.

BOOKS AND MAPS.—The Everingham district is entirely within Sheet 71 (formerly 93 S.E.) of the One-inch Ordnance Map; and the geological route, Sancton and Newbald, entirely within Sheet 72 (formerly 94 S.W.). Both are to be had coloured for solid and drift geology. The Six-inch Sheets of the district are 195 and 208.

PERMISSION to visit their properties has been kindly granted by the Right Hon. Lord Herries (who is unfortunately prevented by an engagement in Glasgow from being present) and by Captain Slingsby.

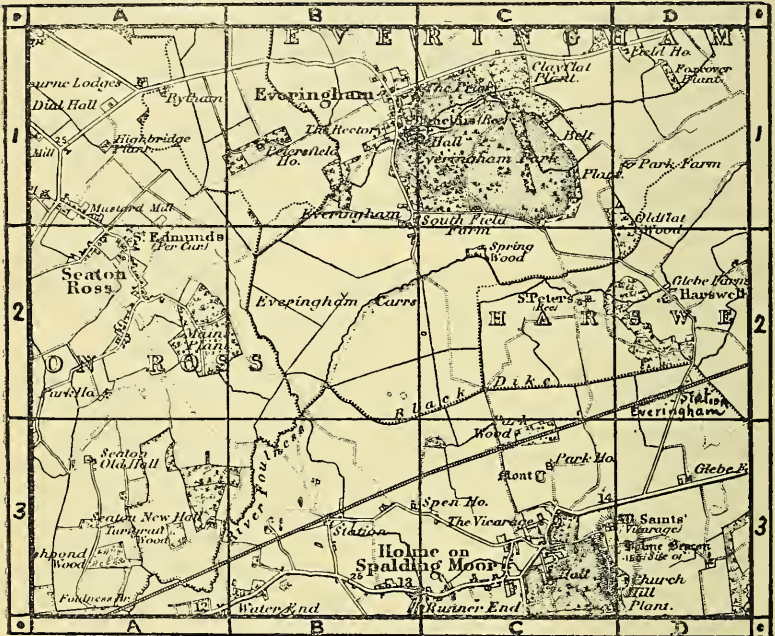
THE DISTRICT for investigation includes Everingham Park and surrounding woods, and also the low-lying Carr-land lying north of the railway at Holme-on-Spalding Moor.

ROUTES.—

- 1.—Mr. J. J. Marshall will lead the general body of naturalists from Holme-on-Spalding Moor Station on arrival of the 10-10 a.m. train from Selby and the 10-48 a.m. train from Market Weighton (which the N.E.R. Co. will allow to stop to set down), for the investigation of Black Dyke, River Foulness, Mains Plantation, and Everingham Carrs, Park, and Woods. Return from Everingham Station by the train reaching Market Weighton at 4 p.m., which will be specially stopped to take up the party.

- 2.—The gamekeeper (Mr. James Sumner) and his son and Mr. Wm. Hewett will lead a party of Entomologists to investigate the woods on the Everingham Estate, starting from Everingham Station on the arrival of the 10-15 a.m. train from Selby and the 10-48 a.m. train from Market Weighton (stopped specially to set down). This party will return by the same train as the first one.
- 3.—The Geological party will meet at Market Weighton Station at 10-42 a.m. and under the direction of Mr. F. F. Walton, F.G.S., President of the Hull Geological Society, will work the Sancton and Newbald district, returning to Market Weighton via North Cliff.

CONVEYANCES, 1s. each, from Everingham Church to Station, in the afternoon, will be provided, but only for members who advise Mr. Marshall in advance that they will require them.



GEOLOGY.—The Geological section will be officially represented by its President, Mr. Wm. Horne, F.G.S., and its Secretaries, Rev. W. Lower Carter, M.A., F.G.S., and Mr. J. W. Stather, F.G.S.

Mr. J. W. Stather, F.G.S., writes as follows:—A glance at the map shows that though the geological structure of the country along the base of the wolds south of Market Weighton is extremely simple, the outcropping beds are exceedingly varied and interesting in character, ranging from the Trias to the Chalk. The Jurassic beds run roughly N.N.W. and S.S.E., and three faults are marked by Tate and Blake as cutting at right angles across the strike, in the direction of the valleys which penetrate the Chalk, by the villages of Drewton, Newbald, and Sancton. In the vicinity of North Cliff, the Lower Lias has been worked in several places for marling the land, and it is here that the character of the beds can be best studied. In a general way the beds exposed may be described as consisting of a thick bed of Limestone at the top, full of *Lima gigantea*, *Cardinia listeri*, and *Ammonites johnstoni*; below this are softer beds, not generally so well seen, and then beds of Limestone again, very full of *Ostrea*, forming regular oyster beds, below which there are more shales and thin Limestones, the lowest being full of *Pleuromya crowcombea* and *Modiola minima*. A detailed account of several of the sections has been given by Prof. Blake (Quart. Journ. Geol. Soc., vol. xxviii.). The Oolites, which disappear near Acklam, reappear from under the Chalk in the neighbourhood of Sancton. Twenty feet of the unfossiliferous Kelloways Sands, full of glistening mica plates, are visible in the lower part of the pit, near the

church. The upper part of the same quarry is occupied by a curious deposit of boulders of local origin. At Newbald, there are sections in both the Kelloways Rock and the Millepore Oolite. The latter forms a considerable spread, and has been largely quarried to the west of the village. Middlemiss and Keeping mention the following species from this bed:—*Trigonia conjungens*, *Lima pectiniiformis*, and *Cricopora straminea*. At Bealsbeck, nearly a mile west of the North Cliff escarpment, many years ago, a large collection of bones of extinct animals were found, a full account of which is given by Prof. Phillips in his 'Geology of the Yorkshire Coast.' The following works may be consulted for fuller particulars:—'The Yorkshire Lias' (Tate and Blake); 'The Geology of the Hull and Barnsley Railway' (E. M. Cole); 'Sections at Cave' (Middlemiss and Keeping); 'Geology of Country between Market Weighton and the Humber' (F. F. Walton); and 'The Memoirs of the Geological Survey.'

BOTANY.—The Botanical section will be officially represented by its Secretaries, Mr. John Farrah, F.L.S., Mr. J. J. Marshall, and Mr. Charles Crossland.

Flowering Plants.—Mr. J. J. Marshall writes that the flora of the routes chosen does not appear to be known; he has, however, gathered the following within a short distance. Owing to the lateness of the fixture most of them will be past flowering but some should be found on the day of the excursion. The dry sandy wastes yield *Spergularia rubra*, *Radiola millegrana*, *Ornithopus purpusillus*, *Filago minima*, *Cerastium minus*, *Gentiana campestris*. In the forage fields are found *Papaver argemone*, *Alyssum calycinum*, *Silene otites*, *S. gallica*, *S. noctiflora*, *Melilotus parviflora*, *Cherophyllum anthriscus*, *Lamium amplexicaule*, *Apera spica-venti*. The swampy places should produce *Enanthe lachenalii*, *Bidens tripartita* and *Potamogeton plantagineus*. Others noted include *Chelidonium majus*, *Corydalis claviculata*, *Geranium columbinum*, *Potentilla argentea*, *Serratula tinctoria*, *Carduus pratensis*, *Jasione montana*, *Echium vulgare*, and *Goodyera repens*.

Mosses and Hepatics.—Mr. J. J. Marshall writes that though this is not a favourable time of year for the mosses, the well wooded tracts will probably contain *Orthotrichums*, and the heathy ground *Dicranum undulatum*, *D. spurium*, *Bryum erythrocarpum*, etc. **Lichens.**—No records.

Fungi.—No records. Any specimens met with should be sent to Mr. Charles Crossland, 4, Coleridge Street, Halifax.

Alga.—No records. Tubes should be sent to Mr. W. West, F.L.S., 15, Horton Lane, Bradford, who is preparing an Alga-Flora of Yorkshire for publication, and notes that this is a district for which he has no material.

VERTEBRATE ZOOLOGY.—The Vertebrate section will be represented by its President, Mr. Thomas Bunker, and Mr. F. Boyes.

Mr. F. Boyes writes that although the district to be explored presents no bold outlines or striking physical features, being part of the great plain of York, it has many isolated bits of great interest, as presenting somewhat of their original character of heath, moorland, and pine woods which are always well worth investigation. The whole district is of low elevation, but well wooded, and should afford ample scope for all tastes. Game of all kinds, including Hares and Rabbits, abounds and in the park there is a large herd of Fallow Deer; while of

Mammalia, the Fox, Stoat, Weasel, and Hedgehog are common, and both the Badger and Otter have occurred in the neighbourhood, while the Bank and Field Voles are numerous. [Mr. James Sumner, the keeper, adds the Noctule Bat and Water Shrew to the list.]

The **Birds** are particularly interesting, and include Long-eared and Barn Owls, Sparrowhawk and Kestrel, Magpie, Jay, Green and Great Spotted Woodpeckers, Nightjars, Kingfisher and Swift, Swallow, House and Sand Martins. In the woods are Wood Wren (common), Willow Wren and Chiff Chaff, Great, Cole, Blue and Long-tailed Tits, Tree Pipit (numerous), Bullfinch, etc., all of which breed. The Ring and Stockdoves are common, and the Turtle Dove should be there. The Stone Curlew used to breed on all the old warrens and grounds, along with the Snipe and Redshank; the two latter still breed and the Wild Duck also. The Heron is not uncommon. The Woodcock has nested near, and the Corncrake is an annual visitor, as no doubt is the Quail. The Wheatear and Stonechat used to be there on the heathy and sandy portions, but I have not observed the latter of some years. Of the commoner birds, such as Corn Bunting, etc., they are too numerous to particularise. Unfortunately, it will be late for the summer birds, as they will be working down to the coast, and at this time of the year are very silent.

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[Mr. James Sumner, the keeper, also mentions the occurrence of most of these birds, and specially notes that the Heron nests, that the Turtle-dove occurs, and that he has been surprised not to have observed the Quail on the estate. The Peregrine has occurred within recent years, and the Hawfinch breeds. Mr. W. Hewett notes that a pair of Herons have for several years nested in a fir-tree in the Park, but have not been observed there this year].

Of **Reptiles**, the Adder is common on the heathy spots, and the Lizard also. [Mr. Sumner, the keeper, has not seen the Lizard, but notes the occurrence of the Blindworm].

The **Fishes** include Pike, Perch, Rudd, Chub, Roach, Eels, Stone Loach, Stickleback, etc., in the canal running up to Holme River Head.

CONCHOLOGY.—The Conchological section will be officially represented by its President, Mr. W. Denison Roebuck, F.L.S., its Secretary, Mr. F. W. Fierke, and by Mr. John W. Taylor, F.L.S.

There appear to be no records whatever for the area covered by the Excursion, but there should be a fair proportion of woodland species in and about the Park, while collectors of fluviatile forms should search the dykes and meads shown in the map not far from the railway.

ENTOMOLOGY.—The Entomological Section will be officially represented by its President, Mr. H. H. Corbett, M.R.C.S., and its Secretary, Mr. Wm. Hewett

Lepidoptera.—Mr. William Hewett writes that Mr. James Sumner (the keeper) and his son have paid much attention to Entomology, and taken the following amongst very many others during the last few years: *Smerinthus populi*, *Cherocampa porcellus* (at flowers of Yellow Flag), *Macroglossa stellatarum*, *Sesia bembeciformis*, *Hepialus hectus*, *Callimorpha jacobææ*, *Chelonia plantaginis*, *Arctia mendica*, *A. fuliginosa*, *Pecilocampa populi*, *Eriogaster lanestris*, *Eurymene dolobraria*, *Pericallia syringaria* (the Lilac Beauty), *Eumomos fuscantaria* (the larvæ of this rare Yorkshire moth will be feeding on the date of the excursion and should be looked for on Ash), *Amphidasis prodromaria* (the Oak Beauty), *A. betularia* and its variety *doubledayaria*, *Tephrosia crepuscularia* (*binndularia*) and its variety *delamerensis*, *Geometria papilionaria* (the Large Emerald moth), *Phorodesma bajularia*, *Panagra petvaria* (swarms over bracken in the Park), *Eupithecia rectangularis*, *Melanthia albicillata*, *Petasia cassinea*, *Acronycta megecephala*, *Neuria saponaria*, *Apamea gemina*, *Caradrina alsines*, *Agritis valligera*, *Taniocampa populeti*, *Hæna thalassina*, *Cucullia umbratica*, *Notodonta trepida*, etc.

Mr. Hewett adds that he has personally been much obliged to Lord Herries for being allowed to investigate the entomology of the estate, and that he proposes to draw up for publication in 'The Naturalist' a complete list of all the species observed.

Coleoptera.—There are no records for the immediate district, but in other parts of the Market Weighton district *Quedius molochinus*, *Philonthus varians*, *P. marginatus*, and *Tachinus marginellus* have been taken by Rev. W. C. Hey, and *Oxyporus rufus* and *Mycetophagus quadripustulatus* by Mr. E. G. Bayford.

Any specimens of **Orthoptera**, **Neuroptera**, and **Trichoptera** would be gratefully received by Mr. Geo. T. Porritt, F.L.S., Crosland Hall, Huddersfield, for examination and report.

Diptera.—Specimens should be sent for determination either to Mr. R. H. Meade, Mount Royd, Manningham, Bradford, or Mr. P. H. Grimshaw, F.E.S., of the Museum of Science and Art, Edinburgh; the latter is collecting specimens and notes for an account of Yorkshire Diptera.

WORMS.—Any examples collected should be sent to Rev. Hilderic Friend, Ocker Hill, Tipton, for examination.

PHOTOGRAPHERS taking views on or in connection with the excursion are invited to present prints to the Union; and any willing to take special views to reproduce in the account to be afterwards published of the excursion should communicate with the Secretaries.

PROGRAMME OF MEETINGS.—

4-0 p.m.—Meat Tea, 2/- each, at the Londesborough Arms Hotel, Market Weighton.

5-0 p.m.—Sectional Meetings } At Girls' School-room (by kindness of Vicar).
5-15 p.m.—General Meeting }

As Everingham is 3 miles from the Station, Members must allow time.

Yorkshire Naturalists' Union.

President :

PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.

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JOHN CORDEAUX, M.B.O.U., Great Cotes, Lincolnshire.

Hon. Secretary :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

THE 135TH MEETING

WILL BE HELD AT

DARLINGTON,

FOR THE INVESTIGATION OF

UPPER TEESDALE,

From MIDDLETON to HIGH FORCE,

ON

WEDNESDAY, NOVEMBER 24th, 1897,

And following days.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G. N., H. & B., L. & Y., L. & N. W., Great Central, Midland, and N. E. Railways which have booking arrangements for Darlington or Middleton-in-Teesdale, with leave to break journey at Darlington or any Station on the Middleton Branch, to Members and Associates of the Y. N. U. producing their signed card of Membership. Tickets taken on Wednesday or Thursday, 24th or 25th Nov., 1897, will be available for return on any day up to Saturday, Nov. 27th, inclusive. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

WEDNESDAY'S PROGRAMME:—

The **THIRTY-SIXTH ANNUAL MEETING** will be held at **DARLINGTON**.

The use of the **MECHANICS' INSTITUTE, DARLINGTON**, for the various meetings has been secured by the local society.

11=30 a.m., The Sectional Meetings

(which all members and associates are entitled to attend) will be held for the election of Officers of Sections and to receive the annual reports from the secretaries.

The Committees of Research

whose annual meetings have not already been held, will meet immediately after the Sectional Annual Meetings.

Luncheon.—Members wishing luncheon will find the Imperial Hotel conveniently near the Mechanics' Institute. Ordinary at 1 p.m.

3=0 p.m., The General Committee

(each member of which receives a special summons with this circular) will meet (in the 'Club-room') to consider the Annual Report, elect Officers, and arrange the Excursion-programme for 1898.

5=0 p.m., Meat Tea,

2/- each, will be served by Mr. Albert Barnes in a room in the Institute.

6=0 p.m., The Annual Public Meeting

of Members and Associates will be held in the Large Hall, Mechanics' Institute. The chair will be taken by the President of the Union,

Prof. W. Boyd Dawkins, M.A., F.R.S., who will deliver the

PRESIDENTIAL ADDRESS,

taking as his subject

“The Caves of Yorkshire.”

During the delivery of the address the chair will be occupied by Mr. James I'Anson, J.P., President of the Darlington and Teesdale Naturalists' Field Club.

Cards of Membership,

The production of these is absolutely necessary for the obtaining of railway tickets at reduced fares, and also for admission to the various meetings.

Members who have lost or mislaid their cards, may have another on application to the Secretary, enclosing a stamped addressed envelope.

Associates may obtain theirs through the secretary of their own local society.

The Conversazione.

After the President's address there will be an exhibition of objects of interest; and during the evening selections of music will be given at intervals.

All communications regarding the local arrangements should be addressed to

MR. GEORGE BEST, HON. SEC.,
Darlington Naturalists' Field Club,
Bondgate, Darlington.

THURSDAY'S PROGRAMME:—

EXCURSION TO MIDDLETON & UPPER TEESDALE for **ONE** or for **THREE** DAYS.

Train leaves Darlington at 6-57 a.m., arriving at Middleton-in-Teesdale at 8-5 a.m. The party will then drive to a little beyond High Force (wagonette fare 1s. single, or 1s. 6d. return).

The last train leaves **Middleton-in-Teesdale** at 5-40 p.m. for all parts.

The Geologists will be led by Mr. Wm. Herdman, F.G.S., of Middleton-in-Teesdale, who will conduct them to the Cronkley Pencil Mill, the strata of which are classed by Messrs. Clough and Gunn as of Silurian origin, corresponding to the Stockdale Shales. After having examined the strata at the Pencil Mill the party will return to the conveyances and proceed to Middleton, and inspect the Basalt Quarry of Messrs. Ord & Maddison, of Darlington.

The Bryologists and Naturalists, under the leadership of Mr. Richard Barnes, will devote their attention to the rich moss flora of Upper Teesdale, accompanying the geologists in the first instance in the wagonettes.

PROLONGATION OF EXCURSION.—Should the weather be favourable and members wishful to prolong their stay in Teesdale, Mr. Herdman and Mr. Barnes will be glad to arrange for further investigation. Mr. Barnes suggests that—arrangements being modifiable to suit circumstances—headquarters be at Langdon Beck or High Force; one day be devoted to High Force and Cronkley, one to Langdon Beck and Falcon Clints, and one to Winch Bridge and Holwick.

Mr. Herdman would make suitable arrangements for the geologists if they will write him, and he invites members to inspect his collections of local minerals and mineral spars, the best in the district.

Mr. James Backhouse, F.Z.S., will probably join the party on Thursday or later.

NATURAL HISTORY WORK IN WINTER.—Although November is not an ideal month for field work, there is nevertheless much to be done by keen investigators. If flowering plants are all over, the season is at its best for Mosses, and for Lichens, while if frosts have not intervened, a number of Fungi may be found. In Zoology, the conchologist may meet with many of the smaller species of Mollusca, although the large thick-shelled species will have buried themselves for hibernation. *Vitrina pellucida* is at its best in winter, and most of the slugs and small land-shells creep abroad when the weather is mild. The field of investigation for lepidopterists is but restricted, and mainly restricted to pupa-digging, but coleopterists can do something, and water-beetles are even to be obtained in frosty weather by breaking the ice. Trapping for small Mammals is productive in winter, and the movements of Birds are always to be observed.

GEOLOGY OF UPPER TEESDALE.—Mr. William Herdman, F.G.S., of Middleton-in-Teesdale, writes that the geological formations of Teesdale on the Durham side of the Tees comprise the Palæozoic series of strata, of which the Carboniferous forms a sub-division, the latter being divided into the Millstone Grit and Yoredale Rocks, the strata of the district comprising Arenaceous, Argillaceous and Calcareous strata from the High Slate Sills to the Great Whin Sill. On the mountain sides in Teesdale patches of Millstone Grit may be found; in one instance at Carr's Craggs, above Newbiggin, dressed Millstone may be seen belonging this series, being dressed for our northern mills, but found to be too soft, hence the abandonment of the place. These strata have an inclination to the S.E., consequently the geological student, in traversing the Tees valley to Harwood, will find the strata in ascending order. On the Yorkshire side of the Tees, near the Cronkley Scarrs, a series of strata traversed by quartz-veins and several igneous dykes have been denominated as Silurian, corresponding to the Stockdale Shales. They lie west on the upthrow side of the Great Burtree-Ford Fault. The Great Whin Dyke, which traverses the whole length of Teesdale, can be studied to advantage at Messrs. Ord & Maddison's Whinstone Quarry at Middleton, thence at Holwick Scarrs and Falcon Clints, while minor faults have been found at Lady's Rake Mine and other parts of Upper Teesdale. The celebrated water-falls of High Force and Cauldron Snout contain excellent sections of Basalt, where at the latter-named place it is nearly 30 fathoms thick.

BRYOLOGY OF UPPER TEESDALE.—Mr. Richard Barnes, of Saltburn, who has paid much attention to the subject, writes that it scarcely needs reiteration that the district of Upper Teesdale has been noted for some considerable time for its botanical richness, and to the bryologist it offers especial charms and will be found extremely interesting, since, in Yorkshire, there is no finer ground, if even so fine, no ground more classic to be met with than is afforded by this district for investigation. The bryology of Upper Teesdale has been ably dealt with

both in Baker's 'North Yorkshire' and in 'The Musci and Hepaticæ of Teesdale' by the late Dr. Spruce, who, it may be mentioned, was the first to reveal the wealth of its moss-flora when visiting the Dale in 1843. Bryologists who intend joining the excursion will derive much interest in perusing the two excellent works referred to, should they have not already done so. Although the season is somewhat late for gathering in a good state of fructification the various species of Brya and Orthotricha, in which the dale is singularly rich, yet some good work should be done, as the season is admirably adapted for procuring most of the rarer species peculiar to the district. Should the weather forbid any attempt being made at the higher portion of the district some excellent ground for exploration will be afforded by the little shelving cliffs that skirt the river bank from Winch Bridge upwards. The following rarer species may be met with in this locality or near thereto:—*Anæctangium compactum*, *Gymnostomum commutatum*, *Weissia viridula* var. *densifolia*, *Dicranella schreberi*. *Archidium phascoides*, *Seligeria doniana*, *Trichostomum crispulum*, *T. mutabile*, *Barbula revoluta*, *Grimmia torquata*, *G. funalis*, *Ulota drummondii*, *U. crispula*, *Orthotrichum rupestre*, *O. stramineum*, *O. pulchellum*, *Bartramia halleriana*, *Philonotis calcarea*, *Webera longata*, *W. cruda*, *W. annotina*, *Bryum pallescens*, *B. bimum* var. *cuspidatum*, *B. argenteum* var. *lanatum*, *B. concinnatum*, *Mnium subglobosum*, *Fontinalis squamosa*, *Hedwigia ciliata*, *Thuidium recognitum*, *Eurhynchium teesdalii*, *Plagiothecium pulchellum*. *Amblystegium sprucei*, *Hypnum filicinum* var. *gracilescens*, *H. incurvatum*, *Jungermannia bantriensis*, *Cephalosia laxifolia*, *Lejeunea calcarea*, *L. rossettiana*. On the higher ground and the scars beneath the following rarer species may be noted:—*Sphagnum teres*, *Andreaea alpina*, *A. crassinerve*, *Rhabdoweissia fugax*, *R. denticulata*, *Cynodontium bruntoui*, *C. strumiferum*, *C. polycarpum*, *Dicranum sutvellum*, *D. falcatum*, *D. schisti*, *Campylopus atrovirens*, *C. setifolius*, *Blindia acuta*, *Didymodon luridus*, *D. cylindricus*, *D. cylindricus* var. *holtii*, *Barbula recurvifolia*, *Encalypta ciliata*, *Grimmia doniana*, *Racomitrium ellipticum*, *R. protensum*, *Ptychomitrium polyphyllum*, *Amphoridium lapponicum*, *A. mougeotii*, *Tetraplodon mnioides*, *Amblyodon dealbatus*, *Neesia uliginosa*, *Catocopium nigrum*, *Bartramia æderi*, *Webera acuminata*, *Zieria julacea*, *Bryum lacustre*, *B. uliginosum*, *B. mildei*, *Cinclidium stygium*, *Aulaconium androgynum*, *Diphyscium foliosum*, *Fissidens osmundoides*, *F. decipiens*, *F. fontanus*, *Neckera pumila*, *Pseudoleskea catenulata*, *Pterogonium gracile* (*Cylindrothecium concinnum*), *Orthothecium intricatum*, *Hypnum filicinum* var. *zalliscloause*, *H. rugosum*, *H. arcuatum*, *H. stellatum* var. *protensum*, *H. giganteum*, *H. sarmentosum*, *H. stramineum*.

HOTEL ACCOMMODATION.—The Imperial Hotel, King's Head Hotel, and North-Eastern Hotel, at Darlington, are the principal ones. Members prolonging their stay in Upper Teesdale will find the Cleveland Arms Hotel, Middleton, the High Force Inn, or Langdon Beck Inn, convenient places to stay at. Geologists are recommended to stay at Middleton, bryologists at High Force or Langdon Beck.

BOOKS AND MAPS.—The whole district is comprised in Sheets 25 and 92 (new series) of the one-inch Ordnance Maps. For further information see Baker's 'North Yorkshire' (in 'Transactions of Y.N.U.', part xii., p. 128); 'The Flora of Teesdale,' 1883 (Atkinson, Market Place, Barnard Castle); 'The Musci and Hepaticæ of Teesdale,' 1844, by Richard Spruce ('Trans. Bot. Soc., Edinb.');

'Teesdale Botany,' by James Backhouse ('Nat.,' 1884, p. 10); 'Notes on the Avifauna of Upper Teesdale,' by James Backhouse, junr. ('Nat.,' 1885, p. 353; and 'Nat.,' 1888, p. 79); Phillips' 'Rivers, Mountains, and Sea Coast of Yorkshire,' second edition, pp. 17, 18, 45, 51, 190; 'Geology of High Teesdale,' by Prof. Sedgwick (Cam. Phil. Trans., 1824, vol. ii., p. 174); 'Discovery of Silurian Beds in Teesdale' (Quart. Journ. Geol. Soc., London, 1877, pp. 27—34); James Backhouse's recently published 'Upper Teesdale, Past and Present,' 1896, price 1/- (Atkinson, Barnard Castle).

PERMISSION has been granted by Lord Barnard, Lord Strathmore and Mr. Cosmo Bonsor, for members to visit their Teesdale estates.

Yorkshire Naturalists' Union.

President:

PROF. MICHAEL FOSTER, M.A., Sec.R.S., Cambridge.

Hon. Secretary:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

Hon. Secretary for this Meeting:

HARRY SPEIGHT, Crownest Road, Bingley.

THE 136TH MEETING

WILL BE HELD AT

CLAPHAM,

FOR THE INVESTIGATION OF

INGLEBOROUGH & BOWLAND KNOTTS,

On SATURDAY, 14th MAY, 1898.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G. N., H. & B., L. & V., L. & N. W., Great Central, Midland, and N. E. Railways which have booking arrangements for Clapham Station, to Members and Associates of the Y.N.U. producing their signed card of Membership. Tickets taken on Friday or Saturday, 13th and 14th May, will be available for return any day up to Monday, 16th May. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION:—Owing to the very limited accommodation, and the great demand for it, members should write and secure beds **at once**. The Flying Horse Shoe, close to Clapham Station (postal address, Clapham, Lancaster), will be head-quarters for members staying over the week-end.

BOOKS AND MAPS.—The district is included in Sheets 97 S.W. (Ingleborough Hill) and 60 (92 N.W.) Clapham and Bowland Knotts, both of which are to be had geologically coloured. There are no special works on the Clapham district in particular, but it is included in the Settle and Ingleton lists. Reference may be made to Speight's 'Craven and North-West Yorkshire Highlands,' 1892; Davis & Lees' 'West Yorkshire,' 1878; Balderston's 'Ingleton: Bygone and Present,' n.d.; George H. Brown's 'On Foot round Settle.' (2/-) 1896; Dr. W. Marshall Watts' 'School Flora,' 3 editions, 1878, 1879, & 1896.

PERMISSION to visit their properties has been kindly granted by Mr. J. A. Farrer and Mr. T. R. Clapham.

THE DISTRICT.—Mr. Harry Speight writes that the area of investigation embraces a highly picturesque and romantic district comprised within the ancient parish of Clapham at the Northern extremity of the West Riding. The small village of Clapham is delightfully situated close to the fault which brings into prominence the characteristic scenery of the great Scar Limestone, with its varied animal and vegetable life. Prim and neat, yet rustic and retired, Clapham, with its church, manor-house, and cross (where the now extinct markets were held by charter granted in the time of King John) beside its prattling trout beck, is often declared to be the prettiest village in Yorkshire. The summit of Ingleborough (2,373 ft.) lies three miles from it to the north. East of the village is "Ingleborough" park, with mansion, the seat of Mr. James Anson Farrer, lord of the manor. This extensive domain and the gills adjoining are well wooded, and some

of the trees attain quite stately proportions, The rather backward season will necessitate members restricting their observations to the more fertile beck-courses and the sylvan glades of Trow Gill, ascending towards the chasm of Gaping Gill and the southern and eastern slopes of Ingleborough. The Geologists will visit the Silurian tract in the vicinity of Austwick and the classic group of erratics at Norber. Wharfe, and Feizor, if not too far a-field, will also amply repay botanizing. The limestone abounds with caves, pot-holes, and underground streams containing a variety of life, which will repay investigation. Special facilities have been obtained for the examination of the great Ingleborough Cave, which is traversable for a distance of about half-a-mile. Though originally intended to examine the gritstone tracts of Bolland Knotts, the state of the season will hardly justify members confining themselves to that locality. Those, however, who are passing the week-end at Clapham, will enjoy a ramble over the moors to the summit of the Bolland Road (1,400 ft.), from which there is a wide and interesting panorama.

ROUTES.—All parties will leave Clapham Station at 10-30 a.m.

I.—Mr. Reginald J. Farrer will conduct the general body of naturalists in the immediate vicinity of Clapham.

II.—Geologists will, under the leadership of Mr. Benj. Holgate, F.G.S., arrive at the cave at 11-15 a.m. (Conveyances for those who order); the cave will be left at about 12-40; the stile at head of valley above Trow Ghyll, 1-40; to Gaping Ghyll Hole and back to the stile, 2-40; the party will return towards the foot of Trow Ghyll. These hours will afford plenty of time for the work to be done, and if any time is gained, members wishing to see the Norber Erratics may cross over there, and return to the 'Flying Horse Shoe' by 5 p.m.; $2\frac{3}{4}$ hours at least are required to proceed from Trow Ghyll to Norber and back to Clapham.

INGLEBOROUGH CAVE.—A reduced charge of 8d. each for admission will be made to Members and Associates showing their cards.

CONVEYANCES.—From Station to village, conveyances will be provided, fare 6d., for members ordering in advance from the Flying Horse Shoe Inn.

GEOLOGY OF CLAPHAM.—Mr. B. Holgate, F.G.S., writes that the objects of interest in the immediate neighbourhood are: To the north and west, the Clapham Beck, with its waterfalls, rapids, and underground stream from Gaping Ghyll Hole, the Cave, Trow Ghyll, the dry valley both below and above it, the remains of Ghylls which were in their time similar to Gaping Ghyll, which now draws off the water that formerly went through them, the valleys along which the streams ran to feed these Ghylls, and the Gaping Ghyll Hole. The cave is of little interest to the archæologist, no remains either of flint implements or bones having been found in it, but it is of surpassing interest to the physical geologist and to those who wish to study the formation of different forms of stalactites and stalagmites, for here we see the pipe stalactite which does not drop and is hollow, the stalactites enlarged from the outside and in length at the same time; the stalagmites, some with the corresponding stalactite above them and some without; here we also clearly see the formation of tufa. Until 1837 the cave was only open for about eighty yards, further access being stopped by two lakes of water at different levels, one behind the other. The way in which they slowly built up their own barrier and raised their edges higher and higher, so making the water deeper, may be clearly seen; also the way in which tufa collected about the pendant stalactites show how this class of lime is formed. The remains of an ancient pebbly conglomerate show the great amount of wear to which the cave has been subjected since that period when this conglomerate formed the pebbly floor. The careful manner in which the cave has been preserved bring out in the best form the above facts, and Mr. H. Harrison, the guide, takes the greatest interest and makes it his study. Leaving the cave and proceeding up Trow Ghyll, we have evidence of the ancient bed of the beck, now no longer in action. At the head of Trow Ghyll Nick the marks still remain of water as it seethed in a turbulent stream from side to side in its rapid and broken course. At the head of this dry valley we have two deep ghylls, now partially filled, probably by huge blocks of stone blocking the upper part of them. These are similar to the Gaping Ghyll Hole, have been fed by the same beck; the dry water-courses are still visible which fed them, and which at that time passed over Gaping Ghyll Hole without falling into it. Care must be taken in approaching Gaping Ghyll, as it is unprotected. To the east of Clapham,

at Norber, we have the well known and splendid example of huge blocks of black silurian rock having been torn by glaciers from their parent bed in the Crummock Valley and distributed in large numbers over the white limestone at the mouth of the valley. Some of these blocks have been borne round to the west of the southern end, at least 250 feet higher than the place from which they were torn.

BOTANY.—In Davis & Lees' 'West Yorkshire,' 1878, pp. 266 and 267, are given two lists, one of 94 plants from near Clapham, Austwick, Feizor, Lawkland, etc., the other of 46 found between Clapham and Bowland Knotts. We are indebted for botanical notes to Mr. Reginald J. Farrer, Mr. Lister Rotheray, Mr. J. Beanland, and Mr. W. West, F.L.S.

Flowering Plants.—There are many very interesting plants to be found, including *Anagallis tenella* (damp field near station), *Trollius* and *Epipactis latifolia* (woods fringing the Wening), *Ophrys muscifera*, *Primula farinosa*, *Gymnadenia*, *Campanula latifolia*, *Carduus heterophyllus*, *Parnassia*, *Habenaria chlorantha*, *Viola hirta*, *Rubus saxatilis*, *Gentiana amarella*, *Juniperus*, *Polemonium* (rare), *Rosa villosa*, *Antennaria dioica*, *Convallaria maialis*, *Saxifraga hypnoides*, various *Droseræ*, *Chrysosplenium oppositifolium*, *Pinguicula*, *Vaccinium oxycoccos*, *Sedum rhodiola*, *Arenaria verna*, *A. gothica*, *Viola lutea*, *Sax. aizoides*, *Rubus chamemorus*, *Aquilegia vulgaris*, etc., and various ferns occur.

Mosses and Hepatics.—Mr. Lister Rotheray notes that numerous mosses are on record, including *Sphagnum tenellum*, *Rhabdoweissia fugax*, *Campylopus atrovirens*, *Distichium capillaceum*, *Barbula recurvifolia*, *B. tortuosa*, *Eucalypta ciliata*, *Racomitrium heterostichum*, *R. sudeticum*, *Orthotrichum nudum*, *O. rupestre*, *O. stramineum*, *O. crispum*, *Zygodon mougeotii*, *Aulacomnium androgynum*, *Bryum alpinum*, *B. elongatum*, *B. julaceum*, *Cinclidium stygium*, *Bartramia calcarea*, *B. halleriana*, *Anomodon viticulosus*, *Hypnum plumosum*, *H. pumilum*, *H. swartzii*, *H. filicinum*, *H. kneiffii*, *H. scorpioides*, *Neckera crispa*, etc., and of Hepatics, *Marchantia polymorpha*, *Preissia commutata*, *Fegatella conica*, *Asterella hemispherica*, *Lunularia vulgaris*, *Lejeunea echinata*, *Porella platyphylla*, *P. rivularis*, *Lepidozia reptans*, *Chiloscyphus polyanthus*, *Trichocolea tomentella*, and *Scapania nemorosa*, etc.

Fungi.—No records. **Lichens.**—*Collema ceranoides*. Mr. W. West, F.L.S., notes the following: *Collema furvum*, *Leptogium lacerum*, *Cetraria islandica*, *Peltigera polydactyla*, *Solorina saccata*, *Parmelia caperata*, *P. tiliaea*, *P. tenella*, *Umbilicaria polyphylla*, *Squamaria saxicola*, *Placodium murorum*, *P. candicans*, *Lecanora parella*, *L. rupestris*, *L. calcarea*, *Pertusaria fallax*, *P. globulifera*, *Thelotrema lepadinum*, *Lecidea lurida*, *L. sanguinaria*, *L. canescens*, *L. cupularis*, *L. grossa*, *L. vesicularis*, *L. geographica*, *Opographia varia*, *Normandina luteovirens*, *Endocarpa rufescens*, *Verrucaria gemmata*, *V. calciseda*, *V. nitida*, etc.

Algæ.—Mr. W. West, F.L.S., has collected many species within easy walking distance of Clapham, including *Lemanea fluviatilis*, *Spirotenia condensata*, *Mesotenum macrococcum*, *M. endlicherianum*, *Penium navicula*, *P. polymorphum*, *Roya obtusa*, *Closterium cornu*, *C. costatum*, *C. directum*, *C. juncidum*, *C. kiitzingii*, *C. parvulum*, *C. pseudodiana*, *C. subulatum*, *C. venus*, *Pleurotenium ehrenbergii*, *Tetmemorus brebissonii*, *Euastrum affine*, *E. ansatum*, *E. didelta*, *E. elegans*, *E. notabile*, *E. oblongum*, *Micrasterias americana*, *M. rotata*, *Xanthidium aculeatum*, *X. antilopæum*, *Cosmarium blyttii*, *C. bioculatum*, *C. brebissonii*, *C. crenulatum*, *C. ornatum*, *C. punctulatum*, *Spondylosium secedens*, *S. inflexum*, etc.

VERTEBRATE ZOOLOGY.—Mr. J. Walling Handby, of Austwick, has paid considerable attention to the vertebrates of the neighbourhood, and furnishes much valuable information. We are also indebted for notes to Mr. H. Harrison, Mr. H. B. Booth, Mr. J. Beanland, and Mr. R. B. Cragg.

Mammalia.—The records include the Fox, Otter, Mole, Stoat, Weasel, Hedgehog, Badger, Squirrel, etc., and the Polecat formerly.

Birds.—The moorland and crag species are to be found, and also some woodland forms—The Peregrine, Merlin, Raven, Ring Ouzel, an extensive colony of Sand Martins in sand quarries about a mile from Clapham, Golden Plover, Dunlin, Sandpiper, Dipper, Curlew, Nightjar, Heron, Redstart, Grey and Yellow Wagtail, Twite, Grouse, Land Rail, Moorhen, Snipe, Lapwing, Longeared Owl, Shorteared Owl, Tawny Owl, Great, Blue and Longtailed Tits, Whitethroat, Blackcap, Garden Warbler, Willow-wren, Wood-wren, Chiffchaff, Pipits, Spotted Flycatcher, etc. The Buzzard is now extinct.

Reptiles.—The date is too early, unless the day be very warm and sunny. The Lizard occurs, the Blindworm is fairly numerous, and no doubt the Viper occurs, though not on record.

Fishes.—The Common Trout, Bullhead, and Eel abound, while the Perch occurs in Low Pond, Clapham, and Tench in a quarry on Newby Moor (H. Harrison).

CONCHOLOGY.—Conchologists will find the neighbourhood of Clapham a rich field for investigation, the characteristic species of the Scar-limestone tract, such as *Balea*, *Clausilia dubia*, *Helix rupestris*, etc., being plentiful. Mr. Hugh Richardson's list of mollusca of the Clapham district (J. of Conch., Ap., 1886, p. p. 60-61) includes 41 species, of which *Helix lamellata*, *Pupa muscorum*, *Azeca*, were found in Mr. Farrer's grounds and in Clapham Woods; a number of freshwater species in a fossil state are to be found in the Lake Marl of Crummockdale. Mr. Beanland finds in a field to the right of Clapham Station *Succinea putris* and *Limnæa truncatula*, *Cl. laminata*, and the various species of *Pupa* and *Vertigo* in moss all the way from the village to the cave.

ENTOMOLOGY.—The Insect-fauna of the district seems to be a blank, there being no district records, except the following:—

Lepidoptera.—*Larentia multistrigaria* (J. Beanland).

Coleoptera.—Mr. J. W. Carter notes that the following species have been taken near Clapham and Ingleborough: *Carabus arvensis*, *Notiophilus aquaticus*, *N. palustris*, *Nebria gyllenhalii*, abundant on Ingleborough summit; *Clivina fossor*, *Patrobis assimilis*, abundant on the summit; *Pterostichus æthiops*, *Calathus melanocephalus* and its var. *nubigena*, *Byrrhus fasciatus*, *Silpha atrata*, and other commoner species. The rare *Carabus glabratus*, discovered in England and on Ingleborough by Sir W. J. Hooker, should be looked for, as it has probably not been observed since its discovery a great number of years ago. *Miscodera arctica* and *Pterostichus vitreus*, both of which are alpine and sub-alpine species and occur in some other parts of Yorkshire, should be looked for, the former I have always found under *very small pieces* of stone.

NATURAL HISTORY NEAR BOWLAND KNOTTS.—Mr. J. F. Pickard writes that not many plants found near Bowland Knotts are likely to bloom at this time of the year, though *Meconopsis cambrica* is said to grow in some abundance near the Knotts and Tosside, but he has not found it himself. *Audromeda polifolia* is common in the marshes on the Bowland side of the Knotts, together with *Vaccinium vitis-idaea* and *V. oxycoccus*. Between Dale Head and the Knotts is a large moss, where grows *Menyanthes*, *Drosera rotundifolia*, and probably *D. longifolia*; on the roadside near is a quantity of *Veronica scutellata*. Both oak and beech fern are found in the neighbourhood, and on the Knotts *Lycopodium selago* and *L. clavatum* are said to grow. The Birds are Golden Plover, Raven, Merlin, Kestrel, Snipe, Rock Dove, Short-eared Owl, Stonechat, Wheatear, Ring Ousel, Cuckoo, Curlew, etc. The Fox is occasionally shot but is exceedingly rare in Bowland.

GEOLOGY OF BOWLAND KNOTTS.—It had been originally intended to make a special feature of Bowland Knotts, but found somewhat too early in the year for general work. A long and most interesting note by Mr. R. H. Tiddeman, M.A., F.G.S., sent for this circular, has had to be omitted for want of space, but is in type, and copies will be distributed at the excursion.

PHOTOGRAPHERS.—It is hoped that photographers present will consult the Secretary, with a view of taking views that may be reproduced to illustrate the report of the excursion.

SECTIONAL MINUTE BOOKS FOR 1897 AND PREVIOUS YEARS.—Several are missing; will Sectional Officers or Members assist the Secretary to recover them, so that proper accounts may be published of last year's excursions.

PROGRAMME OF MEETINGS.—

5-0 p.m.—Meat Tea, 2/- each	} All at the Flying Horse Shoe Inn, close to Clapham Station.
6-0 p.m.—Sectional Meetings	
6-15 p.m.—General Meeting	

Train leaves Clapham for the South at 6-55 p.m.

Yorkshire Naturalists' Union.

SUPPLEMENT TO CIRCULAR

OF 136th MEETING, AT

CLAPHAM,

ON SATURDAY, 14th MAY, 1898.

GEOLOGY OF BOWLAND KNOTTS.—Mr. R. H. Tiddeman, M. A., F.G.S., writes that the geology which may be met with from Clapham southwards is all contained in the Geological Survey Map, Sheet 92 N.W. (new series Sheet 60) which may be had either coloured for solid rocks only or for drifts as well. The solid rocks edition is the best to get for the geology generally, as so much of the detail is lost in the drift colouring. A horizontal section, No. 147, from Heysham to Settle, also relates to this ground. The distance from the Clapham station to Bowland Knotts is under five miles, a fairly direct mountain road but all against the collar. The ground passed over consists entirely of beds of Millstone Grit and associated shales. These are much broken by a series of faults, which range from W.N.W. to N.N.W. It would be difficult to make out the arrangement of these rocks were it not for the clues afforded by two fairly distinct beds: (1), Black Fossiliferous Shales, containing *poridionæ* in chief abundance, orthoceras, goniatites, occasionally fish scales and teeth, and fragments of fossil plants; (2), The sandstone below this is remarkable for being a hard siliceous rock (almost a ganister). A few feet below the top of this there is often a thin bed of coal, which may be found by poking about under the beds of sandstone. It is generally found in a pool in the stream. At a lower level at the bottom of the grit or a little below it, is often a bed of coal of better proportions, ranging about 1-ft. 10-in. to 2-ft. 0-in. This has been extensively worked by level and crop works, not so much here as on the extension of the outcrop westwards towards Lancaster (91 N.E.). It has been worked near Wray, Hornby, Farleton, and Caton, and in the valley of the Conder, and generally goes by the name of the Caton Coal. Like most of the Millstone Grit coals, it is inconstant in thickness, and often probably absent or reduced to a mere trace. The shales mentioned above may be known on the map by the green colour given them. The geology is not to be plainly seen along the road, but Keasden Beck on the west, and Kettlesbeck from 1 to 1½ miles east of the road, give very good sections and are pretty little glens; although there are not, so far as I recollect, any footpaths along them. Another smaller and shorter gill which runs down by Throstle Nest and is close to the road, gives a fair exposure of the Fossiliferous Shales, and shows the Coal Grit thrown up by a small fault. At Dovenanter End a small vein of galena was tried many years ago. In Kettlesbeck, right bank, between the railway and Kettlesbeck Bridge, a calcareous bed was found containing *Productus* and *Spirifer*, a very unusual fauna in these Millstone Grits. This is a higher horizon than that of the Fossiliferous Shales above the Caton Coal Grits. A trace of it was also found in the road as it crosses the hill S.W. of Dubgarth. **DRIFTS.**—The peaty flats about Clapham wander about amongst numerous drumlins, old ice-sheet rubbish. The north end of Burn Moor is covered with a spread of drift and here and there little ridges, which are evidently the moraines of dwindling glaciers coasting the fell, present themselves. Occasionally Silurian boulders are found here, which probably came from Ingleton, or the other older foundations of the Ingleborough range. Drift is to be found high up on the ascent to Bowland Knotts. Glacial striae on the rocks, especially on the fine surface of the Coal Grit, are common, and I have found scratched surfaces with overlying boulders on the Knotts themselves. These scratches are striking for Pendle, and show that an ice-stream crossed the ridge at an elevation of about 1,400 ft.—(See "Evidence for an Ice-Sheet in N. Lancashire, Yorkshire, and Westmorland," by R. H. Tiddeman, Quart. Journ. Geol. Soc., pp. 471-491, 1872).

Yorkshire Naturalists' Union.

President :

PROF. MICHAEL FOSTER, M.A., Sec.R.S., Cambridge.

Hon. Secretary :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

Special Hon. Secretary for this Meeting:

H. H. CORBETT, M.R.C.S., 9, Priory Place, Doncaster.

THE 137TH MEETING

WILL BE HELD AT

DONCASTER,

FOR THE INVESTIGATION OF

BALBY, WEST MOOR, ARMTHORPE, SANDAL BEAT,

SANDAL BRICKFIELDS, WHEATLEY WOOD, etc.,

ON

Whit-Monday, 30th May, 1898.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G. N., H. & B., L. & V., L. & N.W., M. S. & L., Midland, and N. E. Railways which have booking arrangements for Doncaster Station to Members and Associates of the Y.N.U. producing their signed card of Membership. Tickets taken on Friday, Saturday, Sunday, or Monday, 27th to 30th May inclusive, will be available for return any day up to Tuesday, 31st May. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION.—Members will find excellent accommodation at The Glyn (Temperance), The Angel, The Elephant, The Reindeer, etc.

HEAD-QUARTERS for members staying the week-end will be at The Glyn Hotel.

BOOKS AND MAPS.—The whole of the district to be investigated lies within Sheet 87 S.E. of the One-inch Ordnance Map. This sheet may be had geologically coloured. The following books may be consulted—'West Yorkshire,' Davis and Lees, 1878, p. 371; 'Naturalist,' Aug., 1897, for Yorkshire Boulder Committee Report, 1896-7; 'Transactions of the Yorkshire Geological and Polytechnic Society,' for Corbett and Kendall on Post Glacial Gravels of Doncaster district 1896.

ROUTES.—All parties will leave The Glyn Hotel (close to the station) at 11 a.m.

Two completely distinct routes will be followed:—

I.—**GEOLOGISTS:** To Balby Brick Works and Hexthorpe. Leader: Mr. P. F. Kendall, F.G.S.

II.—**BOTANISTS, CONCHOLOGISTS, ENTOMOLOGISTS, ORNITHOLOGISTS, etc.:** To West Moor, by conveyances, returning by Armthorpe, Wheatley, and Sandal. Fare, 1/- each, if booked by 28th May; no guarantee can be given to those who do not book. Leaders: Messrs. Corbett, Stiles, Hewett, Bayford, etc.

PERMISSION to visit their estates, quarries, works, etc., is granted by the Mayor and Corporation of Doncaster, Lord Auckland, Sir W. H. Cooke, Mrs. G. Wright, Mr. Browne, The Great Central Railway Co., The Balby Brick Co., and Messrs. Cockin, Gibson, Fox, Beastall, and Senior.

ON SATURDAY EVENING, 28th May, an Informal Meeting, and Exhibition of Objects of Local Scientific Interest, will be held at The Glyn Hotel.

GEOLOGY.—The Geological Section will be officially represented by its Secretaries, Messrs. J. W. Stather and J. H. Howarth, and by the President of the Boulder Committee, Mr. P. F. Kendall.

The district to be investigated is for the most part on the Bunter Sandstone, which is capped by Post Glacial Gravel and Boulder Clay. The Upper Magnesian Limestone, capped by Boulder Clay, is exposed by the side of the Great Central Line between Doncaster and Conisborough.

The high-road from Doncaster to Balby follows the crest of a long low hill of Bunter Sandstone, that serves as the dividing line of the Don and Trent watersheds. Immediately upon leaving Doncaster, at Balby Bridge on the left side of the road, the sandstone has been extensively quarried, and an interesting section is exposed, which from below upwards is roughly as follows: Red Sandstone, White Calcareous Sandstone, Red Marl with wave-worn surface, White Calcareous Sandstone, Red Sandstone, with partings and isolated patches of Marl, Gravel. The gravel is composed of various sized stones, from 1-ft. downwards; the great majority are Carboniferous, with a considerable number of Quartzites and Cherts. About $1\frac{1}{2}$ miles from Doncaster is another large quarry in the Bunter, with a great deposit of gravel on top. The Bunter here contains a thin gravel bed, composed of Grits, Ganisters, Quartzites, and Conglomerates. The sand is beautifully ripple-marked. The over-lying gravels are strongly current-bedded, dipping towards the Trent watershed. They are composed of similar pebbles to those at the Balby Bridge quarry, but contain a larger number of Cherts. About a quarter of a mile to the west of this quarry, the Upper Magnesian Limestone has been exposed at the side of the Great Central Line in removing 'ballast.' The surface of the limestone forms a remarkable series of domes. The deposit above the limestone consists of soft sandy clay, with numerous large boulders of Mountain Limestone, Millstone grit, Ganister, and Magnesian Limestone. The boulders are not striated. About half a mile south-west of this point is another quarry, showing Bunter capped with Boulder Clay. Here two erratics have been found—a Shap Granite and a Volcanic Agglomerate. This is the first point at which the Balby Boulder Clay is seen, and about a quarter of a mile in a southerly direction on the right side of the Worksop Road are three brick manufactories, where fine sections are to be seen. The clay here is a tough purplish coloured till, with very numerous boulders. These latter vary in size from stones of several tons weight downwards; many of them are strongly striated. They consist for the most part of Coal-Measure Rocks, together with a great number of Magnesian Limestones, Poikilitic Marls, Gypsums, Mountain Limestones, Yoredale Limestones, and a very small percentage of Lake District Erratics. The Till has a maximum thickness of about 35 feet, and rests upon the Bunter. About 18 feet from the top is a well-marked parting of coarse sand with fragments of coal. A second sand-parting is exposed about 30 feet down.

BOTANY.—

Flowering Plants and Ferns.—Mr. H. H. Corbett furnishes the following report for the district to be investigated:—West Moor is a portion of the old fen country that formerly occupied much of the lower lands of the Don and Trent watersheds. It is now entirely under cultivation, but remnants of the old flora linger in the numerous ditches. Among other species to be found are *Ranunculus lingua*, *Eupatorium cannabinum*, *Hydrocharis morsus-ranæ*, *Hottonia palustris*, and several interesting species of *Potamogeton*, *Carex*, etc. The moor is surrounded by somewhat steep banks of gravel, capping the Bunter Sandstone. Here may be found *Draba verna*, *Teesdalia nudicaulis*, *Geranium dissectum*, *Potentilla argentea*, *Senecio sylvaticus*, etc. These and many other psammophilous species will be found throughout the gravelly and sandy district from West Moor, through Arm-

thorpe, and on to Sandal Beat. Within the Beat and the adjacent Wheatley Wood are *Corydalis claviculata*, *Erica tetralix*, *Pyrola minor*, *Prunus padus*, *Pyrus aria*, *Listera ovata*, *Orchis maculata*, *Juncus bufonius*, *Nephrodium spiuulosum*, etc. On the race-course are, among other plants, *Genista anglica*, *Ulex gallii*, and *Erica cinerea*. In the gravel pit near the junction of Armthorpe Lane and Thorne Road are, besides many things already mentioned, *Cerastium arvensis*, *Ornithopus perpusillus*, *Conium maculatum*, and *Myosotis collina*. At the Sandal Brickworks, the ponds and marshy ground yield many interesting plants, of which the most noteworthy is *Lathyrus nissolia*, whilst close by on the roadside are *Rosa tomentosa* and *Nepeta cataria*.

Mosses and Hepatics.—No records.

Fungi.—No records.

Algæ.—No records.

MICRO-ZOOLOGY AND MICRO-BOTANY.

—Mr. M. H. Stiles states that the districts to be traversed offer a very promising field for work in this department. In Micro-Zoology, so far, little or no work has been done. In Micro-Botany, diatomaceous gatherings from several sources have been examined, resulting in the compilation of the following provisional lists. He hopes that this excursion will be the means of considerably extending these. Diatoms from Balby Brickpond: *Cymatopleura elliptica*, *C. solea*, *Cocconeia lanceolata*, *C. cistula*, *Pinnularia oblonga*, *P. radiosa*, *Nitzschia sigmoidea*, etc., *Epithemia gibba*, *E. turgida*, *Cocconeis placentula*, *Cyclotella kützingiana*, *Navicula exilis*, *N. cuspidata*, *Himantidium undulatum*, *Synedra fulgens* and *S. radians*, *Pleurosigma attenuatum*. Diatoms in Sandal Beat Pond: *Pinnularia oblonga*, *P. radiosa*, *P. viridis*, *Synedra capitata*, *S. radians*, *Amphora ovalis*, *Cocconeia cistula*, *C. lanceolata*, *C. parva*, *Cocconeis placentula*, *Stauroneis phœnicenteron*, *Cymatopleura solea*, *Gomphonema acuminatum*, *Navicula exilis*, *Fragilaria capucina*, *Nitzschia sigmoidea*, *N. lanceolata*, *Epithemia turgida*, *Cyclotella* species, *Achnanthisdium* species. Diatoms in Sandal Brickpond: *Amphipleura pellucida*, *Cocconeia cistula*, *C. parva*, *Cocconeis placentula*, *Epithemia gibba*, *E. turgida*, *Fragilaria capucina*, *Gomphonema acuminatum*, *Navicula exilis*, *N. limosa*, *Pinnularia radiosa*.

VERTEBRATE ZOOLOGY.—Mr. J. Cordeaux will be present.

Mammalia.—No systematic work has been done in this group, and the smaller species are comparatively unknown. The following species occur in Sandal Beat and Wheatley Wood:—Long-eared Bat, Noctule, Fox, Stoat, Weasel, Long-tailed Field Mouse, Water Vole, Hedgehog, Mole, and Shrew.

Birds.—The woods and fields are frequented by numerous species of birds, among which the following should be seen or heard:—Nightingale, Blackcap, Garden Warbler, Golden-crested Wren, Chiffchaff, Grasshopper Warbler, Long-tailed Tit, Creeper, Yellow Wagtail, Sand Martin, Hawfinch, Tree Sparrow, Lesser Redpole, Bullfinch, Common Bunting, Reed Bunting, Jay, Magpie, Carrion Crow, Swift, Nightjar, Great Spotted Woodpecker, Green Woodpecker, Cuckoo, Barn Owl, Long-eared Owl, Tawny Owl, Sparrow Hawk, Kestrel, Heron, Mallard, Stock Dove, Turtle Dove, Pheasant, Partridge, Corn Crake, Golden Plover.

Reptiles.—Common Snake and Viper have been seen in Wheatley Wood.

Amphibians.—No notes are available on this group.

CONCHOLOGY.—The district ought to well repay careful examination of its numerous ponds and ditches. No systematic collecting has been done, but the following have been noticed:—*Bythia tentaculata*, *B. leachii*, *Planorbis albus*, *P. spirorbis*, *P. carinatus*, *P. complanatus*, *P. contortus*, *Physa fontinalis*, *Limnæa peregra*, *L. stagnalis*, *L. palustris*, *L. truncatula*. The soil of the district being peat, sand, and gravel there are few terrestrial shells to be found. The only species noticed are *Zonites cellarius*, *Z. nitidulus*, *Z. crystallinus*, *Helix nemoralis* or *hortensis*, a very small diaphanous form in Wheatley Wood, *Helix rotundata*, *Zua lubrica*, and *Vertigo edentula*. Should any conchologists accompany the geologists to Balby they would find good hunting grounds in the quarries of Magnesian Limestone on the Tickhill road about half-a-mile beyond the Brick Works. Here are *Zonites cellarius*, *Z. nitidulus*, *Z. crystallinus*, *Helix aspersa*, *H. nemoralis*, *H. hispida*, *H. rotundata*, and *Pupa umbilicata*. In Edlington Lane, about half-a-mile from the Brick Works are *Helix nemoralis* in great variety, *H. cantiana* and *H. virgata*. In the ponds at the Brick Works are *Anodonta anatina* and *Limnæa peregra*.

ENTOMOLOGY.—

Lepidoptera.—Mr. H. H. Corbett reports that the district contains some of the best collecting grounds in the county; within the area under investigation he has taken more than five hundred species. Sandal Beat and Wheatley Wood (often wrongly named Green House Wood) have long been known as favourite spots with lepidopterists. The following species, and many others, are obtainable in Wheatley Wood about the end of May:—Larvæ:—*Thecla w-album*, *Nola cucullatella*, *Pecilocampa populi*, *Pericallia syringaria*, *Nyssia hispidaria*, *Amphydasis prodromaria*, *Geometra papilionaria*, *Phorodesma pustulata*, *Hybernia aurantiaria*, *Cheimatobia boreata*, *Diloba cæruleocephala*, *Mellinea gilvago*, *Tethea subtusa*, *Cosmia paleacea*, *Epunda viminalis*, *Brephos parthenias*, *Phycis betulella*, *P. roborella*, *Talæporia pseudo-bombycella*, *Solenobia inconspicua*, *Fumea roboricolella*, *Hyponomeuta euonymella*, *Harpiteryx scabrella*, *H. nemorella*, *Gelechia mulinella*, *G. viscariella*, *G. fraternella*, *G. mouffetella*, *Coleophora currucepennella*, *C. lineolella*. Imagines of *Euchloë cardamines*, *Brenthiis eufrosyne*, *Charocampa porcellus*, *Macroglossa fuciformis*, *Hepialus hectus*, *Procris statures*, *Nudaria senex*, *Arctia mendica*, *Orgyia pudibunda*, *Tephrosia crepuscularia* and var. *delamevensis*, *Eupisteria heparata*, *Macaria liturata*, *Eupithecia pulchellata*, *E. lariciata*, *E. albipunctata*, *Cidaria silaceata*, *Anaitis plagiata*, *Platypteryx falcula*, *Cerura furcula*, *Notodonta dictæa*, *Neuria reticulata*, *Apanea unanimitis*, *Hadena dissimilis*, *Stenopteryx noctuella*, *Halias prasinana*, *Coccyx splendidulana*, *Heusimene fimbriana*, *Eupœcilia nana*, *E. maculosana*, *Tinea bistrigella*, *Micropteryx sparmannella*, *Gelechia luculella*, *Harpella geoffrella*, *Tinagma sericiella*, *Elachista raschkiella*, *Lithocolletis roborella*, *L. lautella*, *L. cerasicolella*, *L. cavella*, *L. emberizapennella*, *L. frolichella*, *L. stettinella*, and *L. klemannella*. It is to be hoped that lepidopterists will avail themselves of the whole week-end at Doncaster, and then they will have some opportunity of getting some evening and night collecting done.

Coleoptera.—Mr. E. G. Bayford writes:—The Doncaster district is exceptionally rich in coleoptera, and a visit at this season should prove very remunerative to the collector. In the circumstances it would be tedious to give more than a sample of the species which are known to occur:—*Cychrus rostratus*, *Carabus monilis*, *Dromius 4-maculatus*, *D. 4-notatus*, *Tachypus flavipes*, *Leistus ferrugineus*, *L. rufescens*, *Oxyporus rufus*, *Silpha thoracica*, *S. 4-punctata*, *Necrophorus mortuorum*, *Scaphidium 4-maculatum*, *Hister bimaculatus*, *Soronia punctatissima*, *S. grisea*, *Ips 4-punctatus*, *Pityophagus ferrugineus*, *Adalia obliterata*, *Anaitis ocellata*, *Halyzia 14-guttata*, *H. 22-punctata*, *Coccinella hieroglyphica*, *Chilocorus similis*, *Dorcus parallelipedus*, *Sinodendron cylindricum*, *Melolontha vulgaris*, *Pyropterus affinis* (one of the four places where this species is known to occur), *Campylus linearis*, *Strangalia armata*, *S. melanura*, *Toxotus meridianus*, *Grammotera ruficornis*, *Leopopus nebulosus*, *Chrysomela hyperici*, *C. polita*, *C. staphylea*, *Orsodacna cerasi*, *Lema melanopa*, *Timarcha tenebricosa*, *T. violaceonigra*, *Hydrothassa marginella* (in Buttercup flowers), *Luperus rufipes*, *Clinocara undulata*, *Meloe proscarabæus*, *M. violaceus*, *Ædemera nobilis*, *Attelabus curculionides*.

Neuroptera and Trichoptera.—Mr. G. T. Porritt writes that he has several species of Neuroptera and Trichoptera taken in the locality while working for Lepidoptera, of which two—*Raphidia xanthostigma* and *Nothochrysa capitata*—are rare (both are common in Wheatley Wood, H.H.C.). The district seems especially rich in species of the genus *Chrysopa*, and no doubt many varieties and many genera occur. The Dragonflies of the district need special working (Sandal Brickfields is a good locality for these, H.H.C.).

Other Orders.—No records. Diptera are abundant, and many interesting species should be seen. Of Hymenoptera aculeata, bees and fossorial hymenoptera are common, and *Chrysis ignita* is common on the walls of the stable at the Flint Cottage, Wheatley Wood, parasitic on mason-wasps.

PHOTOGRAPHERS.—It is hoped that photographers present will consult the Secretary, with a view of taking views that may be reproduced to illustrate the report of the excursion.

PROGRAMME OF MEETINGS.—

5-30 p.m.—Meat Tea, 2/- each	} All at the Glyn Hotel, Doncaster.
6-15 p.m.—Sectional Meetings	
6-30 p.m.—General Meeting	

Yorkshire Naturalists' Union.

President:

PROF. MICHAEL FOSTER, M.A., Sec.R.S., Cambridge.

Hon. Secretary:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

THE 138TH MEETING

WILL BE HELD AT

TERRINGTON,

FOR

TERRINGTON GARR AND WICANTHORPE PARK,

On MONDAY, 20th JUNE, 1898.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G. N., H. & B., L. & Y., L. & N. W., Great Central, Midland, and N. E. Railways which have booking arrangements for Malton, Castle Howard, Hovingham, Slingsby, or Barton-le-Street, to Members and Associates of the Y.N.U. producing their signed card of Membership. Tickets taken on Friday, Saturday, Sunday, or Monday, 17th to 20th June inclusive, will be available for return any day up to Tuesday, 21st June. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

WEEK-END HEAD-QUARTERS.—At Terrington.

HOTEL ACCOMMODATION.—Members wishing to spend the week-end are advised to do so at Terrington. Mr. J. S. Upex, who may be addressed at Terrington, York, will do his best to secure comfortable bedroom accommodation in and around Terrington for members communicating with him; and he will also arrange for luggage being conveyed from the station selected.

BOOKS AND MAPS.—The whole of the district included in the day's proceedings is in Sheet 53 (formerly 96 S.E.) of One-inch Ordnance Map; while members staying the week-end, who may wish to investigate other portions of the Castle Howard estate, will also need Sheet 63 (93 N.E.). Both these sheets are to be had geologically coloured (both for drift and solid geology). Baker's 'North Yorkshire, pp. 207-209 of the 2nd edition (published in Y.N.U. Trans., part 13) contains a list of plants of the district.

PERMISSION has been granted by the Hon. H. W. Fitzwilliam, the Rev. S. Wimbush, and other land-owners, to visit their estates.

THE DISTRICT.—Mr. John Wright, of Terrington, writes that the district selected for this meeting, with its extensive heaths, hedges, parks, woods, and waters, has varied and pleasant attractions for artist, archæologist, and lover of nature. The sublime heights of Terrington, situated on the sunny slope of the Howardian Range, afford extensive prospects along the great Vale of York on the one hand, and over the North Yorkshire and Cleveland Moorlands on the other. The parish church of All Hallows, or All Saints, bears evident marks of great antiquity. A rare bell is in the tower, said by tradition to have come from Kirkham Priory, and bears the early date, 1400, with inscription to 'Robert the Prior.'

The chancel floor contains the memorial inscription thus: 'Near this place lies ye body of Mr. Robert Teesdale, of Castle Howard, who died June ye 26th, 1773, aged 62 years.' He was head gardener at Castle Howard, and was father of Robert Teesdale, the pioneer of botany, and author, who died in 1804 [See Transactions of Y.N.U., part viii., p. 199]. The church-yard contains also the remains of another eminent botanist, with this inscription at the head of his grave: 'Richard Spruce, traveller, and author of many botanical works; born at Ganthorpe, Sept. 10, 1817; died at Coneysthorpe, Dec. 28, 1893'; and near, his respected father, Richard Spruce, schoolmaster, who taught with much success at Bulmer, Ganthorpe, and Welburn, where he died in 1851.

ROUTES.—Conveyances will be in readiness at Malton Station, and will start immediately on the arrival of the train from Driffild, due at 9-50 a.m.

Mr. J. S. Upex will meet the party at Terrington Carr, conduct them across the moor, to the North Carr, and then on to Wiganthorpe, taking the garden, or park, lake, etc., and on to Terrington. The party will also have the benefit of the presence and assistance of Mr. M. B. Slater, F.L.S., Mr. John Wright, and others.

CONVEYANCES.—To Terrington and back, 2/- each if ordered in advance of Rev. F. Young, Norton, Malton, Hon. Secretary of Malton Naturalists' Society. Without previous order, the fare will be 2/6, and no guarantee of seats.

GEOLOGY.—The Rev. E. Maule Cole, M.A., F.G.S., writes as follows:—In consequence of the multiplicity of faults, the low range of hills, called the Howardian, which separates the Vale of York from the Vale of Pickering, is most puzzling and difficult to decipher. Unaided by the geological survey maps, it would be almost impossible for the amateur to say on what particular horizon of the Lower Oolites he was treading. The case is different with the Middle Oolites. There, the particular characteristics of the various beds so stamp themselves on the natural scenery that it is almost equally impossible to make a mistake. The generally uniform level beds of the Lower Calcareous Grit form the summit of the ridges, followed by a steep, almost precipitous, bank of Oxford clay, resting on hard projecting nabs of Kellaways Sandrock. The general idea of the range in question is, however, considerably simplified by the fact that the beds which lie to the west dip in an easterly direction towards Gilling, and veer round to the north in approaching Malton, the average dip being towards the north-east. Hence, in passing from a little south of Terrington to Slingsby on the north, the beds of the Lower, Middle, and Upper Lias, are first crossed, the Middle Lias forming a distinct terrace on the side of the hill; then the various estuarine sandstones, divided up by, first, the Millepore or Whitwell Limestone, and secondly, by the Grey or Scarborough Limestone, locally known as Brandsby Roadstone. A little to the east of Wiganthorpe, the Kellaways, Oxford Clay, and Lower Calcareous Grit, are met with, and then for about a mile the Lower Oolites curiously enough reappear. This is due to faulting, the main faults running east and west, whereas you are supposed to be journeying north. After a mile walk rounded knolls of Kellaways Rock reappear, followed by a steep bank of Oxford Clay, and capped by Lower Calcareous Grit. On the summit of this ridge stretches a long ancient entrenchment. The ground now begins to descend, and in about half a mile, you find yourself on the Coralline Oolite beds, which slope down to the village of Slingsby, and its castle, begun but never finished. It may be added that there is a small inlier of Upper Lias, exposed by denudation, a little to the north of Wiganthorpe. The beck which rises near Terrington, flows north to Wath, where it has cut a ravine, and finds its way into the Rye. When, in the Ice Age, the moraine of the great Scandinavian glacier dammed up the end of the Vale of Pickering, and prevented the escape of the waters of the Rye and its tributaries, and so formed a great lake, the imprisoned waters would have found their way into the Vale of York by this Wath beck, had not the ridge near Castle Howard Station been a few feet lower, and so determined the course of the river now known as the Derwent. The Howardian range, like the Eastern Moorlands and the Wolds, does not seem to have been ever invaded by a glacier. There is no trace whatever of Boulder Clay or of ice action, though the latter may be somewhat apparent in Wold Dales exposed to the east.

BOTANY.—Mr. M. B. Slater, F.L.S., writes that the neighbourhood of Terrington and Wiggantheorpe may be said to be somewhat classical ground for the botanist. One of the best early lists of the plants of Yorkshire, 'Plantæ Eboracenses,' (by Robert Teesdale, F.L.S., sometime gardener at Castle Howard), contains a list of the flowering plants found chiefly about Castle Howard, and was published in the 1st vol. of the Linnean Transactions, and a supplement was given in the second volume, Dec. 1798, containing additional flowering plants from other districts of Yorkshire, also a good list of grasses, ferns, mosses, hepatics and lichens. Both lists are very carefully drawn up and are still referred to by writers on botanical geography. The learned botanist and traveller, Dr. R. Spruce, A.L.S., was born at the village of Ganthorpe, a short distance from Terrington, and his remains lay in the churchyard at Terrington, alongside the grave of his father. In his early years he studied the plants of this district, and more particularly the cryptogamic plants, and in Sir W. J. Hooker's London Journal of Botany for April, 1845, he published a list of 23 mosses with good descriptions, all new additions to the British flora, and many of them found by him in the district around Castle Howard.

Flowering Plants.—Mr. J. S. Upex, of Terrington, gardener at Wiggantheorpe Park, writes that at this season many interesting plants will be in flower, in Terrington Carr, and also in the woods and meadows near by. The following amongst many others have been collected by himself:—In the bogs: *Pinguicula vulgaris*, *Potentilla comarum*, *Narthecium ossifragum*, *Parnassia palustris*, *Viola palustris*, *Valeriana dioica*, *Utricularia minor*, *Callitriche aquatica*, *Eriophorum polystachion*, *Geum intermedium*, *Sparganium simplex*, *S. ramosum*, *Alisma plantago*, and *Triglochin palustre*. Years ago the *Droseras* were plentiful, but owing to drainage a specimen can now rarely be met with. On the moorland may be found *Erica cinerea*, *E. tetralix*, *Polygala vulgaris*, *Potentilla tormentilla*, *Alchemilla vulgaris*, *Pedicularis sylvatica*, *Lathyrus macrorrhizus*, *Galium saxatile*, *Molinia caerulea*, and *Nardus stricta*. In the woods surrounding the moor are *Asplenium filix-femina*, *Aspidium filix-mas*, *A. spinulosum*, *A. dilatatum*, *Blechnum spicatum*, *Pyrola minor*, *Brachypodium sylvaticum*, *Vaccinium myrtillus*, *Convallaria majalis*, *Lysimachia nemorum*, *Melampyrum pratense*, and *M. cristatum*. In the North Carr, *Trollius europæus* grows abundantly. A few of the plants growing in Wiggantheorpe Park are *Orchis ustulata*, *O. morio*, *Habenaria viridis*, *Tragopogon minor*, *Rhinanthus crista-galli*, *Juncus bufonius*, *J. acutiflorus*, and *Equisetum sylvaticum*. In the lake near to the hall grow *Potamogeton crispus* and *Myriophyllum spicatum*. Round the large lake, at the bottom of the park, *Typha latifolia*, *T. angustifolia*, and *Epilobium hirsutum*; and on a bank near by sometimes a specimen may be found of the Greater Broomrape, *Orobanche elatior*. In the pastures near the village of Terrington both *Ophioglossum vulgatum* and *Botrychium lunaria* grow in quantity; and in a field on the south side of the village, *Dianthus deltoides*. On the old stone walls are found *Sedum acre*, *S. album*, *S. dasyphyllum*, *Arabis thaliana*, and *Asplenium ruta-muraria*.

Mr. M. B. Slater, F.L.S., writes that the Howardian district furnishes a great variety of situation for our native plants. Terrington Carr, a well-known botanical locality, is a heathery swamp, a little to the north-east of Terrington and Wiggantheorpe. The Carr and adjoining district are rich in our terrestrial orchids, many of which should be in flower at this season, viz.:—*Orchis mascula*, *O. maculata*, *O. latifolia*, *O. morio*, *O. ustulata*, *O. pyramidalis*, *Gymnadenia conopsea*, *Habenaria bifolia*, *Ophrys apifera*, *O. muscifera*, *Epipactis latifolia*, *E. palustris*, *Listera ovata*, *L. cordata*, and *Spiranthes autumnalis*. Some rare species of *Carex* also grow in the Carr, and for many other native plants found in the district consult Baker's North Yorkshire, ed. 2, p. 208.

Mosses and Hepatics.—On a portion of the peaty ground known as Terrington North Carr, formerly grew the rare moss *Paludella squarrosa*, which was first discovered in 1842, and recorded from the locality by Dr. Spruce in the 'Phytologist' for that year. After the wet summer of 1860 the bog was drained, and this moisture-loving plant soon afterwards disappeared, also the rare *Thuidium blandovii*, which grew in the same locality. The *Paludella* had only been met with in Britain at another place, on Knutsford Moor, Cheshire, where it was discovered by the late W. Wilson, in 1832. This locality has also long since been destroyed by drainage, so the moss must, for the present, be considered extinct in Britain until some

fortunate searcher may meet with it on some other of our peat bogs. The following are some of the rarer mosses still to be met with on the carr land and in some of the adjoining woodlands:—*Sphagnum laricinum*, *S. squarrosum*, *S. cuspidatum*, *S. subsecundum*, *S. cymbifolium*, and *S. acutifolium*, *Seligeria recurvata*, *Brachyodus trichodes*, *Ditrichum tortile*, *Barbula lurida*, *B. cylindrica*, *Tortula aloides*, *T. marginata*, and *T. papillosa*, *Splachnum ampullaceum*, *Bryum inclinatum* and *B. obconicum*, *Aulacomnium androgynum*, *A. palustre*, *Polytrichum gracile*, *P. formosum*, *Fissidens pusillus*, *Brachythecium rivulare*, *B. plumosum*, *Eurhynchium piliferum*, *E. swartzii*, *E. praelongum*, *Plagiothecium borrierianum*, *P. denticulatum*, *Thuidium recognitum*, *Hyporum stellatum*, *H. somerfeltii*, etc. **Hepaticæ.**—*Frullania tamarisci*, *F. dilatata*, *Radula complanata*, *Porella platyphylla*, *Lepidozia reptans*, *Odontoschisma sphagni*, *Cephalozia conniveus*, *C. multiflora*, *C. divaricata*, *C. lammersii*, *Lophocolea heterophylla*, *L. cuspidata*, *Kantia trichomanis*, *K. arguta*, *Ptilidium ciliare*, *Scapania umbrosa*, *Marsupella ustulata*, *Jungermania ventricosa*, *J. riparia*, *J. capitata*, *J. bicrenata*, *J. turbinata*, etc.

Fungi, Lichens, Algæ.—No records.

VERTEBRATE ZOOLOGY.—

Anthropology.—Mr. John Wright, of Terrington, writes that the race type of genus *Homo* in the district is Anglo-Danish, and that Yorkshire is strikingly Teutonic.

Mammalia.—Mr. John Wright notes that Fox, Otter (captured in the Stittenham Beck, Saturday, April 12th, 1884), Mole, Stoat, Weasel, Hedgehog, Badger, Squirrel, Hare, Rabbit and Water Rat occur. Mr. Fitzwilliam's keeper adds that the Mole and Field Mouse also occur.

Birds.—Mr. John Wright notes the occurrence of Hawks, Sand Martin, Plover, Heron, Wagtails, Flycatchers, Wheatear, Nuthatch, Nightjar, Cuckoo, Blackbird, Thrush, Yellowhammer, Goldfinch (or Redcap), Chaffinch, Landrail (or Corn-crake), Snipe, Owls, Tits, Whitethroat, Blackcap, Bullfinch, Goldcrested Wren, Wood Wren, Woodcock, Rook (Stittenham Wood is an old and favourite roosting place for this common bird for a wide district), Jackdaw, Crow, Jay, Magpie, Woodpecker, Teal, Wild Ducks, Swift, House Martin, Hedge Sparrow, House Sparrow, Starling, Linnets, Kingfisher, Redbreast, Partridge, Pigeons, Stormcock or Mistletoe Thrush. The Bittern was frequent in the last century, but since the drainage of Sheriff Hutton Carrs it has disappeared. Bohemian Waxwing, Dipper or Water Ouzel, Wild Goose. Many years ago the Raven used to breed in the Mausoleum at Castle Howard, but has now disappeared from there. This nesting place supplied familiar living specimens to the hostelries at various places along the old York and Scarborough turnpike road. The Goldfinch was also common at Terrington, but is now very scarce. The Hon. H. W. Fitzwilliam's keeper notes the presence of the Blackcap, Golden-crested Wren, Tit, Creeper, Wagtail, Sand Martin, Hawfinch, Hedge Sparrow, Bullfinch, Jay, Magpie, Carrion Crow, Swift, Nightjar, Great Spotted Woodpecker, Green Woodpecker, Sparrow Hawk, Barn Owl, Tawny Owl, Mallard, Heron, Stockdove, Kestrel, Corncrake, Pheasant, Partridge, Goldfinch, and Common Plover.

Fishes.—Mr. John Wright notes the presence of Pike, Perch, Trout, Eel, Tench, and Carp.

CONCHOLOGY.—Beyond about half-a-dozen species or so, seen by Mr. Alfred H. Taylor, of Malton, the mollusca of the district are as yet uninvestigated.

ENTOMOLOGY.—Although the neighbouring district of Castle Howard is known to be very productive, and Mr. P. Inchwald, F.L.S., once lived at Hovingham, there appears to be nothing known of the insects of Terrington district.

PHOTOGRAPHERS.—The Secretary is particularly anxious for a photograph to be specially taken to reproduce in the account of the excursion to be published in the 'Naturalist.'

PROGRAMME OF MEETINGS.—

4-30 p.m.—Meat Tea, 2/- each, provided by Mrs. E. Goodrick.
 5-30 p.m.—Sectional Meetings } At the School-room, Terrington.
 6-0 p.m.—General Meeting }

The conveyances will leave Terrington at 7-0, and reach Malton station in time for the 8-35 p.m. train for York, Leeds, Thirsk, Middlesbrough, Hull, etc.

Yorkshire Naturalists' Union.

President:

PROF. MICHAEL FOSTER, M.A., Sec.R.S., Cambridge.

Ex-Presidents:

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PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.

Hon. Secretary:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

Hon. Secretary for this Meeting:

WILLIAM GREGSON, F.G.S., Baldersby, S.O., Yorkshire.

THE 139TH MEETING

WILL BE HELD AT

LEYBURN,

FOR

JERVAULX ABBEY,

On SATURDAY, 9th JULY, 1898.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G. N., H. & B., L. & Y., L. & N. W., Great Central, Midland, and N. E. Railways which have booking arrangements for Leyburn, to Members and Associates of the Y. N. U. producing their signed card of Membership. Tickets taken on Friday or Saturday, 8th or 9th July inclusive, will be available for return any day up to Tuesday, 12th July. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

WEEK-END HEAD-QUARTERS.—At Bolton Arms Hotel, Leyburn.

Accommodation being, however, in much demand at so attractive a centre, members should lose no time in securing rooms.

MR. HORNE'S COLLECTIONS.—Mr. Wm. Horne, F.G.S., will be glad to show his Yoredale fossils and his collection of other antiques to the members of the Union when opportunity offers.

BOOKS AND MAPS.—The whole district is included in Sheet 51 (formerly 97, S.E.) of the One-inch Ordnance Map; which may be had geologically coloured. There appear to be no books or papers dealing with this particular portion of Wensleydale, all the records appearing in the various books, such as Baker's 'North Yorkshire,' Barker's 'Three Days of Wensleydale,' Whitaker's 'Richmondshire,' etc., being for other portions of the dale. These works may however be referred to for general and topographical information, as also may Speight's admirable recent work on 'Romantic Richmondshire.'

PERMISSION has been granted by Lord Masham and Lord Bolton for members to visit their estates.

THE DISTRICT to be investigated—with Jervaulx Abbey as a centre, includes the lower portion of Wensleydale, from Leyburn to Masham, an area which seems never to have been systematically worked in any department of natural history. The lists and notes which have been published in respect of the Wensleydale Flora and Fauna have either been for the upper portions of the dale, to which attention has been paid by Fothergill, Baker, Percival, and Lees, or for the neighbourhood of Masham lower down, which has been well worked by Mr. James Carter and his sons. The Jervaulx tract therefore seems a perfect blank in our knowledge of the distribution of Yorkshire plants and animals, and one likely to amply repay investigation.

ROUTES.—All parties will drive from Leyburn to Jervaulx, the conveyances starting from the station immediately on arrival of the 11-36 a.m. train.

I.—The general body of naturalists, led by Mr. Hartshorn and others, will explore the neighbourhood of Jervaulx Abbey, the conveyances returning to Leyburn at 4 p.m.

II.—The geologists, led by Mr. W. Horne, F.G.S., will accompany the first party to Jervaulx, but will leave at 3 o'clock for Harmby Quarries.

ADMISSION TO JERVAULX ABBEY GROUNDS.—Arrangements have been made for free admission to members showing their cards. Without cards the ordinary admission fee of 6d. will be charged.

CONVEYANCES.—The charge for the drive from Leyburn to Jervaulx and back will be 2/3 for those who order from Mr. J. Hartshorn, Leyburn, R.S.O., on or before Thursday morning's post, 7th of July. There will be no guarantee of conveyances if not so ordered, and the charge, if there are any seats available, will be 3/-.

GEOLOGY.—Mr. William Horne, F.G.S., of Leyburn, writes that the district to be visited is the lowest part of the Yoredale Rocks seen in Wensleydale. They dip down very quickly for the last seven miles at the rate of 100 feet per mile, and the Upper and Main Limestone on the west end of Penhill to East Witton drop down 700 feet and are covered with glacial drift and moraines, while the higher ground is capped with Millstone Grit, but at Harmby we have a fine section of Red Bead Limestone overlaid with Leyburn Black Flagstone. This Black Flagstone is not found anywhere besides this immediate district. The Harmby quarries have yielded a large number of fossil fish remains, of which he has collected some 35 different species when the quarries were worked some years ago. These fishes lived in the old carboniferous seas, and are principally of the shark family (for further details of the fossil fishes see the Quarterly Journal of the Geological Society for November, 1884). The Black Flag is not rich in fossils but it has yielded the lowest and oldest tibia yet found. Near Leyburn the flinty Chert is being worked and here members will have the opportunity of studying these interesting minerals. Here we

have a solid bed of flint four feet thick of a whitish-grey colour. Sometimes we find small pockets with beautiful quartz crystals embedded. The blocks of Chert as it is called are sent into the Potteries to grind other flinty and pottery material for making china, etc. This formation of flint and its deposits is one of the geological problems of the day; yet even embedded in this hard flint he has found fish teeth.

Mr. William Gregson, F.G.S., writes that the district under consideration embraces the eastern portion of one of the most charming of Yorkshire dales and one which is exceedingly interesting from a geological point of view. The Lower Magnesian Limestones which occupy the tract of country between Bedale and Kilgram Bridge do not extend so far west as the latter place, which is generally regarded as the eastern boundary of Wensleydale. Proceeding up the dale in a westerly direction from the wooded slopes of Clifton Castle, we pass over the alternating shales and sandstones of the Millstone Grit formation for five or six miles, until we reach the higher beds of the Yoredale series in the neighbourhood of East Witton, where the Main Limestone occurs with a thickness of 20 to 30 feet. Overlooking the latter on the south-west, and towering to a height of some 1,500 feet, stands the well-known and conspicuous landmark of Pen Hill, which is capped by the Red Scar Grit, immediately overlying the numerous beds of shales and sandstones of the Lower Millstone Grit. West of this point, for several miles up the dale, we have a remarkable development of the Yoredale Rocks, consisting of several hundred feet of limestone, separated or interstratified by beds of sandstone and bituminous plate of varying thickness, with occasionally thin seams of impure coal. The charm which characterises the scenery of Wensleydale, and adds so materially to the beauty of the landscape, undoubtedly arises, in some degree from this want of uniformity, and the varied character of the Yoredale Rocks; for the soft shales are being eroded and the hard limestones left to form pretty cataracts, much in the same manner, and by a similar process (though of course on a smaller scale), to that which is now in operation at the Falls of Niagara, in America, where the limestone ledge is constantly being undermined by the erosion of the soft shales beneath; thus causing the falls to be slowly but surely receding at an ever varying speed, southwards towards Lake Erie. On the south-western side of Leyburn, and close to the town, a valuable bed of hard siliceous limestone known to the commercial world as Chert, is now being worked by Mr. W. Horne, F.G.S., of Leyburn, and is extensively used in the manufacture of Staffordshire and other wares. With few exceptions, the limestone beds around Leyburn dip to the south-east at a slight angle, eventually disappearing beneath the rough grits of Masham and Witton Moors. The rocks, both on the north and south banks of the River Ure, are here overlaid by a post-glacial deposit of varying depth, forming river terraces, upon which grow excellent crops of rich grass, turnips, etc.; and here also many of the celebrated Wensleydale cheeses are made. There are excellent limestone quarries at Harmby and at Leyburn, some of which, being fairly fossiliferous, will well repay a visit from the members of the geological section. On the village green at East Witton stands a huge boulder, weighing over three tons, which is now used as a drinking fountain.

ALTITUDES.—The following are the heights above sea level of various points in Wensleydale:—

Kilgram Bridge	...	...	...	...	300 feet.
High Jervaulx	...	...	...	...	425 "
East Witton Fell	...	...	...	...	1145 "
Ancient Camp (south of Middleham Castle)	...	...	...	...	600 "
Leyburn Station	...	...	...	...	580 "
Leyburn Shawl	...	...	...	over	800 "
Pen Hill Beacon	...	...	...	...	1685 "

BOTANY.—On this occasion the botanists have the unusual advantage of a virgin field for exploration, as there do not appear to be any published records for the immediate neighbourhood of Jervaulx Abbey, not even in Baker's 'North

Yorkshire, nor in Percival's 'Flora of Wensleydale,' which appeared in the Naturalist for 1888.

Flowering Plants.—Mr. W. Scott, the gardener at Jervaulx Abbey, mentions that *Echium plantagineum*, which grows in the Abbey ruins, several ferns, and *Typha latifolia*, mentioned by W. G. M. Jones Barker as growing near Jervaulx, are the only noteworthy forms met with in the immediate neighbourhood.

Mosses and Hepatics.—No records.

Fungi.—No records.

Lichens.—No records.

Algæ.—No records.

VERTEBRATE ZOOLOGY.—In this department also there appear to be no records.

Fishes.—Mr. W. Horne, F.G.S., and his son have noted the presence of Salmon, Trout, Eel, Grayling, Chub, Dace, Gudgeon, Pike, Minnow, Perch, Stickleback, etc.

CONCHOLOGY.—Very little collecting appears to have been done at and in the near vicinity of Jervaulx Abbey, and what little there is, is included in Mr. W. Denison Roebuck's paper on 'Conchological Field Notes from Wensleydale' (Nat., Jan. 1883, viii., 81-87); we there learn that in 1877 Mr. John W. Taylor, F.L.S., found *Helix lapicida*, *H. hortensis*, one immature *H. aspersa*, and *H. rotundata* at Jervaulx Abbey, and that *Balea* was in great abundance on wall-tops throughout Wensleydale that September. In a horse-trough among the ruins of the Abbey, Mr. Roebuck found, in August, 1882, dead examples of *Bythinia tentaculata*, *Limnæa peregra*, *Helix rufescens*, and *H. hispida*, and *Clausilia rugosa* among the ruins. At Ulshaw Bridge Mr. William Nelson found *Ancylus fluviatilis* in 1877, and at East Witton he collected *Limax arborum*, *Helix rufescens*, and *Clausilia rugosa*. At Middleham have occurred, either to Mr. Nelson or to Mr. Roebuck, *Helix caperata*, *H. itala* (*ericetorum*), *H. rotundata*, and *Pupa cylindracea*. No systematic collecting has, however, been done in the district, which presents, therefore, a fine field for research on the part of conchologists. Mr. W. Horne, F.G.S., has taken freshwater mussels.

ENTOMOLOGY.—The insect-fauna of this portion of Wensleydale is, so far as known, a blank, and appears never to have been investigated.

CRUSTACEA.—Mr. W. Horne, F.G.S., notes the occurrence of *Astacus astacus*, the freshwater crayfish.

AMATEUR PHOTOGRAPHERS.—The Secretaries have arranged for a suitable photograph being taken for reproduction.

PROGRAMME OF MEETINGS.—

5-15 p.m.—Meat Tea, 2/- each	} All at the Bolton Arms Hotel, Leyburn.
6-15 p.m.—Sectional Meetings	
6-45 p.m.—General Meeting	
7-28 p.m.—Train leaves Leyburn.	



Yorkshire Naturalists' Union.

President :

PROF. MICHAEL FOSTER, M.A., Sec.R.S., Cambridge.

Hon. Secretary :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

Special Hon. Secretary for this Meeting:

THOMAS SHEPPARD, 4, High Brighton, Withernsea, Hull.

THE 140TH MEETING

WILL BE A

THREE DAYS' EXCURSION,

HELD AT

EASINGTON,

FOR

SPURN and KILNSEA,

FROM SATURDAY TO BANK HOLIDAY MONDAY,

30th JULY to 1st AUGUST, 1898.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G N., H. & B., L. & Y., L. & N.W., Great Central, Midland, and N. E. Railways which have booking arrangements for **Withernsea** to Members and Associates of the Y.N.U. producing their signed card of Membership. Tickets taken on Friday, Saturday, or Sunday, 29th to 31st July inclusive, will be available for return any day up to Tuesday, 2nd August. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination, the reduced fares being available for each stage of the journey.

WEEK-END HEADQUARTERS.—At Easington. Accommodation being very limited, early application for rooms should be made to Mr. Sheppard, who will keep a list of rooms available at Easington and Kilnsea, and allot them to members according to priority of application. If all are taken up, late applicants can find accommodation at Withernsea.

BOOKS AND MAPS.—The whole district is included in Sheet 85, One-inch Ordnance Map; also to be had geologically coloured. The report of the Y.N.U. Excursion to Spurn in 1884 ('Naturalist,' Nov. 1884, pp. 92-3); the paper on 'The Spurn' by J. Cordeaux ('Naturalist,' August, 1884, pp. 1-8); 'The Birds of the Humber District' by the same author; and Clarke and Roebuck's 'Vertebrate Fauna of Yorkshire' will prove useful. The Geologists should consult Phillips' 'Geology of the Yorkshire Coast'; Clement Reid's 'Geology of Holderness'; S. V. Wood and J. L. Rome 'On the Glacial and Post-Glacial Structure of Lincolnshire and South-East Yorkshire' (Q.J.G.S., xxiv., 146); and G. W. Lamplugh on 'The Bridlington and Dimlington Glacial Shell-beds,' (Geol. Mag., 1881, 537-546).

THE DISTRICT to be investigated is the peninsula of the Spurn and the immediate vicinity of Kilnsea and Easington.

PERMISSION has been granted by Col. W. Lambert White, J.P.

LOW TIDES.—At 9 a.m. Saturday, 10 a.m. Sunday, 11 a.m. Monday.

BIRD PROTECTION.—It is satisfactory to know that the Spurn district is an absolutely protected area, within which no birds may be shot nor any nests or eggs taken.

SATURDAY'S ROUTES.—Members spending the week-end will do well to devote special attention to the extreme point of the Spurn, for which there will not be very much time for those taking the Monday only.

Mr. H. Bendelack Hewetson, F.L.S., of Easington, offers the use of his yacht, boat, trawl, etc., to members spending the week-end. Subject to weather and tides they will be available during Saturday.

SATURDAY EVENING'S PROGRAMME.—Mr. Hewetson invites members to visit his excellent series of local erratics, fossils, and mammalian remains from the glacial and post-glacial beds of the vicinity, and will say a few words on them. It is hoped that members will also be able to inspect Mr. Loten's birds.

MONDAY'S ROUTES.—The first party of members will take the 7-0 a.m. train from Hull (Paragon Station), reaching Withernsea at 7-45 a.m.

The second or main party will leave Hull by the 9-50 a.m. train, reaching Withernsea at 10-51 a.m.

Conveyances will be in readiness for both parties, to drive them to Kilnsea Warren, which will be reached about 9-30 a.m. and 12-30 p.m. respectively.

I.—The general body of Naturalists, led by Messrs. J. Cordeaux, J. P., M.B.O.U., H. Bendelack Hewetson, F.L.S., F.Z.S., F.R.G.S., F. Boyes, and C. Waterfall, will explore the narrow strip of land between Kilnsea and the Lighthouse.

II.—The Geologists, led by local workers, will leave the waggonettes at Out Newton, and examine the cliff sections between that place and Easington. The Basement Clay with its contained Marine shells, the "Purple" and "Hessle" Clays are well exposed, and an excellent opportunity will be afforded for collecting Scandinavian and other erratics.

MONDAY'S CONVEYANCES.—The charge for the drive from Withernsea to Kilnsea Warren and back will be 2/- for those who order from Mr. Sheppard, at Withernsea, on or before Saturday, 30th July. There will be no guarantee whatever of conveyances if not so ordered. In writing for waggonette accommodation members should distinctly state by which train they will reach Withernsea.

GEOLOGY.—Of this neighbourhood Mr. Alfred Harker, M.A., F.G.S., writes:—Excepting certain superficial deposits Holderness is built entirely of glacial accumulations. At the beginning of the Great Ice Age the district was a broad bay, the coast-line corresponding roughly with the eastern boundary of the chalk as now exposed. The great Norwegian ice-sheet advanced across the North Sea until it reached the cliffs of Yorkshire, which it over-rode only to a slight extent. It dammed back, however, the British ice which was thus diverted in a southerly direction. The main branch of this native ice was the great Teesdale glacier, which headed probably in the Lake District of Cumberland. The higher part of the chalk wolds was never covered by ice. The coast-line of Yorkshire, and especially the Bay of Holderness, was the battle field of the two opposing ice-streams, and in the mingled terminal moraines, which form the Basement Boulder Clay, we find boulders of the gneisses, crystalline schists, and peculiar igneous rocks of Norway side by side with the local chalk and Jurassic rocks, the Carboniferous strata and Whin Sill of Teesdale, and stray specimens from the Cumberland Hills and the Eden Valley. This basement clay is seen at Dimlington. There and elsewhere shell-bearing patches have been exposed, representing portions of the sea bottom ploughed up by the front of the Norwegian ice-sheet. The next stage in the history was a partial recession of the ice, so that in certain tracts stratified silt, sand, and gravel were irregularly laid down, while elsewhere boulder-clay (the 'Purple Clay') continued to form. This intermediate series is followed in the Holderness sections by the Upper Boulder Clay (including the reddish 'Hessle Clay'). The preponderance of Yorkshire rocks among the boulders is greater than in the Basement Clay.

The most striking geological process now in progress in the district is the rapid destruction of the coast by the sea, the loss, despite various protective works, being estimated at between two or three yards *per annum*. Owing to this cause and the shifting of the beach by storms, the sections exposed in the cliffs are continually changing, and any detailed description would be of little use after a short lapse of time.

BOTANY.—The excursion to Spurn ought to be well attended by working botanists of the Y.N.U., seeing that this ‘ultima thule’ of Yorkshire is a remarkably good, isolated, and fairly well-left-alone piece of ground, most suitable for botanical investigation. It has been frequently visited in the past but there still exist reasons for thinking that fresh and interesting discoveries of plants may yet be made; and at least there is much useful work of confirmation of previous records still to be done, a full list being anxiously desired for the completion of the Flora of the East Riding of Yorkshire, which Mr. J. F. Robinson has in hand.

Flowering Plants.—Mr. James Frazer Robinson writes that to inland botanists the following list will, he feels sure, offer many attractions. With the exceptions noted it is the result of visits made to Easington, Kilnsea, and Spurn by the Hull Scientific and Field Naturalists’ Societies during the past dozen years. The exceptions, in brackets, [] have not yet been recorded for the district but are interpolated because there is a great probability of their existence at Spurn, and they will, perhaps, keep our enthusiasts on the ‘qui vive’ for fresh laurels. [*Thalictrum minus*], *Ranunculus sardous (hirsutus)*, on the clay cliffs; [*Glaucium luteum*], *Cakile*, [*Crambe*, found north of Withernsea], *Cerastium semidecandrum*, *Arenaria peploides*, *Buda marina*, *Claytonia perfoliata*, *Erodium cicutarium*, *E. maritimum*—a former record of the Y.N.U.—*Trifolium arvense* and *T. scabrum* together at a few hundreds of yards distance from the higher lighthouse, *T. fragiferum* on the Humber bank, *Vicia lathyroides*, *Eryngium maritimum*, of which, as of others, botanists should be sparing in their removals, *Cichorium intybus* (clay cliffs), [*Statice limonium*, recorded for Flamborough, and Cleethorpes, Lincolnshire], *Armeria maritima*, *Volubilis soldanella*, *Cuscuta* sp. ? recorded by Canon Maddock, *Plantago maritima*, *P. coronopus*, *Zeta maritima*, *Atriplex littoralis*, *A. portulacoiæ*s, *Salicornia herbacea*, *Sueda maritima*, *Salsola*, *Rumex maritimus*, *Hippophaë rhamnoides*, the ‘dune thorn’ of the Dutch and the most abundant shrub on the Spurn isthmus, *Ophrys apifera* on the ‘Warren,’ *Juncus gerardi*, [*Juncus balticus*], *Triglochin maritimum*, *Zostera marina*, [*Z. nana*], *Scirpus maritimus*, *Carex arenaria*, *Ammophila arundinacea*, [*A. baltica*, of which there is only one known station in Britain, namely, at Ross Links, Northumberland; its large violet panicle should be seen with other grasses at Spurn as it frequently is on the Dutch dunes], *Agropyrum junceum*, *Lepturus filiformis*, [*Hordeum marinum*], and *Elymus arenarius*.

Mosses and Hepatics.—Mr. J. J. Marshall states that *Tortula ruralis* var. *arenicola* is the only moss he knows as having occurred at Spurn, and that *T. papillosa* and *Bryum atropurpureum* have been gathered at Withernsea. Mr. R. Barnes is confident that the four maritime species of *Bryum* he has gathered in Coatham Marshes should also be found in the Humber Estuary, and hopes bryologists will keep a sharp look-out for them.

Lichens and Fungi.—No records.

Marine Algæ.—Not many have been noted, the coast of Holderness lacking rock pools and therefore being unfavourable for their growth. Amongst the rejectamenta have been found the commoner *Fuci*, including *Halidrys siliquosa*, and the red forms *Delesseria alata*, *D. sinuata*, *Rhodymenia ciliata*, *Griffithsia setacea*, *Plocamium coccineum*, *Polysiphonia fastigiata*, *P. nigrescens*, etc.

VERTEBRATE ZOOLOGY.—

Mammalia.—Fox, Hare, Rabbit, Stoat, Weasel, Brown Rat, Water Vole, Mole, Mouse, Common Shrew, and Hedgehog.

Birds.—Mr. F. Boyes writes that the promontory of Spurn and its immediate neighbourhood offer to the ornithologist one of the most interesting spots to be found on the whole East Coast of England and as a resting place for migratory birds it has perhaps no equal. The estuary of the Humber which ebbs out so far as to leave miles of mudflats uncovered at every tide presents a most tempting place of call for any wandering or passing migrants and there is no knowing what rare birds, especially amongst the waders, may be found there during the period of migration, whilst the perennial feast daily spread out before them induces many of this class of birds to winter there. To name the birds which have occurred at one time or another in the vicinity of Spurn would be to include a large portion of the British list but as at the Union’s visit the autumn migration has scarcely begun the birds will be few in number in comparison with what would be found there a month

later. The most interesting feature will be the colony of the Lesser Tern which still exists, but in much diminished numbers, and the Ringed Plover also breeds there. A few waders, fresh from the Arctic Circle and still wearing the summer plumage, may possibly be seen and a look out should be kept for any warblers that may have got down to the coast preparatory for their departure. One of the rarest of these which has occurred there is the Barred Warbler (*Sylvia nisoria*). Amongst other rare species which have been taken there the Blue Throat and Rustic Bunting may be mentioned, but it is altogether too early to expect much variety of bird life.

Mr. Cordeaux adds that 'the Spurn district is the Heligoland of England.'

Reptiles.—Lizard, Grass Snake, Triton and Smooth Newts.

Fishes.—

CONCHOLOGY.—Mr. F. W. Fierke, M.C.S., writes that there is little to be said about the molluscan life of the Peninsula. The Helices do certainly abound, as may be gathered from the number of broken shells that occur, apparently the result of the untiring zeal of the birds. After a rain the common *Helix nemoralis* appears in countless numbers, and at such a time anyone interested in the study of the banded varieties of this species will find ample scope for his operations. *H. virgata* var. *nigrescens*, which has been recorded by Mr. J. Darker Butterell, may be met with, whilst the species itself of course abounds, together with *H. caperata*. It is desirable to pay attention to the tree trunks deposited on the Peninsula as they have more than once formed excellent hunting grounds for some interesting terrestrial molluscs. In this way two or three species of *Vertigo* and also of *Hyalina* have been recorded. The brackish dykes at Kilnsea and district may be profitably explored. *Hydrobia ventrosa* is the common brackish form. Naturalists having opportunities for more extended investigation are advised to try the numerous ponds and dykes, which form such a marked feature of Holderness, for the aquatic forms, and they will find more especially some very fine specimens of var. *crista* of *P. nautilus*.

ENTOMOLOGY.—The Spurn district is an excellent one for the Lepidopterist, who may sugar here with good results.

Lepidoptera.—Mr. N. F. Dobrée, F.E.S., writes that in the first and subsequent weeks of August one might expect to meet with *Leucania littoralis*, *Agrotis ripa*, *A. vestigialis*, *Lomaspilis marginata*, *Tapinostola elymi* (found on tips of bent grass round about the boat-houses), *Miana bicoloria*, *M. fasciuncula*, *M. literosa*, *Manestra albicolon* (if the collector is lucky and sharp), *M. abjecta*, *Agrotis cursoria*, *A. corticea*, *A. tritici*, *Triphæna interjecta*, *Xylophasia lithoxylea*, *Cerigo matura*, and of course a number of commoner species in greater or less abundance.

Mr. J. W. Boulton adds that the list of Spurn Lepidoptera is a very long one, and that the following rarities have occurred:—*Pieris daphidice*, *Argynnis latona*, *Colias edusa* and var. *helice*, *C. hyale*, *Vanessa cardui*, *Acherontia*, *Sphinx convolvuli*, *Deilephila galii*, *Cherocampa elpenor*, *Macroglossa stellatarum*, *Zygæna filipendulæ*, *Euchelia jacobææ*, *Dasychira fascelina*, *Dicranura vinula*, *Agrotis nigricans*, *A. præcox*, *A. obscura*, *Chariclea umbra*, etc.

Mr. C. Russell adds notes of the occurrence of *Gortyna ochracea*, *Gonoptera libatrix*, and *Lithosia lurideola*; and at Withernsea of *Epinephile hyperanthus*.

Coleoptera.—Mr. C. Russell has taken *Sermyla halensis* and *Anomala frischii*.

AMATEUR PHOTOGRAPHERS.—One or two cameras from Hull are expected to be in attendance.

PROGRAMME OF MONDAY'S MEETINGS.—

3-30 p.m.—Conveyances leave Kilnsea Warren for Easington.

4-0 p.m.—Meat Tea, 2/- each, at the Neptune Inn, Easington.

4-45 p.m.—Sectional Meetings. } In the open air if weather is fine.

5-0 p.m.—General Meeting. }

The chair at the General Meeting will be occupied by the President of the Conchological Section (Mr. F. W. FIERKE).

5-20 p.m.—Conveyances leave Easington for Withernsea.

6-35 p.m.—Train leaves Withernsea for Hull

8-40 p.m.—Train leaves Hull for the West.

Yorkshire Naturalists' Union.

President:

WILLIAM WEST, F.L.S., Bradford.

Hon. Secretary:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

THE 143RD MEETING

WILL BE HELD AT

DENT,

FOR THE INVESTIGATION OF

The VALLEY OF THE DEE, the NORTHERN SLOPES
OF WHERNSIDE, GRAGRETH, HOLME FELL, etc.,

ON

Whit=Monday, 22nd May, 1899.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.N., H. & B., L. & Y., L. & N.W., M.S. & L., Midland, and N.E. Railways which have booking arrangements for Dent Station to Members and Associates of the Y.N.U. producing their signed card of membership. Tickets taken on Friday, Saturday, Sunday, or Monday, 19th to 22nd May inclusive, will be available for return any day up to Tuesday, 23rd May. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION.—As this is very limited, and much taken up at Whitsuntide, applications by members wishful to spend the week-end in the valley must be made **at once**. There are private apartments to be let, if instant application be made to Mr. Davidson, Postmaster, Dent, or direct to the innkeepers.

At Dent-Head is the 'Sportsman's Inn'; at Dent are the 'George and Dragon Inn' and 'Sun Inn.'

WEEK-END HEAD-QUARTERS for members staying the week-end will be at the 'Sun Inn,' Dent.

Postal Addresses: Dent, Sedbergh, R.S.O., Yorkshire.

BOOKS AND MAPS.—The whole Dee valley, the scene of the excursion, is comprised within Sheet 50 (formerly 97 s.w.) one-inch Ordnance Map, except Holme Fell, which is in Sheet 49 (98 s.e.). The sheets north of these include the Sedbergh country, which is not in the scope of the present excursion. Both sheets are to be had geologically coloured.

Of Books and Papers to consult for the Dent district may be cited:—Catalogue of Plants growing in the Sedbergh District, by John Handley (price 1/-, to be had of author); Thompson's Guide to Sedbergh (1/-, Jackson, Sedbergh) has fourteen pages on Dent; Sunshine and Storm in the Dales, by P. H. Lockwood of Sedbergh (3/6, author); the Life and Letters of Adam Sedgwick (Cambridge Univ. Press) has two chapters on Dent; the Geology of the Neighbourhood of Kirkby Lonsdale and Kendal, explanatory of Sheet 98 S.E. (Geol. Survey, 2/-) includes Helm Knott and Holm Fell; also Y.N.U. Programmes for Sedbergh, Nos. 68 and 108 (Sec., Y.N.U., 3d. each to members). The Geological Survey have also published an explanation of Sheet 97 S.W., 'The Geology of the Country round Ingleborough,' 8vo., 110 pp. (Eyre & Spottiswoode, East Harding St., E.C.).

SATURDAY'S ROUTE.—Mr. John Handley will lead a party for the investigation of the flora, etc., of Holme Fell, starting from Rashmill at 10 a.m., and working round to Gawthorpe. Rashmill is eight miles from Dent station, three miles from Sedbergh station.

SATURDAY EVENING.—It is hoped that members staying the week-end will assemble on Saturday evening, at the Sun Inn, Dent, and it is hoped to arrange for exhibits of local specimens, and the discussion of information bearing upon the natural history of the dale.

MONDAY'S ROUTE.—Mr. Wm. Robinson and Mr. J. Davidson will lead a party of naturalists for the investigation of Hell's Cauldron, Whernside, and Deepdale; members arriving by the 8-22 a.m. train from the south, and those already on the spot, will start at once from the station. Members arriving by the 12-34 p.m. train will be met at station by Rev. R. Pickering, and take a short cut by Ewegaes Bridge to join the main body.

Geologists arriving at 8-22 a.m. will be conducted or directed by Mr. W. Robinson.

CONVEYANCES may be had for the journey between Dent Station and Dent, or vice-versâ, if ordered of Mr. Parrington, 'George and Dragon Inn,' Dent. **The Secretary undertakes no responsibility whatever in the matter.**

PERMISSION to visit their lands is granted by Miss Sedgwick, Mr. R. Burra, Mr. C. E. Taylor, Mr. T. Powley, and other owners and occupiers.

In addition to those named in other parts of this circular, Mr. C. E. Taylor, of Akay, Capt. Hicks, of West House, Rev. J. H. Mackie, M.A., F.G.S., of Sedbergh, and other local residents are taking interest in the Union's visit.

THE DISTRICT.—Mr. W. Robinson writes that Dent Dale is the most southern of a cluster of three drainage valleys, alike as regards their origin, situated in the extreme north-west of Yorkshire, and wedged in, as it were, into the neighbouring county of Westmorland, through which the drainage waters flow to Morecambe Bay. It is cut off from the rest of the County of which it forms a part, by rough and mountainous passes, much used in the earlier days of the century, when fell or pack-saddle ponies were the accepted methods of travelling in districts remote from the great trunk highways, but now grass-grown and comparatively unfrequented. It is a noticeable feature in the landscape that the centre of Dent Dale is several times broader than the outlet—a widening out initiated, probably, by the scouring action of ice on the south-west slopes of Risell caused by the thrust of the Deepdale Glacier, and continued since by the more rapid disintegration of the softer rocks along the eastern line of the Great Fault. This 'Fault' is greatly responsible, moreover, for the division of the valley into two entirely divergent classes of landscape, each dependent on the character of the surrounding rocks and each picturesque and beautiful in its own way; and, when it is mentioned that the whole is surrounded and enclosed by lofty hills, as varied as is the climate east and west of the Fault, it will readily be understood that Dent Dale may become as interesting to the naturalist as it has been hitherto to the comparative few who know and appreciate its worth.

GEOLOGY.—The late Rev. Adam Sedgwick wrote: All the mountains of Dent, to the east of Helm's Knot and Colm Scar, are composed of nearly horizontal beds of limestone, sandstone and flagstone, and of dark shale. here and there showing traces of coal; and the whole series is surmounted by a coarse gritstone called the Millstone Grit. The limestone beds are arranged in six groups, of which the lowest, called the Great Scar Limestone, is several times thicker than all the other groups put together. The top of it is seen just above the village of Flintergill, and its upper beds are finely exposed in the river course at Kirthwaite. Its lower beds are nowhere seen in our valley, but they are grandly exposed in Chapel-le-dale, where they rest upon the greenish slate rocks. All the limestone groups of Dent are separated by thick masses of sandstone, flagstone and shale, and as the top of the Great Scar Limestone is only seen near the river course, the other five groups are to be looked for on the mountain sides. The lowest of the five contains the black marble beds, and under the highest of the five (sometimes called the Upper Scar Limestone) is the only bed of coal that has been worked in Dent for domestic use. The Upper Scar Limestone is surmounted by a bed of shale, which is capped by the lower beds of the great group called Millstone Grit. This part of the Millstone Grit forms the flat top of the hill called Crag, and the top also of Ingleborough, and over this grit (at Great Colm, Whernside, etc.) is a shale with beds of coal that is too poor (in the hills of Dent) for domestic use, but which might, I think, be profitably employed in burning lime (Life of Sedgwick, vol. 1, p. 17).

Mr. Hugh Richardson, M.A., adds that Helm Gill has the additional interest of a mica trap dyke exposed in the bed of stream some 50 yards before it leaves the moorland and enters the wooded valley. As in other limestone districts there

are caves, notably one above Gawthrop, which may be explored with the help of a candle; there is a smaller one on the north side of the valley nearly opposite Dent and a third near the river above Hell's Cauldron. In dry seasons the water runs underground and the river bed below Hell's Cauldron is dry.

The paragraph on geology written for the Sedbergh circular of Aug. 1st, 1887, by Mr. J. W. Davis, may be referred to with advantage.

BOTANY.—Mr. John Handley writes: Much as we admire Dentdale, we feel how grand the flowers must have been before the days of ploughs, harrows, or the cutting of drains, when it was all forest, entered by a gate near the residence of Mr. R. Burra, which still retains its name. The gentle, modest and timid flowers would then flourish, as well as the fine and stately Foxglove and Giant Bell Flower, which have now to take refuge in the fences, by the sides of the green tunnels of the pretty lanes. There are some plants which have an early record, but have not been seen recently and which do require confirmation. *Draba incana* and *Draba muralis* were recorded for Dent in 1666. *Cyprripedium Calceolus* (Lady's Slipper) we find in Miall's Flora '(Deepdale) Dentdale, leaves only (1854).' Some botanists are so sanguine as to believe that the plant is there still that it is intended to organize a party to look for it this summer. I have found it difficult to keep right with 'leaves only,' but I hope they may be successful—the habitat is likely. Ray says (1670) '*Salix herbacea* on a hill called Whernside over against Ingleborough,' and on the opposite side of the valley *Salix nigricans* is likely to be found, as it is recorded for just over the hill. Pinder (1845) records *Alchemilla alpina* (Alpine Lady's Mantle) for Dent Craggs, and it is said that the Sedbergh and Dent districts are the only places in Yorkshire where this plant grows. Pinder also records *Ribes alpinum* and *R. rubrum* as true natives of Dent. *Agrimonia odorata* has an early record, but they all want recent confirmation. J. Windsor says *Sedum villosum* grows on the Dent slopes of Widdale. *Orchis morio*, Benthams says, is in Lower Dentdale and *Orchis stulata* has an early record. *Gymnadenia conopsea* is said to be common on the grassy turf of Dentdale. *Prunus padus* (Heckberry) is one of the characteristic plants of Dent and flowers early under favourable circumstances, and grows to a large size; *Arum maculatum* (Cuckoo Pint) is very common, *Prinula farinosa* is on the limestone and sparingly on the slate, *Lathræa squamaria* (Toothwort), *Cardamine amara* (Bitter Cress), *C. impatiens* ought to be found as it is not far away, *Ranunculus aquaticus* (Water Crowfoot), *R. acris* grows very double, both in the higher and lower part of the dale, *Polygala depressa* is by the road-side, *Stellaria aquatica* (Water Chickweed). *Geranium sylvaticum* (Wood Cranesbill). *G. lucidum* (Shining Cranesbill) covers some old walls by the road-side. *Rubus Chamæmoris* (Cloudberry, or Knoutberry according to Sir John Hill) grows plentifully on Whernside and Knoutberry Haw. *Circæa alpina* (Alpine Nightshade) wants confirmation. *Peucedanum Ostruthium* (Masterwort) is an introduction for medicinal purposes. *Campanula rapunculoides* (Creeping Bell Flower) is spreading fast and seems to be anxious to be one in the survival of the fittest, as it grows the whole length of the valley. *Vaccinium Vitis-idea* (Cowberry) grows on the Baughfell side at a high elevation. *Convolvulus Sepium* (Great Bindweed) is in some of the hedges, *Viola palustris* is stated by R. Clapham to be common. *Chrysosplenium alternifolium* is rather scarce, and so are the fly-catching plants, *Drosera rotundifolia* and *Pinguicula vulgaris*. Ferns are plentiful, including *Asplenium Adiantum-nigrum*, *Ceterach officinarum*, *Cystopteris fragilis*, *C. alpina*, *Asplenium viride*, *Cryptogramme crispa*, *Blechnum boreale*, and *Scolopendrium vulgare*. It will be interesting to note if the Lycopodiums grow in Dent, as *L. clavatum*, *L. alpinum*, *L. se'ago* and *L. selaginoides* all grow on Holme Fell, which adjoins Dent. Last year *Gentiana Amanella* and *Erigeron acris* were added to the Dent list.

Mosses and Hepatics.—Mr. George Stabler writes that the best place for the Hepaticologist is, as far as he knows, Bracken Ghyll. There are also two fine ghylls, one at and another below Dent village. The *Habrodon* was gathered on an ash some distance below the village near the river. *Breutelia arcuata* fruited more freely and grew finer at Bracken Ghyll than in any place he has seen. The *Lejeunea hamatifolia* and *Bazzania deflexa* grow at the same place. Many years since he introduced into the lower part of Bracken Ghyll some plants of *Dumortiera irrigua* which he received from the late Dr. D. Moore of Glasnevin. He has once been there since, now many years ago, and failed to find it growing. All the conditions would be favourable to its growth except that of the winter temperature which will be greatly lower than that of Killarney. Mr. Stabler also supplies the following names of a few of the Mosses and Hepatics which he has found in Dent. *Sphagnum acutifolium* var. *quinquefarium* Br. f. *pallens* Warnst.; *S. acutifolium*

var. *luridum* f. *leptocladon* Limp.; *S. acutifolium* var. *luridum* f. *compactum* Warnst.; *S. teres*, *S. intermedium*, *S. rigidum*, *Gymnostomum rupestre*, *Seligeria recurvata*, *Barbula spadicea*, *B. papillosa*, *Eucalypta ciliata*, *Grimmia conferta*, *Orthotrichum pulchellum*, *Bartramia Halleriana*, *B. Cederi*, *Breutelia arcuata* c. fr.? *Homalia trichomanoides*, *Habiodon Notarisi*, *Heterocladium heteropterum*, *Cylindrothecium concinnum*, *Orthothecium intricatum*, *Eurhynchium crassinervium*, *E. striatum*, *Amblystegium confervoides*, *Reboulia hemispherica*, *Lejeunea hamatifolia*, *L. echinata*, *L. minutissima*, *Bazzania trilobata*, *B. deflexa*, *Saccogyna viticulosa*, *Kantia arguta*, *Blepharostoma trichophylla*, *Mylia Taylori*, *Jungermania genthiana*, *J. pumila*, *J. cordifolia*, *J. Bantriensis*, *J. incisa*, *Metzgeria pubescens*.

Lichens.—Mr. W. West, F.L.S., notes occurrence of *Collema furcum*, *Sphaerophoron coralloides*, *Ramalina polymorpha*, *Cetraria islandica*, *Solorina saccata*, *Ricasolia latevirens*, *Parmelia caperea*, *P. titiacea*, *Physcia obscura*, *P. ciliaris*, *P. stellaris*, *Lecanora rupestris*, *L. subfusca*, *Lecidea sanguinaria*, *L. vesicularis*, *L. lithophila*, *L. geographica*, *Graphis scripta*, *Eudocarpon rufescens*, *Verrucaria mauroides*, *Melanotheca gelatinosa*.

VERTEBRATE ZOOLOGY.—

Mammalia.—Mr. W. Prior writes that the Otter, Stoat, Weasel and Water Shrew occur. Mr. W. Morris and Mr. J. Davidson note the presence of these, and also of Hedgehog, Mole, Squirrel, Dormouse, Rats, various Mice, Weasel, Stoat, Polecat, Water Rat, etc.

Birds.—Mr. W. Prior notes the Goshawk, Buzzard, Peregrine, Sparrow Hawk, Kestrel, Merlin, Raven, Carrion Crow, Hooded Crow, as occurring; some of these are only occasional visitors. Also the Curlew, Golden Plover, Dunlin, and small birds too numerous to mention. Mr. J. Davidson and Mr. W. Morris note that the following breed in the dale:—Thrush, Missel Thrush, Blackbird, Ring Ouzel, Dipper, Wheatear, Whinchat, Redstart, Robin, Whitethroat, Lesser White-throat, Garden Warbler, Goldcrest, Chiffchaff, Willow Wren, Wood Wren, Reed and Sedge Warblers, Hedge Sparrow, Sparrow, Tree Sparrow, all the usual Tits. Creeper, Wren, Pied, Grey and Yellow Wagtails, both Pipits, Redbacked Shrike, Spotted Flycatcher, Swallow. House and Sand Martins, Goldfinch, Green Linnet, Chaffinch, Linnet, Redpole, Twite, Bullfinch, Yellowhammer, Reed Bunting, Skylark, Starling, Jay, Magpie, Jackdaw, Crow, Rook, Raven, Swift, Nightjar, Green Woodpecker, Wryneck, Kingfisher, Cuckoo, Barn, Longeared, Shorteared, and Tawny Owls, Buzzard, Sparrowhawk, Merlin, Kestrel, Ringdove, Stockdove, Rockdove, Pheasant, Partridge, Quail, Red and Black Grouse, Corn Crane, Moorhen, Golden Plover, Dotterel, Peewit, Woodcock, Snipe, and Dunlin; and that many others are occasional or regular visitants. Mr. C. E. Taylor, of Akay, confirms most of these.

Reptiles.—Newt, Lizard, Blindworm, Toad, Frog are noted by Mr. Davidson and Mr. W. Morris.

Fishes.—There are Salmon, Salmon-Trout, Eel, Minnow, Roach, and Bullhead, as noted by Mr. Davidson and Mr. Morris.

CONCHOLOGY.—Mr. Hugh Richardson, M.A., writes that the best hunting grounds will be for land shells on the limestone, and for freshwater shells in the ditches in the flat fields by the rivers mid-way between Dent and Rashmill. The list of species recorded is meagre. At Cowgill, Denthead, the walls are productive, and Mr. W. Denison Roebuck this year found in a few minutes *Clausilia bidentata*, *Helix rupestris*, *H. rotundata*, *H. rufescens* (very small), *Fuza umbilicata*, *Vitrina*, *Hyalina crystallina*, *H. nitidula*, *H. pura*, *H. altitaria*, *Limax agrestis*, *Arion cinctuscriptus*, and *A. minimus*.

ENTOMOLOGY.—There appears to be no information whatever as to the Insect Fauna of Dent-dale.

PHOTOGRAPHERS.—It is hoped that photographers present will consult the Secretary, with a view of taking views that may be reproduced to illustrate the report of the excursion. Secure if possible photo. of V.N.U. grouped round SEDGWICK MONUMENT in Dent main street.

PROGRAMME OF MEETINGS.—

- 3-15 p.m.—Tea, 2/- each, at George and Dragon Inn, Dent.
- 4-0 p.m.—Meeting.
- 4-15 p.m.—Conveyances (1/- each) leave for Station.
- 5-53 p.m.—Train leaves Dent for Hawes Junction.
- 6-15 p.m.—Train leaves Dent for the South.

Yorkshire Naturalists' Union.

President:

WILLIAM WEST, F.L.S., Bradford.

Hon. Secretary:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

THE 144TH MEETING

WILL BE HELD AT

TADCASTER,

FOR THE INVESTIGATION OF

STUTTON CARRS, GRIMSTON PARK, JACKDAW CRAG
QUARRY, and PART OF TOWTON BATTLEFIELD,

ON

SATURDAY, 10th JUNE, 1899.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.N., H. & B., L. & Y., L. & N.W., M.S. & L., Midland, and N.E. Railways which have booking arrangements for Tadcaster, Newton Kyme, Stutton, Ulleskelf, or Church Fenton, to Members and Associates of the Y.N.U. producing their signed card of membership. Tickets taken on Friday, Saturday, Sunday, or Monday, 9th to 12th June inclusive, will be available for return any day up to Tuesday, 13th June. The journey may be broken at any of these stations. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

HOTEL ACCOMMODATION.—Members wishing to spend the week-end will find ample accommodation at the Londesborough Hotel, Tadcaster.

BOOKS AND MAPS.—The whole district is in Sheet 70 (formerly 93 s.w.) one-inch Ordnance Map (also published geologically coloured), and also falls within Sheets 190 and 205 of the six-inch map.

Published information is but scanty. A list of Neuroptera and Trichoptera observed near Tadcaster, by Mr. F. G. Binnie, was printed in the *Naturalist*, Nov., 1897, pp. 349-351. A list of Mosses of Tadcaster District, by Mr. W. Ingham. B.A., was printed in the *Naturalist* for April, 1899, pp. 117-122. The Geological Survey Memoir may be referred to, but the references to this district in Davis and Lees' 'West Yorkshire' are wanting in detail.

ROUTES.—Trains reach Church Fenton from Sheffield at 8-49 a.m., from Leeds and Harrogate at 9-27 a.m., from Normanton at 9-35 a.m., from Doncaster at 9-47 a.m., and from York at 10-2 a.m.

I.—The main body of naturalists will leave Church Fenton station on the arrival 10-2 a.m. train from York (members arriving earlier would do well to search the ditches and ponds west and north of the station), proceed straight to Kirkby Wharfe, then work westwards through Grimston Park and Stutton Carrs to Jackdaw Crag Quarry, and thence to Tadcaster. Mr. W. Callum, M.A., Mr. Edwin Payne, Mr. Wm. Nelson, etc., will act as guides.

II.—Lepidopterists will proceed to Stutton Station by trains arriving at 8-25, 9-20, and 10-57 a.m., and at once proceed to investigate the neighbourhood. Mr. C. Bennett will act as guide.

III.—**Geologists** will investigate the glacial moraines at Wighill and Healaugh, starting from Tadcaster Station on the arrival of train at 11-13 a.m.

IV.—**Afternoon Parties**.—Members from York, etc., will alight at Ulleskelf, at 2-25 p.m., and proceed westward through Grimston Park and Stutton Carrs. Members from Leeds alight at Stutton at 2-40 p.m., and investigate the Park and Carrs.

PERMISSION to visit their lands is granted by Mrs. Fielden (Grimston Park); Mrs. Maxwell-Stuart (Scarthingwell); Mr. E. Brooksbank (Healaugh); Mr. H. H. Riley-Smith (Toulston); and other landowners.

GEOLOGY.—Rev. E. Maule Cole, M.A., F.G.S., writes the following:—Taking the Cock Beck for our guide, the whole of its bed lies on the Lower Magnesian Limestone, the Upper Limestone and the Middle Red Marls, which flank its sides, having been completely cut through. The main portion of the Upper Limestones, which is extensively quarried for agricultural purposes, lies to the East of the Cock Beck. It is, as a rule, unfossiliferous. Mr. Huddleston notices that in Towton Field occurs 'a form of Magnesian Limestone which is concretionary* in small ovoids, almost resembling an oolite.' The Middle Red Marls, being very friable, are easily cut through, and initiate valleys—one such stretching from Sherburn to Huddleston. The famous Huddleston quarry, from which the choir of York Minster was built, is in the Lower Limestones, which there are dolomitic. The best point for examining the Middle Red Marls is the railway cutting between Tadcaster and Stutton. The Upper Red Marls occur in Grimston Park, and just North and East of the village of Towton. The moraines at Wighill and Healaugh, portions of the lateral moraine of the Wensleydale glacier, are worthy of notice. Wighill Church stands on one and commands a fine prospect.

BOTANY.—In Davis and Lees' 'West Yorkshire,' 1878, there are no precise indications as to the Flora of this immediate tract, but a short list of 36 species collected here in August 1881, is given by Messrs. F. Arnold Lees and W. West (Nat., Nov. 1881, p. 60).

Flowering Plants.—Mr. W. Ingham, B.A., York, notes that in Jackdaw Crag Quarry, about the middle, *Draba verna* var. *brachycarpa* Jord., will be found in fruit.

Mr. Edwin Payne notes that the plants which have occurred in the area marked and for the day's work include:—*Anemone nemorosa*, *Polygonum Persicaria*, *Ranunculus acris*, *Lotus corniculatus*, *Alchemilla vulgaris*, *Trifolium procumbens*, *Cardamine pratensis*, *Fragaria vesca*, *Fumaria officinalis*, *Geranium molle*, *Anthyllis Vulneraria*, *Capsella Bursa-Pastoris*, *Primula vulgaris*, *Helianthemum vulgare*, *Cerastium viscosum*, *Papaver Rhœas*, *Viburnum Opulus*, *Iris Pseudacorus*, *Iris fetidissima*, *Aquilegia vulgaris*, *Potentilla reptans*, *Chrysanthemum leucanthemum*, *Anagallis arvensis*, *Trifolium repens*, *Ranunculus aquatilis*, *Geum urbanum*, *Agrimonia Eupatoria*, *Gnaphalium dioicum*, *Geranium pratense*, *Solanum Dulcamara*, *Ulex europæus*, *Achillea Millefolium*, *Nepeta Glechoma*, *Veronica Chamædryas*, *Rhinanthus Crista-galli*, *Polygala vulgaris*, *Thymus Serpyllum*, *Ajuga reptans*, *Knautia arvensis*, *Hypochaeris radicata*, *Conium maculatum*, *Matricaria inodora*, *Viola tricolor*, *Galium cruciatum*, *Stachys sylvatica*, *Rosa spinosissima*, *Hypericum perforatum*, *Verbascum Thapsus*, *Nasturtium officinale*, *Sanguisorba officinalis*, *Sinapis arvensis*, *Sanicula europæa*, *Scutellaria minor*, *Pedicularis palustris*, *Vicia cracca*, *Urtica dioica*, *Scantix Pecten-Veneris*, *Rosa canina*, *Atropa Belladonna*, *Cornus sanguinea*, *Agrostemma Githago*, *Lathyrus pratensis*, *Ophrys apifea*, *Doronicum Pardalianches*, *Ranunculus Flammula*, *Potentilla anserina*, *Bryonia dioica*, *Hieracium Pilosella*, *Listera ovata*, *Malva sylvestris*, *Lamium album*, *Silene inflata*, *Galium Mollugo*, *Campanula rotundifolia*, *Galeobdolon luteum*, *Delilota officinalis*, *Ballota nigra*, *Spiræa Ulmaria*, *Cnicus palustris*, *Geum rivale*, *Migitalis purpurea*, *Tanacetum vulgare*, *Lysimachia nemorum*, *Erythraea Centaurium*, *Lycopsis arvensis*, *Astragalus Glycyphyllus*, *Linaria vulgaris*, *Achillea Ptarmica*, *Chlora perfoliata*, *Epilobium hirsutum*, *Symphytum officinale*, *Sonchus*

*This seems to me to correspond with the horizon of the celebrated concretionary beds on the Durham Coast at Monk Wearmouth, which however consist of larger nodules.

arvensis, *Lysimachia vulgaris*, *Scabiosa Columbaria*, *Epilobium angustifolium*, *Bunium flexuosum*, *Lythrum Salicaria*, *Aretium Lappa*, *Nymphaea alba*, *Prunella vulgaris*, *Daucus Carota*, *Tormentilla officinalis*, *Scabiosa succisa*, *Angelica sylvestris*, *Geranium sanguineum*, *Pimpinella Saxifraga*, *Campanula hederacea*, *Campanula rotundifolia*, *Eupatorium cannabinum*, *Hottonia palustris*, *Feniculum vulgare*, *Convolvulus arvensis*, *Senecio vulgaris*, *Verbena officinalis*, *Bartsia odontites*, *Lychnis diurna*, *Centranthus ruber*, *Chelidonium majus*, *Salvia Verbenaca*, *Calamintha officinalis*, *Ononis arvensis*, *Pulicaria dysenterica*, *Echium vulgare*, *Galeopsis versicolor*, *Heracleum Sphondylium*, *Parnassia palustris*, *Colchicum autumnale*, *Mentha aquatica*, *Veronica officinalis*, *Ranunculus Ficaria*, *Gagea lutea*, *Viola odorata*, *Mercurialis perennis*, *Tussilago Farfara*, *Caltha palustris*, *Oxalis acetosella*, *Helleborus viridis*, *Leucojum aestivum*, *Primula elatior*, *Adoxa moschatellina*, *Arum maculatum*, *Trifolium filiforme*, *Petasites vulgaris*, *Tragopogon pratensis*, *Paris quadrifolia*, *Myosotis palustris*, *Stellaria holostea*, *Geranium pneum.*, *Sagina apetala*, *Euonymus europaeus*, *Agraphis nutans*, *Geranium Robertianum*, *Matricaria Parthenium*, *Origanum vulgare*, *Primula veris*, *Fragaria elatior*, *Helosciadium nodiflorum*, *Parietaria officinalis*, *Campanula patula*, *Thalictrum flavum*, *Centaurea nigra*, *Oxalis corniculata*, *Draba verna*, *Orchis maculata*, *Or. Morio*, *Or. pyramidalis*, *Or. Masculata*, *Epipactis latifolia*, *Cephalanthera ensifolia*, *Ophrys muscifera*, and *Orchis incarnata*.

Mosses and Hepatics.—Mr. W. Ingham, B. A., York, writes as follows :—On the sides of Jackdaw Crag Quarry the following mosses grow : *Trichostomum mutabile* Bruch, *T. tortuosum* Dixon, a tall highly tomentose form, *Trichotrichum anomalum* var. *saxatile* Milde, *Fissidens decipiens* DeNot, *Tortula intermedia* Berk., *Barbula tophacea* Mitt., an abnormal form, *B. rubella* Mitt., *B. rigidula* Mitt., *B. cylindrica* Schp., *Neckera crispa* var. *falcata* Boul., *Anomodon viticulosus* H. & T., *Eurhynchium tenellum* Milde. On the bed of the quarry, and on loose stones, the following mosses grow : *Ditrichum flexicaule* var. *densum* Braith., *Barbula revoluta* Brid., *B. convoluta* Hedw., *Weisia microstoma* C. M., *Trichotomum crispulum* Bruch and var. *viridulum* Bruch, *Zygodon viridissimus* R. Br. (on a tree), *Bryum pendulum* Schp., two rare forms of *Eurhynchium Swartzii* Hobk., *Amblystegium Juratzke* Schp. on large stones in shade, *A. Kochii* B. & S. on bare ground in shade, not fruiting here, *Hynum stellatum* var. *protensum* B. & S. abundant, *H. chrysophyllum* Brid., *H. cuspidatum* L. fruits here ; the middle parts and the shady parts will be the best to work for rarities.

A short list of fourteen mosses and hepatics collected in this district in August 1881. by Messrs. Lees, West, etc., is in the 'Naturalist' for Nov., 1881, p. 62.

Lichens.—*Lecidea vesicularis*, *Opegrapha saxicola*, *Parmelia parietina* v. *aureola*, *Endocarpon minutum* v. *complicatum*, and *Collema cheileum* were collected in the district by Mr. W. West and others, August 1881 (Naturalist, Nov. 1881, p. 62).

Fungi.—In the Naturalist for Nov, 1881, pp. 61-63, is a list of 104 species of fungi, collected between Church Fenton and Jackdaw Crag Quarry, by Mr. Geo. Masee and others.

Algæ.—Mr. West noted *Batrachospermum moniliforme*, *Synedra splendens*, *Tabellaria flocculosa*, *Zygnema cruciata*, and *Ectostrema iritis* as found in this district in August 1881 (Naturalist, Nov. 1881, p. 63).

VERTEBRATE ZOOLOGY.—The district is a good one for vertebrates, its configuration being varied and including plenty of wood and water.

Mammalia.—The district, affording plenty of cover, harbours numerous species, including the Badger, Weasel, Stoat, Squirrel, Mole, Fox, Hedgehog, etc.

Birds.—Mr. Edwin Payne has noted numerous birds in the district, which has plenty of woodland and water. The Nightingale has visited Tadcaster three years in succession ; and other birds that have occurred include : Sparrow Hawk, Kestrel, Golden Plover, Thrush, Missel Thrush, Blackbird, Ring Ousel, Wheatear, Whinchat, Redstart, Robin, Whitethroat, Lesser Whitethroat, Garden Warbler, Chiffchaff, Reed and Hedge Sparrow, House Sparrow, Blue, Great and Long-tailed Tits, Creeper, Wren, Pied, Grey and Yellow Wagtails, Swallow, Yellow Hammer, House and Sand Martins, Goldfinch, Green Linnet, Chaffinch, Brown Linnet, Bullfinch, Reed Bunting, Skylark, Jay, Starling, Magpie, Jackdaw,

Crow, Rook, Royston Crow, Swift, Nightjar, Woodpeckets, Kingfisher, Cuckoo, Barn and Short-eared Owls, Stock Dove, Pheasant, Partridge, Corn Crane, Peewit, Woodcock, Snipe, Heron, Wild Duck, Water Hen, etc.

Reptiles and Fishes.—Mr. Edwin Payne, of Tadcaster, notes that Salmon occasionally occur, their only hindrance being the pollution of the Ouse below the junction of the Aire; Trout are in the shallows near the Weir and Tadcaster Bridge; and other fish found are Pike, Chub, Barbel, Roach, Dace, Gudgeon, Eels, Flounders, Bleak, Minnow, Millers'-thumb, etc.

CONCHOLOGY.—The Rev. T. Ainsworth Brode, of York, has visited Stutton several times in search of shells, and has found the following in profusion:—*Helix rufescens*, with vars. *rubens*, *alba*, and *albocincta*, in hedgerow close to Stutton Station; *Helix cantiana* very abundant in lane between windmill and large quarry; *Clausilia laminata*, very fine, in a small quarry near the big farm. In this quarry there is abundance of the Deadly Nightshade, *Atropa Belladonna*. *Clausilia bidentata* (*rugosa*) is very common in Jackdaw Crag Quarry; in this same large quarry also occur *Helix hortensis* var. *arenicola* and very fine specimens of *H. nemoralis*; *H. aspera* is abundant, but it is difficult to get a good shell, as they all seem much weather-marked. In the farther quarry, of which the end is guarded by a wall, he has found exceptionally fine shells of *H. nemoralis*, and some few *Buliminus obscurus*. Among the smaller shells are to be found some of the *Hyalinia*, and *Helix rotundata*, and *H. hispida*. As far as he knows *H. virgata* occurs but sparingly, and he has some recollection of having taken a few shells of *H. pulchella*. He has not searched for water snails, but there should be some in the low-lying parts near the river.

Mr. William Nelson has taken *Limnaea glabra*, *Planorbis spirorbis*, *Physa hypnorum*, *P. fontinalis*, and *L. peregra* in ponds and ditches close to Church Fenton Station, *Vitina* and *Clausilia rugosa* at Stutton, and *Cl. laminata*, *Cl. rugosa*, *Helix cantiana*, *H. aspersa*, and a *Vertigo* about Towton.

Mr. J. Hawkins, of York, has taken the following shells at Tadcaster, but he does not indicate which occur in the district marked out for the day's investigations:—*Anodonta cygnea*, *A. anatina*, *Unio tumidus*, *Limnaea auricularia*, *L. stagnalis*, *L. truncatula*, *L. peregra*, *Neritina fluviatilis*, *Planorbis corneus*, *P. complanatus*, *P. spirorbis*, *Physa fontinalis*, *P. hypnorum*, *Paludina vivipara*, *Helix aspersa*, *H. nemoralis*, *H. arbustorum*, *H. cantiana*, *H. virgata* vars. *alba* and *submaritima*, *H. rufescens*, *H. hispida*, *H. rotundata*, *Pupa marginata*, *Clausilia rugosa*, *Bulimus obscurus*, and *Helix pulchella*. *H. fusca* has also been taken.

ENTOMOLOGY.—There does not appear to have been any Entomological work done in this particular district.

Lepidoptera.—No available records. **Coleoptera.**—No records.

Trichoptera.—Mr. G. T. Porritt, F.L.S., notes that Trichopterists should work especially for the local *Æceta notata*, which Mr. F. G. Binnie recorded as occurring abundantly on the River Wharfe, at Tadcaster; he also recorded the interesting *Leptocerus albifrons* from the same locality. Mr. Binnie's list should be referred to for the names of other species (Nat., Nov. 1897, pp. 349—351).

PROGRAMME OF MEETINGS.—

4-45 p.m.—Meat Tea, 2/- each	} All at the Londesborough Hotel, Tadcaster.
5-30 p.m.—Sectional Meetings	
5-45 p.m.—General Meeting	

Trains leave Tadcaster 6-28 for York, Scarborough, Hull, etc.; 6-31 for Leeds, Harrogate, Thirsk, etc.

A CONVERSAZIONE, 7-0 to 9-30 p.m., at the Londesborough Hotel, will follow the meetings, when there will be various local exhibits, including a living Badger caught at Tadcaster. Mr. W. Callum, B.A., will read a short paper on the Roman Station of Calcaria. Mr. G. F. Tindall will give a short account of the Substrata and Well-borings of Tadcaster town and neighbourhood, and members generally are requested to bring interesting exhibits.

The last trains leave Tadcaster at 8-56 p.m. for Harrogate, Ripon, Thirsk, Leeds, etc.; 9-9 p.m. for Church Fenton, York, etc.; and 9-46 p.m. for Wetherby and Leeds.

Yorkshire Naturalists' Union.

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Hon. Secretary:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

THE 145TH MEETING

WILL BE HELD AT

DRIFFIELD,

FOR THE INVESTIGATION OF

THE NEIGHBOURHOOD OF EMSWELL, SKERNE,
WANSFORD, AND THE UPPER PART OF
THE RIVER HULL,

ON

SATURDAY, 8th JULY, 1899.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways which have booking arrangements for Driffield, Nafferton, Garton, or Wetwang, to Members and Associates of the Y.N.U. producing their signed card of membership. Tickets taken on Friday, Saturday, Sunday, or Monday, 7th to 10th July inclusive, will be available for return any day up to Tuesday, 11th July. The journey may be broken at any of these stations. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

WEEK-END HEAD-QUARTERS at the Buck Hotel, Driffield, or at the Trout Inn, Wansford.

HOTEL ACCOMMODATION.—Members wishing to spend the week-end will find plenty of accommodation at Driffield.

BOOKS AND MAPS.—The whole district is in Sheet 64 (formerly 94 N.W.) one-inch Ordnance Map (also published geologically coloured), and also falls within Sheets 161, 162, 178, and 179 of the six-inch map.

Of books and papers which may be referred to, Mr. T. Sheppard sends the following list:—Geology of the Country around Driffield (Geol. Survey Mem.), J. R. Dakyns and C. Fox-Strangways, 1886; Geology of Holderness, C. Reid, 1885; the Physical Geography and Geology of the East Riding of Yorkshire, E. M. Cole (Proc. Yorkshire Geol. Soc., 1885); on the Red Chalk of Yorkshire, E. M. Cole (loc. cit., 1878); on the Origin and Formation of the Wold Dales, E. M. Cole (loc. cit., 1879); on the Chalk of Yorkshire, E. M. Cole (loc. cit., 1882); Note on Dry Valleys in the Chalk, E. M. Cole (loc. cit., 1887); Drainage Sections at Driffield, J. R. Mortimer (loc. cit., 1881); the Origin and Distribution of the Unwaterworn Chalk-Gravel on the Yorkshire Chalk-Hills, J. R. Mortimer (Proc. Geol. Assn., vol. 8, no. 5); the Chalk Water-Supply of Yorkshire, J. R. Mortimer (Proc. Inst. Civil Engrs., 1879); Notes on the White Chalk of Yorkshire, G. W. Lamplugh (Proc. Yorks. Geol. Soc., 1895); the Geology of Flamboro' Head with Notes on the Yorkshire Wolds, G. W. Lamplugh (loc. cit., 1896); the Fishes of the River Hull, H. M. Foster (the Hull Scientific and F.N. Club, 1898).

ROUTES.—

Mr. Mortimer's Museum of Antiquities and Geology will be open for inspection all day from 8-30 a.m.

I.—**Naturalists** will explore the banks of the river Hull, and the canal between Driffield and Brigham. Conveyances will leave Mr. Mortimer's Museum at 10 a.m., and drive straight to Brigham. Members will then work the river and canal banks back to Driffield. Leaders, Messrs. J. D. Butterell, W. H. Blakeston, etc.

II.—Mr. Charles Waterfall will lead a party of botanists and conchologists from Mr. Mortimer's Museum to Emswell, where the springs start, and follow the river Hull down to Driffield and thence to Wansford, exploring the boggy ground between the canal and the river.

III.—**Geologists** from Hull district leave Driffield 9-3 a.m. for **Fimber**, for examination of quarry on boundary of upper and middle chalk; then take train at 11-18 a.m. for **Wetwang**. Geologists from Leeds, York, Scarborough, etc., leave Malton at 10-48 a.m. for **Wetwang**, joining the above party for examination of chalk quarries on boundary line again as above. Take 2-43 p.m. train for Garton. Examination of gravel beds of Craike Hill. Walk to Emswell, source of river Hull. Walk thence to Driffield. Leaders:—Rev. E. Maule Cole, M.A., F.G.S. and Mr. J. R. Mortimer.

IV.—**Afternoon Parties.**—Naturalists will work down between the river and canal, and on meeting the first party return with them, or they may work up the river Hull to Emswell.

CONVEYANCES may be had for the journey between Driffield and Brigham (fares One Shilling each) if **ordered** from Mr. J. Ewbank, Middle Street Mews, Driffield.

PERMISSION to visit their lands is granted by Lord Londesborough and other owners and occupiers.

THE DISTRICT.—The district appointed for investigation is the basin of the infant river Hull from its source at Emswell Springs down to its junction with the Lowthorpe Trout Stream, near Brigham. The low-lying boggy tract between the river and the canal near Wansford will be found remarkably rich in plants and shells.

GEOLOGY.—Rev. E. Maule Cole, M.A., F.G.S., writes that the quarries to be examined are on the boundary line between the Upper flintless Chalk and the Middle Chalk with flints. The sand and gravel beds at Craike Hill are covered with Boulder Clay, and are decidedly glacial. Lias fossils, coal, mountain limestone, granites, red sandstone, etc., occur in the gravels.

BOTANY.—Mr. Wm. H. Blakeston, of Driffield, writes that the district comprised in the basin of the river Hull (from Elmswell to Brigham) is somewhat low-lying, and abounds in plants of a moisture-loving character. He has generally found the Elmswell end the most productive, as the ground is generally less adapted to cultivation than in the Brigham neighbourhood.

Flowering Plants.—Mr. W. H. Blakeston states that the following plants were noted in some part of the district named last year between June and August: *Valeriana officinalis*, *Poterium Sanguisorba*, *Veronica Anagallis*, *Myosotis versicolor*, *Epilobium palustre*, *E. hirsutum*, *Polygala vulgaris*, *Thalictrum flavum*, *Galium palustre*, *Epipactis palustris*, *Scutellaria galericulata*, *Hydrocotyle vulgaris*, *Eriophorum polystachion*, *Carex paradoxa* (this last confirmed by Mr. Arthur Bennett).

Mr. J. F. Robinson adds that *Sisymbrium Sophia* (Flixweed) and *Ophrys apifera* (Bee-orchis) also occur.

Mr. Charles Waterfall, of Hull, writes that *Mimulus luteus* (the Monkey Plant) is plentiful on the canal bank, while the low-lying boggy ground between the river and the canal is a perfect botanist's paradise. The rare *Carex paradoxa* is abundant, also a *Carex* which is thought to be either *C. teretiuscula* or *C. Ehrhartiana*. *Carex paniculata* (the Great Panicked Sedge) is also abundant and though much commoner than either of the preceding is nevertheless a tolerably good find. He also saw the Flesh-coloured Orchis, *O. incarnata*, the Buckbean, *Menyanthes trifoliata*, the Great Valerian, *Valeriana sambucifolia*, the Marsh Red Rattle, *Pedicularis palustris*, the Marsh Hawkweed, *Crepis paludosa*, the Yellow Carex, *Carex flava*, the Yellow Iris, *Iris pseud-acorus*, the Great Water Dock (young), *Rumex Hydrolapathum*, the Shining Pondweed, *Potamogeton lucens*; one of the Water Starworts, he thinks a variety of *Callitriche verna*; the Mare's Tail, *Hippuris vulgaris*, the Opposite-leaved Pondweed, *Potamogeton densus*, the Curly Pondweed, *P. crispus*, the Distichous Carex, *C. disticha*, the Cotton Grass, *Eriophorum latifolium*, and others. While in boggy ground about Over Clew, King's Mill, there grows in addition to these the Bog Pimpernel, *Anagallis tenella*, and the Marsh Helleborine, *Epipactis palustris*.

Mosses and Hepatics.—No records.

Lichens.—No records.

Fungi.—No records.

Algæ.—Mr. William West, F.L.S., notes that only a few common species are known from this district, so that there is ample scope for investigation.

VERTEBRATE ZOOLOGY.—The district will be found fairly productive.

Mammalia.—Mr. F. Boyes notes the presence of the Noctule and Pipistrelle Bats, Fox, Hare, Rabbit, Stoat, Weasel, Brown Rat, Old English Black Rat (occasionally near the river Hull), Common and Long-tailed Field Mouse, Water Vole and Field Vole, Common and Water Shrew, Mole, Hedgehog, Otter (occasionally), Badger (Garton district), and he remarks that Daubenton's Bat should be looked for there, also the Long-eared Bat.

Birds.—Mr. F. Boyes, of Beverley, notes that over fifty species might be named as occurring in the district, but those likely to be met with are such as frequent the damp meadows, the streams, and the adjoining fields and copses. These include the Whinchat, Willow Wren, Whitethroat, Reed and Sedge Warblers, Spotted Flycatcher, Pied and Yellow Wagtails, Tree and Meadow Pipits, Corn, Yellow and Reed Buntings, Swallow, House and Sand Martins,

Cuckoo, Swift, Kingfisher, Snipe, Lapwing, Corn Crake, Spotted Crake (has bred on the margin of the river Hull), Waterhen and Coot, Little Grebe, and Wild Duck, all of which breed there.

Reptiles and Fishes.—Mr. F. Boyes notes that the Frog, Toad, Newt, and Common Ringed or Grass Snake occur; and of Fishes, the Grayling, Trout, Minnow, Bleak, Dace, Chub, Roach, Bream, Pike, Perch, Stickleback (3 and 10 spined), Gudgeon, Stone Loach, Miller's Thumb, Eels, Burbot (now rare), River Lamprey (abundant), Flounder.

Mr. H. W. Foster gives the following as a list of fish to be found in the district named:—Trout (*Salmo fario* and *S. leuvenis*), Perch, Pike, Roach, Dace, Chub, Minnow, Stickleback (three spined), Loach, Miller's Thumb, and Eel (*Anguilla acutirostris*). Coarse fish are very backward this year owing to the cold spring, and consequently will not be in good condition.

CONCHOLOGY.—Mr. L. B. Ross, F.C.S., of Driffield, says that conchologists would do well to walk from Frodingham Bridge along the drain to Foston (half-mile), and return on the other side, and then on to Brigham, etc., as arranged under Route I.; they will do better there than on any other part of the route. *Planorbis corneus*, *Limnæa stagnalis*, *Anodonta cygnea*, *Limnæa auricularia*, and others, occur. In the canal will be found *Ancylus fluviatilis*, *Sphærium corneum*, *Bythinia tentaculata* and var., *Limnæa palustris*, *L. peregra*, *L. truncatula*, *Physa fontinalis*, *Pisidium pusillum*, *Planorbis carinatus*, *P. complanatus*, *P. spirorbis*, *Succinea putris*; and on the banks, in the fields, woods, etc., *Bulimus obscurus*, *Pupa umbilicata*, *Vitrina pellucida*, *Zonites cellarius*, *Cochlicopa lubrica*, *Carychium minimum*, *Helix hispida*, *H. cantiana*, *H. aspersa*, *H. virgata*, *H. nemoralis*, and various slugs.

The debris thrown out in cleaning out the canal near Wansford has yielded to Mr. J. Darker Butterell numerous fluviatile forms, including *Planorbis vortex*, *P. corneus*, *P. carinatus*, *P. marginatus*, *P. albus*, *Physa fontinalis*, *Limnæa auricularia*, *L. peregra*, *L. truncatula*, *L. palustris*, *Valvata piscinalis*, *Ancylus fluviatilis*, *A. lacustris*, *Succinea elegans*, *Anodonta cygnea*, *Neritina fluviatilis*, *Bythinia tentaculata*, *B. leachii*, *Sphærium corneum*, *Pisidium amnicum*, and *P. fontinale*.

On the banks of the canal are *Helix aspersa*, *H. virgata* (in abundance), *H. caperata*, *H. hispida*, *H. nemoralis*, *Zua lubrica*, *Zonites alliarius*, *Limax maximus*, *Agr. olimax agrestis*, *A. levis*, and all five species of *Arion*, while *Balea perversa* is to be found on ash trees near Wansford.

ENTOMOLOGY.—There appear to be no records of any kind for any order of insects.

PHOTOGRAPHERS.—It is hoped that photographers present will consult the Secretary, with a view of taking views that may be reproduced to illustrate the report of the excursion.

PROGRAMME OF MEETINGS.—

5-0 p.m.—Meat Tea, 2/- each	} All at the Buck Hotel, Driffield.
6-0 p.m.—Sectional Meetings	
6-30 p.m.—General Meeting	

Trains leave for Hull, 7-22; for Leeds, etc., 7-38; for Scarborough, 8-13 p.m.

MR. MORTIMER'S MUSEUM of Local Antiquities and Geology will be, by his kindness, available for inspection all day, so long as daylight lasts, and will be found eminently worthy of inspection. It is to be hoped that the County Council of the East Riding will take steps to secure the permanence of so valuable a local collection—valuable because of its strictly local character.

Yorkshire Naturalists' Union.

President:

WILLIAM WEST, F.L.S., Bradford.

Hon. Secretary:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

THE 146TH MEETING

WILL BE HELD AT

INGLEBY GREENHOW

And STOKESLEY,

FOR THE INVESTIGATION OF THE NORTHERN SLOPES OF

THE CLEVELAND HILLS,

FROM

FRIDAY to BANK-HOLIDAY MONDAY,
4th to 7th August, 1899.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways which have booking arrangements for Battersby Junction, Ingleby Greenhow, Stokesley, or Sexhow Stations, to Members and Associates of the Y.N.U. producing their signed card of membership. Tickets taken on Friday, Saturday, Sunday, or Monday, 4th to 7th August inclusive, will be available for return any day up to Tuesday, 8th August. The journey may be broken at any of these stations. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination: the reduced fares being available for each stage of the journey.

WEEK-END HEAD-QUARTERS will, by reason of great demand for limited accommodation, be partly at Stokesley and partly at Carlton-in-Cleveland.

The Bay Horse Hotel, Stokesley, will be head-quarters for the Geologists. Tariff 20/- for dinner on Friday, bed, breakfast and dinner on Saturday and Sunday, and breakfast on Monday. Apply direct to landlady.

The Golden Lion Inn, Stokesley, will be head-quarters for Naturalists wishing to be at Stokesley. Tariff 10/6, for bed on Saturday and Sunday nights, with breakfast and dinner on Sunday, and breakfast on Monday. Apply direct.

Naturalists wishing to be actually on the ground will stay at **Carlton-in-Cleveland**, the station for which is Sexhow. Mr. S. H. Harries, of Carlton-in-Cleveland, Northallerton, has kindly undertaken to engage rooms, either at the Blackwell Ox Inn, or in the village, for members writing to him.

Accommodation being so much in demand at all these places at Bank-Holiday times, instant application should be made for rooms.

BOOKS AND MAPS.—The whole district to be worked by the Naturalists is included in Sheets 96 N.W. and 96 N.E. of the One-inch Ordnance Survey Map. Geologists will need in addition Sheets 33 (formerly 103 S.E.) and 34 (104 S.W.). All these sheets may be had coloured to show both solid and superficial geology.

FRIDAY'S ROUTE.—Geological only. Members leave Sexhow Station at 11-38 a.m., proceed through Carlton and ascend Carlton Bank, thence along Cringley Moor and the Wainstones; thence by conveyances leaving Greenhow Park at 5-30 p.m. for Stokesley. Leader: Rev. John Hawell, M.A., F.G.S.

The Geological Programme has been arranged as a Joint Excursion of the Union and of the Yorkshire Geological and Polytechnic Society, whose Summer Meeting will be held at Stokesley, on Friday, 4th August, and who give a hearty invitation to our Members to join in their proceedings. Programme with full particulars may be obtained on application to the Rev. W. Lower Carter, M.A., F.G.S., Hopton, Mirfield.

SATURDAY'S ROUTES.—

- I.—The Geological party leave Stokesley at 9 a.m., driving to Great Ayton; the Whinstone Dyke and Roseberry Topping examined, thence to Kildale and home to Stokesley in conveyances leaving Dundale Beck at 5 p.m. Mr. Hawell, leader.
- II.—Naturalists reaching Sexhow Station at 2-26 from the west, 3-3 from the east, will walk or drive to Carlton, and under the guidance of Messrs. S. H. Harries, W. H. Thomas, T. A. Lofthouse, T. F. Ward, J. A. Jones, and other members of the Cleveland Field Club, investigate the slopes of Carlton Bank and the hill summits behind, returning to Carlton and by conveyance (if ordered) to Stokesley in time for dinner at 6 p.m.

MONDAY'S ROUTES.—

- I.—Geologists, under the leadership of Rev. J. Hawell, M.A., F.G.S., will start from Ingleby Greenhow station at 8-34 A.M., for Ingleby Manor, Hags Yat, Basedale, Battersby Moor, etc.
- II.—Naturalists will leave Stokesley Station at 8-30 A.M., proceed through Kirkby and along Kirkby Bank to Hoggat's Wood (under Broughton Bank), and thence to Ingleby Greenhow. Leaders: Messrs. S. H. Harries, T. A. Lofthouse, W. H. Thomas, T. F. Ward, and other members of the Cleveland Field Club.
- III.—Members arriving at Ingleby Greenhow at 11-30 A.M. will proceed direct to Hoggat's Wood, and join the early party.

PERMISSION to visit their lands is granted by Lord De L'Isle and Dudley, Mr. J. J. Emerson, Mr. M. Morrison, Capt. Phillips, and other owners and occupiers. Members are, however, particularly requested not to enter Busby Wood.

GEOLOGY.—Rev. J. Hawell, M.A., F.G.S., writes that the district to be investigated constitutes a portion of the escarpment bounding the North-East Yorkshire Moors or Cleveland Hills on their north-western side. This escarpment is bolder and loftier here than anywhere else, and the highest point of the Cleveland Hills at Bottom Head (1,489 feet) is close to the edge of the declivity. The geologist visiting the district for the first time will be able, without much difficulty, to read the story which tells the origin of this striking feature of the landscape. At the top of the escarpment lies the hard and thick Estuarine Sandstone of the Inferior Oolite, and immediately under this the softer shales of the Upper Lias, which have naturally weathered much more readily. On a lower horizon the sandstone of the Middle Lias has produced a minor feature from the same cause. At the foot of the escarpment the glacial deposits have covered up the inequalities of the native rock, producing a more or less level plain, which, however, frequently rises into bosses of sand and gravel in the proximity of the hills. These sands and gravels, as they occur about Ingleby, though termed by the officers of the Geological Survey 'Middle Glacial,' may just as well be contemporaneous with later glacial time. The glacial deposits, which do not here reach an elevation of more than about 700 feet above sea-level, contain large numbers of foreign blocks, a very large proportion of which are porphyrites from Cheviotland and Lake District rocks. Numerous boulders of Shap Granite occur. Owing to this covering of glacial matter the Lower Lias is not well seen in the district to be investigated, though glimpses of it will be observed here and there. No lower rock will be seen, though the Lias approaches quite near to Stokesley. Fine sections of the Middle and Upper Lias will be visited. In days gone by the highest portion of the Upper Lias was mined for alum, and the portion immediately below it for jet, but these operations, having become profitless, have entirely ceased. Neither is the ironstone of the Middle Lias, so rich in the neighbourhood of Eston and Skelton-in-Cleveland, sufficiently rich and plentiful in this district to pay for mining under present circumstances, though it was formerly wrought to some extent in several places. The highest rocks which will be seen during the excursion belong to the Inferior Oolite. The massive Estuarine Sandstone affords a building stone which is still quarried at several points. Below this is the Inferior Oolite ironstone called 'The Dogger.' Near Ingleby, however, the Dogger does not exist, but it is well seen a little further south. The Whinstone or Basalt of the Cleveland Dyke, which will be examined at Great Ayton and Kildale, is a rock of great interest and value. Entering Yorkshire near Yarm it runs a more or less straight course and terminates on Sneaton High Moor. The rock is really an augite-andesite. The Geol. Surv. Memoir on North Cleveland

says 'Two points may be noted at most exposures. The first is the small amount of alteration that the dyke has caused in the adjacent rocks, the calcining effect rarely extending for more than a few feet from the cheeks of the dyke. Another curious point is the way in which, for a few yards, the beds dip into the dyke. It looks as though the intrusive rock had contracted on cooling, and dragged down the adjacent rock with it. In no case is the dyke known to lie in a line of fault. The dyke consists of a bluish-grey rock, rather compact, and having a tendency to conchoidal fracture. It is finely crystalline, even microscopically, except at the sides, which have a very compact appearance. Scattered pretty evenly throughout are glassy crystals of felspar, some of which show the parallel striations of plagioclase. Other minerals are rare—pyrites, calcite, quartz, nesotype, and pectolite, though found occasionally, may be hunted for in vain, unless a 'lucky' spot is hit on. The best place to find such minerals is in Kildale, where there is a considerable number of cavities in the whin about half-an-inch in diameter. The sides of the cavities are coated with little hexagonal pyramids of quartz, and in the centre is a crystal of calcite, the two minerals being kept apart by a curious layer of a sooty-looking substance.'

BOTANY.—

Flowering Plants.—Mr. W. H. Thomas states that so far as he knows there is nothing particularly worthy of note among the flowering plants in the Stokesley district. All the commoner plants are well represented, but the absence of records of rare plants should incite the botanists to make them. Among the least common are *Paris quadrifolia* (Ingleby), *Habenaria bifolia*, *Habenaria viridis*, *Epipactis latifolia*, *Parnassia palustris*, *Geranium pratense*, *Campanula latifolia*, *Carlina vulgaris*, *Listera ovata*, *L. cordata*, *Orchis ustulata* (Middleton-in-Leven). On the moors *Calluna vulgaris*, *Erica cinerea*, and *E. tetralix* are very abundant.

Rev. J. Hawell, M.A., has observed the following plants in his parish of Ingleby Greenhow:—*Papaver dubium*, *Fumaria capreolata*, *Cardamine amara*, *Barbarea vulgaris*, *Erophila verna*, *Viola odorata*, *Polygala vulgaris* and var. *alba*, *Lychnis diurna* and var. *alba*, *Githago segetum*, *Arenaria trinervis*, *Moutia fontana*, *Hypericum perforatum*, *H. quadrangulum*, *H. humifusum*, *H. pulchrum*, *Empetrum nigrum*, *Genista tinctoria*, *Cytisus scoparius*, *Prunus padus*, *Gum rivale*, *Agrimonia eupatoria*, *Poterium officinale*, *Ribes albinum*, *Callitriche verna*, *Sedum acre*, *Epilobium palustre*, *Circaea lutetiana*, *Sanicula europæa*, *Silaus pratensis*, *Angelica sylvestris*, *Viburnum Opulus*, *Galium saxatile*, *Asperula odorata*, *Scabiosa arvensis*, *Centaurea cyanus*, *Serratula tinctoria*, *Solidago virgaurea*, *Achillea ptarmica*, *Tanacetum vulgare*, *Gnaphalium sylvaticum*, *Tragopogon pratense*, *Leontodon hispidus*, *Crepis virens*, *C. hieracioides*, *Sonchus arvensis*, *S. oleraceus*, *Vaccinium Myrtillus*, *Erica Tetralix*, *E. cinerea*, *Erythraea centaurium*, *Gentiana campestris*, *Scrophularia nodosa*, *Veronica hederifolia*, *Melampyrum pratense*, *Mentha sativa*, *M. aquatica*, *M. arvensis*, *Stachys sylvatica*, *Galeopsis tetrahit*, *Ballota nigra*, *Tencreium scorodonia*, *Pinguicula vulgaris*, *Lysimachia nemorum*, *Polygonum convolvulus*, *Chenopodium album*, *Euphorbia pepus*, *E. exigua*, *Juniperus communis*, *Habenaria bifolia*, *H. viridis*, *Epipactis latifolia*, *Listera ovata*, *Iris pseudacorus*, *Tamus communis*, *Alisma plantago*, *Potamogeton natans*, *Paris quadrifolia*, *Scilla nutans* var. *alba*, *Allium ursinum*, *Sparganium ramosum*, *Asplenium Ruta-muraria*, *A. Trichomanes*, *Pedicularis vulgaris* var. *alba*, *Prunella vulgaris* var. *alba*, *Vicia sepium* var. *alba*, *Ajuga reptans* var. *alba*, *Campanula rotundifolia* var. *alba*, *Calluna vulgaris* var. *alba*, *Galium mollugo*, *Helleborus viridis*.

Fungi.—Rev. J. Hawell, M.A., writes that amongst the Fungi occurring in the parish of Ingleby Greenhow are *Mycena galericulata*, *Inocybe geophyllus*, *Stropharia semiglobata*, *Hypholoma fascicularis*, *Hygrophorus coccineus*, *H. obrusseus*, *H. chlorophanus*, *Lactarius blechnius*, *L. subdulcis*, *Russula heterophylla*, and *Polyporus vaporarius*.

Mosses, Hepatics, Lichens, Algæ.—No records.

VERTEBRATE ZOOLOGY.

Mammalia.—Mr. T. H. Nelson writes that Badgers occur along the hills. Mr. R. G. Clayton adds that Fox, Otter, Squirrel, Stoat, Weasel, Water Vole, Field Vole, Short Tailed Field Mouse, Shrew, and Bats occur.

Birds.—Mr. T. H. Nelson, M.B.O.U., states that the following occur or have been noticed : *Merlin, Rough Legged and Common Buzzards, Peregrine Falcon, *Tawny, *Long Eared and *Barn Owls, Short Eared Owl, Goosander (occurred once), Crossbills, Heron, *Dipper, *Common Sandpiper, *Kingfisher, *Wild Duck, Teal, *Curlew and *Golden Plover on moors, *Snipe, Jack Snipe, *Woodcock (has been known to breed), Dabchick, *Pied Flycatcher, Green Sandpiper, Snow Bunting, *Green and *Great Spotted Woodpecker. Mr. Clayton adds the *Garden Warbler, *Ring Ouzel, and the commoner birds are plentiful. N.B.—*Breed in district.

Reptiles and Fishes.—Mr. R. G. Clayton states that the Viper, Blindworm, and Lizard occur : and of Fishes the Trout, Loach, Minnows, etc.

CONCHOLOGY.—Rev. John Hawell, M.A., F.G.S., writes that in the parish of Ingleby Greenhow he has obtained the following Mollusca : *Limax maximus*, *Agrilolimax agrestis*, *Vitrina*, *Hyalinia cellaria*, *H. alliaris*, *H. nitidula*, *H. radiatula*, *H. pura* and var. *margaritacea*, *H. crystallina*, *H. fulva*, *H. nitida*, *H. excavata*, *Arion ater*, *A. subfuscus*, *A. fasciatus*, *Helix rotundata*, *H. lamellata*, *H. aculeata*, *H. pygmaea*, *H. caperata*, *H. granulata*, *H. hispida* and vars. *subglobosa* and *subrufa*, *H. cantiana*, *H. arbutorum* and vars. *cincta* and *flavescens*, *H. nemoralis* and var. *libellula*, *H. hortensis* and var. *incarnata*, *H. aspersa* and vars. *minor*, *undulata*, and *flammea*, *Buliminus obscurus*, *Pupa anglica*, *P. cylindracea*, *Vertigo pygmaea*, *V. edentula*, *Balea perversa* and var. *viridula*, *Clausilia laminata*, *C. perversa*, *Cochlicopa lubrica*, *Azeca*, *Succinea elegans*, *Carychium*, *Ancylus fluviatilis*, *Limnea peregra*, *L. truncatula*, *Planorbis nautilus*, *Pisidium fontinale*. He has obtained *Limax cinereo-niger* at Easby, and *L. marginatus* occurs at Kildale, where he has also taken *Helix fusca* and *Succinea putris*. *Vertigo substriata* has been taken at Great Ayton. He has obtained *Limnea glabra*, *Planorbis spirorbis*, and *Bullinus hypnorum* at Kirkby-in-Cleveland. He has specimens of *Limnea stagnalis* which are labelled as having been found at Stokesley about 1857, and specimens of *Anodonta cygnea* labelled as having been taken from Stokesley Mill Dam about the same date. The species still occurs, he believes, in the Leven near Stokesley from which place he has also a record of *Pl. albus*, while *Pl. fontanus* is recorded from Potto, and *Acicula lineata* was found some years ago near Great Ayton.

ENTOMOLOGY.—

Coleoptera.—Mr. M. Iawson Thompson writes that the district has not been systematically investigated for beetles, but should produce interesting species that are living on plants at this time of the year. *Toxotus meridianus* has been taken at Stokesley. Mr. T. Ashton Lofthouse says that the Glow Worm has been taken in the adjoining dale (Bilsdale), and will probably occur here.

Lepidoptera.—Mr. T. Ashton Lofthouse writes that part of the district covered by this excursion is well wooded, some of the woods being old ones; they have the appearance of being likely ground for entomological research. Among the insects that have been taken in the district are :—*Vanessa atalanta*, *V. cardui*, *Smerinthus populi*, *Macroglossa stellatarum*, *Nemeophila plantaginis*, *Eriogaster lanestris* (larvæ will be about full grown), *Cilix glaucata*, *Notodonta dictæa*, *N. dictæoides*, *Cerura furcula*, *Bryophila perla*, *Leucania conigera*, *L. comma*, *L. lithargyria*, *Neuronia popularis*, *Cerigo matura*, *Luperina testacea*, *Miana literosa*, *Agrotis suffusa*, *A. saucia*, *A. obscura* (at sugar), *Noctua glaucosa*, *N. rubi*, *N. umbrosa*, *N. baja*, *Mania maura*, *Xanthia fulvago*, *Cirrhædia xerampelina*, *Pedia chi*, *P. flavicincta*, *Hadena dentina*, *H. dissimilis*, *Calocampa vetusta*, *Cloantha solidaginis*, *Cucullia umbratica*, *Gonoptera libatrix*, *Brephos parthenias*, *Epione apiciaria*, *Crocallis elinguaris*, *Ennomos tiliaris*, *Venusia cambrica*, *Eupithecia subulvata*, *Melanthia rubiginata*, *Cidaria testata*, *C. populata*, etc.

Hymenoptera.—In 1892, Rev. J. Hawell sent to Mr. S. L. Mosley a gall from Little Broughton, occurring on the flower stalk of *Hieracium boreale*; from this he bred out a hymenopterous (*Aulax hieracii*).

PROGRAMME OF MEETINGS.—

4-30 p.m.—Meat Tea, 2/- each, at the Dudley Arms Inn, Ingleby Greenhow.
 5-30 p.m.—Sectional Meetings }
 6-30 p.m.—General Meeting } at the School-room, Ingleby Greenhow.

Yorkshire Naturalists' Union.

President :

WILLIAM WEST, F.L.S., Bradford.

Ex-Presidents :

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PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.
SIR MICHAEL FOSTER, K.C.B., M.A., M.D., Sec. R.S., Cambridge.

Hon. Secretary :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

THE 148TH MEETING

WILL BE HELD AT

BARNESLEY,

FOR THE INVESTIGATION OF

**WORSBOROUGH RESERVOIR,
STAINBOROUGH, BROOM ROYD, FRIARTAIL, AND
OTHER WOODS [IN] THE NEIGHBOURHOOD,**

On THURSDAY, 28th SEPTEMBER, 1899.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways which have booking arrangements for Barnsley Station, to Members and Associates of the Y.N.U. producing their signed cards of membership. Tickets taken on Wednesday or Thursday, 27th and 28th September, will be available for return on Thursday, 28th September. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

BOOKS AND MAPS.—The whole district to be worked by the Naturalists is included in Sheet 87 of the One-inch Ordnance Survey Map, new series, or 87 s.w., old series (which are totally different maps). The latter may be had geologically coloured. The explanation of this quarter sheet, by Prof. A. H. Green, and the same writer's work on the Yorkshire Coal-Field, should also be consulted.

ROUTES.—

I.—The general body of naturalists will, under the leadership of Messrs. F. Batley, W. E. Brady, E. G. Bayford, J. Armitage, and A. Whitaker, leave the Queen's Hotel, Barnsley, at 10-30 a.m., and proceed to Locke Park, where the party may divide and take the following directions :—

IA.—Ouselthwaite, Worsborough Reservoir, Rockley Abbey and Dam, Broom Royd, Friartail, Green Springs, and Old Park Woods, to Birdwell Station, returning by the 3-51 p.m. train to Barnsley.

IB.—Rob Royd and Stainborough Park, rejoining the other party at Rockley Dam.

II.—The Geological party will leave the Queen's Hotel at 10-30 a.m., and will be led by Messrs. P. F. Kendall, F.G.S., W. Hemingway, E. W. Thirkell, J. Tomlinson, and H. Wade, and will devote themselves to the glacial phenomena of the district. They will visit the Old Mill Gasworks and proceed by way of Smithy Green to a section at East Gawber Colliery: a 36-ft. section in Staincross Railway cutting will be examined, and the party may proceed forward to Royston and Notton Green and examine the valley or depression between the latter place and Carlton. The arrangements are not quite complete and this route is subject to subsequent alteration.

PERMISSION to visit their estates is kindly granted by Mr. T. V. Wentworth, Mr. H. J. Elmhirst, and other landowners.

GEOLOGY.—Mr. E. W. Thirkell writes :—The district to be investigated is the Dearne Valley from Barnsley to Haigh, covering Carlton, Roystone, etc. Two special features of this district, to which the attention of the party should be directed, are (i.) The Glacial deposits; (ii.) The escarpment of the Woolley-edge Rock.

(I.) Boulder clay and warp occurs in patches about Staincross and Royston; a section may be seen in a railway cutting (about three-quarters of a mile S. E. of Staincross) crossing the Barnsley and Wakefield road near the old toll-gate, between Standhill and North Royd Woods; another patch occurs to the N. E. of Royston, extending from Low Common nearly to the station; and another half-a-mile to the east of Royston Church. Boulders have been found at Notton Green and at Royston; that from Royston has been removed to Locke Park, Barnsley. Besides the Boulder clay, a few patches of gravel occur which perhaps belong to the Glacial deposits. They have been noticed in Woolley Park, between Royston and Notton Park, and about half-a-mile S. W. of Carlton: they bear a close resemblance to gravel seen in the cutting alluded to above.

(II.) This rock overlies the Wath Wood, Woodmoor or Meltonfield coal seam, and the outcrop of this seam and of the seams below it may be looked for between the escarpment and the railway at convenient places. The Beamshaw seam is worked from the day, and the 'adit' will probably be passed on the round, and the Barnsley seam is also worked from the day at Woolley Colliery. The line of the escarpment is very pronounced, but an interesting feature about it is that it is cut off at a fault at Burton bank and is continued again at the other side of the fault. This fault runs in a line nearly along the strike and crosses the Wakefield road and Burton bank. A good section of the Rock may be obtained in the quarries, and plant remains are fairly plentiful.

Mr. H. B. Nash adds :—The country for five miles round Barnsley is occupied almost exclusively by Middle Coal Measures, and all the workable seams from the Shafton to the Whinmoor are being got at one point or another within that area. From the heapsteads at most of the collieries good specimens of Coal Measure fossils, as described in the reports of the Yorkshire Fossil Flora Committee, may be obtained. Escarpments of the Oaks and Woolley Edge Rocks are prominent features and locally striking, being fairly continuous for long distances, as is also the Upper Chevet Rock, which is cut off by a fault a little south of Royston station. Travelling in a north-easterly direction, nearly all the beds are crossed in the order of their formation. The strike of the beds is steadily from north-west to south-east. The faults range either rudely parallel or else nearly at right angles to the strike of the beds. Boulder clay occurs between Royston and Mapplewell, and erratic blocks have been found at a few spots, but they are not very prolific.

BOTANY.—

Flowering Plants.—Mr. F. Batley writes that the season is very late for flowering plants, still some interesting work should be done, the following amongst many others occurring along the line of the proposed route :—*Impatiens Noli-me-tangere*, *Malva moschata*, *Galium tricornis*, *Myrrhis odorata*, *Draba verna*, *Arabis Thaliana*, *Menyanthes trifoliata*, *Myosotis palustris*, *Verbascum Thapsus*, *Verbena officinalis*, *Scutellaria galericulata*, *Polygonum amphibium*, *Adoxa moschatellina*, *Polygonum Bistorta*, *Galeobdolon luteum*, *Betonica officinalis*, *Myosotis versicolor*, *Valeriana officinalis*, *Plantago media*, *Myriophyllum spicatum*, *Epipactis latifolia*, *Paris quadrifolia*, *Petasites vulgaris*.

Mosses and Hepatics.—No records.

Lichens.—No records.

Fungi.—A full list of the species collected in 1897 at the Fungus Foray, held Sept. 18–20, given in the Naturalist of that year, pp. 341–348, may be referred to with profit. Alluding to the locality to be investigated this year, Mr. Crossland says :—‘Here *Crucibulum vulgare*, the bird’s nest fungus, was in great profusion. Fine chunks of the liver fungus (*Fistulina hepatica*) were a feature about Stainborough. A pink-spotted agaric, made out to be *Entoloma angustum* Fr., new to Britain, was collected on this excursion.’

Algæ.—No records.

VERTEBRATE ZOOLOGY.—

Mammalia.—The Long-eared, Noctule, and Pipistrelle Bats, Hedgehog, Mole, Common and Water-Shrew (occasionally), Fox, Weasel, Martin (extinct), Stoat, Otter (rarely), Badger (now very rare), Squirrel, *Mus minutus* (scarce), Long-tailed Field Mouse, House Mouse, Brown Rat, Water Vole, Field Vole, and Red Field Vole (occasionally), Hare and Rabbit all occur or have occurred, also Fallow-Deer, domesticated, at Stainborough (condensed from ‘The Vertebrate Animals of the Mammalian Families in the Barnsley District,’ by Thomas Lister ; publ. in Trans. Barnsley Nat. Soc., vol. iv. (1884) part 2).

Birds.—Most of the spring migrants, including the Pied Flycatcher, which breeds in Stainborough Park, will have taken their departure, but there may still remain the Whitethroat, Redstart, Wheatear, Blackcap, Whinchat, Sand Martin, Chiff-chaff, Nightjar, Willow-Warbler, Landrail, Swallow, Ray’s Wagtail, House Martin, and Tree Pipit.

Amongst residents in, and visitors to, the district, the following may be mentioned :—The Hobby, Merlin, Kestrel, Sparrow-Hawk, Long-eared and Short-eared Owls, Cole, Marsh and Long-tailed Tits, Bunting, Tree Sparrow, Hawfinch, Goldfinch, Bullfinch, Green and Spotted Woodpeckers, Creeper, Nuthatch, Kingfisher, Quail, Sandpiper, Woodcock, Canada Goose, Heron, Little Grebe (a specimen was taken in the town the first week in this month), Great Crested Grebe (a pair of these fine birds which had nested on the reservoir this year have unfortunately been shot).—(Compiled from ‘List of the Birds of the Barnsley District,’ from the notes of Mr. Thomas Lister ; publ. in Trans. Barnsley Nat. Soc., vols. II. and III., 1882-3).

Reptiles and Fishes.—The Frog, Toad, Sand Lizard, two species of Newts, Green Snake, and Viper, all occur. The late Dr. Lancaster (Trans. B.N.S., vol. IV., p. 23) tabulates the following fishes as occurring in the Barnsley district :—Trout, Char (introduced), Chub, Pike, Perch, Dace, Roach, Carp, Eel, Bullhead, Loach, Gudgeon, Minnow, Stickleback, Tench, Bream, and (?) Rudd. Specially fine examples of several species are preserved in the club-room of the Fitzwilliam Angling Society.

CONCHOLOGY.—This is practically a blank. Of slugs, Mr. E. G. Bayford has observed three, the common, the large black, and orange with black markings. *Helix nemoralis* and *H. hortensis* occur, and a *Limnaea* is very common in some of the pools.

ENTOMOLOGY.—

Coleoptera.—Mr. E. G. Bayford remarks that the area to be investigated is one which (excepting Worsborough reservoir) has not been systematically worked for beetles, but from its varied character may be considered a fairly productive one. Such species as *Staphylinus pubescens*, *Triphyllus punctatus*, etc., may be looked for on decaying fungi; and the three species of *Rhinosimus*, *R. ruficollis*, *R. viridipennis*, and *R. planirostris*, under loose bark. Nearly twenty years ago Mr. J. Harrison, F.E.S., found *Lampyris noctiluca* (the glow worm) near Stainborough, since which time no record of its occurrence is known. The present occasion is a good opportunity for rediscovering this very interesting insect.

Worsborough Reservoir has been well worked, and with excellent results. In its waters have been found such species as *Desonectes assimilis*, *D. depressus*, *Hydoporus 12-pustulatus*, etc. The banks furnish *Anchomeni* and *Bembidia* in abundance. *Anchomenus marginatus* taken near Stainborough by Mr. C. Bellamy in 1884 has been again found this year at the reservoir by Mr. Walmsley. *Bembidium rufescens* is by no means uncommon, and *B. flammulotum* abounds. *Elaphrus riparius*, *Cychnus rostratus* and *Carabus monilis* have been taken here, while the old willows which fringe the banks are riddled with the larvæ of *Rhagium bifasciatum*, freshly-emerged specimens of which may be easily found by those wanting them. Other longicorns of rarer occurrence here and in the neighbourhood are *Toxotus meridianus*, *Rhagium inquisitor*, and *Clytus arctis*. In addition to these *Dascillus cervinus*, *Corymbites cupreus* in several varieties, *Dromius 4-maculatus*, *D. 4-notatus*, *Thymalus limbatus*, *Necodes littoralis*, and *Attelabus curculionoides* are known to occur.

Lepidoptera.—Mr. W. E. Brady writes that the general route is a suitable one for such species of lepidoptera as are obtainable locally. *Sphinx convolvuli* and *Eupheria juvago* have been taken in the district, and the following species occur, in some cases plentifully:—*Macroglossa stellatarum* (has been unusually plentiful this year), *Oporabia dilutata*, *Nonagria fulva*, *N. typhae*, *Gortyna flavago*, *Noctua glareosa*, *Anchocelis rufina*, *A. litura*, *Polia chi* (dark varieties), *Miselia oxyacanthæ* and var. *capucina*, *Phlogophora meticulosa*, *Calocampa vetusta*, *C. exoleta*, *Gonoptera libatrix*, etc. Amongst larvæ *Amphidasis betularia* (producing black and intermediate forms), *Notodonta camelina*, *N. dictæa* and *N. dictæoides* are not uncommon.

Mr. Jno. Harrison, F.E.S., supplies the following list of Micro-lepidoptera:—*Peronea sponšana*, *P. comparana*, *P. schalleriana*, *P. variegana*, *Teras caudana*, *T. contaminana*, *Grapholitha ramella*, *G. trimaculana*, *Pedisa corticana*, *P. solandriana* (good vars. to be had amongst Alder), *P. sordidana*, and *Ephippiphora similana*.

Dermoptera.—Mr. E. G. Bayford notes that in addition to the ubiquitous Earwig, its smaller relative *Labia minor* is not uncommon.

Neuroptera.—Mr. E. G. Bayford notes that *Libellula cancellata* has this year been a very common species.

The MUSEUM of the BARNSELY NATURALISTS' SOCIETY will be open to Members and Associates of the Union and their friends from 4 to 6 p.m.

PHOTOGRAPHERS.—It is hoped that Photographers present will consult the Secretary, with a view of taking views that may be reproduced to illustrate the report of the excursion.

PROGRAMME OF MEETINGS—

5- 0 p.m.—Meat Tea, 2/- each	} All at the Queen's Hotel, Barnsley.
5-45 p.m.—Sectional Meetings	
6- 0 p.m.—General Meeting	

Yorkshire Naturalists' Union.

President:

GEORGE T. PORRITT, F.L.S., Huddersfield.

Ex-Presidents:

REV. WM. FOWLER, M.A., Liversedge.

H. CLIFTON SORBY, LL.D., F.R.S., etc., Sheffield.

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HENRY EELES DRESSER, F.L.S., F.Z.S., London.

CHAS. P. HOBKIRK, F.L.S., Ilkley.

R. H. TIDDEMAN, M.A., F.G.S., H.M. Geol. Survey, Mumbles, Glam.

ROBERT BRAITHWAITE, M.D., F.L.S., F.R.M.S., London.

PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.

SIR MICHAEL FOSTER, K.C.B., M.A., M.D., Sec. R.S., Cambridge.

WILLIAM WEST, F.L.S., Bradford.

Hon. Secretaries:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

EDWIN HAWKESWORTH, Goodman Street, Hunslet, Leeds.

THE 150TH MEETING

WILL BE HELD AT

HORNSEA,

FOR THE INVESTIGATION OF

HORNSEA MERE AND NEIGHBOURHOOD, AND THE COAST
LINE FROM HORNSEA NORTHWARDS TO ATWICK
AND SKIPSEA,

On SATURDAY, 19th MAY, 1900.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways which have booking arrangements for Hornsea, to Members and Associates of the Y.N.U. surrendering the Certificate noted below. Tickets taken on Friday or Saturday, 18th or 19th May, will be available for return any day up to Monday, 21st May. The journey may be broken at Hornsea Bridge station. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate initialled by one of the Secretaries of the Union. Members and Associates wishing for this Certificate must apply to Mr. Hawkesworth for it, and must enclose a stamped directed envelope and their current card of membership of the Union, which latter will be returned with the Certificate.

Hornsea is one of the stations to which the N.E.R. Company issue week-end return tickets at a single fare.

WEEK-END HEAD-QUARTERS.—At the Alexandra Hotel, Hornsea, close to station. Tariff: Bedroom, 2/6 per night; meat breakfast or tea, 2/- each; mid-day dinner on Sunday, 2/6. Members desiring accommodation must communicate direct with Mr. RD. HORNSEY, Alexandra Hotel, Hornsea, Hull.

It is hoped that as many members as possible will spend the week-end in investigating the district.

BOOKS AND MAPS.—The whole area for investigation is included in Sheets 94 N.E. (Skipsea) and 94 S.E. (Hornsea) of the One-Inch Ordnance Map, which may be had geologically coloured. Fretwell's Illustrated Guide to Hornsea, N.D., 6d., contains chapters on the Flora by Mr. J. F. Robinson, the Geology by Mr. J. W. Stather, and the Mollusca by Mr. F. W. Fierke. The Naturalist for July 1881, pp. 194-6, contains full reports of the work done by the Union on its visit to Hornsea in June 1881.

THE DISTRICT to be investigated consists of the neighbourhood of Hornsea Mere, the remarkable earthworks at Skipsea Brough, and the coast line from Skipsea to Hornsea.

ROUTES.—

1.—The Geological Party will leave Hornsea Station immediately after arrival of the 10-35 a.m. train, and proceed in conveyances (1/- each) to Skipsea. Members desiring a seat should communicate with Miss Rose Carr, Waggonette Proprietor, Hornsea, not later than Thursday, 17th May.

On arrival at Skipsea the earthworks at Skipsea Brough will be examined and explained by Mr. J. R. Boyle, F.S.A., and the party will then proceed to the shore, and work back to Hornsea, under the leadership of Messrs. J. W. Stather, F.G.S., and F. F. Walton, F.G.S., who will be accompanied by Mr. William Morfitt, of Atwick, and his sons.

2.—The Sheffield Naturalists' Club Party are making their own arrangements, not being able to arrive in time to join Route 1.

3.—The general body of naturalists will investigate Hornsea Mere. Leaders: Members of the Hull Scientific Club. Boats may be hired from the boat-house at 1/- per boat per hour.

4.—Geologists arriving by later trains are recommended to proceed along the shore northwards to meet the main party.

5.—Naturalists arriving by later trains are recommended to leave the train at Hornsea Bridge Station, and join the main body in the vicinity of the Mere.

6.—Marine Zoology. The Yorkshire Marine Zoology Committee will investigate the shore-line.

PERMISSION for Hornsea Mere is granted by Mr. H. S. Constable, J.P., and for Skipsea Brough by Mr. C. Goodlass.

LOW-WATER will be at 1-6 p.m. on Friday, 1-48 p.m. on Saturday, and 2-30 p.m. on Sunday.

Mr. W. Morfitt's collection at Charlotte Cottage, Atwick will be open to inspection by members staying over the week-end. Mr. E. Howarth furnishes the following notes on them:—

From the Peatbeds and boulder clay between Skipsea and Hornsea have been collected many interesting fossils by Mr. Wm. Morfitt and his two sons, of Atwick, and an inspection of their collections will aid materially in a full understanding of the coast geology of the district. Besides a large number of derived fossils, belonging to the chalk and lias chiefly, they have found in the peat and clay tusks and teeth of Mammoth, teeth of *Elephas antiquus*, as well as remains of Irish Elk, Reindeer, Red-deer, and Rhinoceros. Many interesting antiquities have also been collected by them from the neighbouring barrows.

GEOLOGY.—Mr. J. W. Stather, F.G.S., President of the Hull Geological Society, writes:—With the exception of certain deposits of later date, Holderness is entirely composed of glacial accumulations, the joint product of native and Scandinavian glaciers, during the great ice age; and there seems no doubt, that before the ice reached our shores, the district was a wide bay, with the sea running quite up to the foot of the Wolds, its shore line approximating to the present course of the railway from Hull to Bridlington. The cliff sections between Skipsea and Hornsea, which the geological party propose to visit, are fairly typical of the whole coast line of Holderness.

Post Glacial Deposits.—On the shore opposite Skipsea, and resting on boulder clay, will be seen an extensive deposit of fresh water marls, peat, etc., marking a time when Holderness was occupied by a series of meres, of which Hornsea mere is the only remaining example. A deposit of a similar kind occurs on the beach at Hornsea and can be seen at low tide, if not covered by the shifting beach material. Fossil shells occur in these marls, for list of which see Mr. Fierke's notes on another page of this page this circular.

The Glacial Beds.—As the members walk along the shore towards Hornsea, they will note that the sections, though much obscured by slipping, show distinct bands of boulder clay separated by irregular deposits of silt and gravel. The significance of these bands is not yet thoroughly understood, but the probability is that they mark oscillations of the margin of the ice-sheet.

The Boulders.—The clays are full of boulders from widely separated sources. Gneisses, crystalline schists, granites and the peculiar igneous rocks of Norway, are found side by side with local Chalk, Oolite, and Lias. The Whin sill and the Carboniferous series of Teesdale are also well represented and a few types from the Cumberland Hills and the Eden Valley have also been recognised.

Denudation.—The rapid destruction of the Holderness coast by the sea, is painfully evident to all observers. The average loss of land is estimated at about three yards per annum.

BOTANY.—

Flowering Plants.—Mr. J. F. Robinson writes that the botany of the Hornsea district is very fairly typical of Holderness generally, being that of a low-lying boulder clay region near the sea. It may be regarded under four divisions, viz:—(1) The Boulder Clay of the fields and cliffs (for pelophiles); (2) the Glacial Gravels forming low hills and mounds inland (for xerophiles); (3) the Mere, dykes and drains (for hygrophiles); (4) the Sea Coast (for arenophiles or halophytes). Owing, however, to the early date of the visit and the lateness of the season many species will not have commenced flowering, although there will be plenty of vegetation to make observation interesting; and if nothing else be done it will be satisfactory to confirm, if possible, some of the records of the older botanists, e.g., R. Teesdale's (1792-8) *Alisma natans* in Hornsea Mere and *Glaucium luteum* on the sea-coast sands; Hy. Baines' (1840) *Crambe maritima*, and *Festuca uniglumis* on the coast near Atwick; and *Botrychium lunaria*, Smith's var. γ (probably *matricariaefolia*) recorded in Dillwyn & Turner's Botanists' Guide (1805). The following list, arranged under the four heads mentioned above, contains a few of the species that may be found during the excursion, not always in flower but often sufficiently in foliage to make identification easy:—(1) *Ranunculus sardous* (*hirsutus*), *Cichorium intybus*, *Plantago maritima*, *P. Coronopus*, *Beta maritima*, and *Equisetum maximum*. (2) *Arabis Thaliana*, *Cerastium semidecandrum*, *Trifolium filiforme*, *Astragalus danicus* (*hypoglottis*)—occurs on gravels a little out of the area of the excursion but should be looked for in it—*Vicia lathyroides*, *Lathyrus sylvestris* (O.B.G.), *Poterium Sanguisorba*, *Myosotis collina*. (3) The Batrachian *Ranunculi*—*R. circinatus*, *R. peltatus*, vars. *truncatus*, *penicillatus*, and *floribundus*, *R. Drouetii*, *R. heterophyllus*, *R. Baudotii* (occurs in saline dykes and ponds in Holderness but has not yet been observed near Hornsea)—*Ranunculus Lingua*, *Nasturtium palustre* and *N. amphibium*, *Cardamine flexuosa*, *Stellaria palustris*, *Hippuris vulgaris*, *Apium graveolens*, *Stium latifolium*, *Enanthe Phellandrium*, *Bidens cernua*, *Taraxacum officinale* var. *palustre*, *Hottonia palustris*, *Salix triandra* (vars.), *Ceratophyllum demersum*, *Orchis ustulata* and *O. incarnata*, *Typha angustifolia*, *Lemna trisulca*, *L. gibba*, *L. polyrrhiza*, *Sagittaria*, *Butomus*, *Potamogeton alpinus*, *P. densus*, *P. pectinatus*, *Zannichellia pedunculata*(?) *Scirpus caricis*, *S. lacustris*, *Carex filiformis*, *Calamagrostis lanceolata*, etc. (4) *Crambe maritima* (?) *Cochlearia danica*, *Silene maritima* (the last two recorded at a former excursion of the Y.N.U.), *Arenaria peploides*, *Volvulus soldanella*, *Ammophila arundinacea*, *Agropyrum pungens*, *A. junceum*, and *Elymus arenarius*.

Mosses and Hepatics.—

No records available.

Lichens, Algæ, and Fungi.—

No records for fungi, lichens, and fresh-water algæ.

In Fretwell's Guide, p. 48, Mr. J. F. Robinson notes that *Fucus nodosus*, *Polysiphonia fastigiata*, *Halidrysiliquosa*, *Laminaria digitata*, *Plocamium coccineum*, *Rhodymenia ciliata*, *Griffithsia setacea*, and *Maugeria sanguinea* have been found on the shore at Hornsea.

VERTEBRATE ZOOLOGY.—

Mammalia.—No records.

Birds.—Mr. F. Boyes writes that the small Heronry in the trees bordering the Mere has slightly increased since the Union's last visit, and will be noticed with interest by many of the visitors. There are also breeding on the Mere the Great Crested Grebe (in small numbers), the Pochard, Wild Duck, Shoveller, Coot,

Waterhen, Water Rail, and Mute Swans. Other birds likely to be met with are Reed Warblers (breeding in large numbers), Sedge Warblers, Reed Buntings, Tree Creeper, and numerous Warblers, etc., etc.

Mr. T. Audas mentions that the Reed Warbler and the Black-headed Bunting breed in the reeds, and that other birds breeding in or about the Mere include the Coot, Moorhen, Mallard, Pochard, and Mute Swan, which are common; and the Water Rail and Shoveller, which are rare. The Heronry, which now contains over 25 nests, has been increasing of late years. One or two pairs of the Great Crested Grebe still breed, but this bird has of late years suffered much by persecution.

The Mere is strictly preserved—and rightly so—and it is particularly enjoined on Members that no nesting is allowed.

Reptiles and Amphibia.—No records.

Fishes.—Mr. H. W. Foster writes that Trout is entirely absent from the district, and that Hornsea Mere yields Pike, Perch, Roach, and Eel.

CONCHOLOGY.—

Land and Freshwater Mollusca.—The first list published is that in The Naturalist for July, 1881, p. 196, recording the results of the first visit of the Union to Hornsea. Fretwell's Illustrated Guide to Hornsea, N.D., contains a full account by Mr. F. W. Fierke. In this he points out that the Mere is unusually rich in freshwater species, that the southern margin might be very appropriately described as 'the cemetery of the Mere' by reason of the thousands of dead shells apparently washed from other parts of the Mere, that search should be made in the sheltered parts and marshy ground ambushed by the tall reeds and grasses, or (by means of a boat) in the deeper parts amongst an immense entanglement of pond weeds, *Segmentina nitida* is here to be found in its only East Riding station. *Planorbis fontanus* is common and *P. carinatus* is exceedingly fine. Mr. Clement Reid, F.G.S., in his Memoir on the Geology of Holderness cites *Limnaea glabra* as occurring in the Mere, but the record has not been confirmed by conchologists, and is in fact a very doubtful one; *L. auricularia* occurs in the deeper parts, and *Physa fontinalis* reaches unusually large dimensions. Both species of *Bithinia* are common, and *Velletia lacustris*, not yet on record, should be searched for. The swan mussel, *Anodonta cygnea*, is very abundant. *Pisidium milium* has been taken, and *Sphaerium corneum* and *S. lacustre* are plentiful, and *S. rivicola* is recorded by Mr. Reid, but is doubtful and requires confirmation. As to land shells *Hyalinia nitida* and others should be found amongst damp mosses by the water side. *Vertigo anti-vertigo* and *V. edentula* also occur in this situation; *H. alliaria* occurs on Swan Island. At the Wassand end of the Mere the woods are fairly productive, and have yielded *H. pura*, *H. fulva*, *Helix aculeata*, and *H. arbustorum*. *H. aspersa* var. *exalbida* occurs sparingly in one locality near Hornsea, and towards the coast *H. virgata* and *H. itala* and var. *alba* are found, and *H. virgata* var. *hyalozonata* is in great abundance on the cliffs between Hornsea and Skipsea.

Marine Mollusca.—In Fretwell's Guide, p. 53, Mr. F. W. Fierke remarks that the Marine Mollusca cannot be so advantageously studied, as on this part of the Coast there are no rocky pools.

ENTOMOLOGY.—

Lepidoptera.—There do not appear to be any records of Lepidoptera, except that on the Union's former visit in June 1881, *Acidalia emarginata*, *Melanippe montanata*, and *Emmelesia decolorata* were taken (Nat., July 1881, p. 195).

Coleoptera.—Mr. M. Lawson Thompson writes that Hornsea Mere is known to Coleopterists as one of the best localities in Yorkshire for some of the Geodephaga affecting wet places. Among the species that have been taken there the following may be cited:—*Bembidium æneum*, *B. assimile*, *B. obliquum*, *Pterostichus anthracinus*, *P. gracilis*, *P. minor*, *Trechus discus*, *Taphria nivalis*, *Anchomenus piceus*, *A. puellus*, *Oodes helopioides*, *Chlanienus nigricornis*, *C. holosericeus*. On the Union's former visit, in June 1881, *Athous hemorrhoidalis*, *Otiorrhynchus picipes* and *Hister bimaculatus* were taken by Mr. T. E. Holder.

Other Orders.—No records.

PROGRAMME OF MEETINGS.—

5-0 p.m.—Meat Tea, 2/- each	} All at Alexandra Hotel, Hornsea.
6-0 p.m.—Sectional Meetings	
6-30 p.m.—General Meeting	
7-0 and 7-35 p.m.—Trains leaves for Hull.	

Yorkshire Naturalists' Union.

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Hon. Secretaries:

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EDWIN HAWKESWORTH, Goodman Street, Hunslet, Leeds.

THE 151ST MEETING

WILL BE HELD AT

YORK.

FOR THE INVESTIGATION OF THE NATURAL HISTORY OF

ASKHAM BOG,

AND FOR THE GEOLOGICAL INVESTIGATION OF THE
MORAINIC RIDGES OF ASKHAM AND BILBROUGH,

ON

WHIT-MONDAY, June 4th, 1900.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways which have booking arrangements for YORK, to Members and Associates of the Y.N.U. showing their signed card of membership at North-Eastern Stations, or (at other companies' stations) surrendering the Certificate noted below. Tickets taken on Saturday, 2nd June, will be available for return any day up to Tuesday, 5th June. The journey may be broken at Copmanthorpe Station. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate initialled by one of the Secretaries of the Union (except at stations on the North-Eastern line, where production of Card of Membership is sufficient). Members and Associates wishing for this Certificate must apply to Mr. Hawkesworth for it, and **MUST ENCLOSE** a stamped directed envelope and their current card of membership of the Union, which latter will be returned with the Certificate.

BOOKS AND MAPS.—The Askham Bog area is included in Sheet 71 of the One-inch Ordnance Map, and geologists will also require Sheet 70 for Bilbrough. Both are published geologically coloured. Copies of the circular of the Union's visit in 1879 may also be had of the Secretaries, price 6d. (3d. to Members).

Askham Bog has been the subject of seven papers in the 'Natural History Journal' for 1879-80, viz. :—I. Geological, II. Shells, III. Butterflies, IV. Birds, V. and VI. Flowers and Ferns, VII. Beetles. A few remaining copies of these can still be had at 3d. each post free, or 1/- for the set, from Editors, 'Natural History Journal,' Bootham School, York.

THE DISTRICT.—The Rev. W. C. Hey, M.A., writes that Askham Bog is one of the very few undrained spots left in the Vale of York. Hence the naturalist values it much as the palæontologist values one bone of an extinct animal, for from it he can draw such a true and interesting picture of a phase in the development of our great county now almost passed away. Pools bordered by flags, sedges, bulrushes and marsh ferns; jungles of *Osmunda*, with birch, willow and blackthorn; all sorts of birds, and insects, and molluscs that love such watery solitudes—these are the features of Askham Bog. The Bog will be observed to consist of three general divisions. Entering it from the north we come upon a large number of shallow pools and deeper ponds (these latter disused brick ponds). This is 'Chandler's Whin,' the glory of the coleopterist. Here, too, the conchologist will find his best hunting ground, and the botanist some nice water plants. Beyond this are open marshy fields, intersected by a ditch rather rich in many sorts of creatures. Crossing another ditch we reach the Bog proper—a tangled mass of flags and sweet gale, and various low growing trees. I remember as a child standing here under *Osmundas* which towered many feet above my head, but I understand that grand fern has been almost eradicated. Askham Bog is not what it was—big houses crowd up to it—its thickets are noisy with the scream and thunder of trains, but even yet no naturalist can visit it without being both impressed and delighted with the pictures of fen life presented to his eager eyes.

ROUTES.—

1.—The general body of naturalists, under the leadership of the Rev. T. Ainsworth Brode and other York Members, will devote exclusive attention to Askham Bog itself, and will leave York Station in conveyances at 10-15 a.m., driving to the Dringhouses entrance, fare 6d. each. Members desiring seats in the conveyances must notify Rev. T. Ainsworth Brode, 3, Penley's Grove Street, York, not later than Thursday, May 31st.

2.—The Geological Party will proceed in conveyances with the main party, thence walk to Bilbrough, and work back to York, examining the moraines and brick ponds mentioned in Mr. Kendall's paragraph.

3.—Lepidopterists desirous of working the Bog at night on Saturday and Monday, in company with Mr. William Hewett, should communicate with him at 12, Howard Street, Fulford Road, York.

PERMISSION has been granted by Mr. E. Lycett Green, subject to there being no disturbance of game, nesting birds, or the ferns.

GEOLOGY.—Mr. Percy F. Kendall, F.G.S., writes that the City of York stands at the centre of a crescent of drift hills, the terminal moraine of a great glacier. East of the City there is a practically undivided ridge, but to the Westward the moraine splits into several sub-parallel ridges or loops, and between these lies the inter-morainic swamp, Askham Bog. The Geologists should visit the brick-yards which lie just betwixt the North Eastern Railway and the Tadcaster Road. If these should chance to be cleared of water a most interesting section will be seen consisting of mounds of gravel covered by a laminated warp whose bedding conforms to the surface of gravel through a thickness of 8 or 10 feet. The erratics include many examples of a highly fossiliferous carboniferous limestone, besides volcanic rocks from the Lake District and probably Shap Granite. A careful search should be made for Porphyrites of the Cheviot type. If time permit, the excursion should be extended to Bilbrough where there are good exposures of glacial gravels in pits on the crest of the moraine, and the Triassic sandstones are visible in an old quarry near Street Houses. Close to this place the Tadcaster District Council is boring for water.

BOTANY.—

Flowering Plants.—Mr. H. J. Wilkinson writes that the following flowering plants, etc., may be met with :—*Ranunculus Lingua*, *R. trichophyllus*, *R. hirsutus*, *Barbarea stricta*, *Stellaria glauca*, *Hypericum Elodes*, *Rhamnus catharticus*, *R. frangula*, *Rubus* (many species), *Rosa tomentosa*, *R. canina* (many sub-species), *Parnassia*, *Pimpinella magna*, *Ceanothus Phellandrium*, *Carduus pratensis*, *Serratula tinctoria*, *Menyanthes*, *Utricularia vulgaris*, *Hottonia*, *Lysimachia vulgaris*, *Rumex Hydrolapathum*, *Salix pentandra*, *S. fragilis*, *Myrica*, *Hydrocharis*, *Orchis*

incarnata, *Habenaria viridis*, *Carex dioica*, *C. pulicaris*, *C. stellulata*, *C. ovalis*, *C. elongata*, *C. axillaris*, *C. vulpina*, *C. teretiuscula*, *C. paradoxa*, *C. paniculata*, *C. vulgaris*, *C. stricta*, *C. acuta*, *C. flava*, *C. fulva*, *C. binervis*, *C. panicea*, *C. pseudo-cyperus*, *C. filiformis*, *C. paludosa*, *C. riparia*, *Juncus obtusiflorus*, *Cladium*, and *Calamagrostis lanceolata*.

Cryptogams.—Mr. H. J. Wilkinson writes that when the members of the Y.N.U. visited Askham Bog on the 2nd June, 1879, hundreds of specimens of *Osmunda regalis* (royal fern) were observed, many of which exceeded six feet in height. The members will be very fortunate if they come across a score of royal ferns this year (1900). As no specimens of this fern were taken by the naturalists in 1879 (see report in the *Naturalist*, vol. iv., 1878-79, pp. 191-192), so none must be removed this year. *Lastrea thelypteris*, *L. cristata*, *L. spinulosa*, *L. dilatata*, *Osmunda regalis*, and *Ophioglossum vulgatum* may also be observed, but none are allowed to be gathered.

Mosses, Hepatics, Lichens, Algæ and Fungi.—In 1879 the Y.N.U. collected *Tetraphis pellucida* (in fruit), *Climacium dendroides*, *Hypnum cordifolium*, *Oscillatoria nigra*, *Euglena viridis*, *Chatophora tuberosa*, *Coleochaete scutata*, *Batrachospermum moniliforme*, *Pandorina morum*, *Closterium moniliforme*, *Mougeotia genuiflexa*, *Chara syncarpa*, and *Kiccia natans*.

VERTEBRATE ZOOLOGY.—

Mammalia.—Mr. E. G. Potter notes that Askham Bog is famous for its Foxes, and is now more particularly preserved as a fox cover. The Hedgehog, Weasel, and Water-Rat also occur; Bats are plentiful, and are assiduous moth-catchers on warm nights.

Birds.—Mr. James Backhouse, F. L. S., writes that most of one hundred species of birds are on record as having been observed in Askham Bog. Of these the Bittern and Hen Harrier are no more, but the 'far wood' is still the breeding-place more or less regularly of Sparrow Hawk, Kestrel, Long-eared Owl, Carrion Crow, Magpie, etc., whilst in 'Chandler's Whin' and the 'Jungle' innumerable Waterhens and Snipe are to be found, and an occasional Redshank sometimes rears its young. Of small birds, Warblers and Tits of several species are more especially numerous, and in the drier and more open parts Buntings abound. The Grasshopper Warbler is not uncommon in the central part.

Mr. E. G. Potter writes that the following are some of the birds usually met with in the bog, those marked with an asterisk having nested there or in the immediate neighbourhood during recent years :—*Sparrow Hawk, *Kestrel, *Longeared Owl, *Carrion Crow, *Magpie (a few years ago these two latter species used to be very common), *Snipe, *Mallard, Teal, Heron (small flocks sometimes observed feeding), *Lapwing, *Moorhen, *Pheasant, *Partridge, *Ringdove, *Bullfinch, *Reed Bunting, *Sedge Warbler (common), *Willow Warbler, *Chiff Chaff, *Yellowhammer, *Longtailed Tit, *Blue Tit, *Great Tit, *Cuckoo, Pied and *Yellow Wagtails, Wheatears (on migration in early spring), *Meadow Pipit, *Sky-lark, *Linnet, *Tree Sparrow, Tree Creeper, Greenfinch, Grasshopper Warbler (this species can be heard singing its weird song any evening at this time of the year; it generally commences to sing about 7.30 p.m.). Of course there are many other casual visitors, such as Hooded Crow, Golden Plover, Woodcock, Swift, etc. In days gone by, Jays, Nightjar, and Redshank have been known to breed here.

Reptiles, Amphibia, and Fishes.—No records.

CONCHOLOGY. The Rev. W. C. Hey, M.A., writes that *Segmentina nitida* swarms in a large shallow pond left of the roadway, and about two hundred yards from the entrance to 'Chandler's Whin.' The moss at the sides of the same pond yields plenty of *Vertigo antivertigo* and *Zonites fulvus*, with a few *Helix pygmaea*. The large deep square pond close to the railway line is the locality for *Limnaea stagnalis* and large *Planorbis complanatus*. *Valvata cristata* abounds in several of the large shallow ponds. *P. corneus*, *P. nautileus*, *P. contortus*, and *P. carinatus* all occur sporadically. The intersecting ditch yields many ordinary species, including very fine large *Limnaea peregra*. *Physa hypnorum* may sometimes be got in grassy pools near the entrance to 'Chandler's Whin,' but its occurrence is irregular. *Vertigo entula* can often be swept from the low herbage in the far 'Jungle.' *Sphaerium corneum* occurs in the large pale form. Several interesting forms of *Pisidium* can also be collected.

Mr. John Hawkins writes that beginning at Dringhouses, which is on the way from York to the Bog, he has taken *Helix aspersa*, some very dark or nearly black, and some yellowish, also the rose-lipped variety; the small var. *conoidea* also may

be met with. This is also a good locality for *H. nemoralis* and *H. hortensis*, very variable in colour, *H. rufescens*, *H. cantiana*, and some very large *H. arbustorum* with its var. *flavescens*. In the Bog itself he has taken within the last ten years *Helix aculeata*, sparingly, *H. caberata*, *H. rotundata*, *H. hispida*, *H. pygmaea*, *H. pulchella*, *Vertigo antivertigo*, *V. pygmaea*, *V. edentula*, *Cochlicoba lubrica*, very fine, *Carychium minimum*, *Sphaerium corneum*, and var. *psidioides*, *Pisidium amnicum*, *P. fontinale*, *P. pusillum*, *P. roseum*, *Bythinia tentaculata*, *Valvata cristata*, *Planorbis lineatus*, *P. nitidus*, *P. nautilus*, *P. albus*, *P. spirorbis*, *P. carinatus*, *P. vortex*, *P. complanatus*, *P. corneus*, *F. contortus*, *Physa fontinalis*, *P. hypnorum*, *Limnaea peregra*, *L. stagnalis*, *L. palustris*, *L. truncatula*, *L. glabra*, *Ancylus oblongus*, *Succinea putris*, *S. elegans*, *Vittrina pellucida*, abundant, *Hyalinia cellaria*, *H. nitidula*, *H. pura*, *Zonites crystallinus*, *Z. radiatulus*, and *Z. fulvus*.

ENTOMOLOGY.

* **Lepidoptera.**—Mr. William Hewett writes that the lepidopterous fauna of Askham Bog is both numerous and interesting, and after twenty-three years experience of collecting in many parts of the country (and especially Yorkshire) he unhesitatingly affirms it to be one of the best collecting-grounds in the kingdom. The date of the excursion is somewhat early for many of the best species, still any or all of the following species should be met with:—*Anthocharis cardamines*, *Argynnis selene*, *Pericallia syringaria*, *Iodis lactearia*, *Acidalia remutata*, *Emmlesia decolorata*, *Eupithecia castigata*, *E. albipunctata* and its var. *angelicata* (the larvæ feed on the flowers and seeds of *Angelica sylvestris*), *E. valerianata*, *E. vulgata*, *E. absynthiata*, *E. tenuiata*, *Collix sparsata* (for which Askham Bog is the only Yorkshire locality, and here it is usually abundant, some seasons literally swarming on favourite evenings, the larvæ are to be found on *Lysimachia vulgaris*); *Coremia ferrugata*, *C. unidentaria*, *Phibalapteryx lignata* (abundant in the Bog, and double-brooded, occurring in June and again in early August), *Cilix spinula*, *Cynatophora duplaris*, *Acronycta tridens*, *A. psi*, *A. leporina* var. *bradyporina* (fairly common at sugar on favourable nights), *A. megacephala*, *A. rumicis*, *A. menyanthidis*, *Leucania lithargyria*, *L. pudorina* (this local species is usually very common both at sugar and flying over the sweet gale), *L. impura*, *L. pallens*, *Xylophasia lithoxylea*, *X. sublustris*, *X. hepatica*, *Apamea gemina*, *A. unanimis*, *Miana strigilis*, *M. fasciuncula*, *M. literosa*, *M. furuncula*, *M. arcuosa*, *Grammeisa trilinea*, *Noctua augur*, *N. plecta*, *N. c-nigrum*, *N. brunnea*, *N. festiva* (some very pretty forms of this variable species may be taken from amongst the swarms that frequently come to sugar), *N. rubi*, *N. baja*, larvæ of *Taenioctampa populeti* on aspen and poplar, larvæ of *Epunda viminalis* on sallow (York and indeed northern larvæ generally of this species produce some beautiful melanitic forms), *Hadena adusta*, *H. dentina*, *H. suasa* (usually very common at sugar), *H. thalassina*, *Cucullia umbratica*, *Hydrelia unca* (one of the many Askham Bog specialities, and frequently abundant on the wing in the early morning and evening). Very common species have been omitted from this list.

Coleoptera.—The Rev. W. C. Hey, M.A., writes that March is the best month for Hydradephaga at Askham Bog. It is very doubtful if *Hydroporus scalesianus*, *H. oblongus*, *Agabus uliginosus*, or *H. rufifrons* will be found in June. But many good things will still remain, e.g., *H. decoratus*, *H. umbrosus*, *H. vittula*, *H. granularis*, *Liopteris agilis*, *Agabus unguicularis*, *A. abbreviatus*, and *C. grapii*. This is the time to look for *Hydaticus transversalis* and *Hydrana palustris*, but they have not occurred for many years. *Bagous petio* (only known as British by five examples from Askham Bog) may be looked for in wet moss at the margins of large shallow ponds. *Dytiscus dimidiatus* is a March insect, but the equally rare *D. circumcinctus* might still be found in the deepest parts of the ponds near the middle of 'Chandler's Whin.' Many species of Philhydrida will abound, including the minute *Limnebius picinus*. The handsome *Donacia lemnae* affects the flags in a large pond which runs at right angles to the railway line. The 'jungle' has yielded among other good things, *Aromia moschata*, *Polyopsis præusta*, *Bradycellus placidus*, and *Cryptocephalus labiatus*. *Oödes helopioides* has often been found in wet moss.

Other Orders.—No records.

PROGRAMME OF MEETINGS.—

4-30 p.m.—Meat Tea, 2/- each	} All at Harker's Hotel, York.
5-15 p.m.—Sectional Meetings	
6-0 p.m.—General Meeting	

Yorkshire Naturalists' Union.

President :

GEO. T. PORRITT, F.L.S., F.E.S., Huddersfield.

Hon. Secretaries :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.
EDWIN HAWKESWORTH, Goodman Street, Hunslet, Leeds.

THE 152ND MEETING

WILL BE HELD AT

CROSLAND HALL,

NEAR HUDDERSFIELD,

FOR THE INVESTIGATION OF

**DROP CLOUGH, BLACKMOORFOOT, WESSENDEN VALLEY,
FORD VALLEY, HARDEN CLOUGH, and Neighbourhood,**

ON

THURSDAY, 28th JUNE, 1900.

The President invites the Members and Associates participating in this Excursion to take Tea with him at Crosland Hall, and it is essential that Members and Associates intending being present should inform him, direct, not later than June 21st.

Crosland Hall is close by Healey House Station, L. & Y. Rly., Meltham Branch.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways, which have booking arrangements for **HUDDERSFIELD**, to Members and Associates of the Y.N.U. showing their signed card of membership at North-Eastern Stations, or (at other companies' stations) surrendering the Certificate noted below. Tickets taken on Wednesday and Thursday, 27th and 28th June, will be available for return any day up to Friday, 29th June. Where through bookings are not in operation, Members may book to most convenient junction, and rebook to destination; the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union (except at stations on the North-Eastern line, where production of Card of Membership is sufficient). Members and Associates wishing for this Certificate must apply to Mr. Hawkesworth for it, and **MUST ENCLOSE** a stamped directed envelope and their current card of membership of the Union, which latter will be returned with the Certificate.

As the various parties start from different stations, members are recommended to obtain return tickets for Huddersfield, getting ordinary tickets from there as may be necessary.

BOOKS AND MAPS.—The area for investigation is included in Sheet 88 of the One Inch Ordnance Map, which may be had geologically coloured. Annotated lists of the fauna and flora, as complete as possible up to date of publication, are contained in Hobkirk's 'History and Natural History of Huddersfield.' Later catalogues of the Lepidoptera (Porritt & Mosley) 1/-, Mollusca (Whitwham) 6d., &c., have appeared in the 'Trans. of the Huddersfield Nat. Soc.' A catalogue of the larger Fungi (Clarke) was issued by the Botanical Society (6d.). There is a small pamphlet on the Vertebrates (Mosley) enumerating all the species (4d.). Copies of these may be obtained from Mr. C. Mosley, Beaumont Park, Huddersfield.

THE DISTRICT.—Mr. T. W. Woodhead, F.L.S., writes:—The valleys of the Colne and Holme are carved deeply out of the Millstone Grit by the inky streams which bear these names; between the two lies the smaller, well-wooded valley of Meltham. Each has its origin in the high moorland tract of the Pennine Chain, which offers a never failing supply of water to the villages and towns below. The three valleys converge towards Wessenden Head; from this point to the north, south, and west, as far as the eye can reach, is one immense stretch of wild moorland hills; to the east we look upon the limits of cultivation. The streams arising among these hills cut their way through thick beds of Peat, and alternating Grits and Shales. The shaley banks of the lower slopes are planted with trees—Pine, Birch, Oak, and Sycamore. To the right is the narrow valley of Bilberry, with its reservoir below, the bursting of which wrought such terrible destruction to life and property in 1852. Lower down, this is joined by the stream from the Ford Valley. Harden Clough is a well-wooded picturesque valley, joining Meltham to the moors; it opens out below near the site of the old Bull Ring. The main road to Meltham from Wessenden Head passes beneath West Nab, a rocky peak 1642 feet high, covered with Cloudberry. The eastern slope is strewn with huge gritstone blocks, the result of a landslip. Near the plantation on the farm below are traces of a Roman Camp. On these moorland slopes abundant evidence has been found that the ground was formerly covered by trees. A century ago the unearthed trunks of pine, etc., were cut up into long splinters by the villagers and used extensively in place of candles. Water from this area is conducted to the reservoir at Blackmoorfoot, three miles away, by a culvert crossing the road, and the contour of the ground is such as to produce the illusion that the water flows uphill. Within a mile of Crosland Hall is the pretty waterfall Folly Dolly, where there is a good section of a Fault. The Wessenden Valley turns sharply to the left and is a fine example of wild moorland scenery. In the peaty bogs are patches of Cotton-grass, on dryer ground Whortleberry and Crowberry are abundant, while on the higher knolls are wide stretches of Cloudberry. The reservoirs in the upper part of the valley are favourite haunts of wild fowl. Below, two large reservoirs are in course of construction by the Huddersfield Corporation, and geologists may find much of interest here. Running parallel with the Colne is the Leeds and Liverpool Canal, which after traversing a tunnel three miles in length, emerges from the foot of the Standedge Hills. The sides of the valley are steep, with rough, close cropped, and often barren pastures, frequently broken by sandstone quarries. At right angles to the main stream are numerous ‘cloughs,’ down which run rapid streams during heavy rains. The chief of these on the north side is Drop Clough. The stream rises on the moors near Cupwith Hill, 1000 feet high, and comes tumbling down its rocky bed in a series of picturesque little waterfalls. Most of the plants mentioned in the circular occur here.

ROUTES.—

1.—From Slaithwaite Station (L. & N.W. Railway) on arrival of 11-32 train, up Booth Bank, over Hill Top into Drop Clough; cross Colne Valley, to Blackmoorfoot Reservoir, Folly Dolly, and Crosland Hall. Leaders: Messrs. T. W. Woodhead, F.L.S., and A. W. Sykes.

2.—From Marsden Station (L. & N.W. Ry.) on arrival of 11-40 train, up Wessenden Valley to Isle of Skye, return by train from Meltham, 4 p.m., to Healey House. Leaders: Messrs. S. L. Mosley, F.E.S., and C. Bulmer.

3.—From Brockholes Station (L. & Y. Ry.) on arrival of 12-4 p.m. train, through Hagg Wood, Ford Valley to Harden Moss, down Harden Clough to Meltham for 4 p.m. train, as above. Leaders: Messrs. W. Tunstall, F.E.S., and Harry Mellor.

All these routes are of general interest, but, if any distinction may be made, botanists are recommended to No. 1; geologists are recommended to join route No. 2—they will then see the landslip at West Nab, and the sections exposed at the New Waterworks of the Huddersfield Corporation in the Wessenden Valley; and entomologists to No. 3.

NATURAL HISTORY COLLECTIONS IN HUDDERSFIELD.

—Members arriving in Huddersfield from Leeds, 10-10 a.m.; Bradford, 10 a.m.; Halifax, 10-16 a.m. will be met at the station by the President, and Mr. S. L. Mosley, who will conduct them to examine the Natural History Collections at the Technical College, Queen Street South (ten minutes' walk from the station), by kind permission of Mr. S. G. Rawson, D.Sc., F.I.C., the principal. They include the late Mr. Joseph Whitwham's fine conchological collection, the late Mr. Samuel

Learoyd's collection of minerals, a number of birds, and a series of exhibits showing the life-history of insects of various orders. There will also be a series of exhibits of apparatus, etc., in the new Biological Laboratories.

PERMISSION has been granted by Sir Joseph Crossland, Kt., to go over his property in the Wessenden Valley; Messrs. Jonas Brook & Bros., Ltd., for Ford Valley and Harden Moss; Mr. Edward Brook; and the Corporation of Huddersfield for the New Waterworks.

GEOLOGY.—Mr. Samuel Jury writes the rocks in this district all belong to the Millstone Grit series, and may be divided into four distinct groups of Sandstones and Shales. First and uppermost is the Rough Rock; second—thin beds of Flagstone immediately beneath Rough Rock; third—three beds of Sandstone, usually known as the Third Grits; and fourth—the Kinder Scout Grit. Many good sections of these are exposed, some of the beds being extensively quarried, and casts of *Sigillaria*, *Stigmaria*, *Lepidodendron*, and *Calamites* are fairly common.

BOTANY.—

Flowering Plants.—Mr. T. W. Woodhead, F.L.S., writes that the district covered by the ramble consists of oak, birch, pine, and mixed woodlands, hilly pastures, moorlands, cloughs, and high open moor. It is not rich botanically, lying as it does entirely on the Millstone Grits, with vast tracts covered by Peat. Much of the ground rises 600 to 1,600 feet or more, and considering the lateness of the season and early date of the ramble, many of the characteristic plants will not be in flower. The following are the more interesting species occurring here:—*Hypericum androsæmum*, *Genista anglica*, *Rubus fissus*, *R. pulcherrimus*, *R. lindebergii*, *R. villicaulis* v. *selmeri*, *R. sprengelii*, *R. leucostachys*, *R. chamæmoris*, *Drosera rotundifolia*, *Hydrocotyle*, *Myrrhis*, *Enanthe crocata*, *Heracleum sphondylium* v. *angustifolium*, *Valeriana dioica*, *Hieracium argenteum*, *H. sciaphilum*, *Wahlenbergia hederacea*, *Vaccinium vitis-idaea*, *Schollera occycoccus*, *Andromeda polifolia*, *Pyrola minor*, *Pinguicula vulgaris*, *Scutellaria minor*, *Plantago media*, *Empetrum nigrum*, *Narthecium ossifragum*, *Asplenium viride*, *A. ruta-muraria*, *Phegopteris dryopteris*, *P. polypodioides*, *Ophioglossum vulgatum*, *Botrychium lunaria*.

Mosses.—The following are the more interesting mosses to be met with in this district:—*Sphagnum acutifolium*, *S. squarrosum*, *S. intermedium*, *S. subsecundum*, *Dichodontium pellucidum*, *Dicranella squarrosa*, *Phaseum bryoides*, *Didymodon rubellus*, *Racomitrium heterostichum*, *Philonotis fontana*, *Bryum pseudo-triquetrum*, *Tetradontium brownianum*, *Hyoconium flagellare*, *Hypnum vernicosum*, *H. ochraceum*, *Hylacomium loreum* and *H. squarrosum*.

Fungi.—Mr. Alfred Clarke writes that the districts to be visited being principally moorland areas are not prolific in fungi. The wood near Harden Clough has yielded a few specimens of *Hydnum repandum* and *Tricholoma rutilans*, in addition to the commoner species of *Amanita*, viz.:—*A. rufescens*, *A. pantherina*, and *Amanitopsis vaginata*, but the season is not sufficiently advanced for finding many of the larger species. For additional records refer to Mr. Clarke's published list mentioned on first page.

VERTEBRATE ZOOLOGY.—

Mammalia.—Mr. S. L. Mosley, F.E.S., writes that in the district to be investigated the Weasel is common, the Stoat occasional, and the Polecat rare. Of the smaller species the Water Shrew is worth mention. On the Holmfirth side many of the Hares are white, probably Scotch Hares turned down. The Mole and Hedgehog are common. An Otter was recently reported in the district, and Brockholes was doubtless formerly the home of the Badger, while such names as Staggard Hill, Deer Hill, etc., show that these were, at one time, headlands frequented by probably Red Deer. Wolf Stones, which will be passed by the Holmfirth contingent, probably was named from the animal whose name it bears.

Birds.—Mr. S. L. Mosley writes:—The valleys to be investigated abound with summer migrants. The Meadow Pipit is particularly abundant, and in its nest the Cuckoo usually deposits its eggs, in this district. The Ring Ouzel is common, and the Dipper may be seen, though we shall not visit its favourite gorge. The sheets of water afford attraction for Wildfowl, and several species of Geese, Ducks, and Gulls have been obtained. Some of these may often be seen on Blackmoor Foot. The Kingfisher is not an unfrequent visitor, and has been seen even in the President's

garden. Records of the rarities will be found in 'Vertebrates of Huddersfield' (4d). Curlew and Golden Plover breed on these moors, and Dotterel visit them in spring and autumn.

With reference to the Note in the 'Naturalist' this month, the Stationmaster at Netherton has promised to keep the Song Thrush's nest there, in situ, until after the date of the excursion, so that any member interested may see it.

Reptiles, Amphibians.—All the three newts are found in the district, the Palmate Newt quite as frequent as the others. The Blindworm is occasionally met with, also the Common Lizard, and formerly the Ringed Snake.

Fishes.—No records.

CONCHOLOGY.—Mrs. H. G. Brierley writes that in the canal at Marsden and Slaithwaite *Anodonta cygnea* may be looked for. The canal, and some of the adjacent ponds in the neighbourhood of Slaithwaite, yield *Planorbis vortex*, *P. albus*, *Sphaerium corneum* and *Limnaea peregra*. In Whitwham's list *Zonites excavatus* is reported from Golcar. *Helix rotundata* is fairly common in the district, and the quarry in Hagg Wood is the only place in the district where *H. nemoralis* is at all plentiful. Whitwham mentions *Arion ater* and *Limax agrestis* as being common, and *L. flavus* rare.

Mr. S. L. Mosley writes that *Arion circumscriptus* (= *bourguignati*) is fairly common, but not recorded in Whitwham's list.

ENTOMOLOGY.—

Lepidoptera.—Mr. G. T. Porritt, F.L.S., F.E.S., writes:—Perhaps the most interesting species likely to be out at the date of the excursion will be *Boarmia repandata*, many of the specimens in the district being remarkable examples of melanism, the blackest form being exceedingly fine, and is apparently almost confined to South-West Yorkshire. It is fairly common some seasons on tree trunks, especially in the Fir Wood at the top of Honley Wood. *Acronycta menyanthidis* and *Hadena glauca* are not uncommon on the stone walls about Harden Moss, and this late season perhaps a few may still be found, though in an early season both ought to be over. *Scodiona belgiaria* is usually common on Crosland Moor, where also *Larentia caesiata*, *Anarta myrtilli* and *Phycis carbonariella* occur freely. Among heath in woods *Acidalia fumata* and *A. inornata* occur, whilst *Melanippe galiata* and *Scoparia muralis* should be found on stone walls in lanes. *Penthina sauciana* and *Phoxopteryx myrtilana* are common among Bilberry, etc. Larvæ of *Hypsipetes elutata* from Bilberry on the Harden Moss, and other moors in the district are known to produce probably more remarkable forms of this common species than any other district; with them feed the beautiful larvæ of *Cloantha solidaginis*. Larvæ of *Cheimatobia boreata* occur freely on birch in the woods; and those of the three species of *Hybernia*, *aurantiaria*, *defoliaria*, and *progenitaria*, and especially those of *Polia chi*, ought all to be collected for varieties.

Coleoptera.—Mr. S. L. Mosley, F.E.S., writes that the higher parts of the grounds to be worked have not been thoroughly investigated. *Carabus arvensis* and *Bembidium nigricorne* have been taken, and such alpine species as *Miscodera arctica* should be looked for. *Melœ proscarabeus* occurs in the firwood in Harden Clough; *Dryocetes alni* and *Trypodendron domesticum* bore into the Alder and Birch, while the ravages of *Hylurgus piniperda* will be only too apparent. *Cicindela campestris* used to occur on these moors and probably still does if looked for. *Bradycellus cognatus* and *B. similis* are common under stones on the moors, and the alpine form of *Calathus melanocephalus* with dark or black thorax is often to be met with. *Aphodius tessellatus* has been taken in some numbers at South Crosland.

Neuroptera and Trichoptera.—Mr. G. T. Porritt, F.L.S., F.E.S., writes:—Members not specially interested in other groups, are recommended to work the streams, etc., on the various routes for specimens in these orders, when good results ought to be obtained. *Sialis fuliginosa* occurs; *Limnophilus luridus* is common about the walls on Harden Moss; *L. extricatus* abundant in ponds; *Stenophylax lateralis*, of which the West Yorkshire form is the darkest known, is common in the small streams on the moors; *Chrysopa tenella* in trees; and many others.

PROGRAMME OF MEETINGS.—

- | | |
|-----------------------------|-------------------------------------------------------|
| 5-0 p.m.—Tea | } In the grounds of Crosland Hall. |
| 6-0 p.m.—Sectional Meetings | |
| 6-30 p.m.—General Meeting | |
| 7-18 p.m. { | } Trains leave Healey House Station for Huddersfield. |
| 8-49 p.m. } | |

Yorkshire Naturalists' Union.

President:

GEORGE T. PORRITT, F.L.S., Huddersfield.

Hon. Secretaries:

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

EDWIN HAWKESWORTH, Goodman Street, Hunslet, Leeds.

THE 153RD MEETING

WILL BE HELD AT

REETH,

FOR THE INVESTIGATION OF

ARKENGARThDALE,

MID-SWALEDALe AND THE NEW FOREST,

From SATURDAY, August 4th, to

BANK-HOLIDAY MONDAY, Aug. 6th, 1900.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways which have booking arrangements for LEYBURN, to Members and Associates of the Y.N.U. showing their signed card of membership at North-Eastern Stations, or (at other companies' stations) surrendering the Certificate noted below. Tickets taken on Friday, 3rd August, will be available for return any day up to Tuesday, 7th August. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey. From certain N.E. stations week-end return tickets are issued to Leyburn at single fare.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union (except at stations on the North-Eastern line, where production of Card of Membership is sufficient). Members and Associates wishing for this Certificate must apply to Mr. Hawkesworth for it, and **MUST ENCLOSE** a stamped directed envelope and their current card of membership of the Union, which latter will be returned with the Certificate.

DRIVING ARRANGEMENTS.—Conveyances will leave Leyburn Station for Reeth (10 miles) on arrival of 7-20 p.m. train from Northallerton, on Friday and Saturday evenings, fare 1/6 each. Should a sufficient number of members order it a conveyance will also meet the train arriving at Leyburn at 11-36 on Saturday morning; otherwise members may walk over the hills (8 miles) to Reeth, leaving their luggage to come on in the conveyance in the evening.

HEAD-QUARTERS of the Union will be at the Buck Hotel, Reeth. Terms 6/- per day, including bed, breakfast, and late dinner or tea. The Secretaries have secured the whole available accommodation of the hotel for the week-end, but it must be distinctly understood that members desirous of attending the meeting must communicate **DIRECT** with Mr. C. W. Robson, Buck Hotel, Reeth, Yorks., regarding both conveyance and rooms, not later than Friday, July 27th. Applications received after that date cannot possibly be entertained. The beds will be allotted according to priority of application, but when those in the hotel are all engaged, Mr. Robson will arrange for others sleeping only elsewhere in the village, all boarding at the hotel. Members writing to Mr. Robson must state definitely that they are members of the Union.

LEADERS AND GUIDES.—The Union has been fortunate in securing the presence of Mr. J. G. Goodchild, F.G.S., F.Z.S., M.B.O.U., of Edinburgh, and Mr. J. E. Tinkler, of Leytonstone. The arrangements and routes will be under the direction of these gentlemen and of Mr. John Barker, of Reeth. Mr. Goodchild was one of the geologists engaged in the survey of the district, and Mr. Tinkler, son of a former vicar of Arkengarthdale, is the author of the list of birds referred to elsewhere.

ROUTES.—These will be arranged by the leaders from day to day.

PERMISSION has been granted for the various estates—subject to the proviso that there is no disturbance of the game. It should also be borne in mind that in gathering specimens of any kind the object of the Union is the preservation of the fauna and flora of its district.

BOOKS AND MAPS.—The district to be investigated is included in Quarter Sheets 97 N.W. and 97 N.E. (new series Sheets 40 and 41) of the One-Inch Ordnance Map. These are published geologically coloured, both solid and drift editions. For geological information consult the Geological Survey Memoir of 'The Country around Mallerstang.' Mr. Goodchild's and Mr. Tinkler's papers in the 'Naturalist' on the Flora and Fauna of the district should be referred to, as well as Mr. J. Gilbert Baker's classical work on 'North Yorkshire' in both editions.

THE DISTRICT for investigation consists of Arkengarthdale, through which flows the Arkle Beck, the various becks draining into it, and the district immediately surrounding its confluence with the Swale.

Mr. John E. Tinkler writes that Arkengarthdale and High Swaledale are mainly composed of a lofty group of fells, reaching their highest point in Great Shunnor Fell, 2,346 feet above sea-level, and seldom reaching a lower elevation than 1,600 feet. They are mainly cragless, treeless sweeps of moorland, their surface composed of peat bog, ling, coarse grass and bents, mixed with swamp, with here and there a small tarn or reservoir, the latter constructed for lead-mining purposes. These are succeeded by lower ranges of hills varying in altitude from upwards of 1,600 feet, until at Applegarth and the Red Scars at the extreme limit of the district, the heights of 950 and 965 feet respectively are reached. The highest point of the New Forest is Kexwith Moor, 1,450 feet. The tops of these lower hills much resemble the higher fells as to their surface, but many of their edges are margined by fine limestone precipices, the most notable being Kison, Winterings, Ellerton, Downholme, Red, Garnless, Clints and Applegarth Scars in Swaledale; the Fell End Scars in Arkengarthdale, and Casey Green Scar in the New Forest. Besides the two main valleys containing the rivers Swale and Arkle, the hills and fells are intersected by numerous deep ravines called Gills, containing smaller streams or becks, often well-wooded on their lower slopes with mountain ash, birch, hazel, juniper, yew, holly, thorn and other trees and bushes, and many of them having small but beautiful waterfalls. Some of these gills are margined by fine limestone crags, notably, East Stonesdale, Swinnergill, Gunnerside Gill and Oxnop Gill in Swaledale, and Little Punchard Gill in Arkengarthdale. Hoove Tarn in Arkengarthdale is at an elevation of over 1,600 feet. The chief woods in Swaledale are found below Reeth, near Grinton, Marrick, Ellerton, Marske, Applegarth (noted for its yews), and Downholme. Above Reeth, beyond large patches of thorn, wild briar, and hazel bushes (chiefly on the hill slopes between Keld and Low Row), scattered clumps of trees here and there, and fir plantations on Whita-side, Crackpot, Kison, and at Thirnswood, there is very little woodland. Scar and Eskeleth are the chief woods in Arkengarthdale, and there are besides several smaller plantations and scattered groups of trees, together with patches of thorn, hazel, etc., here and there in the lower part of the valley, but by far the greater part of the dale is without wood. The New Forest is fairly well wooded, Rispey and Hollin Woods being a fair sample of the woods which formerly clothed the hill slopes and valley bottoms of the whole district. Hedges are almost unknown, stone walls taking their place. The enclosed and cultivated part of the district lies mainly on the slopes of the hills and in the valleys. In Arkengarthdale and Higher Swaledale it consists entirely of pasture and meadow land; in Swaledale, below Reeth, there is some arable land, but of no great extent.

GEOLOGY.—Mr. J. G. Goodchild, F.G.S., F.Z.S., M.B.O.U., writes that the rocks of Arkengarthdale consist chiefly of the upper two-thirds of the Yoredale Rocks (Lower Carboniferous) with a few out-lying remnants of the Millstone Grit, left on the summits of the higher fells as representatives of the thick mass of Upper

Carboniferous Rocks which formerly extended over these parts. The Yoredale Rocks consist of strata of marine origin, and include limestones, calcareo-siliceous rocks of organic origin (the so-called 'cherts'), sandstones, shales, and some few thin coal-seams, which are of marine origin, like the rocks with which they are associated. They were all originally deposited in horizontal sheets, which have since been indurated, jointed, folded, and fractured. Most of the disturbances that have affected the district are of older date than the New Red Rocks, which formerly extended across the plain whose undenuded remnants form the mountain tops. The valleys were shaped by the present rivers in late Tertiary times; and it was during this same period that the mineral-veins for which the district is celebrated were filled. These metalliferous veins are deposits from the hot springs which rose through the faults in the strata during the wane of the great volcanic episode, represented by the rocks of Mull, Skye, Antrim, etc. During the great Age of Snow, Arkengarthdale was first tenanted by glaciers, and then completely enveloped by ice of indigenous origin, and was not, at any time during that period, ever invaded by foreign ice, nor was it submerged. The details of the structure of the district are of too complicated a nature to be sketched out here; but the broader features will be fully discussed on the ground, with the aid of diagrams and sections.

BOTANY.—

Flowering Plants.—Mr. J. G. Baker, F.R.S., writes as follows ('North Yorkshire,' ed. 2, pp. 151-153): For several miles along the eastern side of the lower part of Arkengarthdale we have a fine range of Main Limestone precipices. They begin at Shaw Beck, up which winds the road between Reeth and Barnard Castle, come out in strong force along the edge of Booze Moor (1,712 feet), and, crossing a glen, continue beneath the Hind Rake lead mine (1,515 feet) and beneath the Copperthwaite lead mine (1,415 feet) as far as Fremington, forming as viewed from Reeth a noble range of crags winding along the crest of the opposite hill. The following are the more interesting plants of these cliffs and the Punchard's Gill ravine:—*Thalictrum calcareum*, *Hutchinsia petraea*, *Thlaspi occitanum*, *Draba incana*, *Viola lutea* var., *Rubus saxatilis*, *Epilobium alsinifolium*, *Galium sylvestre*, *Hieracium murorum*, *H. caesium*, *Taxus baccata*, *Juniperus communis*, *Epipactis ovalis*, *Sesleria cærulea*, *Poa nemoralis*, *Allosorus crispus*, *Asplenium viride*, and *Lycopodium selaginoides*.

Mosses.—Mr. J. G. Baker, F.R.S., names the following species as occurring on the cliffs opposite Reeth and in Punchard's Gill ravine:—*Gymnostomum curvirostrum*, *Seligeria recurvata*, *Blindia acuta*, *Dicranum fuscescens*, *Racomitrium protensum*, *Uloa Bruchii*, *Amphidium Mougeotii*, *Pogonatum alpinum*, *Zieria julacea*, *Mnium affine*, *Orthothecium intricatum*, *Eurhynchium pumilum*, *Plagiothecium pulchellum*; and the following as occurring between Reeth and Richmond: *Meesia uliginosa*, *Bartramia ithyphylla*, and *Fissidens pusillus*.

Lichens, Algæ, Fungi.—No records.

VERTEBRATE ZOOLOGY.—

Mammalia.—Mr. J. E. Tinkler notes that Hedgehog, Mole, Stoat, Common Shrew, Weasel, Squirrel, Mouse, Brown Rat, Water Vole, Hare and Rabbit are all found. About the middle of the century both Marten and Polecat were common, but they appear to be extinct at the present time.

Birds.—Mr. J. E. Tinkler, now of Leytonstone, published in The Naturalist for October and November, 1892 (pp. 309-325), a paper on 'The Avifauna of Arkengarthdale, Swaledale, and the New Forest,' based upon experience gained during a twelve years' residence in Arkengarthdale, of which his father was vicar. This paper includes a list, with localities and local names, of 122 species of birds, including all the characteristic types of moorland and hilly districts. He notes that early August is not a particularly good time for the ornithologist in the dales, still most of the ordinary resident species would be seen in the course of a ramble up the main valley and side gills. The moorland bird life at this season is represented chiefly by the Red Grouse, with occasional Snipe, Teal and Wild Duck, perhaps, too, the Merlin might be seen, if by any chance a brood has escaped the gun or trap, and unless things have greatly altered during the past ten years the Kestrel should be a prominent feature of the landscape. The newly cleared hay fields are usually interesting at this time, numerous species, both moorland and otherwise, betaking themselves thither for feeding purposes. The mountain ashes, too, attract the Ring Ouzel and other thrushes, while the Dipper is sure to attract notice both on the Arkle and its tributaries.

Mr. R. Kearton, F.Z.S., furnishes interesting notes of the ornithology of this his native dale, but his observations have chiefly been made about Gunnerside and towards Swaledale head. He notes that some fifty years ago the Dotterel used to nest on Water Crag, and that Gulls fly up Swaledale against a westerly breeze every August, but he has never seen one wing its way in the opposite direction.

Mr. John Barker, of Reeth, a keen observer, also furnishes notes on the ornithology, and he will be pleased to show some albino specimens of Red Grouse from the New Forest to anyone interested.

Reptiles, Amphibia.—Mr. J. E. Tinkler notes that the reptiles which occur include Common Snake, Viper, Slow-worm, Smooth Newt, Toad and Frog; and Mr. W. Denison Roebuck noted the Common Lizard in 1884, in Arkengarthdale.

Fishes.—The Brown Trout (*Salmo fario*) is the characteristic species of the Swale and its feeders, and Mr. Tinkler notes that River Bullhead, Minnow, Loach, and Sharp-nosed Eel are also fairly common.

CONCHOLOGY.—Mr. W. Denison Roebuck, F.L.S., writes that the mollusca of this immediate district have not been systematically investigated, only a few species having been noted in passing visits. The limestone scars and road-sides yield such species as *Helix rupestris*, *Balea*, *Clausilia rugosa*, *Bulimus obscurus*, *Helix hispida*, *H. sericea*, etc., and *Ancylus fluviatilis*, *Limnæa peregra*, etc., are to be found in the streams and roadside troughs and drains.

ENTOMOLOGY.—The insects of the district do not appear to have been investigated at all, although the woods lower down, near Richmond, yielded a large proportion of the species recorded in Mr. John Sang's Darlington lists.

Lepidoptera.—No records.

Coleoptera.—No records.

Other Orders.—No records.

PROGRAMME OF MEETINGS.—

Saturday, August 4th.—

Members will meet together in the evening to compare notes, arrange routes, etc.

Monday, August 6th.—

4-0 p.m.—Meat Tea

4-45 p.m.—Sectional Meetings

5-0 p.m.—General Meeting

5-30 p.m.—Conveyances leave Buck Hotel for Leyburn Station.

7-28 p.m.—Train leaves Leyburn for Northallerton, Leeds, etc.

7-30 p.m.—Train leaves Leyburn for Hawes Junction.

} All at Buck Hotel, Reeth.



LINCOLNSHIRE NATURALISTS' UNION AT FRODINGHAM and SCUNTHORPE.—Members of the Y.N. U. who are unable to join the Arkengarthdale Excursion are invited to join the Lincolnshire N.U. on Bank Holiday Monday, at Frodingham and Scunthorpe. Railway privileges to that station are granted by the Companies, certificate to be obtained from Mr. Hawkesworth. Magnificent exposures in the Lower Lias, a deep bore through Postglacial, Rhœtic, Keuper Marls, etc., a heronry in Appleby woods, a decoy at Ashby, a Gullery on Crossby Common, excellent entomological, botanical and conchological ground at Scunthorpe, are among the features of interest. The party will start from Frodingham Station at 10-30 a.m., and high tea, 2/- each, will be provided at the 'Blue Bell,' Scunthorpe, at 4-30 p.m. Mr. Edgar E. Brown will lead botanists and entomologists north-east on to the Black Rabbit Warren, Crossby; Rev. W. W. Mason to Brumby West Warren; Mr. A. McDonald Cobban to the deep Keuper Bore, and to view the geology of this district as seen in the best iron-pits. The distances will be about three miles. Carriages can be hired if required; if later trains bring members they will join the others by carriage. Members intending to be present should inform the Rev. E. A. Woodruffe-Peacock, Cadney Vicarage, Brigg, Secretary, Lincs. N. Union, not later than the 3rd of August, to enable him to arrange about carriages and tea.

Yorkshire Naturalists' Union.

President :

GEORGE T. PORRITT, F.L.S., Huddersfield.

Hon. Secretaries :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.
EDWIN HAWKESWORTH, Goodman Street, Hunslet, Leeds.

THE 154TH MEETING

WILL BE HELD AT

GRASSINGTON,

FOR THE INVESTIGATION OF THE NATURAL HISTORY OF

GRASS WOODS, KILNSEY SCAR, CRACOE, THRESHFIELD, etc.,

FROM

SATURDAY to MONDAY,

8th to 10th SEPTEMBER, 1900,

IN CONNECTION WITH THE

BRADFORD MEETING of the BRITISH ASSOCIATION.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N. W., Midland, and N.E. Railways which have booking arrangements for **SKIPTON**, to Members and Associates of the British Association or of the Y.N.U. showing their signed card of membership at North-Eastern Stations, or (at other companies' stations) surrendering the Certificate noted below. Tickets taken on Saturday, 8th September, will be available for return any day up to Tuesday, 11th September. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union (except at stations on the North-Eastern line, where production of Card of Membership is sufficient). Members and Associates wishing for this Certificate must apply to Mr. Hawkesworth for it, and **MUST ENCLOSE** a stamped directed envelope and their current card of membership of the Union, which latter will be returned with the Certificate.

DRIVING ARRANGEMENTS.—Conveyances leave Skipton Station every week-day for Grassington at 8-45 a.m., 3 p.m., and 4-45 p.m., extra on Saturdays at 2-10 p.m.; Sunday, 8-35 and 10-0 a.m. Fare 1/- each. Members and others attending the Meeting are requested, if possible, to state what time they propose to start from Skipton Station, so that seats may be reserved for them.

⚠ This will be very necessary in the case of those staying at Threshfield, as a special conveyance will be required, and the fare may be a trifle more.

Members and others attending the meetings of the British Association sections can leave Bradford at 12.58 p.m. in time for 2.10 coach to Grassington, in the neighbourhood of which the remainder of the afternoon can be profitably spent.

HOTEL ARRANGEMENTS.—The Secretaries have engaged the whole of the accommodation at The Foresters' Arms and Commercial Hotels, Grassington, and The Old Hall Inn, Threshfield (one mile from Grassington). As the accommodation is somewhat limited, especially at this season, after the beds in these hotels are engaged, arrangements for sleeping out only will be made, all boarding in the hotels.

Those intending to be at the Meeting must communicate with Mr. Hawkesworth (not with the hotel-keepers) **not later than Thursday morning, Sept. 6th.** The rooms will be allotted by the Secretaries strictly according to priority of application. It will be necessary for some members to occupy double-bedded rooms, so if two friends would like a room together it should be mentioned. Terms at above houses: 12/6 from Saturday, evening meal, to Monday morning, breakfast.

LEADERS AND GUIDES.—The President, Officers, and leading members of the Union, together with residents in the district, will act as leaders and guides.

ROUTES.—Routes will be arranged by the Leaders to suit the circumstances of the case and the convenience of members attending.

The geological members will investigate the neighbourhood of Cracoe and Thorpe. Geologists who are able to leave Skipton by 8.45 a.m. coach on Saturday are advised to alight at Cracoe, sending their luggage forward to destination.

PERMISSION is granted by the Duke of Devonshire, K.G.

BOOKS AND MAPS.—The whole field of the Excursion is included in Sheet 61 (92 N.E.) One-inch Ordnance Map (also published geologically coloured), and in Sheet 134 of the Six-inch Map. The following works may be consulted: (1) R. H. Tiddeman, M.A., F.G.S., 'Physical History of the Carboniferous Rocks of Upper Airedale' (Proc. Yorks. Geol. and Polyt. Soc., 1891, vol. 11, part 3, p. 353); (2) L. C. Miall, F.R.S., F.L.S., 'Geology, Natural History, and Pre-Historic Antiquities of Craven'; (3) Windsor's 'Flora Cravoniensis'; (4) Davis and Lees' 'West Yorkshire,' pp. 309—311; (5) Lees' 'Flora of West Yorkshire'; (6) A List of the Fauna was published in the 'Leeds Mercury Weekly Supplement,' July, 1882; (7) Copies of the Circulars of the Y.N.U. Excursions to Grassington, Aug., 1882, and June, 1891, may still be had, 3d. each; (8) Report of same in 'Naturalist,' Sep., 1882, viii., 30; (9) J. R. Dakyns, 'On the Changes of the Lower Carboniferous Rocks in Yorkshire from North to South' (Proc. Yorks. Geol. and Polyt. Soc., 1891, vol. 11, p. 353).

THE DISTRICT for investigation includes a portion of Upper Wharfedale and Grass Wood, a region which has proved to possess a rich fauna and flora, although it has never had the benefit of a resident investigator, and therefore affords scope for much systematic work to be done.

The Vale of the Upper Wharfe is one of the most picturesque and beautiful of the Yorkshire dales, presenting a series of romantic limestone 'scars,' of which Kilnsey Crag, Arncliffe Cote, Hawkswick Clowders, the Scars about Buckden and Kettlewell and those in Grass Wood are fine examples. The Wharfe is here a swift and noble stream, dashing at times over a shallow rocky bed, and at Ghaistrills confined to a very narrow channel or 'Strid,' while at Netherside and Grass Woods its steep and richly wooded banks rival the sylvan attractions of Bolton.

Grass Wood is a very extensive stretch of woodland of old growth, richly underwooded, occupying the left or eastern slopes of the Wharfe and cut into unequal halves by the main road up the valley. The smaller portion—'Grass Low Wood'—lies between the road and the river; and the larger one—'Grass High Wood'—occupies the hill-slopes of an irregular country towards the east, including within its limits several fine limestone 'scars,' from the summits of which may be obtained magnificent and extensive views of the surrounding country.

GEOLOGY.—Mr. J. H. Howarth, F.G.S., has written a full account of the geology of the district, which, being too long for insertion here, has been printed separately. Copies may be obtained from the Secretaries by sending a stamped addressed envelope. The following is an abstract:—The area consists entirely of the Lower Carboniferous rocks, divided by the North Craven Fault. There is a marked difference in character and vertical extent between the rocks north and south of the

Fault. On the north side the village of Grassington rests on the Mountain or Scar Limestone, which is well seen in the scars behind Grass Woods, extending towards Coniston and Kettlewell. To the Scar Limestone succeed members of the Yoredale series, with the Millstone Grit forming the higher fells and summits. The Craven Fault runs below the village, and between this and Skipton the southern type of rocks comes in. These are much folded. At Cracoe the Pendleside Limestone comes in, and from this point towards the Fault it swells into a series of conical or rounded hills, which form one of the most interesting features of the geology of the district, and are very fossiliferous. Mr. Tiddeman calls these 'reef-knolls,' and thinks they have been built up by marine organisms, in a slowly sinking area, very much as coral reefs have. Mr. J. E. Marr, however, argues, in a paper read before the Geological Society, that they are due to earth movements.

References:—Tiddeman, Brit. Assoc. Report, 1889; Tiddeman, Brit. Assoc. Handbook, 1890, Leeds Meeting; Marr, Quart. Journ. Geol. Soc., vol. 55, no. 219; Dakyns, ditto.

BOTANY.—Flowering Plants.—

Mr. L. Rotheray states that the district offers a rich and varied field to the botanist, owing in a great measure to its being situated on the mountain or carboniferous limestone, the scars of which offer a good and safe habitat for many rare and interesting species of limestone-loving plants. Especially is this so at Grass Wood, an old and very extensive piece of woodland, well stocked with trees and shrubs, thickly interspersed with an undergrowth of smaller plants and grass, amongst which are scattered various outcrops of the limestone; this is intersected with crevices, in which many of the rarer montane species find a home. In such places will be found *Thalictrum minus* var. *montanum*, *Draba incana*, *Spiræa filipendula*, *Helianthemum vulgare*, *Rubus saxatile*, *R. cæsius*, *Hippocrepis*, *Hypericum hirsutum*, *Geranium sanguineum*, *Rosa mollis*, *Epilobium angustifolium*, *Hieracium murorum*, *H. maculatum*, *Polemonium*, *Armeria maritima*, *Taxus*, *Tamus*, *Paris*, *Polygonatum officinale*, *Convallaria*, *Allium scorodoprasum*, *Asplenium viride*, *Polypodium dryopteris*, whilst the following occur in the more grassy and open parts, especially if at all of a moist nature: *Trollius*, *Sagina nodosa*, *Calamintha clinopodium*, *Galeobdolon*, *Primula farinosa*, *Trientalis*, *Rumex aquaticus*, *Ophrys muscifera*, and *Gymnadenia conopsea*. On dry banks, both in the wood and in the lanes and pastures: *Aquilegia*, *Viola odorata*, *V. lutea*, *Alsine verna*, *Geranium sylvaticum*, *Thlaspi alpestre* var. *occitanum*, *Silene inflata*, *Cnicus heterophyllus*, *Centaurea scabiosa*, *Melampyrum pratense*, *Origanum*, *Avena pratensis*, *Koeleria*, *Brachypodium sylvaticum*, *Triticum caninum*, and others are to be found. Careful attention also deserves to be paid to the river banks in the vicinity of the village. Here are *Salix phlycifolia*, *S. laurinus*, *Equisetum sylvaticum*, *Scirpus pauciflorus*, and *Carex muricata*, and it is very probable that a careful investigation of both sides of the river banks may yield other species which have not yet been recorded for the district. When the varied nature of the ground and its conformation is taken into consideration, the above list does not at all yield a sufficient return for such a wide district, and it is not expressing too much to say that many more species ought to be found than are now given if a searching investigation be made of it.

Mosses and Hepatics.—Mr. W. West, F.L.S., writes that the neighbourhood is a fertile one. A large number of species occur, among them being the following:—*Seligeria pusilla*, *S. acutifolia*, *S. trifaria*, *Swartzia montana*, *Encalypta vulgaris*, *Trichostomum mutabile*, *Barbula intermedia*, *Zygodon Nowellii*, *Bartramia Ederi*, *Breutelia arcuata*, *Orthothecium rufescens*, *Cinclidotus fontinaloides*, *Rhynchostegium murale*, *Lejeunia calcarea*, *Asterella hemispherica*, *Metsgeria pubescens*.

Lichens, Algæ.—Mr. W. West, F.L.S., writes that as far as he knows there are only a few odd records for these groups from this district.

Fungi.—The late Mr. H. T. Soppitt wrote that Upper Wharfedale is fairly rich in Fungi, especially *Uredineæ*, of which many species have been found during the past few years between Barden and Grass Woods. The *Æcidium* condition of several interesting species will be found by specially looking for, such as *Puccinia phalaridis* on *Arum maculatum*, *P. sessilis* on *Allium ursinum*, *P. variabilis* on *Taraxacum officinale*, and *P. saniculæ* on *Sanicula europæa*. *Xenodocheus carbonarius* is abundant in Grass Wood on Burnet, as is also *Puccinia andersoni* on *Carduus heterophyllus*, while *Phragmidium sanguisorbæ* is not uncommon on *Poterium sanguisorba* in the fields.

VERTEBRATE ZOOLOGY.—

Mammalia.—Numerous species have already been recorded; the Squirrel is common in Grass Wood, and it would be interesting to ascertain if the Dormouse occurs. Otters are not uncommon in the Wharfe; the Badger has been taken so near as Simon Seat, and the Pine Marten at Buckden so recently as 1880. Observations on the smaller and the more critical species such as Mice, Voles, Bats, etc., are a desideratum.

Birds.—In ornithology the subalpine character of the district is indicated by the presence of such species as the Dipper, Grey Wagtail, Curlew, Stonechat, Dotterel, Common Sandpiper, Ring Ouzel and Red Grouse, and woodland species are common, including Barn, Tawny, and Short-eared Owls, Snow Bunting, etc., while the Raven and Peregrine nested in Upper Wharfedale to within comparatively recent times, and in 1876 a Bittern was shot near Grass Wood. Kilnsey Scar is interesting as one of the very few natural habitats in which the House Martin nests. Mr. G. T. Porritt, F.L.S., writes that he saw the Kingfisher on the river near the Grass Wood in June last.

Reptiles, Amphibians and Fishes.—The Common Lizard, Frog, Toad, Trout, are all the species at present on record. It is stated that Vipers are *not* found in Grass Wood.

CONCHOLOGY.—Mr. W. Denison Roebuck, F.L.S., writes that the molluscan fauna of the neighbourhood of Grassington, Thorpe and Cracoe is very rich in terrestrial mollusca, being well-wooded and predominantly calcareous in character, the abundance of such species as *Limax arborum*, *Helix rupestris*, *Balea*, *Clausilia dubia*, *Cl. laminata*, *Helix arbustorum*, *H. ericetorum*, *Bulinus obscurus*, *Azeca*, etc., being ample evidence. Of other species, *Cyclostoma* occurs on a bank between Grassington and Burnsall, a few yards from the river, *Pupa secale* at Kettlewell, and *Helix lapicida* at Starbotton, Kilnsey, and Troller's Gill, and these should all be looked for in the more immediate neighbourhood of Grassington and Grass Woods. *Ancylus fluviatilis*, *Planorbis spirobis*, *Limnæa peregra*, *L. palustris*, *L. truncatula*, and *Fisidium fontinale*, are the only water shells that have been recorded for Upper Wharfedale, but mostly higher up than Grassington. Altogether about 43 species are on record for the district, a rich fauna for so elevated an area. The chief attention of the conchologist should now be directed to a careful search of Grass Woods and other likely stations in the hope of finding such species as *Helix lamellata*, *H. aculeata*, *H. pulchella*, *Zonites furus*, *Z. nitidus*, *H. sericea*, *H. caperata*, *H. pygmæa*, *Pupa ringens*, *P. marginata*, or any species of *Vertigo*, *Achatina*, and *Acme*, none of which have been as yet reported, but all are within the bounds of possibility as likely to occur. Attention should also be given to increasing the list of slugs and freshwater forms.

ENTOMOLOGY.—Mr. G. T. Porritt, F.L.S., writes that practically nothing is known of the autumn entomology of the district, but from what is known of the species occurring there earlier in the season, careful search would certainly produce good results. Lepidopterists are recommended to work the Grass Wood by beating for larvæ in the daytime, and sugaring for autumn imagines at night. Neuropterists and trichopterists are pretty sure to find *Halesus auricollis* in plenty on the river side, and a sharp look out should be kept for the rare *Stenophylax rotundifemnis* and *Drepanopteryx phalenooides*, both of which may reasonably be expected to occur.

MICRO-ZOOLOGY AND MICRO-BOTANY.—No attention whatever seems to have been given to these subjects.

PROGRAMME OF MEETINGS, &c.—

Saturday, September 8th.—Dinner at 6 p.m.

7-30 p.m.—The members will meet at the Foresters' Arms Hotel, for reports, discussions, arrangement of routes and work, etc.

Sunday.—A conveyance leaves Grassington for Skipton at 6 p.m. in connection with trains to Leeds and Bradford.

Monday, September 10th.—

7-0 a.m., 8-45 a.m.—Conveyances leave Grassington for Skipton.

8-48 a.m., 10-55 a.m.—Trains leave Skipton for Bradford and Leeds.

If a sufficient number require it, a special conveyance might be arranged for, to arrive in Skipton in time for the 9-57 express to Bradford and Leeds.

Yorkshire Naturalists' Union.

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GEORGE T. PORRITT, F.L.S., Huddersfield.

Ex-Presidents :

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WILLIAM WEST, F.L.S., Bradford.

Hon. Secretaries :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

EDWIN HAWKESWORTH, Goodman Street, Hunslet, Leeds.

APPENDIX TO CIRCULAR No. 154, Grassington, 8th—10th Sept., 1900.

GEOLOGY.—Mr. J. H. Howarth, F.G.S., writes :—The area consists entirely of Lower Carboniferous Rocks divided by the North Craven Fault. There is a marked difference in character and vertical extent between the rocks north and south of the fault. On the north side the village of Grassington rests on the Mountain or Scar Limestone which is well seen in the scars behind Grass Wood extending towards Coniston and Kettlewell. To the Scar Limestone succeed members of the Yoredale series, with the Millstone Grit forming the higher fells and summits. The Craven Fault runs below the village and between this and Skipton the southern type of rocks comes in. These are folded into anticlines and synclines, the limestones forming the anticlines and the shales the synclines. The Millstone Grits seen are in the synclines. The road on leaving Skipton runs over an anticline of Clitheroe Limestone which extends from Clitheroe to eastwards of Bolton Abbey. It is well seen from about the Craven Heifer Inn in Hawbank Quarry a mile away on the right. After crossing the anticline the road runs on to shales. Away over on the right are the Barden Moors, with two large reservoirs belonging the Bradford Corporation. These are on the Millstone Grit and the hard beds form a fine escarpment on the sky line along Embsay, Rylstone and Cracoe Fells. On the left are the Grits of Sharpa, 'a mountain chain in miniature.' At Cracoe the Pendleside Limestone comes in. From this point towards the Fault the Pendleside Limestone swells into a series of conical or rounded hills which form a very remarkable and interesting feature in the landscape. These are the reef-knolls of Mr. Tiddeman. Similar knolls appear about Clitheroe, in Bowland, at Malham and several other places in the district, but nowhere are they better seen than here. These knolls stand upon Clitheroe or Pendleside Limestone (here the latter) but they vary considerably from the limestones beneath them. They are light in colour and may fairly be termed white limestones, whereas the limestones associated with them are dark coloured. They are very fossiliferous,

often remarkably so in certain portions. The interior bedding, where such exists, is horizontal or follows the dip of the basement rocks, but the external bedding is usually quaquaversal. Around their base and lower sides occurs a breccia of limestone fragments in either a limestone matrix or a matrix of the overlying shales.

Mr. Tiddeman was the first to suggest the origin of these very puzzling hills, and he thinks they have been built up by marine organisms in a slowly-sinking area, very much as coral reefs have. He considers that the nature of the rocks, the abundance of fossil contents, the dip of the bedding, and the breccias at the foot, support this hypothesis.

Mr. J. E. Marr offers a different explanation. He regards them as due to orogenic movements, and says:—‘Between the comparatively rigid Millstone Grits above and the Lower Palæozoic Rocks below, lie the more yielding group of shales and limestones above these. The formation of the folds with north-easterly and south-westerly axes must have resulted in the accumulation of the rigid Millstone Grits above in great masses into the synclines, and their dragging away from the tops of the anticlines. There may have been actual rupture of the grits of the arches, but in any case there would be relief of pressure there, causing the limestones to be squeezed out from below the synclines and to accumulate in the anticlines, and I believe that it is in this way the knoll-reefs were formed, while the minor faults, which would inevitably accompany repetition of the strata, are marked by breccias differing in character according to the nature of the rocks in which they were formed. If my views be true, we are dealing with a great group of yielding strata, sandwiched in between two more rigid rock-groups, and all affected by the thrusting of other strata over them from the north.’ Mr. Marr thinks that the relief from pressure in the anticlinals may account for the preservation of the fossils in the Knolls.

References:—Tiddeman, Brit. Assoc. Report, 1889; Tiddeman, Brit. Assoc. Handbook, 1890, Leeds Meeting; Marr, Quart. Journ. Geol. Soc., vol. 55, no. 219; Dakyns, ditto.

Yorkshire Naturalists' Union.

SUPPLEMENTARY NOTES TO THE

GRASSINGTON EXCURSION

IN CONNECTION WITH THE

Bradford Meeting of the British Association,

8th to 10th SEPTEMBER, 1900.

BOTANY.—Subsequent to the notes printed in the General Circular, Mr. L. Rotheray writes as follows :—

Although the locality contains a large variety of limestone loving species, owing to the far advanced state of the summer season it cannot be expected that many of these will now be found in flower. Especially will this be the case with the earlier flowering species, such as *Trollius europæus*, *Thalictrum montanum*, *Hippocrepis comosa*, *Helianthemum chaemocistus*, *Rubus saxatilis*, *Rubus cæsius*, *Draba incana*, *Geranium sanguineum*, *Polemonium ceruleum*, *Convallaria magalis*, *Polygonatum officinale*, *Rosa mollis*, *Hieracium murorum*, *H. maculatum*, *Paris quadrifolia*, *Pyrola minor*, *Epilobium angustifolium*, *Spiræa filipendula*, *Sagina nodosa*, *Hypericum hirsutum*, *Allium scorodoprasum*, *Aquilegia vulgaris*, *Lamium galeobdolon*, *Calamintha clinopodium*, *Primula farinosa*, *Geranium sylvaticum*, *Viola lutea*, *V. odorata*, *Trifolium europæus*, *Melampyrum pratense*, *Origanum vulgare*, *Cnicus heterophyllus*, *Silene inflata*, and many others, all of which will now be in fruit. Of the later flowering species, *Serratula tinctoria*, *Centaurea scabiosa*, *Rumex aquaticus* may be met with, and perhaps a few of the above mentioned besides in sheltered nooks and crevices of the limestone rocks where they have not been disturbed. Amongst the sedges and grasses to be met with in the lanes and pastures are *Carex muricata*, *Avena pratensis*, *Koeleria cristata*, *Brachypodium sylvaticum*, and *Triticum caninum*, which will also be now in fruit; while among ferns *Asplenium viride* and *Polypodium dryopteris* will be still showing their green fronds in shady places. Taking into consideration, however, the lateness of the season, but little work in the way of investigation of the district amongst plant forms can be hoped for, although a good deal may be done in the way of mosses, hepatics, lichens, and other lower forms if diligent application be given to searching the nooks and crevices of the limestone fissures in the woods and scars thereto adjoining.

ARCHÆOLOGY.—Mr. Alfred Birtwhistle says :—

Consult Mr. H. Speight's recently published work on Upper Wharfedale, chapters xxxiii-xli.

Local Records.—There are none that we know of save the Parish Registers at Linton, which date from 1599.

CIRC 154.

Buildings.—The church of St. Michael, at Linton, of transition Norman period, and the more ancient Norman chapelry of St. Mary, at Coniston, are well worth investigation. Of the old manor houses, Grassington Old Hall (now the residence of Dr. Wilks) is the most interesting, being of the 13th and 16th century date. Linton Manor, a building of the 18th century, is also a substantial residence. Portions of the old Manor Houses at Threshfield and Kiltsey still remain. These are of the 17th century, as indeed are most of the oldest buildings in the district. A house at Coniston bears on it the date of 1657, and Chapman's Temperance Hotel, at Grassington, has the date 1694. These are the oldest dated houses.

Prehistoric Remains.—There are abundant camps, settlements, barrows, tumuli, &c. The excavations of Mr. E. E. Speight and the Rev. Bailey Harker, at Grassington, and the cave explorations of the Rev. E. Jones, at Elbolton and at Calf Hole, have been fruitful in results.

The finds from Sweet Side, Lea Green, Grass Wood, and High Close Pasture are on view at the Grassington Mechanics' Institute—they include numerous relics in stone, bone, flint, iron, and bronze.

The collections of the Rev. E. Jones, at Elbolton Cave, near Thorpe, and at Calf Hole, near Sky-thorns, are exhibited at the Science and Art Schools, Skipton, and include human skeletons, bone implements, and pottery of Neolithic age, bones of numerous animals, wild cattle, deer, boar, wolf, and grizzly bear.

A visit to the localities, particularly to High Close Pasture, should not be missed by the student of pre-historic man.

It is fully anticipated that both Mr. Speight and the Rev. E. Jones will attend the excursion and be ready to give enquirers any information.

Yorkshire Naturalists' Union.

President :

GEORGE T. PORRITT, F.L.S., Huddersfield.

Hon. Secretaries :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

EDWIN HAWKESWORTH, Goodman Street, Hunslet, Leeds.

THE 155TH MEETING

WILL BE HELD AT

WHITBY,

FOR

SANDBSEND,

FOR THE INVESTIGATION OF THE NATURAL HISTORY OF

THE COAST-LINE AND INLAND WOODS FROM

WHITBY TO KETTLENESS,

On SATURDAY, 15th September, 1900,

AND WILL BE FOLLOWED BY A

FUNGUS FORAY at LYTHE,

15th to 22nd SEPTEMBER, 1900.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways, which have booking arrangements for **WHITBY** or **SANDBSEND**, to Members and Associates of the British Association or of the Y.N.U. showing their signed card of membership at North-Eastern Stations, or (at other companies' stations) surrendering the Certificate noted below. Tickets taken on Saturday, 15th September, will be available for return any day up to Tuesday, 18th September. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

On the 15th, passengers from the north will book to Whitby, and be allowed to break the outward journey at Sandsend, and passengers from the south book to Sandsend, breaking the homeward journey at Whitby.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union (except at stations on the North-Eastern line, where production of Card of Membership is sufficient). Members and Associates wishing for this Certificate must apply to Mr. Hawkesworth for it, and **MUST ENCLOSE** a stamped directed envelope and their current card of membership of the Union, which latter will be returned with the Certificate.

From certain N.E. stations week-end tickets are issued to Whitby or Sandsend at single fare for return journey on Fridays and Saturdays, available for return on Saturday or any preceding day up to Tuesday. From these stations ten days' tickets are also issued to Whitby or Sandsend, on Fridays and Saturdays, available for return on the Saturday or any preceding day up to and including second Monday after date of issue. Break of journey not allowed with these tickets.

HOTEL ACCOMMODATION.—Members desiring to stay in the district over the week-end will find good accommodation at the Station Hotel, Whitby.

PERMISSION is granted by the Marquis of Normanby for Mulgrave Woods to be visited on the 15th September.

BOOKS AND MAPS.—The district is comprised in Sheet 104 S.E. (Whitby and Sandsend), which can be had geologically coloured. Reference should be made to Phillips' 'Geology of Yorkshire,' and to his 'Rivers, Mountains, and Sea Coast'; also to Baker's 'North Yorkshire' for details of the Flora.

THE DISTRICT for investigation is the coast-line from Whitby to Kettle-ness and the woods and ravines adjacent.

SATURDAY'S ROUTES.—Members reach Sandsend at 11-32 a.m. and 1-57 p.m. from the north, at 11-55 a.m. from the south.

1.—Geologists will investigate the coast-line under the leadership of Rev. J. Hawell, M.A., starting from Sandsend Station at 12 noon, and returning by the 4-21 p.m. from Kettle-ness to Whitby.

2.—Naturalists will be under the leadership of Mr. Joseph T. Sewell, of Whitby, and investigate Mulgrave Woods, starting at noon from Sandsend.

3.—Marine zoologists will explore the coast, low tide being at 2-30 p.m. All return by the 4-28 p.m. train Sandsend to Whitby.

GEOLOGY.—Rev. John Hawell, M.A., writes:—From a geological and artistic point of view there is no more interesting bit on the coast of England. In the season of spring-tides a large expanse of shale is uncovered and from this large numbers of fossils are obtainable. With the exception of *belemnites*, however, the best fossils are to be obtained from the nodules and hard bands. Nodules are extremely numerous and range from half-an-inch up to some yards in diameter. The beds to be traversed include the whole of the Upper Lias and a portion of the Middle Lias, including the 'main seam' of Cleveland Ironstone. The ironstone seam is poor at this point, however, and is divided into two by an intervening bed of shale. The stone has been torn up on the scars, but has not been thought worth mining into the cliff. The cliffs have, however, been largely mined for jet and alum. The mouths of numerous tunnels made in seeking jet will be observed in passing along the bottom of the cliff, and if time permit the great Kettle-ness alum works will be visited.

This bit of coast is mapped on sheets 34 and 35 (new series) of the Geological Survey (one inch to mile), and may be had in either the solid or drift edition. The Geological Survey Memoir on 'North Cleveland' is an explanation of these two sheets, and Messrs. Tate and Blake's 'Yorkshire Lias' should be consulted.

BOTANY.—

Flowering Plants.—Mr. Thomas Newbitt, of Whitby, supplies the following notes:—Baker mentions 637 species as found in Eskdale, of which 351 belong to his 'general ascending' category. The physical formation of the district, with its steep hills and rapid streams, causes an almost complete absence of plants delighting in stagnant water and sluggish streams. In the immediate neighbourhood of Whitby may be found *Brassica oleracea*, *Ægopodium podagraria*, *Senebiera coronopus*, and *S. didyma*. *Hyoscyamus niger* has been found in the Old Churchyard, and *Cheiranthus cheiri* is wild among the ruins of the Abbey. Along the coast between Whitby Harbour and Sandsend are *Arenaria peploides*, *Parnassia palustris*, *Poterium sanguisorba*, *Pinguicula vulgaris*, *Gymnadenia conopsea*, *Genista tinctoria*, *Triglochin palustre*, *Hippophaë rhamnoides* (beyond Uppang), *Vicia bithynica* (the only locality in Yorkshire); and *Salvia verbenaca* (near the railway bridge at East Row). On the muddy shores of the Esk, below Ruswarp, are *Glaux maritima* and *Aster tripolium*. *Alisma Plantago* has been found here but is scarce. The garden walls of Ruswarp Village and the walls of the Old Mill (on that side of it which faces the river) display *Asplenium ruta-muraria* and *Linaria cymbalaria*. Cock Mill Woods produce *Lonicera periclymenum* and *L. caprifolium*, *Convolvulus sepium* (*C. arvensis* is very rare), *Myrrhis odorata*, *Solidago virgaurea*, and of vetches *V. sylvatica* and *V. tetrasperma*. The river banks above Ruswarp afford *Petasites vulgaris* in early spring, and *Solanum dulcamara* in summer. *Geranium sylvaticum* and *Campanula rapunculoides* are met with by the road side between Grosmont and Egon Bridge, and in Arncliffe Woods is abundant store of ferns (*Osmunda regalis*,

Polypodium vulgare, and *P. dryopteris*) and fungi. Here are *Epilobium angustifolium*, *Corydalis claviculata*, and *Digitalis purpurea*. At Goathland are *Habenaria bifolia*, *Cornus suecica*, *Trollius europæus*, and on the moors *Drosera*, round and long-leaved, with several heaths. In this district many common plants are singularly wanting; the poppies and dead-nettles are rare, and while *Primula vulgaris* abounds, *P. veris* is remarkable for its absence.

Mosses, Lichens, Algæ, and Fungi.—No records at hand.

VERTEBRATE ZOOLOGY.—Most of the following information has been kindly furnished by Mr. Thomas Stephenson, of Whitby.

Mammalia.—The Squirrel occurs at Mulgrave and in Eskdale; the Badger, once common, is now very rare, while the Otter is all but, if not quite, exterminated on the river. Of Bats, the Noctule, the Longeared, and Pipistrelle are known.

Birds.—Ornithologically the district is a favoured one, and most of the following species may be expected to be seen. Of Residents, the Dipper, Stonechat, Bullfinch, Goldfinch, Creeper, Jay, Rock Pipit, Grey Wagtail, the Tawny, Barn, Longeared, and Shorteared Owls, Sparrowhawk, Kestrel, and Grouse. Of Summer Visitors, the Ring Ousel, Wheatear, Spotted and Pied Flycatchers, Redstart, Whitethroat, Garden Warbler, and Blackcap. At Kettleless, in June of the year 1885, some fifty pairs of Cormorants were breeding in their only Yorkshire locality. Many hundreds of Herring Gulls also breed in the same cliffs in their company, and a few pairs of Rock Piptons on the slopes at Runswick. In the tunnel on the railway many Rock Doves used to breed before traffic commenced on the line.

Reptiles, Amphibia, Fishes.—No records at hand.

CONCHOLOGY.—Mr. H. Pollard furnishes the following notes:—The Whitby district is not uninteresting to the conchologist, and in it have been already collected more than fifty species and varieties including some of by no means common occurrence. On the cliff slopes between the saloon and Sandsend may be found *Helix nemoralis*, *H. arbustorum*, *H. ericetorum* and its varieties *alba* and *minor*, *H. virgata*, *H. concinna*, *H. pulchella* and its variety *costata*, *H. caperata* and the varieties *ornata*, *fulva*, and *bizonalis*, *H. rotundata*, *H. sericea*, *Cochlicopa lubrica* and its variety *lubricoides*, *Succinea putris* and its variety *limnoidea*, *Zonites alliarius*, *Z. purus*, *Z. cellarius*, *Z. nitidulus*, *Vitrina pellucida*, *Pupa marginata*, *Limnæa peregra*, and *Limnæa truncatula*. Many of the lanes and hedge-rows abound with *Helix aspersa*, *H. nemoralis* in every variety of colour and banding, *H. hortensis* and its variety *roseolabiata*, and *H. hispida*. In old walls in Bagdale and Bog Hole *Limax maximus* and *L. flavus* repose, whilst *Analia marginata* is found in a wall a little beyond the station. Other molluscs recorded for the immediate Whitby district are *Arion ater*, *Limax agrestis*, *Pisidium amnicum*, *P. pusillum*, the varieties *ovata* and *decollata* of *Limnæa peregra*, *Helix fusca*, *Succinea putris* var. *drouetia*, *Clausilia rugosa*, *Ancylus fluviatilis*, *Bulinus obscurus* and the variety *alba*, and *Pupa umbilicata*. Mr. J. T. Sewell adds that *Clausilia laminata* occurs in beech woods, and *Planorbis nitidus* in the Abbey pond, Whitby; while the Whitby Museum contains specimens of *Ancylus lacustris* from Mulgrave Park.

ENTOMOLOGY.—The district is a good one for lepidoptera, which are to be found numerously on the cliffs and broken ground near the sea. Mr. J. T. Sewell informs us that near the borders of the moors may be found *Argynnis paphia*, *A. aglaia*, *Satyrus aegeria*, *S. tithonus*, *S. hyperanthus*, *Chortobius davus* (amongst reeds on the moors), *Thanaos tages*, *Hesperia sylvannus*, *H. comma*, *H. linea*, *Zygæna lonicera* (on the cliffs), *Euthemonia russula*, *Chelonia plantaginis*, *Bombyx rubi*, *B. quercus*, *Odonestis potatoia*, *Saturnia carpini*, *Abraxas ulmata* (in the woods), *Fidonia carbonaria*, *F. atomaria*, *F. piniaria* (on the heather), *Anarta myrtilli*, *Plusia iota*, *P. interrogationis*, *Euclidia glyphica*, etc. *Notodonta dictæa* has been taken near Cock Mill Bridge.

PROGRAMME OF MEETINGS.—

4-45 p.m.—Meat Tea, 2/- each	} All at the Station Hotel, Whitby.
5-30 p.m.—Sectional Meetings	
6-0 p.m.—General Meeting	
7-10 p.m.—Train leaves Whitby for South.	
8-20 p.m.—Train leaves Whitby for North.	

FUNGUS FORAY.

The **Y.N.U. MYCOLOGICAL COMMITTEE**, of which Mr. Charles Crossland, 4, Coleridge Street, Halifax, is the Hon. Secretary, will take charge of the whole of the arrangements for this meeting. Mycologists from any part of Britain are cordially invited. The following have signified their intention to be present:—Mr. Geo. Masee, F.R.M.S., F.L.S., Royal Herbarium, Kew; Mr. Charles Crossland, F.L.S., Halifax; Mr. J. Needham, Hebden Bridge; Mr. Alfred Clarke, Huddersfield; Mr. Thomas Gibbs, Sheffield; Mr. J. W. Sutcliffe, Halifax; Rev. William Fowler, M.A., Liversedge; Mr. Thomas Birks, Eaglescliffe; etc.

MYCOLOGISTS and others interested are cordially invited to attend the excursion and take part in the investigations.

HEAD-QUARTERS will be at the Nineteenlands Farm, Lythe, two miles from Sandsend Station. Terms for bed, breakfast and dinner, 6/- per day. Those requiring this accommodation must communicate with Mr. Hawkesworth not later than Wednesday morning, Sept. 12th, with particulars as to arrival and length of stay.

ROUTES.—These will be arranged day by day, such districts being visited as leave is obtained for.

Mulgrave Woods are open to the public on certain days in the week on payment, and Lord Normanby gives special permission for them to be visited on the 15th September.

MEETING, MONDAY EVENING, 17th SEPT., at 6 p.m. at the Nineteenlands Farm, Lythe.

At 6 p.m. the Yorkshire Mycological Committee will meet to select suitable place for Fungus Foray of 1901, and to consider the constitution of that Committee for 1901.

At 6-30 p.m. **A SHORT ADDRESS** will be delivered as follows:—

‘**Mycological Research in the United States,**

by George Masee, F.L.S., F.R.M.S.

Mr. A. Clarke will exhibit a number of stereoscopic photographs of fungi.

The Fungi collected will be on view, and several Microscopes will be available.

FUNGUS SHOW.—Members will meet each day after the ramble at Nineteenlands Farm to examine the specimens collected. The specimens will be arranged and on exhibition during the week.

CONSIGNMENTS OF FUNGI from other parts of Yorkshire, or from Lincolnshire, will be gladly received: they should be labelled with locality and Collector's name, packed in moss or grass (not paper) and addressed to Mr. Crossland, c/o Mrs. Kid, Nineteenlands Farm, Lythe, Whitby.

Yorkshire Naturalists' Union.

President :

GEORGE T. PORRITT, F.L.S., Huddersfield.

Ex-Presidents :

REV. WM. FOWLER, M.A., Liversedge.

H. CLIFTON SORBY, LL.D., F.R.S., etc., Sheffield.

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HENRY EELES DRESSER, F.L.S., F.Z.S., London.

CHARLES P. HOBKIRK, F.L.S., Ilkley.

R. H. TIDDEMAN, M.A., F.G.S., H.M. Geol. Survey, Mumbles, Glam.

ROBERT BRAITHWAITE, M.D., F.L.S., F.R.M.S., London.

PROF. W. BOYD DAWKINS, M.A., F.R.S., F.G.S., etc., Manchester.

SIR MICHAEL FOSTER, K.C.B., M.A., M.D., Sec. R.S., Cambridge.

WILLIAM WEST, F.L.S., Bradford.

Hon. Secretaries :

W. DENISON ROEBUCK, F.L.S., 259, Hyde Park Road, Leeds.

EDWIN HAWKESWORTH, Goodman Street, Hunslet, Leeds.

THE 156TH MEETING

AND

39th ANNUAL MEETING

WILL BE HELD AT

MIDDLESBROUGH

FOR THE INVESTIGATION OF

SPAWOOD MINES AND WOODS,

NEAR GUISBOROUGH,

Also the COAST-LINE AT REDCAR AND TEESMOUTH,

ON

Friday & Saturday, 26th & 27th Oct., 1900.

RAILWAY ARRANGEMENTS.—Through return tickets at pleasure party rates will be issued at all stations on the G.C., G.N., H. & B., L. & Y., L. & N.W., Midland, and N.E. Railways, which have booking arrangements for **MIDDLESBROUGH, REDCAR, or GUISBOROUGH**, to Members and Associates showing their signed card of membership at North-Eastern Stations, or (at other companies' stations) surrendering the Certificate noted below. Tickets taken on Friday, 26th October, will be available for return any day up to Monday, 29th October. Where through bookings are not in operation, Members may book to most convenient junction, and re-book to destination; the reduced fares being available for each stage of the journey.

Passengers with Redcar or Guisborough tickets travelling via Middlesbrough will be allowed to break the outward journey at Middlesbrough.

CIRC. 156.

N.B.—The Railway Booking Clerks will only grant these reduced fares to Members and Associates producing a Special Certificate signed by one of the Secretaries of the Union (except at stations on the North-Eastern line, where production of Card of Membership is sufficient). Members and Associates wishing for this Certificate must apply to Mr. Hawkesworth for it, and **MUST ENCLOSE** a stamped directed envelope and their current card of membership of the Union, which latter will be returned with the Certificate.

From certain N.E. stations week-end tickets are issued to Redcar or Guisborough at single fare for return journey on Fridays and Saturdays, available for return on Saturday or any succeeding day up to Tuesday. Break of journey not allowed with these tickets.

BOOKS AND MAPS.—The whole area of Saturday's Excursions is included in Sheet 34 (= 104 S.W.) of the One-Inch Ordnance Map, which may be had geologically coloured. Ferguson's Natural History of Redcar, now an old book, contains lists of the marine forms occurring; and the publications of the Cleveland Naturalists' Field Club contain much detailed information on the district.

FRIDAY'S PROGRAMME.

The 39th Annual Meeting

will be held at the CLEVELAND LITERARY AND PHILOSOPHICAL SOCIETY'S HALL, Corporation Road, Middlesbrough, the use of which has been kindly granted by the Council of the Society.

Members of the Union from a distance may use the Reading Room of the above Institution, permission for which has been granted by the Society.

3 p.m.—The Sectional Meetings

(which all members and associates are entitled to attend) will be held for the election of Officers of Sections and to receive the Annual Reports from the Secretaries.

3=15 p.m.—The General Committee

(each member of which receives a special summons with this circular) will meet to consider the Annual Report, elect Officers, and arrange the Excursion Programme for 1901.

5=30 p.m.—A Meat Tea

2/- each, will be served at the Corporation Hotel, Middlesbrough, adjacent to meeting-room.

7 p.m.—The General Meeting

of members and associates will be held. The chair will be taken by the President of the Union, who will be supported by prominent members of the Union. After the reading of the Annual Report and the announcement of the Excursion Programme for 1901,

The Presidential Address

will be delivered by Mr. GEO. T. PORRITT, F.L.S., F.E.S.

During the delivery of the Address the chair will be occupied by COLONEL S. A. SADLER, M.P.

A Conversazione

(see over) will occupy the remaining portion of the evening.

Hotel Accommodation.

Head-quarters for members staying overnight will be at the Corporation Hotel, Middlesbrough (bed, breakfast, and attendance, 4/6). Members wishing to be at the sea-side will find plenty of accommodation at Redcar and Saltburn.

SATURDAY'S PROGRAMME.

Excursion to Guisborough and Spawood Mines and Woods.

9-38 a.m.—Train leaves Middlesbrough Station for Guisborough. (Train leaves Saltburn for Guisborough at 9-4 a.m.). Members to meet at Guisborough Station on arrival of train from Middlesbrough at 10-5 a.m. Walk to Spawood Mines, permission for visiting which has been given by Sir Bernard Samuelson & Co., Ltd., and also adjoining woods, permission for which has been granted by Mrs. Chaloner. The walk is about two miles each way. Return train leaves Guisborough at 3-42 p.m. Mr. W. CHARLTON, Mr. T. F. WARD, and Mr. W. H. THOMAS, will act as guides.

Mr. W. M. CHARLTON, Assoc.R.S.M., writes as follows:—Near the Spawood Ironstone Mines, Guisborough, there is a very good exposure of the strata of the Inferior Oolite, the Upper and part of the Middle Lias. On each side of the valley the alum shale has been extensively worked in the manufacture of alum, and the jet rock in searching for jet. The main seam of Cleveland ironstone crops out on both sides of the valley, and where it crosses the gill at Slapewath Bridge forms a small waterfall. At the Spawood Mine the ironstone is worked by means of adits driven into the seam at its outcrop.

‘The railway cutting at Spawood displays a fine section of the bottom seam of ironstone which contains a profusion of *Gresslya intermedia* in the position of life, and large examples of *Pecten æquivalvis*, *Monotis cygnipes*, and *Lurira hermanni*.’—Tate and Blake, Yorkshire Lias, p. 137.

Excursion to Redcar.

9-30 a.m.—Train leaves Middlesbrough, arriving at Redcar at 9-55 a.m. Visitors interested in marine zoology will find Redcar rocks well worth examination. Mr. H. V. SIMPSON, of Redcar, will be glad to furnish any information that may be required. Low tide is about mid-day.

Mr. T. H. NELSON, M.B.O.U., will meet members who wish to see his collection of birds (mostly local) and eggs, after which the party will proceed by the shore to the Tees' mouth, three miles. If it is agreeable, the South Gare Break-water and Lighthouse can be inspected, and the Tees' sands be explored. The return route will be by Coatham Marshes and the site of the old duck-decoy, the whole distance making a round of nine or ten miles.

The following birds may probably be observed at the estuary or on the sands:—Curlew, Whimbrel, Golden Grey, and Green Plover, Godwit, Knot, Ring Dotterel, Redshank, Turnstone, Dunlin, Sanderling, Ducks of various sorts, several species of Gulls, Cormorant, Red-throated Diver, Razorbill, Guillemots, and, the migration season being in full swing, it is highly probable that fresh arrivals of over-sea migrants will be in evidence, all of which are of interest to ornithologists.

As there is no place for refreshments on the route, members had best make provision beforehand.

Trains leave Redcar for Middlesbrough, etc., at 4-44, 5-46, and 7-6 p.m. 5-7 p.m.—A train leaves Middlesbrough, with good connection, for most parts of the county.

Cards of Membership.

The production of these is absolutely necessary for the obtaining of railway tickets at reduced fares, and also for admission to the various meetings and to the *Conversazione* given by the Cleveland Naturalists' Field Club.

Members who have lost or mislaid their cards may have another on application to the Secretaries, enclosing a stamped addressed envelope.

Associates may obtain theirs through the Secretary of their own local Society.

CLEVELAND NATURALISTS' FIELD CLUB.

Conversazione in honour of the visit of the Yorkshire Naturalists' Union to Middlesbrough.

After the delivery of the Presidential Address a *Conversazione* will be held in the Literary and Philosophical Hall and Gallery, to which the Executive of the Cleveland Naturalists' Field Club most cordially invite the members and associates of the Union.

To non-members admission will be by invitation only. During the evening light Refreshments will be provided.

A number of objects of interest will be on view, in addition to an Exhibition of Microscopic Slides.

Dr. H. C. SORBY, F.R.S., will exhibit some Photographs of Marine Animals.

The volumes of Geological Photographs belonging to the Union will also be on view.

The Cleveland Society being desirous of making the meeting as attractive as possible, will be glad to receive offers of help from those members of the Union who possess Microscopes or Natural History Objects of interest; it is, therefore, earnestly hoped that all who can conveniently bring their instruments and suitable objects will do so. Intending exhibitors are requested to communicate with the undersigned as early as possible.

T. A. LOFTHOUSE, Hon. Sec.,
62, Albert Road, Middlesbrough.

Museum (Hon. Curator, Mr. W. Y. Veitch, L.R.C.P., M.R.C.S.).—Arrangements will be made for the local Museum, situate in the Municipal Buildings (Dunning Street entrance) to be open to members of the Union on Friday and Saturday, from two to five p.m. The Museum contains a specially good geological collection. Members wishing to visit at other times will be able to obtain permission by applying to the Librarian, Mr. BAKER HUDSON, at the Free Library.

FLORA OF WEST YORKSHIRE.—SPECIAL OFFER TO CLEAR.—The Executive offer the remaining copies of this work at 7/6 (post-free for 8/-), and would be glad to receive orders.



- (1) 34th Annual Report & Balance-Sheet, for 1895.
- (2) 35th Annual Report & Balance-Sheet, for 1896.
- (3) List of Members, arranged Geographically,
Corrected to October 31st, 1896.
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YORKSHIRE NATURALISTS' UNION.

34th ANNUAL REPORT, for 1895.

THE year which now draws to its close has witnessed no very striking occurrences, but has been characterised by a considerable amount of activity on the part of some of its committees of research, and the continued success of the field meetings.

The Meetings held during the year have been seven in number as usual, one for each division of the county, and a couple of extra meetings for special investigations.

The districts chosen for investigation and the dates of the meetings were as follows :—

May 13, Monday : Hole of Horcum.

June 3, Whit-Monday : Broughton Woods (Joint Excursion with Lincolnshire Naturalists' Union).

June 22, Saturday : Flamborough.

Aug. 5, Bank Holiday Monday : Richmond.

Sep. 2, Monday : Bolton Abbey for Troller's Gill.

The usual descriptive circular for each excursion was issued to members and associates.

The opening excursion of the year was held at Pickering for the investigation of the Hole of Horcum and the upper part of the picturesque valley of Newtondale. The chair was occupied by Mr. Samuel Chadwick, F.G.S., the President of the Geological Section. In this connection your Executive wish to express their sense of the great loss the Union as a working body sustains by the removal from its district of Mr. Chadwick, who is now in New Zealand, and Mr. R. H. Tiddeman, who is now stationed in South Wales, both of whom the Union can ill afford to spare, and whom it will be difficult to replace.

The second excursion was a joint meeting with the Lincolnshire Naturalists' Union in the splendid woods at Broughton, near Brigg. It was a most successful gathering in every way, the ground including the famous gully at Twigmoor. The meetings were held at Brigg, with Mr. F. M. Burton, F.L.S., the President of the Lincolnshire Union, in the chair. This meeting was entirely on Lincolnshire ground, but was preceded on the Saturday by a visit to Goole Moor, with a view of observing the effects produced on it by the destructive work of the various peat-moss-litter companies, who are rapidly destroying the historic low-lying heaths of Goole Moor, Thorne Waste, and Hatfield Chace.

The third meeting was at Flamborough, when the headland and shores at Flamborough Head were explored. At the meeting the chair was occupied by the Rev. W. C. Hey, M.A.

The fourth meeting was the Bank Holiday Monday gathering, which was this year devoted to the exploration of lower Swaledale, with the meeting at Richmond. Mr. William Hewett occupied the chair on this occasion.

The fifth meeting, which was but scantily attended, was at Appletreewick, in Wharfedale, for the purpose of exploring the picturesque gorge of Troller's Gill. Mr. John Stubbins, F.G.S., was in the chair.

The two special meetings referred to were a Fungus Foray, held at Huddersfield from September 7th to 10th, and a meeting at Filey Brig on the 21st September, for the purpose of investigating the Marine fauna and flora of that productive spot at the spring tide of the autumnal equinox, both of which were very successful.

Yorkshire is particularly fortunate in possessing a body of landowners who extend every facility for scientific exploration and natural history investigations on their estates, and the Union has been indebted this season for permission kindly granted whenever requested.

Special thanks are also due to the enlightened policy of the railway companies whose lines traverse our county, for the special privileges which they have granted to members and associates attending the excursions.

For the Excursions of the coming year, 1896, your Executive recommend that the following places be visited:—

- York N.W.... West Tanfield, Saturday, 18th April.
- York N.E. ... Grinkle Park and Staithes, Whit Monday, 25th May.
- York S.E. ... Skipwith Common, Saturday, 20th June.
- York Mid W. Clitheroe for Bolland, Bank Holiday Monday, 3rd August.
- York S.W. ... Roche Abbey, Saturday, 29th August.

The Marine Zoology Committee are wishful to have further visits to Filey at the time of the Vernal and Autumnal Equinoxes, and the Mycological Committee propose that the Fungus Foray shall be held at Selby for Escrick and Osgodby at a date to be fixed, to suit the circumstances of the case, in September, and your Executive have pleasure in recommending that these requests be complied with.

The Societies which constitute the Union are now thirty-six in number the same number as last year.

One new Society has been admitted during the year, the Milnsbridge Naturalists' Society, but this accession is balanced by the amalgamation of the Hull Field Naturalists' Society with the Hull Scientific Club.

The Statistics which the Secretaries of the different Societies have again been good enough to furnish, show a considerable increase in the number of associates, the aggregate membership of the thirty-six Societies now amounting to 2,567, an increase of 284. Adding to this the number of direct members, the total numerical strength is 3,016.

The Membership now stands at 449, being 28 Life Members, 4 Honorary Life Members, and 417 Ordinary Members.

During the year 21 new members have been elected, while a few have resigned and others have been struck off the roll for non-payment of subscriptions.

The Union has to deplore several losses by death during the year, including gentlemen like Mr. Basil T. Woodd and Mr. T. W. Tew, whose sympathies with such societies as ours lead them to extend to a sympathetic though necessarily passive support. The Union has also lost active workers by the decease of the Rev. Wm. Thompson of Sedbergh, whose papers on the topography and botany of that district are well known; Mr. George Tindall of Newmarket and formerly of Doncaster, an active entomologist and at one time a local Treasurer of the Union; and Mr. J. M. Kirk, of Doncaster, the secretary of our own Micro-Zoology Committee. A noticeable feature of our death-roll, too, is the first break made in the long succession of our ex-presidents by the decease of Professor W. C. Williamson, F.R.S., who occupied the chair of the Union in 1881 and 1882; and the first gap caused in the list of Life Members by the recent decease of Mr. Joshua Buckton.

The Financial position of the Union still continues to be a source of anxiety to your Executive. Although the liabilities of the Union are no more than the outstanding subscriptions due from members would liquidate, your Treasurer and the local Treasurers who so materially aid him in his labours, have a considerable amount of labour in endeavouring to collect the subscriptions, and your Executive trust that the members in arrear will assist the Hon. Treasurers by a prompt discharge of their liabilities.

Your Executive very much regret that owing to their Honorary Secretary being single-handed, and the occurrence of other circumstances of an exceptional character, they have been prevented taking steps to carry out the recommendations of the Special Committee

which reported last year, but they propose that immediate action shall now be taken, and they trust they may receive the active and energetic support of the members and associates in their endeavour to put the Union on a sound financial basis.

One of the recommendations made by the Committee was to the effect that a special subscription list be raised of at least £150, in order that the outstanding printers' bills might be discharged and the publication of Transactions proceeded with. Your Executive have the gratification of reporting that although no appeal whatever was made to the members in pursuance of this recommendation, several sums have been spontaneously given as follows:—

	£	s.	d.
Mr. A. H. Pawson	10	10	0
Mr. J. W. Dunning	10	0	0
Mr. J. H. Rowntree	2	2	0
Mr. R. H. Tiddeman	2	2	0
Mr. J. H. Howarth	1	1	0
An Anonymous Donor	0	2	0

Your Executive need hardly add that they will be pleased to receive such donations as members are disposed to contribute.

They would, however, urge upon the members generally the paramount necessity of a simultaneous effort being made this winter to bring about a large accession of membership. For there can be no doubt that there are hundreds of persons in our county who are in sympathy with the Union's aims, and who would if its claims were brought before them, feel it their duty to give the Union their active support.

The Publications of the Union have been as in former years. Of the Transactions there has been no part issued during the year, the reason being that the authors of the various works which are in progress have not been prepared to furnish the requisite MSS. With regard to Baker's 'North Yorkshire,' your Executive have had the pleasure of learning from Mr. M. B. Slater, F.L.S., who is revising the list of mosses, that he has completed about four-fifths of the list, and that he fully hopes to complete the whole this winter. The list of Hepaticæ, which he will add, is also drafted out and will shortly be completed. The Rev. W. C. Hey writes that his List of Yorkshire Coleoptera is ready to the end of the Brachelytra, and that he has not been able to commence the list of Clavicornia for want of sufficient material, that and some of the following groups of beetles not having received so much attention at the hands of Yorkshire Coleopterists as have the Geodephaga and Hydradephaga. Your Executive are not in receipt of reports from the other authors of uncompleted works.

The 'Naturalist' has been published monthly during the year under the sole editorship of Mr. W. Denison Roebuck, F.L.S., under whose painstaking management it has fully sustained the reputation which it has of late years enjoyed, and is now the recognised medium for natural history publications for the whole of the North of England.

Your Executive and the Editor would take this opportunity of reminding members that the journal is sufficiently catholic in its scope to welcome articles dealing with the life-history of animals and plants as observed in the northern counties, as well as with any biological and general considerations that the local observations give rise to.

The Library continues to grow, a fact which has caused your Executive to take into consideration whether the time has not come when it is desirable to find a permanent home for what is now a valuable collection. The advantages to science which would result from transferring the library to some public institution in the county are many, and your Executive feels it a duty to make any arrangement in its power to increase the accessibility of books and pamphlets to members, and to open to every student a collection of books and reprints, many of which are rare, and by far the majority not in any public library in the county. A sub-committee consisting of Messrs. Benjamin Holgate, W. Denison Roebuck, Albert H. Pawson, and Leonard Hawkesworth has been appointed to deal with the matter. Several meetings of this committee have already been held, and they are now in negotiation with a large public institution for carrying out this project; but until they are further advanced it is not desirable to enter into any further details.

The Sections of the Union have more or less steadily carried on their work, but the attendance at some of them during the past year has not been quite so satisfactory as your Executive could have desired. As the success of the field excursions depends very materially upon the presence of the Union's best workers in every department, it is to be hoped that members will use every effort to support the sectional and general officers by their presence at as many excursions as is possible.

The Committee of Research have continued their investigations during the year with very satisfactory results.

For the **Yorkshire Fossil Flora Committee** Mr. W. Cash, F.G.S., its Secretary, reports that the Committee have not done much work during the past year, beyond a little collecting. They have, however, under the new presidency of Mr. Thomas Hick, B.A., &c., taken steps to insure some work being done during the coming year.

The Yorkshire coal-field has been mapped out and sub-districts placed under the following gentlemen's supervision :—Leeds, B. Holgate, F.G.S., J. Stubbins, F.G.S. ; Halifax, James Spencer, Robert Law, F.G.S. ; Low Moor, W. Cash, F.G.S., W. Simpson, F.G.S. ; Barnsley, W. Hemingway ; Wakefield, W. West, F.L.S. ; Bradford, J. E. Wilson.

The Committee cordially invite the co-operation of colliery proprietors, mining engineers, working miners, and, indeed, of all who may be in a position to help. Printed instructions as to the collection of specimens will be forwarded to anyone who will apply to any member of the Committee.

For the **Geological Photographs Committee** Mr. J. E. Bedford, F.G.S., its Secretary, reports that 112 views of subjects in Yorkshire, Scotland, Devon, and Cornwall, have been contributed, mainly by the energetic labours of the Chairman of the Committee, Mr. Godfrey Bingley, to whose work special reference is made by the British Association Committee in their report. Yorkshire still maintains its pre-eminence, for more prints have been contributed by our Committee than from any other district in the kingdom.

The Yorkshire Boulder Committee, 1895.—This Committee has continued its work during the year chiefly in the Calder Valley. As the result of recent excavations, they have settled the vexed question as to the direction in which the Erratics entered this valley.

Glacial deposits have also been reported from Saltburn, Rokeby, Baldersby, Burstwick, and Holderness.

The Committee have devoted two days to the investigation of the York Moraines, a report of which will shortly be issued.

The mapping of the Coast Erratics is being diligently prosecuted by the East-Riding Boulder Committee.

The Coast Erosion Committee.—The Rev. E. Maule Cole, the Secretary of this Committee, reports that the Erosion of the Yorkshire Coast is after all so slow a process that it is impossible to give reports annually, only when something striking occurs. No observations have been made this year.

Micro-Zoology and Micro-Botany Committee.—The Committee appointed for the investigation of the Cryptogamic Flora and Invertebrate Fauna of the Freshwaters of Yorkshire has suffered a heavy loss since our last Annual Meeting in the lamented death of its Secretary, Mr. J. M. Kirk. In his place Mr. M. H. Stiles kindly consented to take up the secretaryship. He reports that the Yorkshire Micro-Zoology and Micro-Botany Committee

have little or no results to record for the past year. The members have found no opportunity for concerted work, and no record has been published of individual investigation beyond the insertion in the February number of the 'Naturalist' of a provisional list of Diatoms found at Cusworth, near Doncaster. It is hoped that, during the coming year, a little more life may be infused into this Committee. The Hon. Secretary would welcome any suggestions for the adoption of a systematic method of working.

The Marine Zoology Committee.—There has been some sign of the existence of this Committee by the holding of a meeting at Filey in September, and it would seem, by the interest aroused on that occasion, that the necessity for taking some active steps was eventually being recognised. There is an immense amount of work to be done, and the difficulties in the way are not to be easily surmounted. The marine biologist cannot choose his own time to conduct his investigations, and must consult almanacks and tide tables, and be largely dependent on the meteorological conditions. Unless, therefore, he lives on the coast, his operations must necessarily be very much curtailed, and only very partial success is likely to reward his efforts. Unfortunately there are but few members so favourably situated and possessing the necessary inclination, and those who have some ambition in this direction have the misfortune to live at a distance from the coast. Nevertheless, by the meeting at Filey it was conclusively shown that much may be done by holding regular excursions at the spring and autumnal Equinoxes, and if these are continued considerable advance must be made in our knowledge of the marine fauna and flora of the coast. Marine Zoology, too, covers such a wide field that of necessity there ought to be special workers to take up exclusively but one class of the invertebrata. The study of some of these animals has been much neglected, and there is consequently great difficulty in obtaining their identification. It may be mentioned on this head that Professor Herdman, F.R.S., has kindly offered to give us all the assistance in his power, and other aid may be expected from the Liverpool Marine Biological Committee. In order that the Botanical Section may not be excluded from the operations of the Committee, it has been suggested that its name should be altered to the Marine Biological Committee.

The excursion to Flamborough was also, to some extent, arranged for the benefit of this Committee, but the fixture of the date was not a fortunate one, as the tide was not by any means low enough to enable the members present on this occasion to reach the productive parts of the shore.

Mr. Butterell is engaged on some bibliographical work which will probably be ready for publication during the ensuing year.

Mr. J. Frazer Robinson, of Hull, has paid considerable attention to the Marine Algæ of the coast of the East Riding, and the information he has collected will be in the hands of the Committee in due course.

Wild Birds' Eggs Committee.—The Bill which was alluded to in the last report has become law under the title of the 'Wild Birds Protection Act, 1894.' Its main provision is that 'a Secretary of State may upon application by the County Council of any administrative county by order prohibit—

1. The taking or destroying of wild birds' eggs in any year or years in any place or places within that county; or
2. The taking or destroying the eggs of any specified kind of wild birds within that county or part or parts thereof, as recommended by the said County Council and set forth in the said order.
3. The application by the County Council shall specify the limits of the place or places, or otherwise, the particular species of wild birds to which it is proposed that any prohibition in the order is to apply, and shall set forth the reasons on account of which the application is made.'

The Act provides that any person convicted of taking or destroying the eggs of any wild birds in a specified area, or the eggs of any species of wild bird named in an order shall 'pay for every egg so taken or destroyed a sum not exceeding one pound.'

Under the provisions of this Act the County Council of the East Riding has prohibited the taking of any eggs; for five years from an area which includes Spurn Point. The same County Council have also added another fortnight to the close time in the East Riding of Yorkshire.

The Mycological Committee.—Mr. Charles Crossland, its secretary, reports that the Committee has done steady and systematic investigation during the season. Not only has the principal Fungus Foray been held, the centre of operations being Huddersfield, with Mr. Masee, Dr. Cooke, Mr. Rea, Mr. Rose, and the local members of the Committee present, but a series of rambles in the West Riding have been held with good results.

British Association.—The Union has again been appointed one of the Corresponding Societies of the Association, and was represented at the Ipswich meeting, in the unavoidable absence of the Rev. E. P. Knubley, M.A., by Mr. M. B. Slater, F.L.S., who reports that at the conferences special attention was again devoted to a discussion on local museums, and the best manner in which they might be made available for scientific and educational purposes.

The Secretariate.—The whole of the secretarial and editorial work of the Union has been this year carried out single-handed by Mr. W. Denison Roebuck. Your Executive, while deeply sensible of the debt which the Union owes to Mr. Roebuck for the singular ability and the indomitable energy with which he has conducted the affairs of the Union, do not think that the members should allow the whole burden of the Secretariate to rest upon one man's shoulders. They hope, therefore, that a colleague may shortly be found who would be willing especially to take a share in organising the excursions and meetings which form so conspicuous and so successful a feature of the work of the Union.

The Presidency for the ensuing year has been offered to and accepted by Mr. John Cordeaux, so well-known to us all as an ornithologist of high rank, and with special claims upon this Union by his authorship of so excellent and standard a work as 'The Birds of the Humber District.'

In conclusion, your Executive have to recognise in the name of the members generally their profound sense of the honour which is conferred upon the Union by the occupancy of its chair by so acknowledged a master of his subject as the distinguished bryologist whose brief tenure of office draws to-day to a close.

FINANCIAL STATEMENT, 1895.

Receipts.

	£	s.	d.	£	s.	d.
Balance from 1894				12	0	4
Levies paid by Societies:—						
1887		0	9			
1888		0	7			
1892		0	19			
1893		1	5			
1894		9	18			
1895		2	7			
				15	5	3
Subscriptions paid by Mem- bers:—						
1882		0	2			
1883		0	10			
1884		0	18			
1886		0	12			
1887		1	7			
1891		1	6			
1892		1	8			
1893		3	8			
1894		26	7			
1895		73	9			
				109	10	3
Sales of Publications				1	12	11
Subscription paid for the 'Naturalist' ..				135	5	6
Donations				25	17	0
				<u>£299</u>	<u>11</u>	<u>3</u>

Payments.

	£	s.	d.	£	s.	d.
Members' Card and General Expenses				16	13	4
Expenses of Meetings:—						
Pickering		8	8			
Brigg		11	11			
Flamborough		8	18			
Richmond		9	2			
Troller's Gill		9	6			
Annual Meetings		3	7			
Fungus Foray		3	0			
Expenses incurred by Hon. Treasurer				53	13	9
Subscription returned to Member Resigned				0	10	6
Subscription to Footpath Preservation Society				0	10	6
Expenses of Boulder Committee (for 4 years)				1	7	6
Expenses of Library, Exchanges, Stock, Insurance, etc.				17	17	6
Paid on account of Transactions				25	12	2
Paid on account of 'Naturalist'				178	7	9
Balance in Bank				0	3	6
				<u>£299</u>	<u>11</u>	<u>3</u>

Assets.

1895 Oct. 19th.

Re 'NATURALIST.'		£	s.	d.	£	s.	d.
Cash in hands of General and Local Treasurers			26	7			
Subscriptions owing			33	15			
					60	2	6
Re GENERAL ACCOUNT.							
Balance in Bank			0	3			
Cash in hands of General and Local Treasurers			39	7			
Subscriptions owing			64	10			
					104	1	0
Re STOCK ACCOUNT.							
Cash in hands of General and Local Treasurers			6	10			
Accounts owing			10	10			
					7	0	0
Book Cases valued at			5	0			
Books in Library valued at			160	0			
Stock of Transactions valued at			40	0			
Stock of 'Flora' valued at			100	0			
Stock of 'Naturalist' valued at			60	0			
					365	0	0
Estimated to produce					185	0	0
					<u>£356</u>	<u>3</u>	<u>6</u>

Liabilities.

Re 'NATURALIST.'		£	s.	d.	£	s.	d.
Owing to Printers			79	13			
Add for Nov. and Dec.			20	0			
					99	13	6
Re GENERAL ACCOUNT.							
Owing to Secretary			3	7			
Owing to Printers			1	5			
					4	12	6
Re TRANSACTIONS.							
Owing to Secretary					9	5	6
Re LIBRARY & STOCK.							
Owing for Year's Rent					1	1	0
					<u>£114</u>	<u>12</u>	<u>6</u>
Balance in favour of Union					247	11	0
					<u>£356</u>	<u>3</u>	<u>6</u>

YORKSHIRE NATURALISTS' UNION.

35th ANNUAL REPORT, for 1896.

YOUR Executive have to congratulate the members on the completion of another excellent year's work, characterised by continued activity on the part of some of the Committees of research ; on the issue of two further instalments of Transactions, and on a successful series of those field meetings on which the Union relies for stimulating investigation in various parts of its area.

The Meetings held during the year have been six in number as usual, one for each division of the county, and a Fungus Foray.

The districts chosen for investigation and the dates of the meetings were as follows :—

April 18, Saturday : Tanfield and Hackfall.

May 25, Whit Monday : Bowland.

June 20, Saturday : Skipwith Common.

July 11, Saturday : Roche Abbey.

Aug. 3, Bank Holiday Monday : Staithes and Grinkle Park.

Sep. 19 to 22 : Selby for Fungus Foray.

The usual descriptive circular for each excursion was issued to members and associates.

The opening excursion of the year was held at Ripon, for the exploration of Hackfall and Tanfield, on the 18th of April, an earlier date than the Union usually selects for its first excursion of the year. Propitious weather enabled much good collecting to be done, especially by the bryological members. Mr. B. M. Smith, of Ripon, assisted your hon. secretary in making the arrangements, and a report from his pen has been published in the 'Naturalist.'

The second meeting was arranged at Whitsuntide, for the exploration of Bowland, which was till then the largest area of unworked ground that had been left for the Union to visit. The hon. secretary had very efficient assistance from Mr. Edward Peake, M.A., in making the arrangements. The excursion was planned to occupy four days, on account of the extent and difficulty of access of the district. There were two centres of exploration, the naturalists having their head-quarters fixed at Newton-in-Bowland, and the geologists, who had the advantage of the leadership of Mr. R. H. Tiddeman, ex-president of the Union, making their explorations from White-well as a centre. Much good work was done by the party, and the only regret was that there was not a much larger muster in so rich, picturesque and comparatively uninvestigated a country.

The third meeting was held at Selby for the investigation of Skipwith Common, when the arrangements were made by the Rev. C. D. Ash, B.A., Vicar of Skipwith, and Mr. W. Norwood Cheesman, of Selby. On this occasion entomology had a large share of attention given to it, and some collecting of microscopical life was done. The geologists, under the leadership of Mr. Percy F. Kendall, F.G.S., examined the glacial moraine which extends from Stamford Bridge to Escrick, and had the good fortune to meet with a newly made section.

The fourth meeting was at Roche Abbey, on the 11th July, when good work was done in the woods at Maltby, and by microscopists in the lakes at Sandbeck and Roche Abbey. The arrangements were efficiently made by Messrs. John Howitt and H. Moore of Rotherham, and there was a large muster of members from South Yorkshire. A list of the Diatoms met with has appeared in 'The Naturalist' for Nov. 1896, from the pen of Mr. J. Newton Coombe.

The fifth meeting was on Bank Holiday Monday, at Staithes, for the exploration of the twin glens of Easington and Roxby, and the neighbouring coast. The geological arrangements were made in conjunction with the Yorkshire Geological and Polytechnic Society, whose headquarters were at Whitby, and whose explorations covered the coast line from Staithes to Whitby and beyond. The naturalists, led by Messrs. Barnes, MacLean, etc., were able to make some interesting observations inland, although the tide was not favourable enough for much shore-collecting. The Rev. John Hawell, M.A., President of the Cleveland Naturalists' Club, assisted your hon. secretary in making the arrangements.

Regarding the Fungus Foray, held on the 19th to 22nd September, of which a notice will be given under the Mycological Committee, there needs only be added here an expression of the obligations under which Mr. W. N. Cheesman laid the Union, by his efficient arrangements as special hon. secretary.

Yorkshire is particularly fortunate in possessing a body of landowners who extend every facility for scientific exploration and natural history investigations on their estates, and the Union has been indebted as usual for leave kindly granted whenever requested, except that on one occasion this year—a rare and exceptional instance in the annals of the Union—permission has been denied.

Special thanks are also due to the enlightened policy of the railway companies whose lines traverse our county, for the privileges they grant to members and associates attending the excursions and the annual meeting.

For the excursions of the coming year, 1897, your Executive recommend that the following programme of places and dates be adopted :—

For York Mid W.—Boston Spa, Easter Monday, April 19th.

For York S.W.—Skelmanthorpe, Thursday, May 13th.

For York N.W.—Cothorstone, Whit-Monday, June 7th.

For York N.E.—Scarborough and Hackness, Saturday, July 10th.

For York S.E.—Everingham Park, Bank Holiday Monday, August 2nd.

The Mycological Committee propose that the Fungus Foray shall be held at Barnsley, at a date to be fixed, to suit the circumstances of the case, in September, and your Executive have pleasure in recommending that the request be complied with.

For the Annual Meeting of next year (1897), invitations will be presented by the Societies at Darlington and at Scarborough, and it will be for the General Committee to decide which of these shall be accepted.

The Societies which constitute the Union are now thirty-six in number, the same number as last year, there having been no changes.

The Statistics which the Secretaries of the different Societies have again been kind enough to furnish, show a slight decrease in the number of associates, the aggregate membership of the thirty-six Societies now amounting to 2,449, a decrease of 118. Adding to this the number of direct members, the total numerical strength of the Union is 2,906.

The Membership now stands at 457, being 25 Life Members, 4 Honorary Life Members, and 428 Ordinary Members, a net increase of but 8 on last year.

During the year 28 new members have been elected, while a few have resigned and others have been struck off the roll for non-payment of subscriptions.

The Death-roll has been heavy during the year. The Union has lost two of its ex-Presidents, Mr. Henry Seebohm, the distinguished ornithologist, and Prof. A. H. Green, the eminent Professor of Geology at Oxford, both of them suddenly, in the prime of life. It has also to deplore the untimely decease of Mr. Thos. Hick, the chairman of its Fossil Flora Committee, and one of the oldest members of the Union; while in the Rev. H. F. Barnes-Lawrence it loses one to whom is due the first inception of the Wild Birds Protection Acts; and in Mr. A. G. More, of Dublin, a Yorkshireman who has done much for the promotion of natural science in Ireland. The names of Mr. G. G. Ianson, of Wakefield, and Mr. S. T. Scrope, J.P., D.L., of Danby-super-Yore, also appear

in the list, together with three Life Members:—Mr. E. B. Wheatley Balme, Mr. E. B. Lees, and Lord Lilford, the last-named being the President of the British Ornithologists' Union, and a most generous supporter of any scientific institution brought under his notice.

The Financial Position of the Union is practically the same as last year, and still continues to be a source of anxiety to your Executive, and it will continue so to be until the members will assist the Committee in placing the Union's affairs on a sound financial basis, by bringing about a large increase of the membership in every district of the county. At present the equilibrium between income and expenditure is too close to permit of the Union doing full justice to one of the main objects for which it exists, viz., the printing and publication of memoirs and papers dealing with the natural history of Yorkshire. In a county of the size, importance, and scientific activity of Yorkshire there should at least be a thousand names on the membership roll, and the Executive trust they may look to the active and vigorous assistance of their members to this end.

The Publications of the Union have been as in former years, the 'Transactions' and the 'Naturalist.'

Two parts of the 'Transactions' have been issued, viz., Part 19 for 1893, and Part 20 for 1894.

Part 19 consists of a further instalment of Mr. Kidson's valuable reports on the Yorkshire Carboniferous Flora, and was issued last Spring.

Part 20 is expected to be sent out before the Annual Meeting, and is devoted to various papers, including Dr. Braithwaite's Presidential Address, delivered last year; the long-delayed report on Yorkshire Lepidoptera for 1891, drawn up by Mr. A. E. Hall; and a further instalment of the Rev. W. C. Hey's Catalogue of Yorkshire Beetles.

With regard to the second edition of Mr. Baker's North Yorkshire, Mr. M. B. Slater, F.L.S., who has in hand the Mosses and Hepatics, states that he has not been able to complete his revision of them as soon as he had hoped, but that he expects to have it ready some time next Spring or Summer. Messrs. Taylor and Nelson propose to furnish a further instalment of their annotated List of Yorkshire Land and Freshwater Mollusca, and complete the portion treating of the freshwater forms.

The 'Naturalist' has been published monthly during the year under the sole editorship of Mr. W. Denison Roebuck, F.L.S., under whose management it has fully sustained the reputation

which it has of late years enjoyed, and it is now the recognised medium for natural history publications for the whole of the North of England.

Your Executive and the Editor would take this opportunity of reminding members that this Journal is sufficiently catholic in its scope to welcome articles dealing with the life-history of animals and plants as observed in the northern counties, as well as with any biological and general considerations that the local observations give rise to.

The Library continues to increase by donations and exchanges, and has been to a certain extent made use of by members. The negotiations spoken of in last year's Report are still pending, the time of our late Honorary Librarian having been fully occupied with other important matters.

The Sections of the Union have more or less steadily carried on their work during the year, but the attendance of leading members of some of the sections has not always been as satisfactory as might be desired; and when the fact is taken into consideration that the success of the field excursions entirely depends upon the presence of the Union's best workers in every department, it is to be hoped that members will endeavour to support the arrangements made by the General and Sectional Officers by their presence at as many excursions as possible.

The Committees of Research have continued their investigations during the year with very satisfactory results.

The Yorkshire Fossil Flora Committee have to deplore the loss of their chairman, by the death of Mr. Thomas Hick, B.A., B.Sc., A.L.S. This is a great blow to the Committee, as much had been expected from his profound knowledge of fossil plants, especially with regard to their structure. Several meetings of the Committee have been held during the year, and many specimens of fossil plants have been collected from various parts of the Yorkshire Coal-fields. In the study of fossil plants showing structure from the Halifax Hard Bed Coal, steady progress is being made, and though *new plants* may be but rarely met with, nevertheless interesting details showing the structure of those already known, are not infrequently brought to light. Many examples of 'casts' have been collected and have been submitted for examination and determination to Mr. Robert Kidston, who has already done much work for the Committee, and from whose pen a further report is expected.

Some encouragement has been given to the Committee by the consent of the manager and his assistant at Park Hill Colliery near Wakefield, to carefully collect and localize specimens of fossil plants

from the Wakefield district, and it is to be hoped that this example will be followed by other colliery managers in the county. To such, printed instructions for collecting will be forwarded on application to Mr. Kidston at Stirling, or to Mr. W. Cash, the Secretary of the Committee, at Halifax.

The Yorkshire Boulder Committee have continued their investigations steadily during the year, and Mr. Thos. Tate, F.G.S., the Secretary, states that during the year our knowledge of the Yorkshire glacial deposits has been extended chiefly along the margins of the county, as at Pickering, at Walsden, in Bowland, etc. The Hull Geological Society's East Riding Boulder Committee have completed their Holderness exploration, adding 2,600 boulders to those previously recorded. The full report has been duly submitted to the British Association, and will shortly appear in 'The Naturalist.'

For the **Geological Photographs Committee** Mr. J. E. Bedford, F.G.S., its Secretary, reports that excellent work has been done, no less than 139 photographs of Geological subjects having been contributed during the year, entirely by Mr. Godfrey Bingley, the Chairman of the Committee. Of these, 71 relate to Yorkshire and 68 to other parts of the Kingdom, and are deposited in the Museum of Practical Geology at Jermyn Street, London, on behalf of the British Association Committee on Geological Photographs. Copies of the Yorkshire views are inserted in the albums belonging to the Union. The photographs which Mr. Bingley has contributed this year to our album are as follows: 18 views of Norber erratics, 10 of the Aire dry valley at Malham, 1 of contorted gypsum beds near Ripon, 2 of fossil trees in a quarry at Headingley, 38 coast views from Flamborough to Scarborough, and 2 coast views at Robin Hood's Bay. The 10 views of the old dry valley of the Aire, above Malham, a magnificent series, have recently been published in the Proceedings of the Yorkshire Geological and Polytechnic Society, in illustration of a paper by Mr. Tate, and that Society has arranged to include a further series of Mr. Bingley's photographs in their Proceedings.

The Coast Erosion Committee.—The Rev. E. Maule Cole, M.A., the Secretary of this Committee, reports that an important landslip occurred at Filey one Sunday in April or May, when thousands of tons of boulder clay at the West End of Carr Naze came down. The cliff top itself sank some 15 feet. In consequence of springs many similar landslips may be expected. All that the sea does is to wash away the debris on the shore. No other observations have been made this year. The similar Committee appointed by the British Association has now ceased to exist.

Micro-Zoology and Micro-Botany Committee.—Mr. M. H. Stiles, the Secretary, reports that no opportunities have been

found for concerted action in this department during the past season. The earlier excursions were barren of results, but some valuable work was done at Roche Abbey by Messrs. J. N. Coombe and J. Stubbins. The results obtained by the former observer are embodied in an excellent paper which appears in the 'Naturalist' for November; those by Mr. Stubbins are not yet published. Further investigations, which will result in an extension of the Cusworth list of Diatoms, etc., have also been made by the Secretary. A working Schedule for this Section is now being framed, and will be published early in the new year.

Marine Biology Committee.—The Secretaries, Mr. J. D. Butterell and Mr. F. W. Fierke, report that operations have been much restricted this year. Only one of the Union meetings has been on the coast, namely, at Staithes, when observations were made by Mr. Arnold T. Watson of Sheffield, but the tides were not sufficiently low to admit of more than the usually occurring species being met with.

Wild Birds' and Eggs Protection Committee.—The Rev. E. P. Knubley, M.A., Chairman and Convener, reports that in the West Riding the County Council has extended the close time in that Riding by adding ten days to the period mentioned in the Wild Birds' Protection Acts. The close time now ends on the 12th of August. They have postponed for the present further application of the Acts to specified areas.

Mycological Committee.—Mr. Charles Crossland, its secretary, reports that the summer being very dry, little or no work could be done until the meeting at Staithes on August 3rd, when 67 Fungi were noted. Since that time the season has been a very good one. The Annual Foray, held this year at Selby, and at which Mr. Geo. Masee, Dr. Plowright, Mr. Carleton Rea, and the whole of the Yorkshire Mycological Committee were present, was a great success in every way; many uncommon species and one new to Britain were found. One or two minor rambles in the West Riding have been held, but from the weather proving unpropitious, not very much could be done. A full report of the Selby Foray will appear in the 'Naturalist' for December.

British Association.—The Union has again been appointed one of the Corresponding Societies of the Association, and was represented at the Liverpool meeting this year by the Rev. E. P. Knubley, M.A., who reports that at the conferences special attention was devoted to the formation of District Unions of Natural History Societies (similar to that which has now existed in Yorkshire for 36 years), on which subject a paper was read by Mr. George Abbott,

M.R.C.S. The remarks made at the conference by Mr. Knubley upon the organisation, the work, and the literature of the Union made a very favourable impression on the conference. The conference also discussed suggestions introduced by Professor W. M. Flinders Petrie on the formation of a Federal Staff for Local Museums. A fuller report will appear in 'The Naturalist.'

The Secretariate.—Another year has added to the debt of gratitude which the Union owes to its indefatigable Hon. Secretary, Mr. W. Denison Roebuck, upon whose capable shoulders the whole of the Secretarial and Editorial responsibility has again fallen, except that for the excursions his labours were to a considerable extent lightened by the valued assistance which he received from Mr. B. M. Smith, Mr. E. A. Peake, M.A., Rev. C. D. Ash, B.A., Mr. H. Moore, Mr. John Howitt, Mr. W. Norwood Cheesman, and the Rev. John Hawell, M.A., to whom the best thanks of the Union are due. Your Executive once more reiterate the hope that Mr. Roebuck may soon have a capable colleague to share his labours.

The Presidency for 1897 has been offered to, and accepted by, Prof. W. Boyd Dawkins, M.A., F.R.S., whose classic works on Cave Hunting and Cave Remains and his special work in connection with the investigation of the Settle Cave many years ago, are so well known.

In bidding farewell to the retiring President, the Executive gladly seize this opportunity of tendering him grateful thanks, not merely for the valuable services that he has rendered to the Union during his term of office, but much more for the years that he has ungrudgingly devoted to the spread of the knowledge of ornithology, both in this county and in the kingdom.

FINANCIAL STATEMENT, 1896.

Receipts.

	£	s.	d.	£	s.	d.
Balance from 1895				0	6	0
Levies paid by Societies:—						
1893	0	5	0			
1894	1	13	0			
1895	5	15	0			
1896	4	10	0			
				12	3	0
Subscriptions paid by Mem- bers:—						
1885	0	10	0			
1892	3	3	6			
1893	5	7	6			
1894	10	12	6			
1895	27	11	6			
1896	89	6	6			
1897	0	16	0			
				137	7	6
Refunded by Printer— charged in error				0	11	0
Donation				0	10	6
Life Composition				7	7	0
Received for 'Naturalist'				141	15	1
				£300	0	1
Total Receipts				£302	11	2
Balance due to Treasurer				2	11	1
				£302	11	2

Payments.

	£	s.	d.	£	s.	d.
Members' Card and General Expenses				25	19	8
Meetings:—						
Tanfield	7	6	9			
Bowland	13	16	9			
Skipwith	0	1	9			
Roche Abbey	6	1	7			
Staithe	6	14	5			
Fungus Foray	7	4	1			
Annual Meetings	8	17	3			
				56	2	7
Expenses incurred by Hon. Treasurer				12	13	5
Marine Biology Committee				0	2	2
Subscription to Footpath Preservation Society				0	10	6
Expenses of Photograph Album				0	2	11
Rent for 2 years				2	2	0
Insurance				0	6	0
Additional Library Fittings				3	6	0
Expenses of Library, Exchanges, Back Stock, etc				21	1	0
Paid on account of Transactions				30	4	0
Paid on account of 'Naturalist'				150	0	11
				£302	11	2
Total Payments				£302	11	2

Assets.

Re 'NATURALIST.'

	£	s.	d.	£	s.	d.
Cash in hands of Local and General Treasurers, or in Bank	43	4	11			
Subscriptions owing	13	7	6			
				56	12	5

Re GENERAL ACCOUNT.

Cash in hands of Local and General Treasurers, or in Bank	41	18	3			
Subscriptions owing	27	5	0			
Due from 'Naturalist' Account	8	5	10			
				77	9	1

Re STOCK ACCOUNT.

Cash in hands of Local and General Treasurers, or in Bank	8	12	8			
				8	12	8
				142	14	2
Book Cases valued at	8	0	0			
Books in Library valued at	160	0	0			
Stock of Transactions valued at	40	0	0			
Stock of 'Flora' valued at	100	0	0			
Stock of 'Naturalist' valued at	60	0	0			
	408	0	0			
Estimated to produce				185	0	0
				£327	14	2

Liabilities.

Re 'NATURALIST.'

	£	s.	d.	£	s.	d.
Owing to Printers	77	15	0			
Add for Nov. and Dec.	20	0	0			
Due to General Account	8	5	10			
				106	0	10

Re GENERAL ACCOUNT.

Balance due to Treasurer, as above	2	11	1			
Owing to Printers	5	6	0			
Owing to Secretary	2	7	0			
				10	4	1

Re TRANSACTIONS.

Owing to Printers—Part 20 say	20	0	0			
				20	0	0

Re LIBRARY & STOCK.

Owing to Tradesmen	0	8	3			
				0	8	3
				£136	13	2
Balance in favour of Union				191	1	0

£327 14 2

LIST OF MEMBERS,

Arranged Geographically,

CORRECTED TO OCTOBER 31st, 1896.

(The Members whose names are printed in heavy type are those of **Permanent Members of the General Committee**. The Dates preceding names are those of election; Original Members, being those elected previous to 1883, are marked —; those to whom **L.** is prefixed are Life Members, by virtue of a donation of not less than five guineas; and those to whom **H.L.** is prefixed are Honorary Life Members, or Ex-Presidents of the Union.)

Members changing their addresses are requested to inform the Secretary as soon as possible.

BARKSTON ASH DIVISION.

Pop. 48,470.

- **L.** **Cheesman, William Norwood**, *The Crescent, Selby.*
 — ... **Emmet, John**, *F.L.S., The Poplars, Boston Spa, R.S.O.*
 1887 ... Emmet, Mrs., *The Poplars, Boston Spa, R.S.O.*
 — ... **Jackson, John**, *M.P.S., High Street, Wetherby.*
 — ... **Nelson, William**, *M.C.S., Gandy Row, Crossgates, Leeds.*

BARNSELY DIVISION.

Pop. 78,844.

- 1889 ... **Bayford, Edwin G.**, 2, *Rockingham Street, Barnsley.*
 1884 ... **Brady, William E.**, 5, *Victoria Road, Barnsley.*
 1885 ... Broadhead, Seth, 30, *Shambles Street, Barnsley.*
 1891 ... Hutchinson, Charles H., 37, *Hopwood Street, Barnsley.*
 1889 ... **Johnson, Henry**, 62, *Huddersfield Road, Barnsley.*
 1892 ... **Thirkell, Edward Walter**, *Hunningley Cottage, Stairfoot, Barnsley.*
 1889 ... Turner, Benjamin, 10, *Pitt Street, Barnsley.*

BEVERLEY BOROUGH.

Pop. 11,425.

- ... **Boyes, Frederick**, *Yorkshire Banking Company, Beverley.*
 — ... **Butterell, J. Darker**, *M.C.S., 4, Willow Grove, Westwood, Beverley.*
 — ... Davison, George, *Garden House, Keldgate, Beverley.*
 — ... **Dobrée, N. F.**, *F.E.S., The New Walk, Beverley.*
 1892 ... Morley, Thomas John, *Toll Gavel, Beverley.*
 — ... **Ridgway, J. Ambrose**, *F.R.A.S., Beverley.*

BRADFORD BOROUGH.

Pop. 216,361.

- 1894 ... Bradford Free Library and Art Museum, *per Butler Wood, Librarian.*
 — ... **Carter, J. W.**, 25, *Glenholme Road, Whetley Lane, Bradford.*
 1884 ... Clayton, John, *Boxtree House, Thornton Road, Bradford.*
 1891 ... Dawson, R. F., 5, *Noble Street, Great Horton Road, Bradford.*
 1890 ... Dickons, J. Norton, 12, *Oak Villas, Manningham, Bradford.*
 1893 ... **Hawkesworth, Leonard**, 23, *Shann Street, Bolton Woods, Bradford.*
 1891 ... **Howarth, James Henry**, *F.G.S., Belvoir House, Heaton, Bradford.*
 1884 ... **Lund, Percy**, 43, *Athol Road, Bradford.*
 — ... **McLandsborough, John**, *F.G.S., F.R.A.S., F.R.Met.S., etc., 5, Lindum Terrace, Manningham, Bradford.*
 — ... **Meade, R. H.**, 1, *Mount Royd, Manningham, Bradford.*

- 1889 ... Naylor, E., 48, *Market Street, Bradford.*
 — ... Nuttall, William, *Moorside, Eccleshill, Bradford.*
 — ... Pocklington, C., *F.R.M.S., 14, Bertram Terrace, Manningham, Bradford.*
 — ... Powell, *Sir Francis Sharp, Bart., M.P., Horton Old Hall, Bradford.*
 1894 ... Scharff, W. E., *M.C.S., c/o Scharff & Sons, Bradford.*
 — ... West, William, *F.L.S., 15, Little Horton Lane, Bradford.*
 — ... Wilson, J. E., 5, *Selborne Terrace, Bradford.*

BUCKROSE DIVISION.

Pop. 50,877.

- 1895 ... Bailey, Matthew, *Flamborough, viâ Hull.*
 1890 ... Bell, James Lumsden, *M.D., White Hall, Driffield.*
 — ... Cole, Rev. E. Maule, *M.A., F.G.S., Vicarage, Wetwang-on-the-Wolds, viâ York.*
 1889 ... Davison, Richard, *Driffield.*
 1889 ... Fountain, Joshua, *Ship Inn, Filey.*
 1887 ... Fisher, Rev. Robert, *M.A., Sewerby Vicarage, viâ Hull.*
 1895 ... Lloyd-Greame, Yarburgh George, *Sewerby House, Hull.*
 1889 ... Mortimer, J. R., *F.G.S., Driffield.*
 — ... Ross, Lewis Buttle, *F.C.S., F.R.Hist.S., Driffield.*
 1890 ... St. Quintin, Wm. Herbert, *J.P., Scampston Hall, Rillington, York.*
 — ... Tindall, Edward, *Knapton Hall, Rillington, York.*
 1889 ... Wood, Richard, *M.D., Beverley Street, Driffield.*

CLEVELAND DIVISION.

Pop. 55,882.

- 1891 ... Burton, J. J., *Hambleton House, Nunthorpe, R.S.O., York.*
 1887 ... Emerson, E. B., *B.A., J.P., Töllesby Hall, Marton, R.S.O.*
 1890 ... Hawell, Rev. John, *M.A., Vicarage, Ingleby Greenhow, Middlesbrough.*
 1888 ... Macpherson, Angus, 16, *Teresa Terrace, Coatham, Redcar.*
 1887 ... Meek, J. M., 6, *Nelson Terrace, Coatham, Redcar.*
 1887 ... Nelson, Thomas H., *M.B.O.U., Oxley Villa, Redcar.*
 1883 ... Smith, Rev. Hy., *M.A., Clarendon House, Redcar.*

COLNE VALLEY DIVISION.

Pop. 59,344.

- 1890 L. Hirst, Ben., *J.P., Tamewater, Dobcross, near Oldham.*
 — L. Porritt, George T., *F.L.S., F.E.S., Crosland Hall, near Huddersfield.*

DEWSBURY BOROUGH.

Pop. 72,986.

- 1894 ... Bradley, Thomas A., *F.A.I., The Bottoms, Savile Town, Dewsbury.*
 1887 ... Crawshaw, C. B., *J.P., Rufford Lodge, Oxford Road, Dewsbury.*
 1894 ... Hemingway, Wilson, *Anroyd Villa, Dewsbury.*
 1894 ... Hey, Harry, 2, *Ash Terrace, Savile Town, Dewsbury.*
 — ... Hobkirk, Charles P., *F.L.S., Hill House, Park Road, Dewsbury (Ex-President).*
 — ... Lee, Phineas Fox, *West Park Villas, Dewsbury.*
 1891 ... Marriott, Arthur S., *Manor Lawn, Dewsbury.*
 1896 ... Taylor, Herbert J., 9, *Portland Villas, Bath Street, Dewsbury.*

DONCASTER DIVISION.

Pop. 73,032.

- 1890 ... Corbett, Herbert H., *M.R.C.S., 19, Hall Gate, Doncaster.*
 1884 ... Crossley, Miss Frances Ann, *Malby, near Rotherham.*
 1884 ... Crossley, Miss Mary A. B., *Malby, near Rotherham.*
 1884 ... Crossley, William Henry, *Malby, near Rotherham.*
 1883 ... Paterson, A., 58, *Apley Road, Doncaster.*
 1890 ... Roberts, Walter, *Ivy Bank, Avenue Road, Doncaster.*
 1884 ... Stiles, M. H., 2, *Frenchgate, Doncaster.*
 1887 ... Wilson, J. Mitchell, *M.D., 51, Hall Gate, Doncaster.*
 — ... Winter, George, 14, *Baxtergate, Doncaster.*

ELLAND DIVISION.

Pop. 64,632.

- 1890 ... Barber, H. Jocelyn, *Brighouse*.
 1896 ... Crowther, J. E., 18, *Upper Back Langdale Street, Elland*.
 1888 ... Law, Robert, *F.G.S., Fenny Royd Hall, Hipperholme*.

HALIFAX BOROUGH.

Pop. 82,863.

- 1895 ... Bairstow, Uriah, 48, *Heath Crescent, Halifax*.
 1887 ... Brooke, Ven. Archdeacon J. Ingham, *M.A., The Vicarage, Halifax*.
 1887 ... Cash, William, *F.G.S., 26, Mayfield Terrace, Halifax*.
 1896 ... Crabtree, Arthur, *West Hill, Halifax*.
 1887 ... Crossland, Charles, 4, *Coleridge Street, Halifax*.
 1894 ... Crump, W. B., *B.A., 90, King Cross Street, Halifax*.
 1889 ... Davis, J. Percy Avison, *Chevinedge, Halifax*.
 1891 ... Edmondson, Joseph, *Heath Avenue, Halifax*.
 1891 ... Gledhill, Edward, 15, *New Bond Street, Halifax*.
 1891 ... Harding, George F., 33, *Hope Street, Halifax*.
 1894 ... Imbery, John, 16, *Hyde Park Road, Halifax*.
 1891 ... Reith, A. W., *M.A., Heath Grammar School, Halifax*.
 1891 ... Shillito, John, *J.P., 17, Cavendish Terrace, Halifax*.
 1894 ... Simpson, William, *F.G.S., The Gables, Halifax*.
 — ... Soppitt, Henry Thomas, 25, *Glen View, Clover Hill, Halifax*.
 — ... Spencer, James, 8, *Salisbury Place, Akroydon, Halifax*.
 1890 ... Sutcliffe, J. Williams, 27, *West View, Hopwood Lane, Halifax*.
 1890 ... Whitaker, J. Ackroyd, *Craven Lodge, Halifax*.
 1889 ... Whiteley, Frederick L., 10, *Corn Market, Halifax*.
 1891 ... Whitley, J. H., *B.A., Brantwood, Halifax*.

HALLAMSHIRE DIVISION.

Pop. 73,249.

- 1895 ... Payne, Richard, *Newhill Hill, West Melton, viâ Rotherham*.
 — ... Wharcliffe, *The Right Hon. the Earl of, Wortley Hall, near Sheffield*.
 1894 ... Young, J. J. Baldwin, *M.A., Richmond Park, near Sheffield*.

HARROGATE BOROUGH.

Pop. 13,917.

- 1883 ... Backhouse, James, *F.L.S., F.Z.S., M.B.O.U., Daleside, Harrogate*.
 1896 ... Cocks, Llewellyn Jameson, *Godolphin House, Harrogate*.
 1887 ... Farrah, John, 3 and 5, *Crescent Road, Low Harrogate*.
 1894 ... Farrar, Abraham, *Junr., F.G.S., The Grange, Beech Grove, Harrogate*.
 1887 ... Fortune, Riley, *F.Z.S., Learoyd House, Raglan Street, Harrogate*.
 1895 ... Goodall, William, 6, *Beechwood Crescent, Harrogate*.
 1893 ... Johnston-Lavis, H. J., *M.D., M.R.C.S., B.ès Sc., F.G.S., etc., Beaulieu, Alpes-Maritimes, France (Nov. 1st to May 19th); 5, Prince's Square, Harrogate (June 15th to Oct. 1st)*.
 1889 ... King, John, *Grove Villa, Franklin Road, Harrogate*.
 1889 ... Lambert, Abraham, 25, *Great George Street, West End Park, Harrogate*.
 1891 ... Laycock, Thomas, jun., *Deepdene, Franklin Road, Harrogate*.
 1889 ... Lofthouse, J. H., 42, *Mayfield Grove, Harrogate*.
 1891 ... McLean, Kenneth, 32, *Studley Road, Harrogate*.
 1891 ... Millward, Adam, *Cambridge Crescent, Harrogate*.
 1886 ... Naughton, John, *Ellesmere School, Park View, Harrogate*.
 1884 ... Peach, Robert, *North Park Road, Harrogate*.
 1883 ... Saynor, John, *Woodside, Lancaster Road, Harrogate*.
 1894 ... Scaife, Miss Margaret C., *Ivydene, Queen's Road, Harrogate*.
 1893 ... Stephenson, Miss L. W., 6, *Beech Grove, Harrogate*.
 1893 ... Waldby, Joseph R., 31, *Grove Road, Harrogate*.
 1893 ... Warwick, John Walton, 15, *East Parade, Harrogate*.

HOLDERNESS DIVISION.

Pop. 41,298.

- 1894 ... Haworth-Booth, *Lieut.-Col. B. B., J.P., D.L., Hullbank Hall, Hull.*
 — ... Loten, Philip W., *Easington, viâ Hull.*
 1888 ... Oldroyd, Charles, *Lund, near Beverley.*
 1891 ... Maddock, *Rev. Henry E., M.A., F.G.S., Patrington Rectory, Hull.*
 1890 ... Scott, Frederick A., *Sutton, near Hull.*

HOLMFIRTH DIVISION.

Pop. 65,159.

- 1894 ... Clayton, John, *Lidgett House, Wharfedale, Silkstone, Barnsley.*
 — ... Waite, William, *Cliffe Cottage, Clayton West, viâ Huddersfield.*

HOWDENSHERE DIVISION.

Pop. 49,327.

- 1894 ... Ash, *Rev. Cyril D., B.A., Skipwith Vicarage, Selby.*
 1896 ... Ash, *Mrs. C. D., Skipwith Vicarage, Selby.*
 1896 ... Banks, Ernest, *Saltmarshe Cottage, Saltmarshe, Howden.*
 — ... Herries, *The Right Hon. Lord, Lord-Lieutenant of the East Riding, Everingham Park, York.*
 1883 ... Leadman, *Alex. D. H., F.S.A., Oak House, Pocklington, York.*
 1890 ... Marshall, *J. J., Market Weighton, R.S.O.*
 — ... Proudlock, John, *The Nurseries, Market Weighton, R.S.O.*
 1886 ... Stears, *John, Westholme, Hessle, Yorkshire.*
 — ... Whitaker, T. Stephen, *F.R.G.S., Everthorpe, Brough.*

HUDDERSFIELD BOROUGH.

Pop. 96,495.

- ... Brooke, *Edward, jun., F.G.S., Oakley House, Edgerton, Huddersfield.*
 1885 ... Brooke, John Arthur, *J.P., Fenay Hall, Huddersfield.*
 1892 ... Clarke, *Alfred, 9, St. Andrew's Road, Huddersfield.*
 1894 ... Cockshaw, Edward, *65, Blacker Road, Birkby, Huddersfield.*
 1895 ... Crosland, *Councillor F., 15, Wentworth Street, Huddersfield.*
 1889 ... Crosland, G. W. Kilner, *Holmfild, Fitzwilliam Terrace, Huddersfield.*
 1893 L. Mills, *F. W., F.R.M.S., Thornleigh, Huddersfield.*
 1895 ... Sykes, A. W., *9, Commercial Crescent, Huddersfield.*
 1894 ... Wilkinson, Johnson, *M.B.O.U., Vermont, Huddersfield.*
 1890 ... Woodhead, *Thomas William, Arnold Street, Birkby, Huddersfield.*

KEIGHLEY DIVISION.

Pop. 63,272.

- ... Brigg, John, *M.P., F.G.S., Kildwick Hall, viâ Keighley.*
 — ... Butterfield, *E. P. P., Wilsden, near Bingley.*

KINGSTON-UPON-HULL BOROUGH.

Pop. 200,044.

- 1895 ... Carlton, John, *48, Albany Street, Hull.*
 1883 ... Dawson, Percival W., *101, Westbourne Avenue, Hull.*
 1894 ... Dennis, Thomas, *21, Peel Street, Hull.*
 1892 ... Fierke, *Frederick Wm., M.C.S., 52, Francis Street West, Hull.*
 1895 ... Hollingworth, John, *M.R.C.S., 2, Hornsea Parade, Holderness Road, Hull.*
 1890 ... Jackson, Andrew Marvell, *Victoria Chambers, Hull.*
 1892 ... Robinson, James Frazer, *37, Caroline Place, Hull.*
 1884 ... Sawdon, Fred. John, *M.D., 32, Beverley Road, Hull.*
 1888 ... Silabon, George, *Waterhouse Lane, Hull.*
 1891 ... Stather, John W., *F.G.S., 16, Louis Street, Hull.*
 1892 ... Waller, Michael, *105, Westbourne Avenue, Hull.*
 1884 ... Walton, F. Fielder, *M.R.C.S., F.G.S., 10, Charlotte Street, Hull.*
 1891 ... Waterfall, Charles, *10, De Grey Street, Beverley Road, Hull.*

LEEDS CITY.

Pop. 387,505.

- 1886 ... Addyman, James W., *B.A. Lond.*, 15, *East Parade, Leeds.*
 1892 ... Asquith, William E., 23, *Cardigan Road, Headingley, Leeds.*
 1892 ... Baker, Walter Francis, *F.E.S.*, 1, *Hillary Street, Leeds.*
 — ... Barran, Sir John, *Bart.*, *Chapel-Allerton Hall, Leeds.*
 — ... Bedford, James, *Sycamore Lodge, Woodhouse, Leeds.*
 — ... Bedford, James E., *F.G.S.*, *Arncliffe, Shireoak Road, Headingley, Leeds.*
 1885 ... Bingley, Godfrey, *Thorniehurst, Shaw Lane, Headingley, Leeds.*
 — ... Birchall, Edward, 18, *Moorland Road, Leeds.*
 — ... Bould, Charles Henry, 5, *Wrangthorne Place, Hyde Park, Leeds.*
 1885 ... Branson, Frederick W., *F.I.C.*, *F.C.S.*, *Wymneholme, Far Headingley, Leeds.*
 1896 ... Broadhead, W. H., *Craiglea, Headingley, Leeds.*
 — ... Brunton, George, *Hillary Mount*, 169, *Woodhouse Lane, Leeds.*
 1893 ... Coe, Joseph, 16, *Bagby Road, Leeds.*
 1896 ... Crowther, Henry, *F.R.M.S.*, *Curator of the Leeds Philosophical and Literary Society's Museum*; 52, *Brudenell Mount, Headingley, Leeds.*
 1896 ... Foster, George, *Mining Engineer, Bleak House, Harehills, Leeds.*
 1891 ... Grahl, C. E., *Ashwood, Headingley Hill, Leeds.*
 1891 ... Hawkesworth, Edwin, 11, *Nursery Mount, Woodhouse Hill, Hunslet, Leeds.*
 — ... Hewetson, H. Bendelack, *M.R.C.S.*, *F.L.S.*, *F.Z.S.*, 10, *Hanover Square, Leeds.*
 — L. Holgate, Benjamin, *F.G.S.*, 4, *Montpellier Terrace, Headingley, Leeds.*
 1892 ... Kendall, Percy F., *F.G.S.*, *Lecturer on Geology at the Yorkshire College*; 5, *Woodland Terrace, Stainbeck Lane, Leeds.*
 1890 L. Kitson, Sir James, *Bart.*, *M.P.*, *Gledhow Hall, Leeds.*
 — ... Lupton, Henry, *F.E.S.*, *Lyndhurst, North Grange Road, Headingley.*
 1890 L. Oxley, Henry, *Spensfield, Weetwood, Leeds.*
 1891 L. Pawson, Albert Henry, *Lawns House, Farnley, Leeds.*
 1891 L. Pawson, Mrs. A. H., *Lawns House, Farnley, Leeds.*
 1893 ... Parkinson, Stephen, *The 'Yorkshire Post,' Leeds.*
 — ... Pocklington, Henry, *F.R.M.S.*, 41, *Virginia Road, Leeds.*
 1887 ... Powys, Rev. H. Annesley, *M.A.*, *Meanwood Vicarage, Leeds.*
 1887 ... Reynolds, Richard, *F.I.C.*, *F.C.S.*, *Cliff Lodge, Woodhouse, Leeds.*
 1896 ... Riddelsdell, Rev. Harry Joseph, *M.A.*, *Clergy House, Parish Church, Leeds.*
 — ... Roebuck, Wm. Denison, *F.L.S.*, *Sunny Bank, Leeds.*
 — ... Rowley, Walter, *M.Inst.C.E.*, *F.G.S.*, etc., *Alder Hill, Meanwood, Leeds.*
 — ... Stoks, Edwin, 1a, *Victoria Terrace, Belle Vue Road, Leeds.*
 — ... Stubbins, John, *F.G.S.*, *F.R.M.S.*, *Ridge End, Wood Lane, Headingley, Leeds.*
 1887 ... Tate, Thomas, *F.G.S.*, 5, *Eldon Mount, Woodhouse Lane, Leeds.*
 — ... Teasdale, Washington, *F.R.A.S.*, *F.R.M.S.*, 255, *Hyde Park Road, Leeds.*
 — ... Tetley, Charles F., *J.P.*, *Spring Bank, Headingley, Leeds.*
 — ... Thrippleton, John, *Burley View, Leeds.*
 1894 ... Wager, Harold, *F.L.S.*, *Bank View, Chapel-Allerton, Leeds.*
 — ... Ward, George, *F.I.C.*, *F.C.S.*, 1, *Buckingham Terrace, Hyde Park, Leeds.*
 1896 ... Wilson, Henry B., *Armley, Leeds.*
 1896 ... Wurtzburg, John H., *J.P.*, *F.R.Hist.S.*, 2, *De Grey Road, Leeds.*
 — ... Yewdall, Edwin, 58, *Wade Lane, Leeds.*

MALTON TOWN.

Pop. 5,272.

- ... Hodgson, William, *Whelgate, Malton.*
 1896 ... Jenkinson, Rev. S., *Norton, Malton.*
 1890 ... Jones, George Fowler, *Quarrybank, Malton.*
 1889 ... Longster, Thomas Piper, *Mowbray Terrace, Malton.*
 — ... Pearson, Hugh W., *Castle Howard Road, Malton.*
 — ... Slater, Matthew B., *F.L.S.*, 84, *West Grove Villas, Newbiggin, Malton.*
 1889 ... Suddaby, W. M., *Crown Hotel, Wheelgate, Malton.*
 1888 ... Walker, A. W., *York and East Riding Bank, Malton.*

MIDDLESBROUGH BOROUGH.

Pop. 98,982.

- 1890 ... **Veitch, W. Y.**, *L.R.C.P., L.R.C.S., The Crescent, Middlesbrough.*
 1890 ... **Thomas, W. H.**, 7, *Ryedale Terrace, Borough Road, Middlesbrough.*
 1887 ... **Ward, Thomas F.**, *Park Road South, Middlesbrough.*

MORLEY DIVISION.

Pop. 65,216.

- 1890 ... **Carter, Rev. W. Lower, M.A., F.G.S.**, *The Manse, Hopton, Mirfield, Normanton.*

NORMANTON DIVISION.

Pop. 72,012.

- ... **Broadhead, John**, *Calverley House, Altofts, Normanton.*
 1894 ... **Burton, John**, *Farmer, Horbury, Wakefield.*
 — ... **Roberts, George**, *Lofthouse, near Wakefield.*

OSGOLDCROSS DIVISION.

Pop. 66,794.

- ... **Bunker, Thomas**, 9, *East Parade, Goole.*
 1896 ... **Gill, E. Leonard**, *Ivry House, Ackworth, Pontefract.*
 — ... **Harrison, John**, *Tillage Works, Goole.*
 1890 **L. Jones, R. Heywood, J.P.**, *Badsworth Hall, Pontefract.*
 1893 ... **Leatham, Claude**, *The Red House, Wentbridge, Pontefract.*
 1895 ... **Neale, Joseph, B.A.**, *Garden Villa, Ackworth, Pontefract.*
 — ... **Pease, W.**, *Elm Cottage, Hook, near Howden.*

OTLEY DIVISION.

Pop. 61,746.

- 1894 ... **Angus, Henry, M.B., C.M.**, *Burnage House, Bingley.*
 1888 ... **Bilbrough, James Wm.**, *Wharfecote, Ben Rhydding, viâ Leeds.*
 1888 ... **Bilbrough, Mrs. J. W.**, *Wharfecote, Ben Rhydding, viâ Leeds.*
 1893 ... **Fawkes, Mrs. Edith M.**, *Farnley Hall, Otley.*
 — ... **Miall, Louis C.**, *F.R.S., F.L.S., F.G.S., Professor of Biology in the Yorkshire College; Crag Foot, Ben Rhydding, Leeds.*
 1885 ... **Speight, Harry**, *Highfield Villas, Crownest Road, Bingley.*

PICKERING TOWN.

Pop. 3,959.

- 1895 ... **Ashton, James T.**, *M.B., Kingthorpe House, Pickering.*
 — ... **Braim, John**, *Hungate, Pickering, Yorkshire.*
 1895 ... **Comber, Charles Thomas Thornton, L.R.C.P., M.R.C.S.**, *Pickering.*
 1889 ... **Fletcher, William**, *Pickering.*
 1890 ... **Hodgson, Thomas**, *Burgate, Pickering.*
 1886 ... **Lightfoot, Rev. Geo. H., M.A.**, *The Rectory, Pickering.*
 1889 ... **Lucy, Charles T.**, *York Union Bank, Pickering.*
 1895 ... **Mitchelson, Major J. M.**, *The Hall, Pickering.*
 1889 ... **Mitchelson, Thomas**, *The Mount, Pickering.*
 1884 ... **Prodham, Herbert**, *Allerston, near Pickering.*
 1889 ... **Wheldon, John Wm.**, *Burgate, Pickering.*

PONTEFRACT BOROUGH.

Pop. 16,407.

PUDSEY DIVISION.

Pop. 49,252.

- 1885 ... **Braithwaite, Wm. D.**, *B.A., Park View, Horsforth, Leeds.*
 1883 ... **Gaunt, Leonard**, *Prospect House, Farsley, Leeds.*
 1886 ... **Gaunt, Mrs. L.**, *Prospect House, Farsley, Leeds.*
 — ... **Jessop, Rev. William**, *F.A.S., Woodcliffe, Rawdon, Leeds.*
 — ... **Taylor, John W.**, *F.L.S., M.C.S., etc., Spring Bank, Horsforth, Leeds.*

RICHMOND DIVISION.

Pop. 54,439.

- 1891 **L. Carpenter, Hon. Mrs. [Beatrice]**, *Kiplin, Northallerton.*
 — ... **Carter, James**, *M.B.O.U., Burton House, Masham, viâ Bedale.*
 1886 ... **Chaytor, R. C.**, *M.C.S., Scrafton Lodge, Middleham, R.S.O.*
 1895 ... **Davidson, Mrs. Ellen**, *Newbegin, Richmond, Yorkshire.*

- 1884 ... **Horne, William**, *F.G.S., Market Place, Leyburn, R.S.O.*
 1885 ... **Huddart, Rev. G. A. W.**, *M.A., LL.D., Kirklington Rectory, Bedale.*
 1895 ... **Raine, Joseph**, *Newbiggin, Richmond, Yorkshire.*
 1884 ... **Taylor, Rev. Richard** **Vickerman, B.A.**, *Melbecks Vicarage, viâ Richmond, Yorkshire.*

RIPON DIVISION.

Pop. 54,925.

- 1886 ... **Clarkson, W. C.**, *L.R.C.P., etc., Darley, Ripley, viâ Leeds.*
 1894 ... **Garrod, Rev. George** **Watts, B.A.**, *11, Crescent Parade, Ripon.*
 1891 ... **Heslington, Thos. Clarke**, *2, North Road, Ripon.*
 1883 ... **Hurst, Joseph S.**, *J.P., Copt Hewick Hall, Ripon.*
 — ... **Ingleby, James**, *Éavestone, near Ripon.*
 — ... **Jowitt, Mrs. Hannah**, *Thornton Grove, Ripley, Leeds.*
 — **L. Knubley, Rev. E. Ponsonby**, *M.A., M.B.O.U., Staveley Rectory, viâ Leeds.*
 1883 ... **Paver-Crow, Richard**, *J.P., Ornshams Hall, Boroughbridge, York.*
 1885 ... **Radcliffe, Sir J. Percival**, *Bart., F.R.A.S., Rudding Park, Knaresborough.*
 — ... **Ripon, The Most Hon. the Marquis of, K.G., F.R.S., etc.**, *Studley Royal, Ripon.*
 1888 ... **St. Paul, Major Horace**, *J.P., The Willows, Ripon.*
 1893 ... **Stephenson, Tom**, *North Stainley Hall, near Ripon.*
 1891 **L. Stobart, William C.**, *J.P., Spellow Hill, viâ Leeds.*
 — ... **Summerfield, Rev. R. A.**, *B.A., North Stainley Vicarage, near Ripon.*
 1884 ... **Travis, Rev. William** **Travis, M.A.**, *The Rectory, Ripley, viâ Leeds.*

ROTHERHAM DIVISION.

Pop. 78,597.

- 1884 ... **Bennett, Samuel H.**, *Boston Castle Grove, Rotherham.*
 1884 ... **Eskholme, George**, *J.P., Beech-en-Hurst, Rotherham.*
 1896 ... **Howitt, John**, *12, Whiston Grove, Rotherham.*
 1896 ... **Moore, Harry**, *12, Whiston Grove, Rotherham.*

SALTBURN-BY-THE-SEA.

Pop. 2,384.

- 1888 ... **Barnes, Richard**, *The Gardens, Saltburn-by-the-Sea.*
 1889 ... **Crawshaw, Rev. Charles**, *M.C.S., Opal House, Emerald Street, Saltburn-by-the-Sea.*
 1890 ... **Hallimond, Henry T.**, *3, Lune Street, Saltburn-by-the-Sea.*
 1884 ... **l'Anson, Joseph** **Coventry, F.S.A., F.G.S., etc.**, *6, Britannia Terrace, Saltburn-by-the-Sea.*
 1885 ... **Irvin, Rev. Benjamin**, *M.A., The Vicarage, Saltburn-by-the-Sea.*
 1890 ... **Thompson, M. Lawson**, *Diamond Street, Saltburn-by-the-Sea.*

SCARBOROUGH BOROUGH.

Pop. 33,776.

- 1893 ... **Barker, Reginald H.**, *Grosvenor Bank, Scarborough.*
 1892 ... **Chapman, John G.**, *Chapman's Hotel, Blenheim Street, Scarborough.*
 1892 **L. Clarke, William** **James, 44, Huntriss Row, Scarborough.
 1892 ... **Hudson, George**, *M.D., Westbourne House, Scarborough.*
 1889 ... **Rowntree, Allan**, *Broom Lodge, Scarborough.*
 — **L. Rowntree, James Henry**, *Westwood, Scarborough.*
 1892 ... **Rowntree, William**, *J.P., Westwood, Scarborough.*
 1888 ... **Woodall, Major John W.**, *M.A., J.P., F.G.S., etc., St. Nicholas House, Scarborough.***

SHEFFIELD CITY.

Pop. 324,243.

- 1884 ... **Birks, Edward**, *Birchcliffe, Broomhall Park, Sheffield.*
 1884 ... **Brittain, Ald. Frederick**, *Melbourne Avenue, Sheffield.*
 1892 ... **Brittain, Ald. W. H.**, *J.P., Storth Oaks, Ranmoor, Sheffield.*
 1893 ... **Coombe, John** **Newton, Brocas Bank, Sheffield.
 1885 ... **Denny, Alfred**, *F.L.S., Professor of Biology in the Firth College, 9, Summerfield, Broomhill, Sheffield.*
 1896 ... **Ellis, Rev. John**, *Sheffield.***

- 1889 L. **Hall, Albert Ernest**, *F.E.S.*, *Norbury, Pitsmoor, Sheffield.*
 1889 ... **Howarth, Elijah**, *F.R.A.S.*, *Curator of Sheffield Public Museum, Weston Park; Hilbre Nest, Crookesmoor, Sheffield.*
 1892 ... Sheffield Central Public Free Library, *Surrey Street, Sheffield* (Samuel Smith, *Chief Librarian*).
 — ... **Sorby, Henry Clifton**, *L.L.D.*, *F.R.S.*, *F.L.S.*, *F.G.S.*, *F.R.M.S.*, *etc.*, *Broomfield, Sheffield (Ex-President).*
 1895 ... Tindall, Frederick Markham, *Jun.*, 27, *Victoria Road, Broomhall Park, Sheffield.*
 1885 ... **Watson, Arnold Thomas**, *Southwood, Tupton Crescent, Sheffield.*
 1893 ... **White, William**, *F.E.S.*, *Curator, the Ruskin Museum, Sheffield.*
 1890 ... **Wilson, H. J.**, *M.P.*, *Osgathorpe Hills, Sheffield.*

SHIPLEY DIVISION.

Pop. 62,166.

SKIPTON DIVISION.

Pop. 58,209.

- ... **Eddy, J. Ray**, *F.G.S.*, *F.R.M.S.*, *The Grange, Carleton, Skipton.*
 1887 ... **Handley, John**, *Briggflatts, Seaberg, R.S.O.*
 1887 ... **Mackie, Rev. John H.**, *M.A.*, *The Grammar School, Sedbergh, R.S.O.*
 1883 ... Morrison, Walter, *M.P.*, *Malham Tarn House, Bell Busk, viâ Leeds.*
 1893 ... **Peake, Edward**, *M.A.*, 12, *Craven Terrace, Settle.*
 — ... **Richardson, Hugh**, *M.A.*, *The Grammar School, Sedbergh, R.S.O.*
 1894 ... Rickards, C. A., *Bell Busk, viâ Leeds.*
 1887 ... Robinson, William, *Green Bank, Sedbergh, R.S.O.*
 — ... Shuffrey, Rev. W. A., *M.A.*, *Vicarage, Arncliffe, viâ Skipton.*
 1896 ... Slingsby, W. Cecil, *F.R.G.S.*, *Carleton, Skipton-in-Craven.*
 1892 ... **Wilkinson, J. J.**, *Burnside, Skipton.*
 1890 L. **Wright, C. B. E.**, *J.P.*, *Bolton Hall, Clitheroe.*

SOWERBY DIVISION.

Pop. 63,202.

- 1896 ... Hellewell, Young, 10, *George Street, Todmorden.*
 1894 ... Needham, James, *Woodend, Hebden Bridge.*
 1894 ... Saltonstal, Thomas, *Sowerby, Halifax.*

SPEN VALLEY DIVISION.

Pop. 57,402.

- ... Blakeley, John Wesley, *Huddersfield Road, Liversedge.*
 1891 L. **Cooke, James S.**, *J.P.*, *F.R.A.S.*, *Springsfield, Gomersal, Leeds.*
 1895 ... Crosland, Robert Wilfrid, *Oldfieldnook, Cleckheaton.*
 — ... **Fowler, Rev. William**, *M.A.*, *Vicarage, Liversedge, viâ Normanton (Ex-President).*
 1896 ... Hind, Rev. H. N., *M.A.*, *Hightown, Liversedge, Normanton.*
 — ... Hindley, A. D., *Liversedge, viâ Normanton.*
 1891 ... Niven, George H., *Northgate House, Cleckheaton.*
 1896 ... Priestley, F. N., *Littleton, Liversedge, Normanton.*
 1893 ... Rothery, Albert, *South Holme, Liversedge, Normanton.*
 — ... **Stead, John James**, *Albert Cottage, Heckmondwike.*

THIRSK AND MALTON DIVISION. (For Malton Names see separate list.)

Pop. 57,183.

- ... **Addison, Rev. Frederick**, *M.A.*, *Sutton Road, Thirsk.*
 1890 ... Buchanan, John Hamilton, *M.D.*, *Sowerby, Thirsk.*
 1890 L. **Carlisle, Right Hon. the Earl of**, *J.P.*, *Castle Howard, York.*
 1888 ... Fitzwilliam, *Hon. W. H. Wentworth, M.P.*, *Wiganthorpe, York.*
 — ... **Foggitt, William**, *South Villa, Thirsk.*
 1883 H.L. **Galloway, Sir Ralph Payne, Bart.**, *M.B.O.U.*, *Thirkleby Park, Thirsk (Ex-President).*
 1894 ... **Grabham, Oxley, M.A.**, *M.B.O.U.*, *Westfield, Flaxton, York.*
 — ... **Gregson, William**, *F.G.S.*, *Baldersby, S.O.*, *Yorkshire.*
 1884 ... **Mitchell, T. Carter**, *F.S.A.*, *Topcliffe, near Thirsk.*
 — ... **Wright, John**, *Terrington, viâ York.*

THORNABY-ON-TEES BOROUGH.

Pop. 15,640.

WAKEFIELD CITY.

Pop. 37,269.

- 1892 ... Parke, George Henry, *F.L.S., F.G.S., St. John's, Wakefield.*
 — ... **Parkin, George**, 15, *York Street, Wakefield.*
 1889 **H.L. Wakefield**, *The Right Rev. William Waisham-How, D.D., etc., Lord Bishop of, Bishopgarth, Wakefield (Ex-President).*

WHITBY DIVISION.

Pop. 54,776.

- 1889 ... Atkinson, Thomas, 7, *Normanby Terrace, Whitby.*
 — ... Colby, George, *Brawby Park, Pickering.*
 1892 ... Hebden, *Mrs. Emmeline, Appleton Mill, Sinnington, R.S.O.*
 — ... **Hey, Rev. William Croser**, *M.A., M.C.S., Derwent House, West Ayton, Seamer, York.*
 1885 ... **Newbitt, Thomas**, 17, *Royal Crescent, West Cliff, Whitby.*
 1894 ... Punshon, *Mrs. R. M., Oldstead Hall, Ampleforth, York.*
 1887 ... Pyman, Walter H. S., *Moss Brow, Whitby.*
 1895 ... Rowland, Lewis George, 16, *St. Hilda's Terrace, Whitby.*
 1888 ... Smith, Christopher W., *Harome, Newton, viâ York.*
 1889 ... Stevenson, John, *J.P., Broomfield Terrace, Whitby.*
 1889 ... Stewart, John T., 3, *Belle Vue Terrace, Whitby.*

YORK CITY.

Pop. 67,004.

- 1896 **L. Anderson**, *Tempest. M.B., B.Sc., 17, Stonegate, York.*
 1893 ... Bean, Eugene, 8, *Nessgate, York.*
 — ... **Clark, James Edmund**, *B.A., B.Sc., 12, Feversham Terrace, York.*
 — ... **Dennis, George C.**, *F.E.S., 39, Blossom Street, York.*
 1893 ... Dutton, Robert, *Castle Mills Bridge, York.*
 1893 ... Elmhirst, Charles E., 17, *Mount Parade, York.*
 1888 ... Gibb, George S., *LL.B., Chestnut Grove, Heworth, York.*
 — ... **Hewett, William**, 12, *Howard Street, Fulford Road, York.*
 1889 ... Hodzman, George, 8, *Feversham Terrace, York.*
 1896 ... Ingham, William, *B.A.Lond., 47, Haxby Road, York.*
 — ... **Jackson, George**, 2, *Clement Street, York.*
 1896 ... Leetham, Ernest, *Park Grove, York.*
 1893 ... Mackay, Donald S., 4, *Lendal, York.*
 1896 ... Melrose, James, *Clifton Croft, York.*
 — ... **Moiser, Henry R.**, *F.G.S., Heworth Grange, York.*
 1895 ... **Platnauer, Henry Maurice**, *B.Sc., F.G.S., etc., Curator of the Museum, York; and Low Royd, St. Olave's Road, York.*
 1893 ... **Potter, Ernest Guy**, 14, *Bootham Crescent, York.*
 1890 ... Procter, John William, *Ashcroft, York.*
 1896 ... Raimse, Alwyn, *M.B., 2, Scarcroft Road, York.*
 1896 ... Rowntree, Theodore H., *Mount Villas, York.*
 1884 ... Thompson, Richard, *Dringcote, York.*
 1890 ... Walker, John Francis, *M.A., F.G.S., F.L.S., F.C.S., F.I.C., F.Z.S., etc., 45, Bootham, York.*
 1896 ... Walker, Wm. Thomlinson, *J.P., Clifton Grove, York.*
 1893 ... Wilkinson, Arthur, 39, *East Mount Road, York.*
 1893 ... **Wilkinson, Henry J.**, 11, *Chapter House Street, York.*

DURHAM, NORTHUMBERLAND, CUMBERLAND, WESTMORLAND, CHESHIRE,
LANCASHIRE, AND ISLE OF MAN.

- 1890 ... Bacon, J. Cæsar, *Seafield, Santon, Isle of Man.*
 — ... **Birks, Thomas**, *Moss Lodge, King's Road, Rochdale.*
 1886 ... **Brownridge, Chas.**, *Assoc.M.I.C.E., F.G.S., 26, North Road, Devonshire Park, Birkenhead.*
 1896 ... Clarke, Henry Shortridge, *F.E.S., Sulby Parsonage, Lezayre, Isle of Man.*

- 1891 ... Collins, Francis Richard, 88, *Mill Street, Crewe.*
 1883 ... Darbshire, R. D., *B.A., F.S.A., Victoria Park, Manchester.*
 1896 H.L. Dawkins, Prof. W. Boyd, *M.A., F.R.S., F.G.S., Manchester*
(President-Elect).
 1894 ... Foggitt, John B., 29, *Newill Street, Southport.*
 1885 ... Gardner, John, *F.E.S., 8, Friar Terrace, Hartlepool.*
 1887 ... Gerrard, John, *M.B.O.U., H.M. Inspector of Mines, Worsley, Manchester.*
 1892 ... Howse, Richard, *Curator of the Newcastle Museum, and Hon. Sec. Tyne-*
side Nat. Field Club, 12, St. Thomas Crescent, Newcastle-on-Tyne.
 1888 ... Leach, Richard Ernest, *M.A., F.L.S., F.G.S., Grammar School,*
Appleby.
 1890 L. Marshall, Arthur, *Hallsteads, Penrith.*
 1894 ... Melvill, James Cosmo, *M.A., F.L.S., etc., Brook House, Prestwich,*
Manchester.
 1894 ... Petty, S. Lister, 24, *Queen Street, Ulverston.*
 1883 ... Richmond, Right Rev. J. J. Pulleine, *D.D., Bishop of, Stanhope Rectory,*
viâ Darlington.
 1889 ... Trechmann, Chas. O., *Ph.D., F.G.S., Hudworth Tower, Castle Eden,*
Durham.
 1890 ... Waddington, Robert, *Haslingden, Lancashire.*
 1887 ... Watts, Rev. A., *F.G.S., F.R.G.S., The Rectory, Witton Gilbert, Durham.*

COUNTIES SOUTH OF YORKSHIRE.

- 1883 H.L. Baker, John Gilbert, *F.R.S., F.L.S., The Royal Gardens, Kew*
(Ex-President).
 — ... Beaumont, Alfred, *F.E.S., The Red Cottage, Pond Road, Blackheath,*
London, S.E.
 1895 ... Braithwaite, Robert, *M.D., F.L.S., F.R.M.S., 303, Clapham Road,*
London, S.W. (President).
 — ... Butterfield, J. A., *B.Sc., 35, Wrotesley Road, Plumstead, London, S.E.*
 1891 L. Champney, John E., *J.P., Abchurch Chambers, London, E.C.*
 1890 L. Charlesworth, John B., *J.P., Hurts Hall, Saxmundham.*
 — ... Cordeaux, John, *M.B.O.U., Great Cotes House, R.S.O., Lincoln*
(President).
 1885 H.L. Dallinger, Rev. W. H., *LL.D., F.R.S., F.L.S., Sec.R.M.S., etc.,*
Ingleside, Newstead Road, Lee, London, S.E. (Ex-President).
 1889 H.L. Dresser, Henry Eeles, *F.L.S., F.Z.S., etc., 110, Cannon Street,*
London, E.C. (Ex-President).
 1883 ... Dunning, Joseph William, *M.A., F.L.S., F.Z.S., F.E.S., 4, Talbot*
Square, London, W.
 1884 ... Fox, Rev. Henry E., *M.A., M.B.O.U., Fairview, Norbiton, Surrey.*
 1883 ... Gough, Rev. T., *B.Sc., F.G.S., King Edward VI. School, East Retford.*
 1894 ... Green, Upfield, *F.G.S., Tenter Street, Moorfields, London.*
 1884 ... Grove, Edmund, *F.R.M.S., Norlington, Preston, Brighton.*
 1887 ... Haigh, G. H. Caton, *M.B.O.U., Aber-iâ, Penrhyndeudraeth, Merioneth-*
shire; and Grainsby Hall, Great Grimsby, Lincolnshire.
 — ... Harker, Alfred, *M.A., F.G.S., St. John's College, Cambridge; Geological*
Survey Office, Sheriff Court Buildings, Edinburgh; and 8, Park
Avenue, Princess Avenue, Hull.
 1891 ... Harrison, Joseph H., 50, *Compton Street, Chesterfield, Derbyshire.*
 1890 L. Hawkesbury, Right Hon. Lord, *Cockglode, Ollerton, Newark, Notts.*
 1883 ... Hopkinson, John, *F.L.S., F.G.S., F.R.M.S., etc., The Grange, St.*
Albans, Herts.
 1884 ... Hudleston, Wilfrid H., *M.A., F.R.S., F.L.S., F.G.S., F.C.S., etc.,*
8, Stanhope Gardens, London, S.W. (Ex-President).
 1892 ... Lindley, W. E., 3, *Glendale Road, Brockley, Kent.*
 — ... Mason, Philip Brookes, *J.P., F.L.S., F.E.S., M.C.S., etc., Trent House,*
Bridge Street, Burton-on-Trent.
 — ... Massee, George E., *F.L.S., F.R.M.S., 1, Kent Road, Kew, Surrey.*
 1890 L. Newton, Rev. Canon Horace, *The Vicarage, Redditch.*
 1883 ... Oldfield, George Wm., *M.A., F.E.S., 21, Longridge Road, Earl's Court,*
London, S.W.

- 1888 ... Oxley, *Rev. W. H., M.A., Petersham Vicarage, Surrey.*
 1888 ... Painter, *Rev. W. Hunt, Stirchley Rectory, near Shifnal, Shropshire.*
 — **H.L. Parsons, Henry Franklin, M.D., F.G.S., 4, Park Hill Rise, Croydon, Surrey.**
 1893 ... Petch, Tom, *B.A., 27, Wisbech Road, King's Lynn.*
 — ... **Slater, Rev. Henry H., M.A., F.Z.S., M.B.O.U., etc., Thornhaugh Rectory, Wansford, Northamptonshire.**
 1890 ... **Spiers, Rev. William, M.A., F.G.S., F.R.M.S., Victoria Place, Cheadle, Staffs.**
 1889 ... Strickland, Walter W. [*Address unknown.*]
 1893 ... **Tiddeman, R. H., M.A., F.G.S., Bridgend, Glamorganshire (Ex-President).**
 — **H.L. Walsingham, The Right Hon. Lord, M.A., F.R.S., F.L.S., F.E.S., etc., Merton Hall, Thetford, Norfolk; and Blubberhouses, Yorkshire (Ex-President).**
 1888 ... Weetman, Henry, *F.Z.S., The Hawthorns, Little Haywood, Stafford.*
 — ... **Whitwell, William, F.L.S., M.C.S., Roslin, 4, Thurleigh Road, Balham, London, S.W.**
 1890 ... Woodd, Charles Hampden Basil, *M.A., Glenthorne, Eastbourne, Sussex.*

SCOTLAND AND IRELAND.

- ... **Clarke, Wm. Eagle, F.L.S., M.B.O.U., Nat. Hist. Dept., Edinburgh Museum of Science and Art, 35, Braid Road, Edinburgh.**
 1885 ... Harvie-Brown, John A., *F.R.S.E., F.Z.S., M.B.O.U., etc., Dunipace House, Larbert, N.B.*
 1888 ... **Kidston, Robert, F.R.S.E., F.G.S., 24, Victoria Place, Stirling, N.B.**
 1889 ... Scharff, Robert F., *Ph.D., B.Sc., M.R.I.A., etc., Keeper, Nat. Hist. Colln., Dublin Museum of Science and Art, 9, Leeson Park, Dublin.*

BRITISH COLONIES.

- ... **Bairstow, Samuel Denton, F.L.S., 120, Main Street, Port Elizabeth, Cape Colony.**
 — ... **Chadwick, Samuel, F.G.S., P.O., Napier, New Zealand.**
 1890 ... LeTall, Benj. Bower, *M.A. Lond., Friends' School, Hobart, Tasmania.*
 1888 ... **Waite, Edgar R., F.L.S., Zoologist to the Australian Museum, Ashville, Avenue Road, Mossman's Bay, Sydney, New South Wales.**



36th Annual Report & Balance-Sheet for 1897.

Report of Sub-Committee on Finance.

List of Members, arranged Geographically,

Corrected to November 1st, 1897.

YORKSHIRE NATURALISTS' UNION.

THIRTY-SIXTH ANNUAL REPORT, for 1897.

YOUR Executive have to congratulate the members on the completion of another year's successful working, on the continued activity of the Committees of Research, and on the success which still continues to attend the Union's excursions.

The Meetings held during the year have been six in number as usual, one for each division of the county, and a Fungus Foray.

The districts chosen for investigation and the dates of the meetings were as follows:—

- April 19, Easter Monday : Boston Spa.
- May 13, Thursday : Skelmanthorpe.
- June 7, Whit Monday : Cotherstone.
- July 8, Thursday : Langdale End and Hackness.
- Aug. 2, Bank Holiday Monday : Everingham Park.
- Sep. 18 to 20, Saturday to Monday : Barnsley for Fungus Foray.

The usual descriptive circular for each excursion was issued to members and associates.

The opening excursion was a most successful gathering at Boston Spa, on Easter Monday, the 19th April. The weather being favourable much good work was done. The meeting was presided over by the Union's old and staunch friend, Mr. John Emmet, F.L.S., to whose keen research in past years it is that we owe what is known of the botany and conchology of the district. Mr. Ll. J. Cocks, in the capacity of special secretary or the meeting, laid the Union under great obligation by the excellence of the arrangements made.

The second meeting was an equally successful one, on the 13th May, devoted to the neighbourhood of Skelmanthorpe, under the able guidance of Messrs. F. Lawton and B. Morley, of that place. The special secretaryship for this meeting was in the hands of Mr. Arthur Crabtree.

The third meeting was held on Whit Monday, June 7th, at Cotherstone, a district which has been but little explored. On this occasion the party was conducted by Messrs. W. Herdman, F.G.S., J. G. Brass, Ridley, M'Andrews, and Carter, all of the neighbourhood. Mr. Arthur Crabtree again performed very efficiently the work of organising and carrying out the arrangements, as special hon. secretary for the meeting.

The fourth meeting was held on July 8th, at Scarborough, partly in conjunction with the Yorkshire Geological and Polytechnic Society, and was devoted to the exploration of Langdale End and the adjacent valleys beyond Hackness. The Union's old friend, Mr. James H. Rowntree, acted as special hon. secretary for this excursion.

The fifth meeting was held on the Bank Holiday Monday, August 2nd, at Everingham Park, the beautifully-situated seat of Lord Herries. On this occasion a fair amount of work was done, especially in lepidoptera. Mr. J. J. Marshall acted as special hon. secretary for this meeting, the arrangements made by him being very efficiently carried out.

Regarding the Fungus Foray, held on the 18th to 20th September, at Barnsley, of which a notice will be given under the Mycological Committee, there needs only be added here an expression of the obligations under which Mr. E. G. Bayford laid the Union, by his efficient arrangements as special hon. secretary.

The Union has again been placed under considerable obligation to the landed gentry of the county, for the unvarying courtesy with which they facilitate the Union's work by allowing permission for their estates to be visited on the occasion of the excursions.

The various railway companies have also most kindly granted such privileges as have been asked for on the occasion of each of the Union's meetings.

For the excursions of the coming year, 1898, your Executive recommend that the following programme of places and dates be adopted:—

For York Mid W.—Clapham for Bowland Knotts, Monday, May 16th.

For York S.W.—Doncaster for Balby and Sandal, Whit Monday, May 30th.

For York N.E.—Hovingham and Wiggantherpe, Saturday, June 18th.

For York N.W.—Bedale for Jerveaux Abbey, Saturday, July 9th.

For York S.E.—Easington for Spurn Point, Friday to Monday, July 30th to August 1st.

The Mycological Committee propose that the Fungus Foray shall be held at Leeds for Harewood Park and Woods, at a date to be fixed to suit the circumstances of the case, in September, and your Executive have pleasure in recommending that the request be complied with.

For the Annual Meeting of next year (1898), the invitation presented by the Scarborough Societies will be renewed, and your Executive cordially recommend that it be accepted.

The Societies which constitute the Union are now thirty-six in number, the same figure as last year. The Ovenden Naturalists' Society, which was one of the oldest in the Union, has ceased to exist, but this loss is counterbalanced by the accession of another Society in the same district, the West Vale Naturalists' Society.

The Statistics which the Secretaries of the different Societies have again been kind enough to furnish, show a further slight decrease in the number of associates, the aggregate membership of the thirty-six Societies now amounting to 2,383, a decrease of 66. Adding to this the number of direct members, the total numerical strength of the Union is 2,814.

The Membership of the Union now stands at 431, being 24 Life Members, 4 Honorary Life Members, and 403 Ordinary Members, a decrease of 26 members from last year.

During the year 38 new members have been elected, while on the other hand a few members have died or resigned, and a considerable number have been struck off the Rolls for non-payment of arrears of Subscriptions.

The Death-roll has included a number of prominent members of the Union. In the late Bishop of Wakefield the Union has lost one of its most valued Ex-Presidents, while the Boulder Committee has been deprived of the services of a most efficient Hon. Secretary by the unexpectedly sudden death of Mr. Thomas Tate, F.G.S. The decease of Mr. J. W. Dunning, M.A., F.L.S., deprives the Union of one of its most munificent friends, while the death of the Rev. Charles Crawshaw, of Saltburn, removes one of the small band of students of marine mollusca. Other losses by death have been Mr. T. A. Bradley, of Dewsbury, Mr. Thomas Saltonstall, of Sowerby, and Councillor F. Crosland, of Huddersfield.

The Financial Position of the Union is practically the same as it was last year. The following is the Hon. Treasurer's Statement of Receipts and Payments during the year:—

FINANCIAL STATEMENT, 1897.

Receipts.				Payments.	
		£	s. d.	£	s. d.
Levies paid by Societies:—				Balance due to Treasurer	2 11 1
1894	0 15 0			Members' Cards and General Expenses	14 19 1
1895	2 18 6			Expenses of Meetings:—	
1896	10 6 9			Boston Spa	8 7 5
1897	7 11 6			Skelmanthorpe	8 13 0
			21 11 9	Cotherstone	9 10 11
Subscriptions paid by Mem- bers:—				Langdale End	6 3 7
1883	0 2 6			Everingham	7 2 10
1884	0 2 6			Fungus Foray	5 11 4
1885	0 2 6			Annual Meetings	11 6 11
1886	0 2 6			Expenses incurred by Hon. Treasurer	56 16 0
1887	0 7 6			Subscription to Footpath Preservation	5 9 1
1888	0 10 6			Society	0 10 6
1889	1 16 0			Album for Geological Photographic	
1890	0 17 6			Committee	0 8 3
1891	2 11 6			Insurance	0 6 0
1892	1 4 0			Expenses of Library, Exchanges, Back Stock, etc.	11 19 2
1893	1 1 0			Païd on account of Transactions ..	23 2 6
1894	2 3 0			Païd on Account of 'Naturalist' ..	137 5 0
1895	9 4 6				
1896	15 3 0				
1897	55 18 6				
		97	7 0		
Sales from Stock of Publications ..		3	4 8		
Received on behalf of 'Naturalist' ..		130	9 5		
		246	12 10		
Balance due to Treasurer		6	13 10		
		£253	6 8		£253 6 8

The financial position of the Union is shown by the statement of assets and liabilities, as follows:—

Assets.

Re 'NATURALIST.'		£	s. d.	£	s. d.
Cash in hands of Local and General Treasurers, or in Bank	32 6 0				
Subscriptions owing	49 4 0			81	10 0
Re GENERAL ACCOUNT.					
Cash in hands of Local and General Treasurers, or in Bank	19 11 6				
Subscriptions owing	71 1 6			90	13 0
Re STOCK ACCOUNT.					
Cash in hands of Local and General Treasurers, or in Bank	6 17 0			6	17 0
		£179	0 0		
Book Cases valued at	8 0 0				
Books in Library valued at	160 0 0				
Stock of Transactions valued at	40 0 0				
Stock of 'Flora' valued at	100 0 0				
Stock of 'Naturalist' valued at	60 0 0				
	368 0 0				
Estimated to produce		185	0 0		
		£364	0 0		

Liabilities.

Re 'NATURALIST.'		£	s. d.	£	s. d.
Owing to Printers	90 10 0				
Add for Nov. and Dec.	20 0 0				
Owing to Secretary	10 9 0			120	19 0
Re GENERAL ACCOUNT.					
Owing to Printers	7 1 6				
Owing to Secretary	5 7 2			12	8 8
Re TRANSACTIONS.					
Part 20 of Trans.	17 15 0				
Parts 21, 22, 23 at same rate	53 5 0				
Owing to Secretary	0 9 0			71	9 0
Re LIBRARY & STOCK.					
Owing to Tradesmen	2 4 0				
Owing to Secretary	0 1 10				
Owing for Rent	1 0 0				
				3	5 10
		£208	2 6		
Balance of assets over liabilities ..		155	17 6		

£364 0 0

The Sub-committee which was appointed last year by the General Committee to investigate the financial basis of the Union have favoured your Executive with a copy of their report, which is one in which your Executive have to express their entire concurrence. The report is printed with this, and it only remains for the new Executive, and for the members generally, to spare no effort which is needed for putting the Union in a position to carry on its work of publication without financial stress.

Local Treasurers.—Your Executive recommend the re-election of the Hon. Local Treasurers as follows:—Barnsley: E. G. Bayford; Beverley: T. J. Morley; Bingley: H. Speight; Doncaster: George Winter; Goole: Thomas Bunker; Halifax: Arthur Crabtree; Harrogate: Adam Millward; Huddersfield: A. Clarke; Hull: John Stears; Malton: M. B. Slater, F.L.S.; Market Weighton: J. J. Marshall; Middlesbrough: T. F. Ward; Pickering: John Braim; Redcar: T. H. Nelson, M.B.O.U.; Ripon: Wm. Gregson, F.G.S.; Saltburn: Richard Barnes; Scarborough: J. H. Rowntree; Selby: W. Norwood Cheesman; Sheffield: A. T. Watson; Skipton: J. J. Wilkinson; Spen Valley: Albert Rothery; Wakefield: George Parkin; Whitby: Thos. Newbitt; York: G. C. Dennis, F.E.S. There are vacancies for the following and other districts, and your Executive would be glad if members would volunteer their services in this capacity:—Boston Spa, Bradford, Bridlington, Darlington, Dewsbury, Driffield, Keighley, Leeds, Richmond, Rotherham, Sedbergh, Settle, and Thirsk.

It is a great advantage to the Union to be represented by the Hon. Local Treasurers, and your Executive would here express the Hon. Treasurer's sense of indebtedness to them for the assistance they render him.

The Publications of the Union have been as in former years, the 'Transactions' and the 'Naturalist.'

One Part, 20, of the 'Transactions' was issued about this time last year, and is devoted to various papers, including Dr. Braithwaite's Presidential Address, delivered in 1895; the long-delayed report on Yorkshire Lepidoptera for 1891, drawn up by Mr. A. E. Hall; and a further instalment of the Rev. W. C. Hey's Catalogue of Yorkshire Beetles.

Your Executive had hoped to be able to issue a further instalment of the second edition of Mr. Baker's 'North Yorkshire,' but Mr. M. B. Slater, F.L.S., in whose capable hands the Mosses are in process of revision, and an entirely new chapter on Hepatics is in preparation, has been unable to

complete the task. Mr. Slater expects, however, to be able to furnish the MS. early in the spring of 1898.

The 'Naturalist' has been published monthly during the year under the sole editorship of Mr. W. Denison Roebuck, F.L.S., under whose direction it has fully sustained the reputation which it has for many years enjoyed as the recognised medium for the publication of natural history observations for the whole of the North of England.

Your Executive and the Editor would take this opportunity of reminding members that the Journal has always been sufficiently catholic in its scope to welcome articles dealing with the life-history of animals and plants as observed in the northern counties, as well as with any biological and general considerations that the local observations give rise to.

The Library continues to increase, mainly by donations and exchanges, and it has been made use of by the members to a larger extent than formerly, in spite of the want of accommodation and of a catalogue. Your Executive have had pleasure in accepting a kind offer by Mr. John Farrah, to have a catalogue drawn up and printed. Your Executive have continued to keep in view the desirability of making the Library more accessible to the members, but have not so far been able to make suitable arrangements for the accomplishment of this object.

The Sections of the Union have more or less steadily carried on their work during the year, and as the success of the field excursions entirely depends upon the presence of the Union's best workers in every department, it is to be hoped that members will endeavour to support the arrangements made by the General and Sectional Officers by their presence at as many excursions as possible.

The Committees of Research have continued their investigations during the year with very satisfactory results.

The Yorkshire Boulder Committee have lost their invaluable Hon. Sec. by the death of Mr. Thomas Tate, F.G.S. They have appointed in his stead Mr. J. H. Howarth, F.G.S., of Bradford, and their investigations have been continued in various quarters as heretofore. The Chairman, Mr. P. F. Kendall, F.G.S., has this autumn visited Southern Norway, and succeeded in collecting in situ and identifying specimens of a number of rocks, examples of which are found upon our East Coast. The information thus obtained by Mr. Kendall will be of great service to the Committee. The usual report has been presented to the British Association, and will be published in the 'Naturalist' in due course.

It is recommended that the Committee be re-appointed, as follows:—Percy F. Kendall, F.G.S., Leeds, Chairman; J. H. Howarth, F.G.S., Bradford, Hon. Sec.; J. E. Bedford, F.G.S., Leeds; C. Brownridge, F.G.S., Birkenhead; John Burton, Horbury; Rev. W. L. Carter, M.A., F.G.S., Hopton; Rev. E. Maule Cole, M.A., F.G.S., Wetwang; H. H. Corbett, M.R.C.S., Doncaster; Wm. Gregson, F.G.S., Baldersby; B. Holgate, F.G.S., Leeds; Wm. Horne, F.G.S., Leyburn; Robert Law, F.G.S., Halifax; J. R. Mortimer, F.G.S., Driffield; H. M. Platnauer, B.Sc., F.G.S., York; Thos. Sheppard, Hull; James Spencer, Halifax; J. W. Stather, F.G.S., Hull; R. H. Tiddeman, M.A., F.G.S., Bridgend; F. Fielder Waiton, F.G.S., Hull; R. Wood, M.D., Driffield; and J. W. Woodall, M.A., F.G.S., Scarborough.

The Yorkshire Fossil Flora Committee.—Mr. Robert Kidston, F.R.S.E., F.G.S., states that since the previous report was given in, a good deal of work has been done in collecting and examining examples of the Yorkshire Coal-Flora. Several new workers are giving valuable assistance, and the detailed report of the Committee will contain several new county records as well as a great many records of plants already known for Yorkshire, but from new localities or horizons.

It is recommended that the Committee be reappointed as follows:—James Spencer, Halifax, Chairman; Benjamin Holgate, F.G.S., Leeds, Vice-Chairman; William Cash, F.G.S., Halifax, Hon. Secretary; J. W. Bond, Leeds; Robt. Kidston, F.G.S., F.R.S.E., Stirling; Robert Law, F.G.S., Hipperholme; William Simpson, F.G.S., Halifax; John Stubbins, F.G.S., F.R.M.S., Pool; William West, F.L.S., Bradford; and J. E. Wilson, Ilkley.

The Geological Photographs Committee have continued their operations during the year, and Mr. J. E. Bedford, F.G.S., the Secretary, reports that successful work has been done. Mr. Godfrey Bingley, Chairman, has contributed 19 views of subjects in Yorkshire and North Wales, and Mr. Samuel Cuttriss 11 views illustrating the Yorkshire Caves, to the national collection kept at the Museum of Practical Geology in Jermyn Street, London. Mr. Bingley has also contributed a series of 38 photographs and 23 lantern slides to the duplicate collection which Mr. W. W. Watts is making at Jermyn Street for use as types for students and lecturers. Duplicate copies of all the Yorkshire views are deposited in the albums belonging to the Union, which are in charge of the Committee. In this connection the Yorkshire Geological and Polytechnic Society may be

congratulated on their having again published in their 'Proceedings' a series of sections along the Yorkshire coast from Flamborough northwards, reproduced from some of Mr. Bingley's negatives.

It is recommended that the Committee be reappointed, as follows :—Godfrey Bingley, Leeds, Chairman ; J. E. Bedford, F.G.S., Leeds, Hon. Secretary ; Rev. E. Maule Cole, M.A., F.G.S., Wetwang ; Edwin Hawkesworth, Leeds ; and F. Fielder Walton, F.G.S., Hull ; with W. W. Watts, London, as Hon. Member.

The Coast Erosion Committee.—The Rev. E. Maule Cole, M.A., the Secretary of this Committee, reports that as usual nothing particular can be reported about coast erosion. Several of the stations hitherto used north and south of Bridlington have been rendered useless by the construction of sea walls. An immense slip of Boulder Clay took place this year just south of the Spa at Scarborough. Also a large mass of Lias came down at the end of Ring Street, Robin Hood's Bay, carrying with it several outbuildings. This was in September. The sea will soon remove the débris in either case.

It is recommended that the Committee be reappointed as follows :—J. C. F'Anson, F.S.A., F.G.S., London, Chairman ; Rev. E. Maule Cole, M.A., F.G.S., Wetwang, York, Hon. Secretary ; Rev. H. E. Maddock, M.A., F.G.S., Patrington ; F. Fielder Walton, F.G.S., Hull ; and J. W. Woodall, J.P., F.G.S., Scarborough ; with C. E. De Rance, F.G.S., as Hon. Member.

The Yorkshire Micro-Zoology and Micro-Botany Committee have not had any opportunities for research in pond life afforded them by the excursions of the past year, and their work has therefore been confined to private investigations by their members. It is recommended that the Committee be reappointed as follows :—H. C. Sorby, LL.D., F.R.S., Sheffield, Chairman ; M. H. Stiles, Doncaster, Hon. Secretary ; J. Newton Coombe, Sheffield ; C. B. Crawshaw, J.P., Dewsbury ; Prof. Alfred Denny, F.L.S., Sheffield ; Charles P. Hobkirk, F.L.S., Dewsbury ; F. W. Mills, F.R.M.S., Huddersfield ; John Stubbins, F.L.S., F.R.M.S., Leeds ; and Wm. West, F.L.S., Bradford.

The Marine Biology Committee.—The members have worked quietly during the year, and have paid repeated visits to the coast. The Committee has, however, had no opportunity afforded them for research at the Union meetings, the tide not having been suitable on the occasion of the Scarborough excursion. It is recommended that the Committee be reappointed

as follows :—H. C. Sorby, LL.D., F.R.S., Sheffield, Chairman. J. D. Butterell, Wansford, Vice-Chairman ; Fred. W. Fierke, M.C.S., Hull, Hon. Sec. ; W. Cash, F.G.S., Halifax ; W. Eagle Clarke, F.L.S., Edinburgh ; John Cordeaux, M.B.O.U., Great Cotes ; Oxley Grabham, M.A., York ; Rev. W. C. Hey, M.A., West Ayton ; E. Howarth, F.R.A.S., Sheffield ; Geo. Masee, F.R.M.S., Kew ; T. H. Nelson, M.B.O.U., Redcar ; T. Petch, B.A., Hedon ; J. Frazer Robinson, Hull ; W. Denison Roebuck, F.L.S., Leeds ; Rev. Henry Smith, M.A., Redcar ; Arnold T. Watson, F.L.S., Sheffield ; and J. W. Woodall, M.A., F.G.S., Scarborough.

Wild Birds' and Eggs Protection Committee.—The Rev. E. P. Knubley, M.A., Chairman and Convener, reports that nothing has occurred during the year in connection with the work of this Committee. Mr. Knubley's removal to Steeple Ashton, Wilts., is a serious loss to the Committee, and it is recommended that the appointment of his successor as Chairman and Convener shall be left to the Committee, which it is recommended to be re-elected as follows :—James Backhouse, F.Z.S., Harrogate ; F. Boyes, Beverley ; T. Bunker, Goole ; H. E. Dresser, F.L.S., F.Z.S., London ; R. Fortune, F.Z.S., Harrogate ; Jno. Gerrard, M.B.O.U., Manchester ; Oxley Grabham, M.A., M.B.O.U., York ; Rev. E. P. Knubley, M.A. ; Claude Leatham, Wakefield ; T. H. Nelson, M.B.O.U., Redcar ; Geo. T. Porritt, F.L.S., Huddersfield ; and Rev. W. T. Travis, M.A., Ripley.

Mycological Committee.—Mr. Charles Crossland, its secretary, reports that in taking a general view of the work done at the Union's excursions during the year, it is to be noted that very few, and then only common forms of fungi were recorded until the meeting at Langdale End and Scarborough on July 8th, when, amongst the few found was one of Berkeley and Broome's species, *Dasyscypha citricolor*. This was considered a valuable find, as original specimens are not in the Berkeley Herbarium at Kew. At the Everingham Park Excursion (Aug. 2nd), *Puccinia hydrocotyle* (Link), a rather uncommon species, turned up in great quantities in Houghton Woods. At the Fungus Foray, held at Barnsley in September, of which a full account was published in 'The Naturalist' for this month (November), 203 species were recorded, including one, *Entoloma angustatum*, new to the British list. Considering the character of the season, the Foray was a very successful one. An exhibition of the specimens collected was part of the programme. It may be noted that Mr. James Needham has been working hard throughout the year

amongst the fungi of the neighbourhood of Hebden Bridge, and has sent upwards of 400 species to the Secretary of this Committee. It is recommended that the Committee be re-appointed as follows :—Rev. William Fowler, M.A., Liversedge, Chairman; Charles Crossland, Halifax, Hon. Sec.; Thomas Birks, Rochdale; U. Bairstow, Halifax; W. Norwood Cheesman, Selby; Alfred Clarke, Huddersfield; Geo. Masee, F.R.M.S., F.L.S., Kew; James Needham, Hebden Bridge; H. T. Soppitt, Halifax; J. Williams Sutcliffe, Halifax; and Harold W. T. Wager, F.L.S., Leeds.

Proposed New Committees.—Your Executive recommend that two new Committees be appointed, one for Bryology and one for Coleoptera.

Proposed Yorkshire Bryological Committee.—The new arrangement begun at the present annual meeting, whereby excursions will be organized in November in connection with the annual meetings, and the fact that the bryologists of Yorkshire are a numerous, able, and enthusiastic body, renders it desirable that encouragement should be given to systematic investigation in their department, and it is therefore recommended that Mr. R. Barnes, Saltburn, R. Braithwaite, M.D., F.L.S., London, Ll. J. Cocks, Harrogate, Charles Crossland, Halifax, Charles P. Hobkirk, F.L.S., Dewsbury, William Ingham, B.A., York, J. J. Marshall, Market Weighton, James Needham, Hebden Bridge, Matthew B. Slater, F.L.S., Malton, H. T. Soppitt, Halifax, and William West, F.L.S., Bradford, be appointed as a Yorkshire Bryological Committee, for the investigation of the bryophytal fauna of Yorkshire.

Proposed Yorkshire Coleoptera Committee.—Your Executive recommend that a committee be appointed, consisting of the Rev. W. C. Hey, M.A., West Ayton, Chairman; Mr. M. Lawson Thompson, Saltburn, Hon. Secretary; Messrs. E. G. Bayford, Barnsley; Herbert H. Corbett, Doncaster; W. Foggitt, Thirsk; John Gardner, F.E.S., Hartlepool; Leonard Hawkesworth, Leeds; Joseph Neale, B.A., Ackworth; and W. Denison Roebuck, F.L.S., Leeds, for the purpose of working out the beetles of Yorkshire at the excursions and elsewhere, and also of arranging for continuing the List of Yorkshire Coleoptera which the Rev. W. C. Hey, M.A., has completed to the end of the Brachelytra, and the continuation of which he is obliged to relinquish by reason of the failure of his eye-sight.

Your Executive have further to recommend, in connection with this subject, that Mr. Hey be elected an Honorary Life

Member of the Union, as a slight mark of appreciation of the value of his services to the Union rendered in many ways for a long series of years, and more especially as regards the List of Yorkshire Coleoptera.

British Association.—The Union has again been appointed one of the Corresponding Societies of the Association, but the British Association meeting having been held this year in Canada, your delegate was unable to be present, and Mr. Harold Wager, F.L.S., was invited to act in his place. Mr. Knubley's removal from Yorkshire creates a vacancy in the position of Delegate to the British Association, which should be filled up at the present annual meeting.

The Executive.—In accordance with the resolution passed at the last annual meeting, whereby the number of members of the Executive appointed by the General Committee was fixed at nine, of which the three senior members were to be ineligible for re-election until after the expiration of a year, Messrs. Charles P. Hobkirk, F.L.S., Benjamin Holgate, F.G.S., and John James Stead retire from a body on which they have served for 20 years, and their colleagues would place on record their deep sense of the obligations under which these gentlemen have laid the Union by their services during so lengthened a period. It is with sentiments of profound regret that members will learn that Mr. Hobkirk has further intimated his intention to retire altogether from office in a Union in which he is by far the oldest office-bearer, and for which he has done so much for about thirty years.

The Secretariate.—No permanent colleague for Mr. Roebuck has yet been found, but he and the Union have been placed under much obligation for assistance rendered in organizing the excursions by Messrs. Ll. J. Cocks, J. H. Rowntree, J. J. Marshall, E. G. Bayford, and Arthur Crabtree, the last-named undertaking two of the excursions—one in the total absence of the Secretary of the Union.

The Presidency.—Your Executive have the pleasure and satisfaction of announcing that the Presidency of the Union for 1898 has been accepted by Professor Michael Foster, Professor of Physiology at Cambridge University and Secretary of the Royal Society, who—it may be added—is also distinguished for his attainments as a scientific horticulturist.

In conclusion your Executive have to express their sense of the great indebtedness under which Prof. Boyd Dawkins has placed the Union by his tenure of the Presidential office, which terminates at the present meeting.

REPORT OF SUB-COMMITTEE ON FINANCE.

The Sub-committee—consisting of Mr. J. W. Addyman, Rev. W. Lower Carter, Mr. A. Clarke, Mr. L. Hawkesworth, Mr. J. H. Howarth, Mr. W. Denison Roebuck, and Dr. H. Clifton Sorby—appointed by the General Committee at the last annual meeting to consider the financial position of the Union, more especially with regard to the 'Naturalist,' have held various meetings during the year, and given the subject their careful consideration.

The Committee consider that the scientific work carried on by the Union is of the greatest value and importance, and that consequently there is no room for retrenchment of expenditure in any department, and they further consider that it would be inadvisable to take any steps which would impair or reduce the value and utility of the 'Naturalist' and the 'Transactions' of the Union, but that on the contrary it is necessary that means should be found for developing and increasing their usefulness.

The Committee therefore cannot but recognise that what is needed is a large and immediate increase of the Union's income, and they would recommend that it be specially referred to the new Executive to take the matter into speedy consideration with a view to instant and continued action.

The Committee would suggest the following points as deserving the attention of the Executive.

1. To set on foot a special subscription list under influential auspices, whereby a sum of not less than £150 may be provided for the purpose of paying off the out-standing liabilities of the Union, without waiting for the collection of subscriptions in arrear, and so enable the Union to proceed with the issue of the Parts of Transactions now in arrear.

2. To organize a simultaneous effort in all parts of the county to raise the membership of the Union to a degree commensurate with the importance of the work it has in hand, and worthy of the county as a scientific centre, and thereby put the Union in a position to carry on its work without financial strain.

3. To organize a similar effort to increase the circulation of the 'Naturalist' in the other counties of Northern England which are included in its scope, and also to take counsel with the associated societies with the view of ascertaining to what extent the interest of the Associates could be enlisted in the 'Naturalist,' as a special natural history journal of high class for the county of York

Your Committee would further suggest that the Executive should consider in what manner it would be possible to overcome the difficulty which is presented in securing direct members for the Union by reason of the generosity which the Union has always shown towards the Associates by granting such ample privileges as they enjoy in return for the small sum of one penny each, which is contributed for them by their local societies.

LIST OF MEMBERS,

Arranged Geographically.

CORRECTED TO NOVEMBER 1ST, 1897.

The Members whose names are printed in heavy type are those of **Permanent Members of the General Committee**. The Dates preceding names are those of election; Original Members, being those elected previous to 1883, are marked —; those to whom **L.** is prefixed are Life Members, by virtue of a donation of not less than seven guineas; and those to whom **H.L.** is prefixed are Honorary Life Members, or Ex-Presidents of the Union.

Members changing their addresses are requested to inform the Secretary as soon as possible.

BARKSTON ASH DIVISION.

Pop. 48,470.

- **L. Cheesman, William Norwood**, The Crescent, Selby.
- ... **Emmet, John**, F.L.S., The Poplars, Boston Spa, R.S.O.
- 1887 ... Emmet, Mrs., The Poplars, Boston Spa, R.S.O.
- ... **Jackson, John**, M.P.S., High Street, Wetherby.
- ... **Nelson, William**, M.C.S., Prospect View, Crossgates, Leeds.

BARNSELY DIVISION.

Pop. 78,844.

- 1897 ... Barraclough, William, Union Foundry, Barnsley.
- 1889 ... **Bayford, Edwin G.**, 2, Rockingham Street, Barnsley.
- 1884 ... **Brady, William E.**, 5, Victoria Road, Barnsley.
- 1891 ... Hutchinson, Charles H., 37, Hopwood Street, Barnsley.
- 1889 ... **Johnson, Henry**, 62, Huddersfield Road, Barnsley.
- 1892 ... **Thirkell, Edward Walter**, Hunningley Cottage, Stairfoot, Barnsley.
- 1897 ... Tomlinson, John, York Terrace, Stairfoot, Barnsley.
- 1889 ... **Turner, Benjamin**, 10, Pitt Street, Barnsley.

BEVERLEY BOROUGH.

Pop. 11,425.

- ... **Boyes, Frederick**, Yorkshire Banking Company, Beverley.
- ... Davison, George, Garden House, Keldgate, Beverley.
- ... **Dobrée, N. F.**, F.E.S., The New Walk, Beverley.
- 1892 ... Morley, Thomas John, Toll Gavel, Beverley.
- ... **Ridgway, J. Ambrose**, F.R.A.S., Beverley.

BRADFORD BOROUGH.

Pop. 216,361.

- 1894 ... Bradford Free Library and Art Museum, per Butler Wood, Librarian.
- ... **Carter, J. W.**, 25, Glenholme Road, Whetley Lane, Bradford.
- 1884 ... Clayton, John, Boxtree House, Thornton Road, Bradford.
- 1890 ... Dickons, J. Norton, 12, Oak Villas, Manningham, Bradford.
- 1893 ... **Hawkesworth, Leonard**, The Poplars, Bolton, Bradford.
- 1891 ... **Howarth, James Henry**, F.G.S., Belvoir House, Heaton, Bradford.
- 1884 ... **Lund, Percy**, 43, Athol Road, Bradford.
- ... **McLandsborough, John**, F.G.S., F.R.A.S., F.R.Met.S., etc., 5, Lindum Terrace, Manningham, Bradford.
- ... **Meade, R. H.**, F.R.C.S., 1, Mount Royd, Manningham, Bradford.
- 1889 ... Naylor, E., 48, Market Street, Bradford.
- ... Nuttall, William, Moorside, Eccleshill, Bradford.
- ... Powell, Sir Francis Sharp, Bart., M.P., Horton Old Hall, Bradford.
- ... **West, William**, F.L.S., 15, Little Horton Lane, Bradford.

BUCKROSE DIVISION.

Pop. 50,877.

- 1895 ... **Bailey, Matthew**, Flamborough, *viâ* Hull.
 1890 ... **Bell, James Lumsden, M.D.**, White Hall, Driffield.
 — ... **Butterell, Joseph Darker, M.C.S.**, Park House, Wansford, Hull.
 — ... **Cole, Rev. Edward Maule, M.A., F.G.S.**, Vicarage, Wetwang-on-the-Wolds, *viâ* York.
 1889 ... **Davison, Richard**, Driffield.
 1889 ... **Fountain, Joshua**, Ship Inn, Filey.
 1890 **L. Hawkesbury**, Right Hon. Lord, Kirkham Abbey, York.
 1895 ... **Lloyd-Greame, Yarburgh George, J.P., D.L.**, Sewerby House, Hull.
 1889 ... **Mortimer, J. R., F.G.S.**, Driffield.
 1890 ... **St. Quintin, Wm. Herbert, J.P.**, Scampston Hall, Rillington, York.
 — ... **Tindall, Edward**, Knapton Hall, Rillington, York.
 1889 ... **Wood, Richard, M.D.**, Beverley Street, Driffield.

CLEVELAND DIVISION.

Pop. 55,882.

- 1891 ... **Burton, J. J.**, Hambleton House, Nunthorpe, R.S.O., York.
 1887 ... **Emerson, E. B., B.A., J.P.**, Tollesby Hall, Marton, R.S.O.
 1890 ... **Hawell, Rev. John, M.A.**, Vicarage, Ingleby Greenhow, Middlesbro'.
 1897 ... **Lawrenson, William**, The Nursery, Eaglescliffe, Yarm-on-Tees.
 1888 ... **Macpherson, Angus, 16, Teresa Terrace**, Coatham, Redcar.
 1887 ... **Meek, J. M., M.A., 6, Nelson Terrace**, Coatham, Redcar.
 1887 ... **Nelson, Thomas H., M.B.O.U.**, Derby Villa, Redcar.
 1883 ... **Smith, Rev. Henry, M.A.**, Clarendon House, Redcar.

COLNE VALLEY DIVISION.

Pop. 59,344.

- 1890 **L. Hirst, Ben, J.P.**, Tamewater, Dobcross, near Oldham.
 — **L. Forritt, George T., F.L.S., F.E.S.**, Crosland Hall, near Huddersfield.
 1897 ... **Tunstall, Wilmot, F.E.S.**, Brook House, Meltham, Huddersfield.

DARLINGTON BOROUGH.

Pop. 35,100.

DEWSBURY BOROUGH.

Pop. 72,986.

- 1887 ... **Crawshaw, C. B., J.P.**, Rufford Lodge, Oxford Road, Dewsbury.
 1894 ... **Hemingway, Wilson**, Anroyd Villa, Dewsbury.
 — ... **Hobkirk, Charles P., F.L.S.**, Hill House, Park Road, Dewsbury
 (Ex-President).
 — ... **Lee, Phineas Fox**, West Park Villas, Dewsbury.
 1891 ... **Marriott, Arthur S.**, Ashlyn, Dewsbury.
 1896 ... **Taylor, Herbert J., 9, Portland Villas**, Bath Street, Dewsbury.

DONCASTER DIVISION.

Pop. 73,032.

- 1890 ... **Corbett, Herbert H., M.R.C.S., 19, Hall Gate**, Doncaster.
 1897 ... **Duff, Francis, 17, Thorne Road**, Doncaster.
 1891 ... **Gledhill, Edward, 48, Queen's Road**, Doncaster.
 1897 ... **Parkin, Leonard**, Axholme House, Doncaster.
 1883 ... **Paterson, A., 41, Cemetery Road**, Doncaster.
 1890 ... **Roberts, Walter**, Ivy Bank, Avenue Road, Doncaster.
 1884 ... **Stiles, M. H., 2, Frenchgate**, Doncaster.
 1887 ... **Wilson, J. Mitchell, M.D., 51, Hall Gate**, Doncaster.
 — ... **Winter, George, 14, Baxtergate**, Doncaster.

ELLAND DIVISION.

Pop. 64,632.

- 1896 ... **Crowther, John E.**, Portland Street, Elland.
 1888 ... **Law, Robert, F.G.S.**, Fenny Royd Hall, Hipperholme, Halifax.

HALIFAX BOROUGH.

Pop. 82,863.

- 1895 ... Bairstow, Uriah, 48, Heath Crescent, Halifax.
 1887 ... Brooke, Ven. Archdeacon J. Ingham, M.A., The Vicarage, Halifax.
 1897 ... Calvert, Roby, Moorland House, Ovenden, Halifax.
 1887 ... **Cash, William**, F.G.S., 26, Mayfield Terrace, Halifax.
 1896 ... Crabtree, Arthur, West Hill, Halifax.
 1887 ... **Crossland, Charles**, 4, Coleridge Street, Halifax.
 1894 ... Crump, W. B., M.A., 90, King Cross Street, Halifax.
 1891 ... Edmondson, Joseph, Heath Avenue, Halifax.
 1891 ... Harding, George F., 33, Hope Street, Halifax.
 1894 ... Imbery, John, 16, Hyde Park Road, Halifax.
 1897 ... McCrea, Arthur Selby, Warley House, Halifax.
 1891 ... Shillito, John, J.P., 17, Cavendish Terrace, Halifax.
 1894 ... **Simpson, William**, F.G.S., The Gables, Halifax.
 — ... **Soppitt, Henry Thomas**, 12, Glen View, Clover Hill, Halifax.
 — ... **Spencer, James**, 8, Salisbury Place, Akroydon, Halifax.
 1890 ... **Sutcliffe, J. Williams**, 27, West View, Hopwood Lane, Halifax.
 1890 ... Whitaker, J. Ackroyd, Craven Lodge, Halifax.
 1889 ... Whiteley, Frederick L., 10, Corn Market, Halifax.
 1891 ... Whitley, J. H., B.A., Brantwood, Halifax.

HALLAMSHIRE DIVISION.

Pop. 73,249.

- 1895 ... Payne, Richard, Newhill Hill, West Melton, Rotherham.
 — ... Wharnccliffe, The Right Hon. the Earl of, Wortley Hall, near Sheffield.
 1894 ... Young, J. J. Baldwin, M.A., M.B.O.U., Richmond Park, near Sheffield.

HARROGATE BOROUGH.

Pop. 13,917.

- 1883 ... **Backhouse, James**, F.L.S., F.Z.S., M.B.O.U., Daleside, Harrogate.
 1896 ... Cocks, Llewellyn Jameson, Godolphin House, Harrogate.
 1887 ... **Farrah, John**, Jefferies' Coate, York Road, Harrogate.
 1894 ... Farrar, Abrm., jun., F.G.S., The Grange, Beech Grove, Harrogate.
 1887 ... **Fortune, Riley**, F.Z.S., 16, Mount Parade, Harrogate.
 1889 ... **Lambert, Abrm.**, 25, Great George Street, West End Park, Harrogate.
 1891 ... Laycock, Thomas, jun., Deepdene, Franklin Road, Harrogate.
 1889 ... **Lofthouse, J. H.**, 42, Mayfield Grove, Harrogate.
 1891 ... McLean, Kenneth, 32, Studley Road, Harrogate.
 1891 ... **Millward, Adam**, Cambridge Crescent, Harrogate.
 1886 ... **Naughton, John**, Ellesmere School, Park View, Harrogate.
 1883 ... Saynor, John, Woodside, Lancaster Road, Harrogate.
 1894 ... Scharff, W. E., M.C.S., The Red House, Duchy Road, Harrogate.
 1893 ... Waldby, Joseph Robert, 31, Grove Road, Harrogate.
 1893 ... Warwick, John Walton, 15, East Parade, Harrogate.

HOLDERNESS DIVISION.

Pop. 41,298.

- 1894 ... Haworth-Booth, Lieut.-Col., B. B., J.P., D.L., Hullbank Hall, Hull.
 — ... Loten, Philip W., Easington, Hull.
 1891 ... **Maddock, Rev. Henry E.**, M.A., F.G.S., Patrington Rectory, Hull.
 1888 ... Oldroyd, Charles, Lund, near Beverley.
 1890 ... Scott, Frederick A., Sutton, near Hull.

HOLMFIRTH DIVISION.

Pop. 65,159.

- 1894 ... Clayton, John, Lidgett House, Wharnccliffe, Silkstone, Barnsley.
 — ... Waite, William, Cliff Cottage, Clayton West, Huddersfield.

HOWDENSHERE DIVISION.

Pop. 49,327.

- 1894 ... **Ash, Rev. Cyril D.**, B.A., Skipwith Vicarage, Selby.
 1896 ... **Ash, Mrs. C. D.**, Skipwith Vicarage, Selby.
 1896 ... **Banks, Ernest**, Saltmarshe Cottage, Saltmarshe, Howden.
 — ... **Herries, The Right Hon. Lord**, Lord-Lieutenant of the East Riding, Everingham Park, York.
 1883 ... **Leadman, Alex. D. H.**, F.S.A., Oak House, Pocklington, York.
 1890 ... **Marshall, J. J.**, Market Weighton, R.S.O.
 — ... **Proudlock, John**, The Nurseries, Market Weighton, R.S.O.
 1886 ... **Stears, John**, Westholme, Hessle, Yorkshire.
 — ... **Whitaker, T. Stephen**, F.R.G.S., Everthorpe, Brough.

HUDDERSFIELD BOROUGH.

Pop. 96,495.

- ... **Brooke, Edwd., jun.**, F.G.S., Oakley House, Edgerton, Huddersfield.
 1885 ... **Brooke, John Arthur**, J.P., Fenay Hall, Huddersfield.
 1892 ... **Clarke, Alfred**, 9, St. Andrew's Road, Huddersfield.
 1894 ... **Cockshaw, Edward**, 65, Blacker Road, Birkby, Huddersfield.
 1893 **L. Mills, F. W.**, F.R.M.S., Thornleigh, Huddersfield.
 1895 ... **Sykes, A. W.**, 9, Commercial Crescent, Huddersfield.
 1894 ... **Wilkinson, Johnson**, M.B.O.U., Vermont, Huddersfield.
 1890 ... **Woodhead, Thomas William**, Arnold Street, Birkby, Huddersfield.

KEIGHLEY DIVISION.

Pop. 63,272.

- ... **Brigg, John**, M.P., F.G.S., Kildwick Hall, Keighley.
 — ... **Butterfield, E. P. P.**, Wilsden, near Bingley.

KINGSTON-UPON-HULL BOROUGH.

Pop. 200,044.

- 1897 ... **Audas, Thomas**, L.D.S., Regent's Terrace, Hull.
 1895 ... **Carlton, John**, 48, Albany Street, Hull.
 1883 ... **Dawson, Percival W.**, 101, Westbourne Avenue, Hull.
 1894 ... **Dennis, Thomas**, 21, Peel Street, Hull.
 1892 ... **Fierke, Frederick Wm.**, M.C.S., 52, Francis Street West, Hull.
 1895 ... **Hollingworth, John**, M.R.C.S., 2, Hornsea Parade, Holderness Road, Hull.
 1890 ... **Jackson, Andrew Marvell**, Victoria Chambers, Hull.
 1892 ... **Robinson, James Frazer**, 37, Caroline Place, Hull.
 1897 ... **Saner, Charles Otto Farmer**, 2, Elgin Villas, Anlaby Road, Hull.
 1884 ... **Sawdon, Fred. John**, M.D., 32, Beverley Road, Hull.
 1897 ... **Sheppard, Thomas**, 78, Sherburn Street, Hull.
 1891 ... **Stather, John W.**, F.G.S., 16, Louis Street, Hull.
 1892 ... **Waller, Michael**, 105, Westbourne Avenue, Hull.
 1884 ... **Walton, F. Fielder**, M.R.C.S., F.G.S., 10, Charlotte Street, Hull.
 1891 ... **Waterfall, Charles**, 10, De Grey Street, Beverley Road, Hull.

LEEDS CITY.

Pop. 387,505.

- 1886 ... **Addyman, James W.**, B.A. Lond., 15, East Parade, Leeds.
 1892 ... **Asquith, William E.**, 23, Cardigan Road, Headingley, Leeds.
 1892 ... **Baker, Walter Francis**, F.E.S., 1, Hillary Street, Leeds.
 1897 ... **Barley, D. H.**, Grove House, Burmantofts, Leeds.
 — ... **Barran, Sir John**, Bart., Chapel-Allerton Hall, Leeds.
 — ... **Bedford, James**, Sycamore Lodge, Woodhouse, Leeds.
 — ... **Bedford, Jas. E.**, F.G.S., Arncliffe, Shireoak Road, Headingley, Leeds.
 1885 ... **Bingley, Godfrey**, Thorniehurst, Shaw Lane, Headingley, Leeds.
 — ... **Birchall, Edward**, 18, Moorland Road, Leeds.
 1897 ... **Bond, J. W.**, Torre Road, Burmantofts, Leeds.
 — ... **Bould, Charles Henry**, 5, Wrangthorne Place, Hyde Park, Leeds.

- 1885 ... **Branson, Frederick W.**, F.I.C., F.C.S., Wynneholme, Far Headingley, Leeds.
- 1896 ... Broadhead, W. H., Craiglea, Headingley, Leeds.
- 1897 ... Butler, A. Edmund, Kepstorn, Kirkstall, Leeds.
- 1893 ... Coe, Joseph, 16, Bagby Road, Leeds.
- 1896 ... **Crowther, Henry**, F.R.M.S., Curator of the Leeds Phil. and Lit. Society's Museum; 52, Brudenell Mount, Headingley, Leeds.
- 1896 ... Foster, George, Mining Engineer, Bleak House, Harehills, Leeds.
- 1891 ... Grahl, C. E., Ashwood, Headingley Hill, Leeds.
- 1897 ... Haslam, William James, St. Martin's Villa, Newton Park, Leeds.
- 1891 ... **Hawkesworth, Edwin**, 11, Nursery Mount, Woodhouse Hill, Hunslet, Leeds.
- ... **Hewetson, H. Bendelack**, M.R.C.S., F.L.S., F.Z.S., M.B.O.U., 10, Hanover Square, Leeds.
- 1896 ... Holbrook, William, St. Ann's Villa, Far Headingley, Leeds.
- 1897 ... Holbrook, Mrs. William, St. Ann's Villa, Far Headingley, Leeds.
- L. **Holgate, Benj.**, F.G.S., 4, Montpellier Terrace, Headingley, Leeds.
- 1892 ... **Kendall, Percy F.**, F.G.S., Lecturer on Geology at the Yorkshire College; 5, Woodland Terrace, Stainbeck Lane, Leeds.
- 1890 L. **Kitson, Sir James, Bart.**, M.P., Gledhow Hall, Leeds.
- 1897 ... Littlewood, H., F.R.C.S.Engl., 40, Park Square, Leeds.
- ... Lupton, Henry, F.E.S., Lyndhurst, North Grange Road, Headingley.
- 1897 ... **Mawson, Joseph A.** [Address wanted.]
- 1890 L. **Oxley, Henry**, Spenfield, Weetwood, Leeds.
- 1891 L. **Pawson, Albert Henry**, Lawns House, Farnley, Leeds.
- 1891 L. **Pawson, Mrs. A. H.**, Lawns House, Farnley, Leeds.
- 1893 ... **Parkinson, Stephen**, 59, Leopold Street, Leeds.
- ... **Pocklington, Henry**, F.R.M.S., 41, Virginia Road, Leeds.
- 1887 ... **Powys, Rev. H. Annesley**, M.A., Meanwood Vicarage, Leeds.
- 1887 ... Reynolds, Richard, F.I.C., F.C.S., Cliff Lodge, Woodhouse, Leeds.
- 1897 ... Rinder, W. H., F.R.G.S., St. Ann's Mount, Burley, Leeds.
- 1897 ... **Robson, A. W. Mayo**, F.R.C.S., 7, Park Square, Leeds.
- ... **Roebuck, William Denison**, F.L.S., 259, Hyde Park Road, Leeds.
- ... Rowley, Walter, M.I.C.E., F.G.S., etc., Alder Hill, Meanwood, Leeds.
- ... Stoks, Edwin, 1a, Victoria Terrace, Belle Vue Road, Leeds.
- ... **Teasdale, Washington**, F.R.A.S., F.R.M.S., 255, Hyde Park Road, Leeds.
- ... Tetley, Charles F., J.P., Spring Bank, Headingley, Leeds.
- ... **Thrippleton, John**, Burley View, Burley, Leeds.
- 1894 ... **Wager, Harold**, F.L.S., Bank View, Chapel-Allerton, Leeds.
- ... Ward, Geo., F.I.C., F.C.S., 1, Buckingham Terrace, Hyde Park, Leeds.
- 1896 ... **Wilson, Henry B.**, Westfield, Armley, Leeds.
- 1896 ... **Wurtzburg, John H.**, J.P., F.R.Hist.S., 2, De Grey Road, Leeds.
- ... **Yewdall, Edwin**, 58, Wade Lane, Leeds.

MALTON TOWN.

Pop. 8,754.

- ... Hodgson, William, Wheelgate, Malton.
- 1896 ... Jenkinson, Rev. S., Prospect Villa, Norton, Malton.
- 1889 ... Longster, Thomas Piper, Mowbray Terrace, Malton.
- 1897 ... Oldfield, George, St. Nicholas Street, Norton, Malton.
- ... Pearson, Hugh W., Castle Howard Road, Malton.
- ... **Slater, Matthew B.**, F.L.S., 84, West Grove Villas, Newbiggin, Malton.
- 1889 ... Suddaby, W. M., Crown Hotel, Wheelgate, Malton.
- 1888 ... Walker, A. W., 24, Yorkersgate, Malton.

MIDDLESBROUGH BOROUGH.

Pop. 98,982.

- 1890 ... **Veitch, W. Y.**, L.R.C.P., L.R.C.S., The Crescent, Middlesbrough.
- 1890 ... Thomas, W. H., 7, Ryedale Terrace, Borough Road, Middlesbrough.
- 1887 ... **Ward, Thomas F.**, Park Road South, Middlesbrough.

MORLEY DIVISION.

Pop. 65,216.

- 1890 ... **Carter, Rev. W. Lower**, M.A., F.G.S., The Manse, Hopton, Mirfield, Normanton.

NORMANTON DIVISION.

Pop. 72,012.

- 1894 ... **Burton, John**, Farmer, Horbury, Wakefield.
— ... **Roberts, George**, Lofthouse, near Wakefield.

OSGOLDCROSS DIVISION.

Pop. 66,794.

- ... **Bunker, Thomas**, 9, East Parade, Goole.
1896 ... **Gill, E. Leonard**, Ivy House, Ackworth, Pontefract.
— ... **Harrison, John**, Tillage Works, Goole.
1897 ... **Jackson, Walter**, 36, Vermuyden Terrace, Goole.
1890 **L. Jones, R.** Heywood, J.P., Badsworth Hall, Pontefract.
1893 ... **Leatham, Claude**, The Red House, Wentbridge, Pontefract.
1895 ... **Neale, Joseph, B.A.**, Garden Villa, Ackworth, Pontefract.
— ... **Pease, W.**, Elm Cottage, Hook, near Howden.

OTLEY DIVISION.

Pop. 61,746.

- 1894 ... **Angus, Henry, M.B., C.M.**, Burnage House, Bingley.
1893 ... **Fawkes, Mrs. Edith M.**, Farnley Hall, Otley.
1897 ... **Metcalf, W. Day**, 5, Springs Terrace, Ilkley.
— ... **Miall, Louis C.**, F.R.S., F.L.S., F.G.S., Professor of Biology in the Yorkshire College; Crag Foot, Ben Rhydding, Leeds.
1885 ... **Speight, Harry**, Highfield Villas, Crownest Road, Bingley.
— ... **Stubbins, John**, F.G.S., F.R.M.S., Woodlands, Pool, Leeds.
1897 ... **Teal, Joseph**, Grange Terrace, Yeadon.
1897 ... **Whitham, Thomas**, Bramhope, Leeds.
— ... **Wilson, John E.**, Yew Bank House, Ilkley.

PICKERING TOWN.

Pop. 4,019.

- 1895 ... **Ashton, James T., M.B.**, Kingthorpe House, Pickering.
— ... **Braim, John**, Hungate, Pickering.
1895 ... **Comber, Charles Thomas Thornton**, L.R.C.P., M.R.C.S., Pickering.
1886 ... **Lightfoot, Rev. George H., M.A.**, The Rectory, Pickering.
1889 ... **Lucy, Charles T.**, York Union Bank, Pickering.
1895 ... **Mitchelson, Major J. M.**, The Hall, Pickering.
1889 ... **Mitchelson, Thomas**, The Mount, Pickering.
1884 ... **Prodhams, Herbert**, Allerston, near Pickering.

PONTEFRACT BOROUGH.

Pop. 16,407.

PUDSEY DIVISION.

Pop. 49,252.

- 1883 ... **Gaunt, Leonard**, Prospect House, Farsley, Leeds.
1886 ... **Gaunt, Mrs. L.**, Prospect House, Farsley, Leeds.
1897 ... **Hutton, Enoch, F.Z.S.**, Columbarian House, Pudsey.
— ... **Taylor, John W.**, F.L.S., M.C.S., etc., Spring Bank, Horsforth, Leeds.

RICHMOND DIVISION.

Pop. 54,439.

- 1891 **L. Carpenter, Hon. Mrs.** [Beatrice], Kiplin, Northallerton.
— ... **Carter, James**, M.B.O.U., Burton House, Masham, R.S.O.
1886 ... **Chaytor, R. C.**, M.C.S., Scrafton Lodge, Middleham, R.S.O.
1897 ... **Hartshorn, John**, Leyburn, R.S.O.
1884 ... **Horne, William**, F.G.S., Market Place, Leyburn, R.S.O.
1885 ... **Huddart, Rev. G. A. W., M.A., LL.D.**, Kirklington Rectory, Bedale.
1895 ... **Raine, Joseph**, Newbiggin, Richmond, Yorkshire.
1884 ... **Taylor, Rev. Richard Vickerman, B.A.**, Melbecks Vicarage, viâ Richmond, Yorkshire.

RIPON DIVISION.

Pop. 54,925.

- 1886 ... **Clarkson, W. C.**, L.R.C.P., etc., Darley, Ripley, Leeds.
 1894 ... **Garrod, Rev. George Watts, B.A.**, 11, Crescent Parade, Ripon.
 1891 ... **Heslington, Thos. Clarke, 44**, North Road, Ripon.
 1883 ... **Hurst, Joseph S., J.P.**, Copt Hewick Hall, Ripon.
 — ... **Ingleby, James**, Eavestone, near Ripon.
 1883 ... **Paver-Crow, Richard, J.P.**, Ornshams Hall, Boroughbridge, York.
 1885 ... **Radcliffe, Sir J. Percival, Bart.**, F.R.A.S., Rudding Park, Knaresborough.
 — ... **Ripon, The Most Hon. the Marquis of, K.G.**, F.R.S., etc., Studley Royal, Ripon.
 1888 ... **St. Paul, Major Horace, J.P.**, The Willows, Ripon.
 1891 **L. Stobart, William C., J.P.**, Spellow Hill, Leeds.
 — ... **Summerfield, Rev. R. A.**, B.A., North Stainley Vicarage, near Ripon.
 1884 ... **Travis, Rev. William Travis, M.A.**, The Rectory, Ripley, Leeds.

ROTHERHAM DIVISION.

Pop. 78,597.

- 1884 ... **Bennett, Samuel H.**, Mountenoy Road, Rotherham.
 1897 ... **Duffy, Ernest E.**, L.S.A., Victoria Terrace, Masborough, Rotherham.
 1884 ... **Eskholme, George, J.P.**, Beech-en-Hurst, Rotherham.
 1896 ... **Howitt, John, 12**, Whiston Grove, Rotherham.
 1896 ... **Moore, Harry, F.R.M.S.**, Curator of Rotherham Museum, 12, Whiston Grove, Rotherham.

SALTBURN-BY-THE-SEA.

Pop. 2,384.

- 1888 ... **Barnes, Richard**, The Gardens, Saltburn-by-the-Sea.
 1890 ... **Hallimond, Henry T.**, 3, Lune Street, Saltburn-by-the-Sea.
 1885 ... **Irvin, Rev. Benjamin, M.A.**, The Vicarage, Saltburn-by-the-Sea.
 1890 ... **Thompson, M. Lawson**, Diamond Street, Saltburn-by-the-Sea.

SCARBOROUGH BOROUGH.

Pop. 33,776.

- 1893 ... **Barker, Reginald H.**, Grosvenor Bank, Scarborough.
 1892 ... **Chapman, John G.**, Chapman's Hotel, Blenheim Street, Scarborough.
 1892 **L. Clarke, William James, 44**, Huntriss Row, Scarborough.
 1888 ... **Gibb, George S., LL.B.**, Scarborough.
 1892 ... **Hudson, George, M.D.**, Westbourne House, Scarborough.
 1889 ... **Rowntree, Allan**, Broom Lodge, Scarborough.
 — **L. Rowntree, James Henry**, Westwood, Scarborough.
 1892 ... **Rowntree, William, J.P.**, Westwood, Scarborough.

SHEFFIELD CITY.

Pop. 324,243.

- 1884 ... **Birks, Edward**, Birchcliffe, Broomhall Park, Sheffield.
 1884 ... **Brittain, Ald. Frederick**, Melbourne Avenue, Sheffield.
 1892 ... **Brittain, Ald. W. H., J.P.**, Storth Oaks, Ranmoor, Sheffield.
 1893 ... **Coombe, John Newton**, Broces Bank, Sheffield.
 1885 ... **Denny, Alfred, F.L.S.**, Professor of Biology in the Firth College ; 9, Summerfield, Broomhill, Sheffield.
 1897 ... **Ellis, Rev. John, 49**, Marlborough Road, Sheffield.
 1889 **L. Hall, Albert Ernest, F.E.S.**, Norbury, Pitsmoor, Sheffield.
 1889 ... **Howarth, Elijah, F.R.A.S.**, Curator of Sheffield Public Museum, Weston Park ; Hilbre Nest, Crookesmoor Road, Sheffield.
 1892 ... **Sheffield Central Public Free Library**, Surrey Street, Sheffield.
 1897 ... **Smith, F. E., 1**, George Street, Sheffield.
 1897 ... **Snelgrove, Edward, B.A.**, Camps Mount Villa, Meersbrook, Sheffield.
 — ... **Sorby, Henry Clifton, LL.D.**, F.R.S., F.L.S., F.G.S., F.R.M.S., etc., Broomfield, Sheffield (Ex-President).
 1897 ... **Stokes, John, M.D.**, 82, Ecclesall Road, Sheffield.
 1895 ... **Tindall, Frederick Markham, jun.**, 27, Victoria Road, Broomhall Park, Sheffield.

- 1885 ... **Watson, Arnold Thomas**, F.L.S., Southwold, Tapton Crescent, Sheffield.
 1897 ... **Wheat, John B.**, M.A., Norwood Hall, Sheffield.
 1893 ... **White, William**, F.E.S., Curator, the Ruskin Museum, Sheffield.
 1890 ... **Wilson, H. J.**, M.P., Osgathorpe Hills, Sheffield.

SHIPLEY DIVISION.

Pop. 62,166.

SKIPTON DIVISION.

Pop. 58,209.

- ... **Eddy, J. Ray**, F.G.S., F.R.M.S., The Grange, Carleton, Skipton.
 1887 ... **Handley, John**, Briggflats, Sedbergh, R.S.O.
 1887 ... **Mackie, Rev. John H.**, M.A., The Grammar School, Sedbergh, R.S.O.
 1883 ... **Morrison, Walter**, M.P., Malham Tarn House, Bell Busk, Leeds.
 1894 ... **Rickards, C. A.**, Bell Busk, Leeds.
 1887 ... **Robinson, William**, Green Bank, Sedbergh, R.S.O.
 — ... **Shuffrey, Rev. W. A.**, M.A., Vicarage, Arncliffe, Skipton.
 1896 ... **Slingsby, W. Cecil**, F.R.G.S., Carleton, Skipton-in-Craven.
 1892 ... **Wilkinson, J. J.**, Burnside, Skipton.
 1890 L. **Wright, C. B. E.**, J.P., Bolton Hall, Clitheroe.

SOWERBY DIVISION.

Pop. 63,202.

- 1896 ... **Hellewell, Young**, 10, George Street, Todmorden.
 1894 ... **Needham, James**, Woodend, Hebden Bridge.

SPEN VALLEY DIVISION.

Pop. 57,402.

- ... **Blakeley, John Wesley**, Liversedge Hall, Liversedge.
 1891 L. **Cooke, James S.**, J.P., Springfield, Gomersal, Leeds.
 1895 ... **Crosland, Robert Wilfrid**, Oldfieldnook, Cleckheaton.
 — ... **Fowler, Rev. William**, M.A., Vicarage, Liversedge (Ex-President).
 1896 ... **Hind, Rev. H. N.**, M.A., Hightown, Liversedge, Normanton.
 — ... **Hindley, A. D.**, Liversedge, Normanton.
 1896 ... **Priestley, F. N.**, Littleton, Liversedge, Normanton.
 1893 ... **Rothery, Albert**, South Holme, Liversedge, Normanton.
 — ... **Stead, John James**, Albert Cottage, Heckmondwike.

STOCKTON-ON-TEES BOROUGH.

Pop. 55,202.

THIRSK AND MALTON DIVISION (For Malton Names see separate list).

Pop. 57,183.

- ... **Addison, Rev. Frederick**, M.A., Sutton Road, Thirsk.
 1890 ... **Buchanan, John Hamilton**, M.D., Sowerby, Thirsk.
 1890 L. **Carlisle, Right Hon. the Earl of**, J.P., Castle Howard, York.
 1888 ... **Fitzwilliam, Hon. W. H. Wentworth**, M.P., Wiganthorpe, York.
 1897 ... **Foggitt, Thomas Jackson**, Market Place, Thirsk.
 — ... **Foggitt, William**, South Villa, Thirsk.
 1883 H.L. **Gallwey, Sir Ralph Payne**, Bart., M.B.O.U., Thirkleby Park, Thirsk (Ex-President).
 — ... **Gregson, William**, F.G.S., Baldersby, S.O., Yorkshire.
 1897 ... **Harrison, W.**, Knayton, Thirsk.
 1884 ... **Mitchell, T. Carter**, F.S.A., Topcliffe, near Thirsk.
 — ... **Wright, John**, Terrington, York.

THORNABY-ON-TEES BOROUGH.

Pop. 15,640.

WAKEFIELD CITY.

Pop. 37,269.

- 1892 ... **Parke, George Henry**, F.L.S., F.G.S., St. John's, Wakefield.
 — ... **Parkin, George**, 15, York Street, Wakefield.

WHITBY DIVISION.

Pop. 54,776.

- 1889 ... Atkinson, Thomas, 7, Normanby Terrace, Whitby.
 — ... Colby, George, Brawby Park, Pickering.
 1892 ... Hebden, Mrs. Emmeline, Appleton Mill, Sinnington, R.S.O.
 — ... **Hey, Rev. William Croser**, M.A., M.C.S., Derwent House, West
 Ayton, Seamer, York.
 1885 ... **Newbitt, Thomas**, 17, Royal Crescent, West Cliff, Whitby.
 1894 ... Punshon, Mrs. R. M., Oldstead Hall, Ampleforth, York.
 1887 ... Pyman, Walter H. S., Moss Brow, Whitby.
 1888 ... Smith, Christopher W., Harome, Nawton, York.
 1889 ... Stewart, John T., 3, Belle Vue Terrace, Whitby.

YORK CITY.

Pop. 67,004.

- 1896 L. Anderson, Tempest, M.D., B.Sc., F.G.S., J.P., 17, Stonegate, York.
 1893 ... Bean, Eugene, 8, Nessgate, York.
 — ... **Dennis, George C.**, F.E.S., 39, Blossom Street, York.
 1893 ... Dutton, Robert, Castle Mills Bridge, York.
 1893 ... Elmhirst, Charles E., 17, Mount Parade, York.
 1894 ... **Graham, Oxley**, M.A., M.B.O.U., Chestnut House, Heworth, York.
 — ... **Hewett, William**, 12, Howard Street, Fulford Road, York.
 1889 ... Hodzman, George, 8, Feversham Terrace, York.
 1896 ... Ingham, William, B.A.Lond., 47, Haxby Road, York.
 — ... **Jackson, George**, 2, Clement Street, York.
 1896 ... Leatham, Ernest, J.P., Alderside, Dringhouses, York.
 1893 ... Mackay, Donald S., 4, Lendal, York.
 1896 ... Melrose, James, Clifton Croft, York.
 — ... **Moiser, Henry R.**, F.G.S., Heworth Grange, York.
 1895 ... **Platnauer, Henry Maurice**, B.Sc., F.G.S., etc., Curator of the
 Museum, York; and Low Royd, St. Olave's Road, York.
 1893 ... **Potter, Ernest Guy**, 14, Bootham Crescent, York.
 1890 ... Procter, John William, Ashcroft, York.
 1896 ... Raimes, Alwyn, M.B., 2, Scarcroft Road, York.
 1896 ... Rowntree, Theodore H., Mount Villas, York.
 1884 ... Thompson, Richard, Dringcote, York.
 1890 ... Walker, John Francis, M.A., F.G.S., F.L.S., F.C.S., F.I.C.,
 F.Z.S., etc., 45, Bootham, York.
 1896 ... Walker, Wm. Thomlinson, J.P., Clifton Grove, York.
 1893 ... Wilkinson, Arthur, 39, East Mount Road, York.
 1893 ... **Wilkinson, Henry J.**, 11, Chapter House Street, York.

DURHAM, NORTHUMBERLAND, CUMBERLAND, WESTMORLAND, CHESHIRE,
LANCASHIRE, AND ISLE OF MAN.

- 1890 ... Bacon, J. Cæsar, Seafield, Santon, Isle of Man.
 — ... **Birks, Thomas**, Moss Lodge, King's Road, Rochdale.
 1886 ... **Brownridge, Charles**, Assoc.M.I.C.E., F.G.S., 26, North Road,
 Devonshire Park, Birkenhead.
 1896 ... Clarke, Henry Shortridge, F.E.S., Sulby Parsonage, Lezayre, Isle
 of Man.
 1891 ... Collins, Francis Richard, 21, Langworthy Road, Manchester.
 1897 ... Craddock, Charles M., B.A., Mayfield, Stockton-on-Tees.
 1896 H.L. **Dawkins, Prof. W. Boyd**, M.A., F.R.S., F.G.S., Owens College,
 Manchester (President).
 1894 ... Foggitt, John B., 29, Neville Street, Southport.
 1885 ... **Gardner, John**, F.E.S., 8, Friar Terrace, Hartlepool.
 1887 ... **Gerrard, John**, M.B.O.U., H.M. Inspector of Mines, Worsley,
 Manchester.
 1897 ... Herdman, William, F.G.S., Lanehead Villa, Middleton-in-Teesdale,
 Darlington.
 1892 ... Howse, Richard, Curator of the Newcastle Museum, and Hon. Sec.
 Tyneside Nat. Field Club; 12, St. Thomas Crescent, Newcastle-
 on-Tyne.

- 1888 .. **Leach, Richard Ernest**, M.A., F.L.S., F.G.S., Grammar School, Appleby, Westmorland.
 1890 L. **Marshall, Arthur**, Hallsteads, Penrith.
 1894 ... **Melvill, James Cosmo**, M.A., F.L.S., etc., Brook House, Prestwich, Manchester.
 1894 ... **Petty, S. Lister**, 24, Queen Street, Ulverston.
 1883 ... **Richmond, Right Rev. J. J. Pulleine**, D.D., Bishop of, Stanhope Rectory, Darlington.
 1889 ... **Trechmann, Chas. O.**, Ph.D., F.G.S., Hudworth Tower, Castle Eden, Durham.
 1887 ... **Watts, Rev. Arthur**, F.G.S., F.R.G.S., The Rectory, Witton Gilbert, Durham.

COUNTIES SOUTH OF YORKSHIRE.

- 1883 H.L. **Baker, John Gilbert**, F.R.S., F.L.S., The Royal Gardens, Kew (Ex-President).
 — ... **Beaumont, Alfred**, F.E.S., The Red Cottage, Pond Road, Blackheath, London, S.E.
 1895 ... **Braithwaite, Robert**, M.D., F.L.S., F.R.M.S., 303, Clapham Road, London, S.W. (Ex-President).
 — ... **Butterfield, J. A.**, B.Sc., 35, Wrotesley Road, Plumstead, London, S.E.
 1891 L. **Champney, John E.**, J.P., Abchurch Chambers, London, E.C.
 1890 L. **Charlesworth, John B.**, J.P., Hurts Hall, Saxmundham.
 — ... **Clark, James Edmund**, B.A., B.Sc., 112, Wool Exchange, London, E.C.
 — ... **Cordeaux, John**, M.B.O.U., Great Cotes House, R.S.O., Lincoln, (Ex-President).
 1885 H.L. **Dallinger, Rev. W. H.**, LL.D., F.R.S., F.L.S., Sec.R.M.S., etc., Ingleside, Newstead Road, Lee, London, S.E. (Ex-President).
 1889 H.L. **Dresser, Henry Eeles**, F.L.S., F.Z.S., etc., 110, Cannon Street, London, E.C. (Ex-President).
 1884 ... **Fox, Rev. Henry E.**, M.A., M.B.O.U., Fairview, Norbiton, Surrey.
 1883 ... **Gough, Rev. T.**, B.Sc., F.G.S., King Edward VI. School, East Retford.
 1894 ... **Green, Upfield**, F.G.S., Tenter Street, Moorfields, London.
 1884 ... **Grove, Edmund**, F.R.M.S., Norlington, Preston, Brighton.
 1887 ... **Haigh, G. H. Caton**, M.B.O.U., Aber-iâ, Penrhynudraeth, Merionethshire; and Grainsby Hall, Great Grimby, Lincs.
 — ... **Harker, Alfred**, M.A., F.G.S., Woodwardian Museum, and St. John's College, Cambridge; and 3, Park Avenue, Princess Avenue, Hull.
 1883 ... **Hopkinson, John**, F.L.S., F.G.S., F.R.M.S., etc., The Grange, St. Albans, Herts.
 1884 ... **Hudleston, Wilfrid H.**, M.A., F.R.S., F.L.S., F.G.S., F.C.S., etc., 8, Stanhope Gardens, London, S.W. (Ex-President).
 1884 ... **l'Anson, Joseph Coventry**, F.S.A., F.G.S., etc., 7, Campden Grove, Kensington, London, W.
 — L. **Knubley, Rev. E. Ponsonby**, M.A., M.B.O.U., Steeple Ashton Vicarage, Trowbridge, Wilts.
 — ... **Mason, Philip Brookes**, J.P., F.L.S., F.E.S., M.C.S., etc., Trent House, Bridge Street, Burton-on-Trent.
 — ... **Massee, George E.**, F.L.S., F.R.M.S., 1, Kent Road, Kew, Surrey.
 1890 L. **Newton, Rev. Canon Horace**, The Vicarage, Redditch.
 1883 ... **Oldfield, George Wm.**, M.A., F.L.S., F.E.S., 21, Longridge Road, Earl's Court, London, S.W.
 1888 ... **Oxley, Rev. W. H.**, M.A., Petersham Vicarage, Surrey.
 1888 ... **Painter, Rev. W. Hunt**, Stirchley Rectory, near Shifnal, Shropshire.
 — H.L. **Parsons, Henry Franklin**, M.D., F.G.S., 4, Park Hill Rise, Croydon, Surrey.
 1893 ... **Peake, Rev. Edward**, M.A., Hillside, Bradfield, Berks.
 1893 ... **Petch, Tom**, B.A., 27, Wisbech Road, King's Lynn.
 1896 ... **Riddelsdell, Rev. Harry Joseph**, M.A., St. Michael's Theological College, Aberdare, South Wales.
 — ... **Slater, Rev. Henry H.**, M.A., F.Z.S., M.B.O.U., etc., Thornhaugh Rectory, Wansford, Northamptonshire.

- 1890 ... **Spiers, Rev. William**, M.A., F.G.S., F.R.M.S., Victoria Place, Cheadle, Staffs.
- 1889 ... **Strickland, Walter W.** [Address unknown.]
- 1893 ... **Tiddeman, R. H.**, M.A., F.G.S., Bridgend, Glamorganshire (Ex-President).
- **H.L. Walsingham**, The Right Hon. Lord, M.A., LL.D., F.R.S., F.L.S., F.E.S., etc. Merton Hall, Thetford, Norfolk; and Blubberhouses, Yorkshire (Ex-President).
- ... **Whitwell, William**, F.L.S., M.C.S., Roslin, 4, Thurleigh Road, Balham, London, S.W.
- 1888 ... **Woodall, Major John W.**, M.A., J.P., F.G.S., etc., 5, Queen's Mansions, Victoria Street, London, S.W.

SCOTLAND AND IRELAND.

- ... **Clarke, Wm. Eagle**, F.L.S., M.B.O.U., Nat. Hist. Dept., Edinburgh Museum of Science and Art, 35, Braid Road, Edinburgh.
- 1885 ... **Harvie-Brown, John A.**, F.R.S.E., F.Z.S., M.B.O.U., etc., Dunipace House, Larbert, N.B.
- 1888 ... **Kidston, Robert**, F.R.S.E., F.G.S., 24, Victoria Place, Stirling, N.B.
- 1889 ... **Scharff, Robert F.**, Ph.D., B.Sc., M.R.I.A., etc., Keeper, Nat. Hist. Coll., Dublin Museum; Tudor House, Dundrum, co. Dublin.

BRITISH COLONIES.

- ... **Bairstow, Samuel Denton**, F.L.S., 120, Main Street, Port Elizabeth, Cape Colony.
- ... **Chadwick, Samuel**, F.G.S., Whetukura, Ormondville, Hawke's Bay, New Zealand.
- 1890 ... **LeTall, Benj. Bower**, M.A. Lond., Friends' School, Hobart, Tasmania.
- 1888 ... **Waite, Edgar R.**, F.L.S., Zoologist to the Australian Museum. Headingly, Mossman's Bay, Sydney, New South Wales.

LEEDS :
CHORLEY AND PICKERSGILL, THE ELECTRIC PRESS.



37th Annual Report & Balance-Sheet for 1898.

List of Members, arranged Geographically,

Corrected to November 1st, 1898.

YORKSHIRE NATURALISTS' UNION.

THIRTY-SEVENTH ANNUAL REPORT, for 1898.

THE Executive have to congratulate the members on the continued prosperity of the Union, especially from the point of view of the Scientific work accomplished at some of the meetings and by the Committees of Research.

The Meetings held during the year have been six in number as usual, one for each division of the county, and also a Fungus Foray.

The districts chosen for investigation and the dates of the meetings were as follows :—

May 14, Saturday : Clapham.

May 30, Whit-Monday : Doncaster for Balby and Sandal.

June 20, Monday : Wiganthorpe and Terrington Carr.

July 9, Saturday : Jervaulx Abbey.

July 29—Aug. 1, Friday to Bank Holiday Monday : Easington for Spurn Point.

Sep. 10 to 12, Saturday to Monday, Fungus Foray : East Keswick for Harewood.

The usual and much appreciated descriptive circular for each excursion was issued to members and associates.

The opening meeting was held at Clapham for Ingleborough slopes and summits, and was held on Saturday, the 14th of May. The predominant feature was the geological party led by Mr. Benj. Holgate, F.G.S., and the arrangements were most efficiently made and carried out by Mr. Harry Speight, in the absence of the honorary secretary.

The second meeting was on Whit-Monday, 30th May, at Doncaster, when the geologists worked southwards and the general body of naturalists north-eastwards. There was much good work done in various departments, and the attendance was large, no less than 28 societies being represented, an unprecedented number of late years. For the success of this excursion the Union is largely indebted to the arrangements made by Mr. H. H. Corbett, who acted as special secretary for the occasion.

The third meeting was held at Terrington and Wiganthorpe, the arrangements being made by the hon. secretary, with the assistance of Mr. M. B. Slater, and the Rev. F. Young, of Malton.

The fourth meeting was held at Jervaulx Abbey on the 9th July, when Mr. William Gregson, F.G.S., acted as special secretary, and the party was led by Mr. William Horne, F.G.S., and Mr. John Hartshorn.

The fifth was the Bank Holiday Monday excursion, when arrangements were made for the week-end, for the exploration of the Spurn promontory and point. Mr. Thomas Sheppard, of Hull, as special hon. secretary, made very efficient arrangements, and several prominent members acquainted with the district co-operated in the day's proceedings.

The Fungus Foray, which was remarkably successful from a scientific point of view, was held at East Keswick, for the exploration of the fine woods of Harewood Park and neighbourhood, on Saturday and Monday, 10th and 12th September.

The Union has once more to acknowledge the courtesy with which the landed gentry of the county have facilitated the Union's work by allowing permission for their estates to be visited on the occasion of the excursions.

The various railway companies have also most kindly granted such privileges as have been asked for on the occasion of each of the Union's meetings.

For the excursions of the coming year, 1899, your Executive recommend that the following programme of places and dates be adopted :—

For York Mid W.—Tadcaster, in June.

For York S.W.—Barnsley and Campsall, in September.

For York N.E.—Stokesley, August Bank-Holiday.

For York N.W.—Dentdale, Whit-Monday.

For York S.E.—Driffield for Skerne and Wansford, in July.

The Mycological Committee propose that the Fungus Foray shall be held at Campsall Woods at a date to be fixed to suit the circumstances of the case, in September, and your Executive have pleasure in recommending that the request be complied with.

For the Annual Meeting of next year (1899), an invitation will be presented by the Harrogate Society and members, and your Executive cordially recommend its acceptance.

The Societies which constitute the Union are now 37 in number, one more than last year.

The Statistics which the Secretaries of the different Societies have again been kind enough to furnish, show a slight increase in the number of associates, the aggregate membership of the 37 Societies now amounting to 2,446, an increase of 63. Adding to this the number of direct members, the total numerical strength of the Union is 2,884.

The Membership of the Union now stands at 438, being 26 Life Members, 7 Honorary Life Members, and 405 Ordinary Members, an increase of 7 members as compared with last year.

During the year about 25 new members have been elected, considerably below the usual number, while on the other hand several members have died, a few resigned, and a few have been struck off the Rolls for non-payment of arrears of Subscriptions.

The Death-roll has been unusually heavy, including the names of such active and earnest workers as James Spencer, George Roberts, George C. Dennis, Edward Brooke, S. D. Bairstow, and J. G. Chapman, as well as such appreciative supporters of the Union's work as George Eskholme, A. D. Hindley, and W. H. Rinder.

The Financial Position of the Union has been greatly improved by the satisfactory payment of arrears during the past year, and also by the contributions made in response to the request for the provision of a special fund. These contributions have exceeded £85, and it is hoped that the fund will reach the amount of £150 asked for, which is absolutely required to put the Union's finances in a sound position.

The following is the Hon. Treasurer's Statement of Receipts and Payments during the year :—

FINANCIAL STATEMENT, 1898.

Receipts.

	£	s.	d.	£	s.	d.
Levies paid by Societies :—						
1896	0	4	0			
1897	6	10	0			
1898	13	1	11			
				19	15	11
Subscriptions paid by Mem- bers :—						
1888	0	5	0			
1889	0	5	0			
1890	0	5	0			
1891	0	5	0			
1892	0	10	6			
1893	0	18	0			
1894	3	9	0			
1895	4	15	6			
1896	6	12	6			
1897	49	8	0			
1898	96	5	0			
1899	0	16	6			
				163	15	0
Donations to Special Fund				86	13	6
Sales from Stock of Publications ..				8	17	7
Life Composition				7	7	0
Receipts on behalf of 'The Naturalist'				192	0	0
Interest allowed by Bank				0	8	0
				£478	17	0

Payments.

	£	s.	d.	£	s.	d.
Balance due to Treasurer				6	14	9
Members' Cards				9	10	0
General Expenses, Stationery, etc. ..				13	10	2
Expenses of Meetings :—						
Clapham	8	5	11			
Doncaster	7	1	2			
Terrington	7	19	8			
Jervaulx	8	7	3			
Easington	7	14	2			
Fungus Foray	4	1	4			
Annual Meetings	15	2	3			
				58	11	9
Collectors' Commission				30	10	9
Receipt Books and Treasurers' Cir- culars				6	14	3
Other Expenses incurred by Treasurer				9	6	9
Album for Geological Photographic Committee				0	6	6
Expenses of Boulder Committee ..				0	12	4
Expenses of Marine Biological Com- mittee				0	5	4
Subscription to Footpath Preservation Society				0	10	6
Subscription to Zoological Record ..				1	0	0
Subscription to Zoological Congress				2	2	0
Expenses of Library, Exchanges, etc. (includes £20 14s. 6d. for 'Naturalist' sent in exchange)				32	14	2
Paid on account of 'Transactions' (includes £8 15s. 0d. for 'Naturalist' sent to Life Members)				43	14	8
Paid on Account of 'The Naturalist'				259	3	7
				475	7	6
Balance in hand				3	9	6
				£478	17	0

I have examined the accounts, as they appear in these books, compared them with the vouchers and counterfoils, and find them correct.
Leeds, Dec. 13th, 1898.
E. HAWKESWORTH.

The financial position of the Union is shown by the statement of assets and liabilities, as follows :—

Assets.

	£	s.	d.	£	s.	d.
Balance in hand				3	9	6
Re 'NATURALIST.'						
Cash in hands of Local and General Treasurers, or in Bank	22	14	9			
Subscriptions owing	18	8	6			
				41	3	3
Re GENERAL ACCOUNT.						
Cash in hands of Local and General Treasurers, or in Bank	15	13	4			
Subscriptions owing	24	11	0			
				40	4	4
				£84	17	1
Book Cases valued at	8	0	0			
Books in Library valued at	160	0	0			
Stock of Transactions valued at	40	0	0			
Stock of 'Flora' valued at	100	0	0			
Stock of 'Naturalist' valued at	60	0	0			
				368	0	0
Estimated to produce				185	0	0
				£269	17	1

Liabilities.

	£	s.	d.	£	s.	d.
Re 'NATURALIST.'						
'Naturalist' for Nov. and Dec., say	20	0	0			
Owing to Secretary	0	18	2			
				20	18	2
Re GENERAL ACCOUNT.						
Owing to Printers	4	10	0			
Owing to Secretary	1	3	0			
				5	13	0
Re TRANSACTIONS.						
Parts 22, 23, 24, say				45	0	0
Re LIBRARY & STOCK.						
Owing to Secretary				0	12	9
				£72	3	11
Balance of assets over liabilities ..				197	13	2
				£269	17	1

Local Treasurers.—Your Executive recommend the re-election of the Hon. Local Treasurers as follows:—Barnsley, E. G. Bayford; Beverley, T. J. Morley; Bingley, H. Speight; Doncaster, George Winter; Goole, Thomas Bunker; Halifax, Arthur Crabtree; Harrogate, K. McLean; Huddersfield, A. Clarke; Hull, John Stears; Malton, M. B. Slater, F.L.S.; Market Weighton, J. J. Marshall; Middlesbrough, T. F. Ward; Pickering, John Braim; Redcar, T. H. Nelson, M.B.O.U.; Ripon, Wm. Gregson, F.G.S.; Saltburn, Richard Barnes; Scarborough, J. H. Rowntree; Sedbergh, Rev. J. H. Mackie, M.A., F.G.S.; Selby, W. Norwood Cheesman; Sheffield, A. T. Watson; Skipton, J. J. Wilkinson; Spen Valley, Albert Rothery; Wakefield, George Parkin; Whitby, Thos. Newbitt; York, H. J. Wilkinson. There are vacancies for the following and other districts, and your Executive would be glad if members would volunteer their services in this capacity:—Boston Spa, Bradford, Bridlington, Darlington, Dewsbury, Driffield, Keighley, Leeds, Richmond, Rotherham, Settle, and Thirsk.

It is a great advantage to the Union to be represented by the Hon. Local Treasurers, and your Executive would here express the Hon. Treasurer's sense of indebtedness to them for the assistance they render him.

The Publications of the Union have been as in former years, the 'Transactions' and the 'Naturalist.'

One Part, 21, of the 'Transactions' was issued in the spring of this year, and was devoted to a further instalment of Mr. Kidston's Report on the Yorkshire Fossil Flora.

With respect to the continuation of the second edition of Mr. J. G. Baker's 'North Yorkshire,' your Executive are pleased to learn from Mr. M. B. Slater, F.L.S., to whom was entrusted the revision of the Mosses, and the addition of a list of the Hepatics, that his task is nearly completed, and that he hopes to furnish the MS. during the winter.

The 'Naturalist' has been published monthly during the year under the sole editorship of Mr. W. Denison Roebuck, F.L.S., under whose direction it has fully sustained the reputation which it has for many years enjoyed as the recognised medium for the publication of natural history observations for the whole of the North of England.

Your Executive and the Editor would again take this opportunity of reminding members that the Journal has always been sufficiently catholic in its scope to welcome articles dealing with the life history of animals and plants as observed in the northern

counties, as well as with any biological and general considerations that the local observations give rise to.

The Library continues to increase, mainly by donations and exchanges, and it has been made use of by the members to a considerable extent. Your Executive have pleasure in stating that a member has been found to undertake the duties of Hon. Librarian, in the person of Mr. John Waddington, of Leeds, who, if elected, would at once undertake the compilation of the catalogue, the cost of which Mr. Farrah so generously offered to defray. Your officers are on the look-out for suitable rooms in Leeds for the accommodation of the books, the Library having considerably outgrown the accommodation placed at the Union's disposal at the Leeds Institute.

The Sections of the Union have more or less steadily carried on their work during the year, and as the success of the field excursions entirely depends upon the presence of the Union's best workers in every department, it is to be hoped that members will endeavour to support the arrangements made by the General and Sectional Officers by their presence at as many excursions as possible.

The Committees of Research have continued their investigations during the year with very satisfactory results.

The Yorkshire Boulder Committee has continued its operations during the year, and its secretary, Mr. J. H. Howarth, F.G.S., reports that several points of exceptional interest have arisen during the year. Shap granite is associated with Eskdale granite at Balby, near Doncaster. Glaciated boulders of chalk have been found at Scarborough twenty miles *north* of the Yorkshire chalk. East coast boulders from Mr. Stather's collection have been submitted by Mr. Kendall to Professor Brögger, of Christiania, who identified some of them, including the Pyroxenite, of Fettveldt, Christianiafjord; a Soda Syenite, from the country north of Christiania; a basic rock from Hitterdål; the Labradorite-porphyrite of Vlos; rocks from the neighbourhood of Drammen; and the 'Sparagmit-conglomerat,' a sandstone or grit covering a vast area in the high mountainous interior of Scandinavia, north of Christiania.

It is recommended that the Committee be re-appointed as follows:—Percy F. Kendall, F.G.S., Leeds, Chairman; J. H. Howarth, F.G.S., Bradford, Hon. Sec.; J. E. Bedford, F.G.S., Leeds; C. Brownridge, F.G.S., Birkenhead; John Burton, Horbury; Rev. W. L. Carter, M.A., F.G.S., Hopton; Rev. E. Maule Cole, M.A., F.G.S., Wetwang; H. H. Corbett, M.R.C.S., Doncaster; Wm. Gregson, F.G.S., Baldersby;

Edwin Hawkesworth, Leeds; B. Holgate, F.G.S., Leeds; Wm. Horne, F.G.S., Leyburn; Robert Law, F.G.S., Halifax; J. R. Mortimer, F.G.S., Driffield; H. M. Platnauer, B.Sc., F.G.S., York; Thos. Sheppard, Hull; J. W. Stather, F.G.S., Hull; R. H. Tiddeman, M.A., F.G.S., Bridgend, Glamorgan-shire; F. Fielder Walton, F.G.S., Hull; and R. Wood, M.D., Driffield.

The Yorkshire Fossil Flora Committee.—The Secretary, Mr. William Cash, F.G.S., reports that the Committee has, unfortunately, had to lament the decease of two of its presidents in rapid succession, Mr. Thomas Hick, B.A., B.Sc., and more recently, Mr. James Spencer, both of whom were well known for their brilliant and original researches on the structure of the fossil plants of the Halifax Hard Bed. These great losses have most seriously interrupted the investigations of the palæobotany of our county. Material has, however, been collected by the Secretary which awaits further study, and which, it is hoped, may still further elucidate the many palæobotanical problems which yet remain unsolved.

It is to be hoped that among the members of the Y.N.U. there may arise able and willing workers to carry on the work of the Committee.

Assistance in collecting material for future study is asked by the Committee, and colliery proprietors and managers, and others who have the opportunity, are invited to co-operate.

A further instalment of Mr. Robert Kidston's report was published during the year as Part 21 of the 'Transactions,' and Mr. Kidston reports that the materials he has in hand are at present insufficient for a further report.

It is recommended that the Committee be re-appointed as follows:—Robt. Kidston, F.G.S., F.R.S.E., Stirling, Chairman; Benjamin Holgate, F.G.S., Leeds, Vice-Chairman; William Cash, F.G.S., Halifax, Hon. Secretary; J. W. Bond, Leeds; Robert Law, F.G.S., Hipperholme; William Simpson, F.G.S., Halifax; John Stubbins, F.G.S., F.R.M.S., Pool; Wm. West, F.L.S., Bradford; and J. E. Wilson, Ilkley.

The Yorkshire Geological Photographs Committee has again had a successful year's work, and Mr. J. E. Bedford, F.G.S., the Secretary, reports that Mr. G. Bingley, Chairman, has contributed 67 views of subjects in Yorkshire, Westmorland, Eden Valley, and Norfolk coast, to the national collection kept at the Museum of Practical Geology in Jermyn Street, London. Mr. Bingley has also contributed 17 photographs to the duplicate collection which Mr. W. W. Watts is making at

Jernyn Street, for the use of students and lecturers as type illustrations of geological subjects. Duplicate copies of all the Yorkshire views have been inserted in the albums belonging to the Union, which are in charge of the Committee. The views taken along the Eden Valley and the 'great backbone of England' are considered by geologists to be of exceptional value. The Hull Geological Society has contributed 11 views of the Yorkshire Coast and Humber Bank to the Yorkshire albums, and duplicates to the Jernyn Street collection. Mr. B. Holgate has contributed four views of sections in the coal measures at Hunslet of boulder-like deposits. Total views for the year, 99.

It is recommended that the Committee be reappointed, as follows:—Godfrey Bingley, Leeds, Chairman; J. E. Bedford, F.G.S., Leeds, Hon. Secretary; Rev. E. Maule Cole, M.A., F.G.S., Wetwang; and F. Fielder Walton, F.G.S., Hull; with W. W. Watts, London, as Hon. Member.

The Yorkshire Coast Erosion Committee.—The Rev. E. Maule Cole, M.A., F.G.S., as Secretary reports that but little of interest has occurred during the year. In the autumn the sea did damage to the sea-wall and cliffs at Bridlington, and the whole coast of Boulder Clay must have suffered more or less, but no landslips were recorded. To the north of Filey Brig the end of the nab beyond the last 'doodle,' which had a hole in it that one could creep through, was clean washed away.

It is recommended that the Committee be re-elected as follows:—J. C. P'Anson, F.G.S., London, Chairman; Rev. E. Maule Cole, M.A., F.G.S., Wetwang, Convener; Rev. H. E. Maddock, M.A., F.G.S., Patrington; and F. Fielder Walton, F.G.S., Hull; with C. E. De Rance, F.G.S., as Hon. Member.

The Yorkshire Micro-Zoology and Micro-Botany Committee.—Mr. M. H. Stiles, Secretary, reports that with the exception of that done at the Doncaster Whit-Monday excursion, no collective work has been accomplished during the past year. On the occasion referred to, Messrs. J. Newton Coombe and M. H. Stiles made about a dozen gatherings of diatomaceous material, and the results of their subsequent working-out will appear in an early number of 'The Naturalist.' Mr. Stiles has also examined a number of gatherings from various parts of the Doncaster district, and he hopes before long—with the help of the Committee—to compile a new and extended list of West Yorkshire Diatoms. He wishes it to be known that he will gladly welcome any help in this direction that members can give him.

It is recommended that the Committee be re-elected as follows:—H. C. Sorby, LL.D., F.R.S., Sheffield, Chairman; M. H. Stiles, Doncaster, Convener; J. Newton Coombe, Sheffield; Prof. Alfred Denny, F.L.S., Sheffield; Charles P. Hobkirk, F.L.S., Ilkley; F. W. Mills, F.R.M.S., Huddersfield; John Stubbins, F.G.S., F.R.M.S., Pool; and W. West, F.L.S., Bradford; your Executive regretting that Mr. C. B. Crawshaw—by reason of pressure of other work—finds it needful to withdraw his name from the Committee.

The Yorkshire Marine Biology Committee.—The Hon. Secretaries, Mr. J. D. Butterell and Mr. F. W. Fierke, report that the excursions this year have not afforded facilities for the operations of this Committee—except that at Easington a number of zoophytes were collected by Mr. R. H. Philip. The bibliographical work of the Committee has progressed steadily, though but slowly, and no lists are as yet ripe for publication.

It is recommended that the Committee be re-elected as follows:—H. C. Sorby, LL.D., F.R.S., Sheffield, Chairman; J. D. Butterell, Wansford; Fred. W. Fierke, M.C.S., Hull, Joint Conveners; W. Cash, F.G.S., Halifax; W. Eagle Clarke, F.L.S., Edinburgh; John Cordeaux, M.B.O.U., Great Cotes; Oxley Grabham, M.A., York; Rev. W. C. Hey, M.A., West Ayton; E. Howarth, F.R.A.S., F.Z.S., Sheffield; G. Masee, F.R.M.S., Kew; T. H. Nelson, M.B.O.U., Redcar; T. Petch, B.A., B.Sc., Hedon; J. Frazer Robinson, Hull; W. Denison Roebuck, F.L.S., Leeds; Rev. Henry Smith, M.A., Redcar; and Arnold T. Watson, F.L.S., Sheffield.

The Yorkshire Wild Birds' and Eggs Protection Committee.—Mr. Oxley Grabham, M.A., who was selected as Chairman and Convener in the place of the Rev. E. P. Knubley, M.A., reports that the Committee note with great satisfaction that, owing to the stringent and effective protection afforded to the colony of Lesser Terns at the Spurn, under the ægis of the East Riding County Council, this colony, which at one time was threatened with destruction owing to indiscriminate egg-collecting on the part of collectors, now numbers one hundred pairs of birds. Moreover, about the same number of Ringed Plover have bred in the locality, and two or three pairs of Sheld Ducks.

It is recommended that the Committee be re-elected as follows:—Oxley Grabham, M.A., M.B.O.U., York, Chairman and Convener; James Backhouse, F.Z.S., Harrogate; F. Boyes, Beverley; T. Bunker, Goole; H. E. Dresser, F.L.S., F.Z.S.,

London; R. Fortune, F.Z.S., Harrogate; Jno. Gerrard, M.B.O.U., Manchester; Rev. E. P. Knubley, M.A., Steeple Ashton; Claude Leatham, Wakefield; T. H. Nelson, M.B.O.U., Redcar; Geo. T. Porritt, F.L.S., Huddersfield; and Rev. W. T. Travis, M.A., Ripley.

Yorkshire Mycological Committee.—Mr. Chas. Crossland, its secretary, reports that the mycological work done during the year has, upon the whole, been very satisfactory, despite the fact that the greater part of the season has been unusually dry. Records were scarce for most of the excursions. At the Doncaster meeting about 30 species were noted. The larger kinds of fungi were not met with in any quantity until after the October rains, when they came up in abundance. The Annual Fungus Foray at Harewood and East Keswick was pronounced a great success; a full account of the work done appears in the December number of the 'Naturalist.' The Committee has had several forays on a small scale, two in the charming valley of Luddenden, and one in the neighbourhood of Huddersfield. The Hebden valley, and one or two other places round Halifax, have been worked continuously all through the year. Several members have individually paid special attention to microscopical species with very good results, numerous additions having been made to the West Riding Mycological Flora and a few to the British Flora. It is the intention of the Committee to bring up the West Riding records to the end of 1898 at an early date.

It is recommended that the Committee be re-appointed as follows:—Rev. William Fowler, M.A., Liversedge, Chairman; Charles Crossland, Halifax, Hon. Sec.; Thomas Birks, Rochdale; U. Bairstow, Halifax; W. Norwood Cheesman, Selby; Alfred Clarke, Huddersfield; Geo. Masee, F.R.M.S., F.L.S., Kew; James Needham, Hebden Bridge; H. T. Soppitt, Halifax; J. Williams Sutcliffe, Halifax; and Harold W. T. Wager, F.L.S., Leeds.

Yorkshire Bryological Committee.—The Secretary, Mr. J. J. Marshall, reports that the members of this new Committee have been actively at work during the year, and many additional stations for rare mosses have been discovered, though nothing absolutely new to the county. The excursions, with the exception of that to Terrington Carr, have scarcely been so successful as usual, the best work being done by the members in their ordinary rambles. The Committee deeply regret that owing to his removal to London they will lose the active assistance of Mr. Ll. J. Cocks.

It is recommended that the Committee be re-appointed as follows:—Matthew B. Slater, F.L.S., Malton, Chairman; J. J. Marshall, Market Weighton, R.S.O., Convener; Richard Barnes, Saltburn; Robert Braithwaite, M.D., F.L.S., London; Llewellyn J. Cocks, London; Charles Crossland, Halifax; Charles P. Hobkirk, F.L.S., Ilkley; William Ingham, B.A., York; James Needham, Hebden Bridge; H. T. Soppitt, Halifax; and Wm. West, F.L.S., Bradford.

Yorkshire Coleoptera Committee.—Mr. M. L. Thompson, the Secretary, reports that the work of this Committee has been actively carried on during the year. For most of the excursions of the Union a record has been preserved of the Coleoptera observed. Such local record lists of the Yorkshire species of *Clavicornia* as have been received by the secretary are being arranged for the publication of the instalment of the list dealing with that group. The nature of the work has been made known through the medium of the 'Naturalist' and other suitable journals relating to the subject, and the committee would like those who may be wishful to respond to the appeal and place material at its disposal to do so as early as possible.

It is recommended that the Committee be re-appointed as follows:—Rev. W. C. Hey, M.A., West Ayton, Chairman; M. L. Thompson, Diamond Street, Saltburn, Convener; E. G. Bayford, Barnsley; H. H. Corbett, Doncaster; William Foggitt, Thirsk; John Gardner, F.E.S., Hartlepool; Leonard Hawkesworth, Bradford; Joseph Neale, B.A., Ackworth; H. Ostheide, Leeds; and W. Denison Roebuck, F.L.S., Leeds.

British Association.—The Union has again been appointed one of the Corresponding Societies of the Association, and was represented at the meeting at Bristol by Mr. Harold Wager, F.L.S., who was chosen last year to succeed Mr. Knubley as the Union's Delegate. Mr. Wager reports that he attended the first Conference of Delegates, which was entirely devoted to a discussion on Coast Erosion. At the second Conference, which he did not attend, several interesting matters were discussed, including the desirability of uniformity of size of scientific publications, earthquake-tremor observations, and ethnographical survey work.

Zoological Congress.—The Union became a member of the International Zoological Congress, held at Cambridge, and was represented by Mr. George S. West, B.A., son of our President-elect. The proceedings—though of great scientific importance—did not offer any points specially applicable to the Union's work.

The Executive.—In accordance with the rule providing for the retirement of the three senior members of the Executive each year, the Rev. William Fowler, Mr. George T. Porritt, and Mr. H. T. Soppitt are ineligible for re-election at the present Annual Meeting, and their colleagues desire to express their sense of the inestimable value of the services which they have rendered to the Union during a long series of years, each of them having served on the Executive for more than twenty years with a brief interval of retirement in one case. Their colleagues venture to express the hope that the present interval may be a brief one.

The Secretariate.—No permanent colleague for Mr. Roebuck has yet been found, but he and the Union have been placed under much obligation for assistance rendered in organising the excursions by Messrs. H. Speight, W. Gregson, Thomas Sheppard, John Waddington, Rev. F. Young, M. B. Slater, and H. H. Corbett.

The Presidency.—Your Executive have pleasure in announcing that the Presidency for 1899 has been offered to and accepted by Mr. W. West, F.L.S., of Bradford, an old and valued member of the Union, and one who is known not only for his all-round knowledge of the botany, in all its ramifications, of the county, but also for his special attainments in the study of the freshwater algæ, in which he is now one of the leading authorities in the world.

In conclusion, your Executive have to express their thanks to the distinguished physiologist whose term of office expires with the present meeting, for the honour which he has conferred upon the Union by his tenure of the office.

LIST OF MEMBERS,

Arranged Geographically.

CORRECTED TO NOVEMBER 1ST, 1898.

The Members whose names are printed in heavy type are those of **Permanent Members of the General Committee**. The Dates preceding names are those of election; Original Members, being those elected previous to 1883, are marked —; those to whom **L.** is prefixed are Life Members, by virtue of a donation of not less than seven guineas; and those to whom **H.L.** is prefixed are Honorary Life Members, or Ex-Presidents of the Union.

Members changing their addresses are requested to inform the Secretary as soon as possible.

BARKSTON ASH DIVISION.

Pop. 48,470.

- **L. Cheesman, William Norwood**, The Crescent, Selby.
- ... **Emmet, John**, F.L.S., The Poplars, Boston Spa, R.S.O.
- 1887 ... Emmet, Mrs., The Poplars, Boston Spa, R.S.O. LEEA
- ... **Jackson, John**, M.P.S., High Street, Wetherby.
- ... **Nelson, William**, M.C.S., Prospect View, Crossgates, Leeds.

BARNSELY DIVISION.

Pop. 78,844.

- 1897 ... Barraclough, William, Union Foundry, Barnsley.
- 1889 ... **Bayford, Edwin G.**, 2, Rockingham Street, Barnsley.
- 1884 ... **Brady, William E.**, 5, Victoria Road, Barnsley.
- 1891 ... Hutchinson, Charles H., 37, Hopwood Street, Barnsley.
- 1889 ... **Johnson, Henry**, 62, Huddersfield Road, Barnsley.
- 1892 ... **Thirkell, Edward Walter**, Hunningley Cottage, Stairfoot, Barnsley.
- 1897 ... Tomlinson, John, York Terrace, Stairfoot, Barnsley.
- 1889 ... **Turner, Benjamin**, 10, Pitt Street, Barnsley.

BEVERLEY BOROUGH.

Pop. 11,425.

- ... **Boyes, Frederick**, Yorkshire Banking Company, Beverley.
- ... Davison, George, Garden House, Keldgate, Beverley.
- ... **Dobrée, N. F.**, F.E.S., The New Walk, Beverley.
- 1892 ... Morley, Thomas John, Toll Gavel, Beverley.
- ... **Ridgway, J. Ambrose**, F.R.A.S., Beverley.

BRADFORD BOROUGH.

Pop. 216,361.

- 1894 ... Bradford Free Library and Art Museum, per Butler Wood, Librarian.
- ... **Carter, J. W.**, 25, Glenholme Road, Whetley Lane, Bradford.
- 1884 ... Clayton, John, Boxtree House, Thornton Road, Bradford.
- 1890 ... Dickons, J. Norton, 12, Oak Villas, Manningham, Bradford.
- 1893 ... **Hawkesworth, Leonard**, The Poplars, Bolton, Bradford.
- 1891 ... **Howarth, James Henry**, F.G.S., Belvoir House, Heaton, Bradford.
- 1884 ... **Lund, Percy**, 43, Athol Road, Bradford.
- ... **McLandsborough, John**, F.G.S., F.R.A.S., F.R.Met.S., etc.,
5, Lindum Terrace, Manningham, Bradford.
- ... **Meade, R. H.**, F.R.C.S., 1, Mount Royd, Manningham, Bradford.
- 1889 ... Naylor, E., 48, Market Street, Bradford.

- ... Nuttall, William, Moorside, Eccleshill, Bradford.
- ... Powell, Sir Francis Sharp, Bart., M.P., Horton Old Hall, Bradford.
- ... **West, William**, F.L.S., 15, Little Horton Lane, Bradford.

BUCKROSE DIVISION.

Pop. 50,877.

- 1895 ... **Bailey, Matthew**, Flamborough, viâ Hull.
- 1890 ... Bell, James Lumsden, M.D., White Hall, Driffield.
- ... **Butterell, Joseph Darker**, M.C.S., Park House, Wansford, Hull.
- ... **Cole, Rev. Edward Maule**, M.A., F.G.S., Vicarage, Wetwang-on-the-Wolds, viâ York.
- 1889 ... Davison, Richard, Driffield.
- 1889 ... Fountain, Joshua, Ship Inn, Filey.
- 1890 L. Hawkesbury, Right Hon. Lord, Kirkham Abbey, York.
- 1895 ... Lloyd-Greame, Yarburgh George, J.P., D.L., Sewerby House, Hull.
- 1889 ... Mortimer, J. R., F.G.S., Driffield.
- 1890 ... St. Quintin, Wm. Herbert, J.P., Scampston Hall, Rillington, York.
- ... **Tindall, Edward**, Knaption Hall, Rillington, York.
- 1889 ... Wood, Richard, M.D., Beverley Street, Driffield.

CLEVELAND DIVISION.

Pop. 55,882.

- 1891 ... Burton, J. J., Hambleton House, Nunthorpe, R.S.O., York.
- 1887 ... Emerson, E. B., B.A., J.P., Tollesby Hall, Marton, R.S.O.
- 1890 ... **Hawell, Rev. John**, M.A., Vicarage, Ingleby Greenhow, Middlesbro'.
- 1897 ... Lawrenson, William, The Nursery, Eaglescliffe, Yarm-on-Tees.
- 1888 ... Macpherson, Angus, 16, Teresa Terrace, Coatham, Redcar.
- 1887 ... Meek, J. M., M.A., 6, Nelson Terrace, Coatham, Redcar.
- 1887 ... **Nelson, Thomas H.**, M.B.O.U., Derby Villa, Redcar.
- 1883 ... Smith, Rev. Henry, M.A., Clarendon House, Redcar.

COLNE VALLEY DIVISION.

Pop. 59,344.

- 1890 L. Hirst, Ben, J.P., Tamewater, Dobcross, near Oldham.
- L. **Porritt, George T.**, F.L.S., F.E.S., Crosland Hall, near Huddersfield.
- 1897 ... Tunstall, Wilmot, F.E.S., Brook House, Meltham, Huddersfield.

DARLINGTON BOROUGH.

Pop. 35,100.

- 1898 ... Summerson, Samuel J., West House, Darlington.
- 1898 ... Thompson, Arthur Hart, St. Medard's, Darlington.

DEWSBURY BOROUGH.

Pop. 72,986.

- 1887 ... Crawshaw, C. B., J.P., Rufford Lodge, Oxford Road, Dewsbury.
- 1894 ... Hemingway, Wilson, Anroyd Villa, Dewsbury.
- ... **Hobkirk, Charles P.**, F.L.S., Hill House, Park Road, Dewsbury (Ex-President).
- ... **Lee, Phineas Fox**, West Park Villas, Dewsbury.
- 1891 ... Marriott, Arthur S., Ashlyn, Dewsbury.
- 1896 ... Taylor, Herbert J., 9, Portland Villas, Bath Street, Dewsbury.

DONCASTER DIVISION.

Pop. 73,032.

- 1890 ... **Corbett, Herbert H.**, M.R.C.S., 19, Hall Gate, Doncaster.
- 1898 ... Darley, Rev. Bertram, Harthill Rectory, Sheffield.
- 1897 ... Duff, Francis, 17, Thorne Road, Doncaster.
- 1898 ... Eden, Hon. Agnes, Armthorpe, Doncaster.
- 1891 ... Gledhill, Edward, 48, Queen's Road, Doncaster.
- 1897 ... Parkin, Leonard, Axholme House, Doncaster.
- 1883 ... Paterson, A., 41, Cemetery Road, Doncaster.
- 1890 ... **Roberts, Walter**, Ivy Bank, Avenue Road, Doncaster.
- 1884 ... **Stiles, M. H.**, 2, Frenchgate, Doncaster.
- 1887 ... **Wilson, J. Mitchell**, M.D., 51, Hall Gate, Doncaster.
- ... **Winter, George**, 14, Baxtergate, Doncaster.

ELLAND DIVISION.

Pop. 64,632.

- 1896 ... **Crowther, John E.**, Portland Street, Elland.
 1888 ... **Law, Robert, F.G.S.**, Fenny Royd Hall, Hipperholme, Halifax.

HALIFAX BOROUGH.

Pop. 82,863.

- 1895 ... **Bairstow, Uriah**, 48, Heath Crescent, Halifax.
 1887 ... **Brooke, Ven. Archdeacon J. Ingham, M.A.**, The Vicarage, Halifax.
 1897 ... **Calvert, Roby**, Moorland House, Ovenden, Halifax.
 1898 ... **Carter, Walter L.**, Summergate, Parkinson Lane, Halifax.
 1887 ... **Cash, William, F.G.S.**, 26, Mayfield Terrace, Halifax.
 1896 ... **Crabtree, Arthur**, West Hill, Halifax.
 1887 ... **Crossland, Charles**, 4, Coleridge Street, Halifax.
 1894 ... **Crump, W. B., M.A.**, 90, King Cross Street, Halifax.
 1891 ... **Edmondson, Joseph**, Heath Avenue, Halifax.
 1891 ... **Harding, George F.**, 33, Hope Street, Halifax.
 1894 ... **Imbery, John**, 16, Hyde Park Road, Halifax.
 1897 ... **McCrea, Arthur Selby**, Warley House, Halifax.
 1891 ... **Shillito, John, J.P.**, 17, Cavendish Terrace, Halifax.
 1894 ... **Simpson, William, F.G.S.**, The Gables, Halifax.
 — ... **Soppitt, Henry Thomas**, 12, Glen View, Clover Hill, Halifax.
 — ... **Spencer, James**, 8, Salisbury Place, Akroydon, Halifax.
 1890 ... **Sutcliffe, J. Williams**, 27, West View, Hopwood Lane, Halifax.
 1890 ... **Whitaker, J. Ackroyd**, Craven Lodge, Halifax.
 1889 ... **Whiteley, Frederick L.**, 10, Corn Market, Halifax.
 1891 ... **Whitley, J. H., B.A.**, Brantwood, Halifax.

HALLAMSHIRE DIVISION.

Pop. 73,249.

- 1895 ... **Payne, Richard**, Newhill Hill, West Melton, Rotherham.
 — ... **Wharncliffe, The Right Hon. the Earl of**, Wortley Hall, near Sheffield.
 1894 ... **Young, J. J. Baldwin, M.A., M.B.O.U.**, Richmond Park, near Sheffield.

HARROGATE BOROUGH.

Pop. 13,917.

- 1883 ... **Backhouse, James, F.L.S., F.Z.S., M.B.O.U.**, Daleside, Harrogate.
 1896 ... **Cocks, Llewellyn Jameson**, Godolphin House, Harrogate.
 1887 ... **Farrar, John**, Jefferies' Coate, York Road, Harrogate.
 1894 ... **Farrar, Abm., jun., F.G.S.**, The Grange, Beech Grove, Harrogate.
 1887 ... **Fortune, Riley, F.Z.S.**, 16, Mount Parade, Harrogate.
 1898 ... **Gaddes, Thomas, M.D.**, 104, Station Parade, Harrogate.
 1889 ... **Lambert, Abm.**, 25, Great George Street, West End Park, Harrogate.
 1891 ... **Laycock, Thomas, jun.**, Deepdene, Franklin Road, Harrogate.
 1889 ... **Lofthouse, J. H.**, 42, Mayfield Grove, Harrogate.
 1891 ... **McLean, Kenneth**, 32, Studley Road, Harrogate.
 1891 ... **Millward, Adam**, Cambridge Crescent, Harrogate.
 1886 ... **Naughton, John**, Ellesmere School, Park View, Harrogate.
 1898 ... **Petty, William Edward**, Cottingham, Harrogate.
 1883 ... **Saynor, John**, Woodside, Lancaster Road, Harrogate.
 1894 ... **Scharff, W. E., M.C.S.**, The Red House, Duchy Road, Harrogate.
 1898 ... **Thomson, George**, 21, Beulah Street, Harrogate.
 1893 ... **Waldby, Joseph Robert**, 31, Grove Road, Harrogate.
 1893 ... **Warwick, John Walton**, 15, East Parade, Harrogate.

HOLDERNESS DIVISION.

Pop. 41,298.

- 1894 ... **Haworth-Booth, Lieut.-Col. B. B., J.P., D.L.**, Hullbank Hall, Hull.
 — ... **Loten, Philip W.**, Easington, Hull.
 1891 ... **Maddock, Rev. Henry E., M.A., F.G.S.**, Patrington Rectory, Hull.
 1888 ... **Oldroyd, Charles**, Lund, near Beverley.
 1890 ... **Scott, Frederick A.**, Sutton, near Hull.

HOLMFIRTH DIVISION.

Pop. 65,159.

- 1894 ... Clayton, John, Lidgett House, Wharneliffe, Silkstone, Barnsley.
 — ... Waite, William, Cliff Cottage, Clayton West, Huddersfield.

HOWDENSHERE DIVISION.

Pop. 49,327.

- 1894 ... Ash, Rev. Cyril D., B.A., Skipwith Vicarage, Selby.
 1896 ... Ash, Mrs. C. D., Skipwith Vicarage, Selby.
 1896 ... Banks, Ernest, Saltmarshe Cottage, Saltmarshe, Howden.
 — ... Herries, The Right Hon. Lord, Lord-Lieutenant of the East Riding,
 Everingham Park, York.
 1883 ... Leadman, Alex. D. H., F.S.A., Oak House, Pocklington, York.
 1890 ... Marshall, J. J., Market Weighton, R.S.O.
 — ... Proudlock, John, The Nurseries, Market Weighton, R.S.O.
 1886 ... Stears, John, Westholme, Hessele, Yorkshire.
 — ... Whitaker, T. Stephen, F.R.G.S., Everthorpe, Brough.

HUDDERSFIELD BOROUGH.

Pop. 96,495.

- ... Brooke, Edwd., jun., F.G.S., Oakley House, Edgerton, Huddersfield.
 1885 ... Brooke, John Arthur, J.P., Fenay Hall, Huddersfield.
 1892 ... Clarke, Alfred, 9, St. Andrew's Road, Huddersfield.
 1894 ... Cockshaw, Edward, 65, Blacker Road, Birkby, Huddersfield.
 1893 L. Mills, F. W., F.R.M.S., Thornleigh, Huddersfield.
 1895 ... Sykes, A. W., 9, Commercial Crescent, Huddersfield.
 1894 ... Wilkinson, Johnson, M.B.O.U., Vermont, Huddersfield.
 1890 ... Woodhead, Thomas William, Arnold Street, Birkby, Huddersfield.

KEIGHLEY DIVISION.

Pop. 63,272.

- ... Brigg, John, M.P., F.G.S., Kildwick Hall, Keighley.
 — ... Butterfield, E. P. P., Wilsden, near Bingley.

KINGSTON-UPON-HULL BOROUGH.

Pop. 200,044.

- 1897 ... Audas, Thomas, L.D.S., Regent's Terrace, Hull.
 1895 ... Carlton, John, 48, Albany Street, Hull.
 1883 ... Dawson, Percival W., 101, Westbourne Avenue, Hull.
 1894 ... Dennis, Thomas, 21, Peel Street, Hull.
 1892 ... Fierke, Frederick Wm., M.C.S., 52, Francis Street West, Hull.
 1895 ... Hollingworth, John, M.R.C.S., 2, Hornsea Parade, Holderness
 Road, Hull.
 1890 ... Jackson, Andrew Marvell, Victoria Chambers, Hull.
 1892 ... Robinson, James Frazer, 37, Caroline Place, Hull.
 1897 ... Saner, Charles Otto Farmer, 2, Elgin Villas, Anlaby Road, Hull.
 1884 ... Sawdon, Fred. John, M.D., 32, Beverley Road, Hull.
 1897 ... Sheppard, Thomas, 78, Sherburn Street, Hull.
 1891 ... Stather, John W., F.G.S., 16, Louis Street, Hull.
 1898 ... Sykes, William, 52, Park Grove, Hull.
 1892 ... Waller, Michael, 105, Westbourne Avenue, Hull.
 1884 ... Walton, F. Fielder, M.R.C.S., F.G.S., 10, Charlotte Street, Hull.
 1891 ... Waterfall, Charles, 10, De Grey Street, Beverley Road, Hull.

LEEDS CITY.

Pop. 387,505.

- 1886 ... Addyman, James W., B.A. Lond., 15, East Parade, Leeds.
 1892 ... Asquith, William E., 23, Cardigan Road, Headingley, Leeds.
 1892 ... Baker, Walter Francis, F.E.S., 1, Hillary Street, Leeds.
 1897 ... Barley, D. H., Grove House, Burmantofts, Leeds.
 — ... Barran, Sir John, Bart., Chapel-Allerton Hall, Leeds.
 — ... Bedford, James, Sycamore Lodge, Woodhouse, Leeds.
 — ... Bedford, Jas. E., F.G.S., Arncliffe, Shireoak Road, Headingley, Leeds.

- 1891 ... Bell, Rev. John, Leeds.
 1885 ... **Bingley, Godfrey**, Thorniehurst, Shaw Lane, Headingley, Leeds.
 — ... Birchall, Edward, 18, Moorland Road, Leeds.
 1897 ... Bond, J. W., Torre Road, Burmantofts, Leeds.
 — ... Bould, Charles Henry, 5, Wrangthorne Place, Hyde Park, Leeds.
 1885 ... **Branson, Frederick W.**, F.I.C., F.C.S., Wynneholme, Far Headingley, Leeds.
 1896 ... Broadhead, W. H., Craiglea, Headingley, Leeds.
 1897 ... Butler, A. Edmund, Kepstorn, Kirkstall, Leeds.
 1893 ... Coe, Joseph, 16, Bagby Road, Leeds.
 1896 ... **Crowther, Henry**, F.R.M.S., Curator of the Leeds Phil. and Lit. Society's Museum; 52, Brudenell Mount, Headingley, Leeds.
 1896 ... Foster, George, Mining Engineer, Bleak House, Harehills, Leeds.
 1891 ... Grahl, C. E., Ashwood, Headingley Hill, Leeds.
 1897 ... Haslam, William James, St. Martin's Villa, Newton Park, Leeds.
 1891 ... **Hawkesworth, Edwin**, 11, Nursery Mount, Woodhouse Hill, Hunslet, Leeds.
 — ... **Hewatson, H. Bendelack**, M.R.C.S., F.L.S., F.Z.S., M.B.O.U., 10, Hanover Square, Leeds.
 1896 ... Holbrook, William, St. Ann's Villa, Far Headingley, Leeds.
 1897 ... Holbrook, Mrs. William, St. Ann's Villa, Far Headingley, Leeds.
 — ... **L. Holgate, Benj.**, F.G.S., 4, Montpellier Terrace, Headingley, Leeds.
 1892 ... **Kendall, Percy F.**, F.G.S., Lecturer on Geology at the Yorkshire College; 5, Woodland Terrace, Stainbeck Lane, Leeds.
 1890 L. Kitson, Sir James, Bart., M.P., Gledhow Hall, Leeds.
 1897 ... Littlewood, H., F.R.C.S.Engl., 40, Park Square, Leeds.
 — ... Lupton, Henry, F.E.S., Lyndhurst, North Grange Road, Headingley.
 1897 ... Mawson, Joseph A. [Address wanted.]
 1890 L. Oxley, Henry, Spenfield, Weetwood, Leeds.
 1891 L. **Pawson, Albert Henry**, Lawns House, Farnley, Leeds.
 1891 L. Pawson, Mrs. A. H., Lawns House, Farnley, Leeds.
 1893 ... Parkinson, Stephen, 59, Leopold Street, Leeds.
 — ... **Pocklington, Henry**, F.R.M.S., 41, Virginia Road, Leeds.
 1887 ... **Powys, Rev. H. Annesley**, M.A., Meanwood Vicarage, Leeds.
 1887 ... Reynolds, Richard, F.I.C., F.C.S., Cliff Lodge, Woodhouse, Leeds.
 1897 ... Rinder, W. H., F.R.G.S., St. Ann's Mount, Burley, Leeds.
 1897 ... Rober, A. W. Mayo, F.R.C.S., 7, Park Square, Leeds.
 — ... **Roebuck, William Denison**, F.L.S., 259, Hyde Park Road, Leeds.
 — ... Rowley, Walter, M.I.C.E., F.G.S., etc., Alder Hill, Meanwood, Leeds.
 — ... Stoks, Edwin, 1a, Victoria Terrace, Belle Vue Road, Leeds.
 — ... **Teasdale, Washington**, F.R.A.S., F.R.M.S., 255, Hyde Park Road, Leeds.
 — ... Tetley, Charles F., J.P., Spring Bank, Headingley, Leeds.
 — ... **Thrippleton, John**, Burley View, Burley, Leeds.
 1898 ... Waddington, John, Winfield Street, Leeds.
 1894 ... **Wager, Harold**, F.L.S., Bank View, Chapel-Allerton, Leeds.
 — ... Ward, Geo., F.I.C., F.C.S., 1, Buckingham Terrace, Hyde Park, Leeds.
 1896 ... Wilson, Henry B., Westfield, Armley, Leeds.
 1896 ... Wurtzburg, John H., J.P., F.R.Hist.S., 2, De Grey Road, Leeds.
 — ... Yewdall, Edwin, 58, Wade Lane, Leeds.

MALTON TOWN.

Pop. 8,754.

- ... Hodgson, William, Wheelgate, Malton.
 1896 ... Jenkinson, Rev. S., Prospect Villa, Norton, Malton.
 1889 ... Longster, Thomas Piper, Mowbray Terrace, Malton.
 1897 ... Oldfield, George, St. Nicholas Street, Norton, Malton.
 — ... Pearson, Hugh W., Castle Howard Road, Malton.
 — ... **Slater, Matthew B.**, F.L.S., 84, West Grove Villas, Newbiggin, Malton.
 1889 ... Suddaby, W. M., Crown Hotel, Wheelgate, Malton.
 1888 ... Walker, A. W., 24, Yorkersgate, Malton.

MIDDLESBROUGH BOROUGH.

Pop. 98,982.

- 1898 ... Clayton, Robert George, 67, Douglas Terrace, Borough Road, Middlesbrough.
 1898 ... Hinton, Alderman Amos, Hilda House, Middlesbrough.
 1898 ... Punch, J. W. R., 2, Cumberland Villas, Borough Road, Middlesbrough.
 1890 ... Veitch, W. Y., L.R.C.P., L.R.C.S., The Crescent, Middlesbrough.
 1890 ... Thomas, W. H., 7, Ryedale Terrace, Borough Road, Middlesbrough.
 1887 ... Ward, Thomas F., Park Road South, Middlesbrough.

MORLEY DIVISION.

Pop. 65,216.

- 1890 ... Carter, Rev. W. Lower, M.A., F.G.S., The Manse, Hopton, Mirfield, Normanton.

NORMANTON DIVISION.

Pop. 72,012.

- 1894 ... Burton, John, Farmer, Horbury, Wakefield.
 — ... Roberts, George, Lofthouse, near Wakefield.

OSGOLDCROSS DIVISION.

Pop. 66,794.

- ... Bunker, Thomas, 9, East Parade, Goole.
 1896 ... Gill, E. Leonard, Ivy House, Ackworth, Pontefract.
 — ... Harrison, John, Tillage Works, Goole.
 1897 ... Jackson, Walter, 36, Vermuyden Terrace, Goole.
 1890 L. Jones, R. Heywood, J.P., Badsworth Hall, Pontefract.
 1893 ... Leatham, Claude, The Red House, Wentbridge, Pontefract.
 1898 ... Leatham, Claude Guy, The Red House, Wentbridge, Pontefract.
 1895 ... Neale, Joseph, B.A., Garden Villa, Ackworth, Pontefract.
 — ... Pease, W., Elm Cottage, Hook, near Howden.

OTLEY DIVISION.

Pop. 61,746.

- 1894 ... Angus, Henry, M.B., C.M., Burnage House, Bingley.
 1898 ... Chorley, Mrs. Harry, Moorville Cottage, Burley-in-Wharfedale.
 1893 ... Fawkes, Mrs. Edith M., Farnley Hall, Otley.
 1897 ... Metcalf, W. Day, 5, Springs Terrace, Ilkley.
 — ... Miall, Louis C., F.R.S., F.L.S., F.G.S., Professor of Biology in the Yorkshire College; Crag Foot, Ben Rhydding, Leeds.
 1885 ... Speight, Harry, Highfield Villas, Crownest Road, Bingley.
 — ... Stubbins, John, F.G.S., F.R.M.S., Woodlands, Pool, Leeds.
 1897 ... Teal, Joseph, Grange Terrace, Yeadon.
 1897 ... Whitham, Thomas, Bramhope, Leeds.
 — ... Wilson, John E., Yew Bank House, Ilkley.

PICKERING TOWN.

Pop. 4,019.

- 1895 ... Ashton, James T., M.B., Kingthorpe House, Pickering.
 — ... Braim, John, Hungate, Pickering.
 1895 ... Comber, Charles Thomas Thornton, L.R.C.P., M.R.C.S., Pickering.
 1886 ... Lightfoot, Rev. George H., M.A., The Rectory, Pickering.
 1889 ... Lucy, Charles T., York Union Bank, Pickering.
 1895 ... Mitchelson, Major J. M., The Hall, Pickering.
 1889 ... Mitchelson, Thomas, The Mount, Pickering.
 1884 ... Prodham, Herbert, Allerston, near Pickering.

PONTEFRACT BOROUGH.

Pop. 16,407.

PUDSEY DIVISION.

Pop. 49,252.

- 1883 ... Gaunt, Leonard, Prospect House, Farsley, Leeds.
 1886 ... Gaunt, Mrs. L., Prospect House, Farsley, Leeds.
 1897 ... Hutton, Enoch, F.Z.S., Columbarian House, Pudsey.
 — ... Taylor, John W., F.L.S., M.C.S., etc., Spring Bank, Horsforth, Leeds.

RICHMOND DIVISION.

Pop. 54,439.

- 1891 L. Carpenter, Hon. Mrs. [Beatrice], Kiplin, Northallerton.
 — ... Carter, James, M.B.O.U., Burton House, Masham, R.S.O.
 1886 ... Chaytor, R. C., M.C.S., Scafton Lodge, Middleham, R.S.O.
 1897 ... Hartshorn, John, Leyburn, R.S.O.
 1898 ... Herdman, William, F.G.S., Lanehead Villa, Middleton-in-Teesdale
 Darlington.
 1884 ... Horne, William, F.G.S., Market Place, Leyburn, R.S.O.
 1885 ... Huddart, Rev. G. A. W., M.A., LL.D., Kirklington Rectory, Bedale.
 1895 ... Raine, Joseph, Newbiggin, Richmond, Yorkshire.
 1884 ... Taylor, Rev. Richard Vickerman, B.A., Melbecks Vicarage, viâ
 Richmond, Yorkshire.

RIPON DIVISION.

Pop. 54,925.

- 1886 ... Clarkson, W. C., L.R.C.P., etc., Darley, Ripley, Leeds.
 1894 ... Garrod, Rev. George Watts, B.A., 11, Crescent Parade, Ripon.
 1891 ... Heslington, Thos. Clarke, 44, North Road, Ripon.
 1883 ... Hurst, Joseph S., J.P., Copt Hewick Hall, Ripon.
 — ... Ingleby, James, Eavestone, near Ripon.
 1883 ... Paver-Crow, Richard, J.P., Ornhams Hall, Boroughbridge, York.
 1885 ... Radcliffe, Sir J. Percival, Bart., F.R.A.S., Rudding Park, Knares-
 borough.
 — ... Ripon, The Most Hon. the Marquis of, K.G., F.R.S., etc., Studley
 Royal, Ripon.
 1888 ... St. Paul, Major Horace, J.P., The Willows, Ripon.
 1891 L. Stobart, William C., J.P., Spellow Hill, Leeds.
 — ... Summerfield, Rev. R. A., B.A., North Stainley Vicarage, near Ripon.
 1884 ... Travis, Rev. William Travis, M.A., The Rectory, Ripley, Leeds.

ROTHERHAM DIVISION.

Pop. 78,597.

- 1884 ... Bennett, Samuel H., Mountenoy Road, Rotherham.
 1897 ... Dufty, Ernest E., L.S.A., Victoria Terrace, Masborough, Rotherham.
 1884 ... Eskholme, George, J.P., Beech-en-Hurst, Rotherham.
 1896 ... Howitt, John, 12, Whiston Grove, Rotherham.
 1896 ... Moore, Harry, F.R.M.S., Curator of Rotherham Museum; 12,
 Whiston Grove, Rotherham.

SALTBURN-BY-THE-SEA.

Pop. 2,384.

- 1888 ... Barnes, Richard, The Gardens, Saltburn-by-the-Sea.
 1890 ... Hallimond, Henry T., 3, Lune Street, Saltburn-by-the-Sea.
 1885 ... Irvin, Rev. Benjamin, M.A., The Vicarage, Saltburn-by-the-Sea.
 1890 ... Thompson, M. Lawson, Diamond Street, Saltburn-by-the-Sea.

SCARBOROUGH BOROUGH.

Pop. 33,776.

- 1893 ... Barker, Reginald H., Grosvenor Bank, Scarborough.
 1892 ... Chapman, John G., Chapman's Hotel, Blenheim Street, Scarborough.
 1892 L. Clarke, William James, 44, Huntriss Row, Scarborough.
 1888 ... Gibb, George S., LL.B., Scarborough.
 1892 ... Hudson, George, M.D., Westbourne House, Scarborough.
 1889 ... Rowntree, Allan, Broom Lodge, Scarborough.
 — L. Rowntree, James Henry, Westwood, Scarborough.
 1892 ... Rowntree, William, J.P., Westwood, Scarborough.

SHEFFIELD CITY.

Pop. 324,243.

- 1884 ... Birks, Edward, Birchcliffe, Broomhall Park, Sheffield.
 1884 ... Brittain, Ald. Frederick, Melbourne Avenue, Sheffield.
 1892 ... Brittain, Ald. W. H., J.P., Storth Oaks, Ranmoor, Sheffield.
 1893 ... Coombe, John Newton, Broces Bank, Sheffield.

- 1885 ... **Denny, Alfred**, F.L.S., Professor of Biology in the Firth College ;
9, Summerfield, Broomhill, Sheffield.
- 1897 ... **Ellis**, Rev. John, 49, Marlborough Road, Sheffield.
- 1898 ... **Gibbs**, Thomas, 29, Fentonville Street, Sheffield.
- 1889 **L. Hall, Albert Ernest**, F.E.S., Norbury, Pitsmoor, Sheffield.
- 1889 ... **Howarth, Elijah**, F.R.A.S., Curator of Sheffield Public Museum,
Weston Park ; Hilbre Nest, Crookesmoor Road, Sheffield.
- 1892 ... Sheffield Central Public Free Library, Surrey Street, Sheffield.
- 1897 ... **Smith**, F. E., 1, George Street, Sheffield.
- 1897 ... **Snelgrove**, Edward, B.A., Camps Mount Villa, Meersbrook, Sheffield.
- ... **Sorby, Henry Clifton**, LL.D., F.R.S., F.L.S., F.G.S., F.R.M.S., etc.,
Broomfield, Sheffield (Ex-President).
- 1897 ... **Stokes**, John, M.D., 82, Ecclesall Road, Sheffield.
- 1895 ... **Tindall**, Frederick Markham, jun., 27, Victoria Road, Broomhall
Park, Sheffield.
- 1885 ... **Watson, Arnold Thomas**, F.L.S., Southwold, Tupton Crescent,
Sheffield.
- 1897 ... **Wheat**, John B., M.A., Norwood Hall, Sheffield.
- 1893 ... **White, William**, F.E.S., Curator, the Ruskin Museum, Sheffield.
- 1890 ... **Wilson**, H. J., M.P., Osgathorpe Hills, Sheffield.

SHIPLEY DIVISION.

Pop. 62,166.

SKIPTON DIVISION.

Pop. 58,209.

- ... **Eddy, J. Ray**, F.G.S., F.R.M.S., The Grange, Carleton, Skipton.
- 1898 ... **Handby**, J. Walling, Austwick, Lancaster.
- 1887 ... **Handley, John**, Briggflats, Sedbergh, R.S.O.
- 1887 ... **Mackie**, Rev. **John H.**, M.A., The Grammar School, Sedbergh, R.S.O
- 1883 ... **Morrison**, Walter, M.P., Malham Tarn House, Bell Busk, Leeds.
- 1894 ... **Rickards**, C. A., Bell Busk, Leeds.
- 1887 ... **Robinson**, William, Green Bank, Sedbergh, R.S.O.
- ... **Shuffrey**, Rev. **W. A.**, M.A., Vicarage, Arncliffe, Skipton.
- 1896 ... **Slingsby**, W. Cecil, F.R.G.S., Carleton, Skipton-in-Craven.
- 1892 ... **Wilkinson**, J. J., Burnside, Skipton.
- 1890 **L. Wright**, C. B. E., J.P., Bolton Hall, Clitheroe.

SOWERBY DIVISION.

Pop. 63,202.

- 1896 ... **Hellewell**, Young, 10, George Street, Todmorden.
- 1894 ... **Needham**, James, Woodend, Hebden Bridge.

SPEN VALLEY DIVISION.

Pop. 57,402.

- ... **Blakeley**, John Wesley, Liversedge Hall, Liversedge.
- 1891 **L. Cooke**, James S., J.P., Springfield, Gomersal, Leeds.
- 1895 ... **Crosland**, Robert Wilfrid, Oldfieldnook, Cleckheaton.
- 1898 ... **Easton**, Rev. E. W., M.A., St. Luke's Vicarage, Cleckheaton.
- ... **Fowler**, Rev. **William**, M.A., Vicarage, Liversedge (Ex-President).
- 1896 ... **Hind**, Rev. H. N., M.A., Hightown, Liversedge, Normanton.
- ... **Hindley**, A. D., Liversedge, Normanton.
- 1896 ... **Priestley**, F. N., Littleton, Liversedge, Normanton.
- 1893 ... **Rothery**, Albert, South Holme, Liversedge, Normanton.
- ... **Stead, John James**, Albert Cottage, Heckmondwike.

STOCKTON-ON-TEES BOROUGH.

Pop. 55,202.

THIRSK AND MALTON DIVISION (For Malton Names see separate list).

Pop. 57,183.

- ... **Addison**, Rev. **Frederick**, M.A., Sutton Road, Thirsk.
- 1890 ... **Buchanan**, John Hamilton, M.D., Sowerby, Thirsk.
- 1890 **L. Carlisle**, Right Hon. the Earl of, J.P., Castle Howard, York.
- 1888 ... **Fitzwilliam**, Hon. W. H. Wentworth, M.P., Wiganthorpe, York.

- 1897 ... Foggitt, Thomas Jackson, Market Place, Thirsk.
 — ... Foggitt, William, South Villa, Thirsk.
 1883 H.L. Galloway, Sir Ralph Payne, Bart., M.B.O.U., Thirkleby Park, Thirsk
 (Ex-President).
 — ... Gregson, William, F.G.S., Baldersby, S.O., Yorkshire.
 1897 ... Harrison, W., Knayton, Thirsk.
 1884 ... Mitchell, T. Carter, F.S.A., Topcliffe, near Thirsk.
 — ... Wright, John, Terrington, York.

THORNABY-ON-TEES BOROUGH.

Pop. 15,640.

WAKEFIELD CITY.

Pop. 37,269.

- 1892 ... Parke, George Henry, F.L.S., F.G.S., St. John's, Wakefield.
 — ... Parkin, George, 15, York Street, Wakefield.

WHITBY DIVISION.

Pop. 54,776.

- 1889 ... Atkinson, Thomas, 7, Normanby Terrace, Whitby.
 — ... Colby, George, Brawby Park, Pickering.
 1892 ... Hebden, Mrs. Emmeline, Appleton Mill, Sinnington, R.S.O.
 — ... Hey, Rev. William Croser, M.A., M.C.S., Derwent House, West
 Ayton, Seamer, York.
 1885 ... Newbitt, Thomas, 17, Royal Crescent, West Cliff, Whitby.
 1894 ... Punshon, Mrs. R. M., Oldstead Hall, Ampleforth, York.
 1887 ... Pyman, Walter H. S., Moss Brow, Whitby.
 1888 ... Smith, Christopher W., Harome, Nawton, York.
 1889 ... Stewart, John T., 3, Belle Vue Terrace, Whitby.

YORK CITY.

Pop. 67,004.

- 1896 L. Anderson, Tempest, M.D., B.Sc., F.G.S., J.P., 17, Stonegate, York.
 1893 ... Bean, Eugene, 8, Nessgate, York.
 — ... Dennis, George C., F.E.S., 39, Blossom Street, York.
 1893 ... Dutton, Robert, Castle Mills Bridge, York.
 1893 ... Elmhirst, Charles E., 17, Mount Parade, York.
 1894 ... Grabham, Oxley, M.A., M.B.O.U., Chestnut House, Heworth, York.
 — ... Hewett, William, 12, Howard Street, Fulford Road, York.
 1889 ... Hodsmann, George, 8, Feversham Terrace, York.
 1896 ... Ingham, William, B.A.Lond., 47, Haxby Road, York.
 — ... Jackson, George, 2, Clement Street, York.
 1896 ... Leatham, Ernest, J.P., Alderside, Dringhouses, York.
 1893 ... Mackay, Donald S., 4, Lendal, York.
 1896 ... Melrose, James, Clifton Croft, York.
 — ... Moiser, Henry R., F.G.S., Heworth Grange, York.
 1895 ... Platnauer, Henry Maurice, B.Sc., F.G.S., etc., Curator of the
 Museum, York; and Low Royd, St. Olave's Road, York.
 1893 ... Potter, Ernest Guy, 14, Bootham Crescent, York.
 1890 ... Procter, John William, Ashcroft, York.
 1896 ... Raimes, Alwyn, M.D., 2, Scarcroft Road, York.
 1896 ... Rowntree, Theodore H., Mount Villas, York.
 1898 ... Terry, Thomas W. L. Trentholme, The Mount, York.
 1884 ... Thompson, Richard, Dringcote, York.
 1890 ... Walker, John Francis, M.A., F.G.S., F.L.S., F.C.S., F.I.C.,
 F.Z.S., etc., 45, Bootham, York.
 1896 ... Walker, Wm. Thomlinson, J.P., Clifton Grove, York.
 1893 ... Wilkinson, Arthur, 39, East Mount Road, York.
 1893 ... Wilkinson, Henry J., 11, Chapter House Street, York.

DURHAM, NORTHUMBERLAND, CUMBERLAND, WESTMORLAND, CHESHIRE,
LANCASHIRE, AND ISLE OF MAN.

- 1890 ... Bacon, J. Cæsar, Seafeld, Santon, Isle of Man.
 — ... Birks, Thomas, Moss Lodge, King's Road, Rochdale.

- 1886 ... **Brownridge, Charles**, Assoc.M.I.C.E., F.G.S., 26, North Road, Devonshire Park, Birkenhead.
- 1896 ... **Clarke, Henry Shortridge**, F.E.S., Sulby Parsonage, Lezayre, Isle of Man.
- 1891 ... **Collins, Francis Richard**, 21, Langworthy Road, Manchester.
- 1897 ... **Cradock, Charles M.**, B.A., Mayfield, Stockton-on-Tees.
- 1896 **H.L. Dawkins, Prof. W. Boyd**, M.A., F.R.S., F.G.S., Owens College, Manchester (President).
- 1894 ... **Foggitt, John B.**, 29, Neville Street, Southport.
- 1885 ... **Gardner, John**, F.E.S., 8, Friar Terrace, Hartlepool.
- 1887 ... **Gerrard, John**, M.B.O.U., H.M. Inspector of Mines, Worsley, Manchester.
- 1897 ... **Herdman, William**, F.G.S., Lanehead Villa, Middleton-in-Teesdale, Darlington.
- 1892 ... **Howse, Richard**, Curator of the Newcastle Museum, and Hon. Sec. Tyneside Nat. Field Club; 12, St. Thomas Crescent, Newcastle-on-Tyne.
- 1898 ... **Hoyle, William Evans**, M.A., etc., Keeper of the Manchester Museum, Owens College, Manchester.
- 1888 .. **Leach, Richard Ernest**, M.A., F.L.S., F.G.S., Grammar School, Appleby, Westmorland.
- 1890 **L. Marshall**, Arthur, Hallsteads, Penrith.
- 1898 ... **Lucas, Bernard Richard**, 3, Dyer Terrace, Winnington, Northwich.
- 1894 ... **Melvill, James Cosmo**, M.A., F.L.S., etc., Brook House, Prestwich, Manchester.
- 1894 ... **Petty, S. Lister**, 24, Queen Street, Ulverston.
- 1898 ... **Proud, J. T.**, Dellwood, Bishop Auckland.
- 1883 ... **Richmond, Right Rev. J. J. Pulleine**, D.D., Bishop of, Stanhope Rectory, Darlington.
- 1898 ... **Smith, W. Herbert**, Pelaw House, Durham.
- 1889 ... **Trechmann, Chas. O.**, Ph.D., F.G.S., Hudworth Tower, Castle Eden, Durham.
- 1887 ... **Watts, Rev. Arthur**, F.G.S., F.R.G.S., The Rectory, Witton Gilbert, Durham.

COUNTIES SOUTH OF YORKSHIRE.

- 1883 **H.L. Baker, John Gilbert**, F.R.S., F.L.S., The Royal Gardens, Kew (Ex-President).
- ... **Beaumont, Alfred**, F.E.S., The Red Cottage, Pond Road, Blackheath, London, S.E.
- 1895 ... **Braithwaite, Robert**, M.D., F.L.S., F.R.M.S., 303, Clapham Road, London, S.W. (Ex-President).
- ... **Butterfield, J. A.**, B.Sc., 35, Wrottesley Road, Plumstead, London, S.E.
- 1891 **L. Champney, John E.**, J.P., Abchurch Chambers, London, E.C.
- 1890 **L. Charlesworth, John B.**, J.P., Hurts Hall, Saxmundham.
- ... **Clark, James Edmund**, B.A., B.Sc., 112, Wool Exchange, London, E.C.
- ... **Cordeaux, John**, M.B.O.U., Great Cotes House, R.S.O., Lincoln (Ex-President).
- 1885 **H.L. Dallinger, Rev. W. H.**, LL.D., F.R.S., F.L.S., Sec.R.M.S., etc., Ingleside, Newstead Road, Lee, London, S.E. (Ex-President).
- 1889 **H.L. Dresser, Henry Eeles**, F.L.S., F.Z.S., etc., 110, Cannon Street, London, E.C. (Ex-President).
- 1884 ... **Fox, Rev. Henry E.**, M.A., M.B.O.U., Fairview, Norbiton, Surrey.
- 1883 ... **Gough, Rev. T.**, B.Sc., F.G.S., King Edward VI. School, East Retford.
- 1894 ... **Green, Upfield**, F.G.S., Tenter Street, Moorfields, London.
- 1884 ... **Grove, Edmund**, F.R.M.S., Norlington, Preston, Brighton.
- 1887 ... **Haigh, G. H. Caton**, M.B.O.U., Aber-iâ, Penrhyndeudraeth, Merionethshire; and Grainsby Hall, Great Grimsby, Lincs.
- ... **Harker, Alfred**, M.A., F.G.S., Woodwardian Museum, and St. John's College, Cambridge; and 3, Park Avenue, Princess Avenue, Hull.
- 1883 ... **Hopkinson, John**, F.L.S., F.G.S., F.R.M.S., etc., The Grange, St. Albans, Herts.
- 1884 ... **Hudleston, Wilfrid H.**, M.A., F.R.S., F.L.S., F.G.S., F.C.S., etc., 8, Stanhope Gardens, London, S.W. (Ex-President).

- 1884 ... **l'Anson, Joseph Coventry**, F.S.A., F.G.S., etc., 7, Campden Grove, Kensington, London, W.
- **L. Knubley**, Rev. **E. Ponsonby**, M.A., M.B.O.U., Steeple Ashton Vicarage, Trowbridge, Wilts.
- ... **Mason, Philip Brookes**, J.P., F.L.S., F.E.S., M.C.S., etc., Trent House, Bridge Street, Burton-on-Trent.
- ... **Massee, George E.**, F.L.S., F.R.M.S., 1, Kent Road, Kew, Surrey.
- 1890 **L. Newton**, Rev. Canon Horace, The Vicarage, Redditch.
- 1883 ... **Oldfield, George Wm.**, M.A., F.L.S., F.E.S., 21, Longridge Road, Earl's Court, London, S.W.
- 1888 ... **Oxley**, Rev. W. H., M.A., Petersham Vicarage, Surrey.
- 1888 ... **Painter**, Rev. W. Hunt, Stirchley Rectory, near Shifnal, Shropshire.
- **H.L. Parsons, Henry Franklin**, M.D., F.G.S., 4, Park Hill Rise, Croydon, Surrey.
- 1893 ... **Peake**, Rev. **Edward**, M.A., Hillside, Bradfield, Berks.
- 1893 ... **Petch**, Tom, B.A., 27, Wisbech Road, King's Lynn.
- 1896 ... **Riddelsdell, Rev. Harry Joseph**, M.A., St. Michael's Theological College, Aberdare, South Wales.
- ... **Slater**, Rev. **Henry H.**, M.A., F.Z.S., M.B.O.U., etc., Thornhaugh Rectory, Wansford, Northamptonshire.
- 1890 ... **Spiers**, Rev. **William**, M.A., F.G.S., F.R.M.S., Victoria Place Cheadle, Staffs.
- 1889 ... **Strickland**, Walter W. [Address unknown.]
- 1893 ... **Tiddeman, R. H.**, M.A., F.G.S., Bridgend, Glamorganshire (Ex-President).
- **H.L. Walsingham**, The Right Hon. Lord, M.A., LL.D., F.R.S., F.L.S., F.E.S., etc. Merton Hall, Thetford, Norfolk; and Blubberhouses, Yorkshire (Ex-President).
- ... **Whitwell, William**, F.L.S., M.C.S., Roslin, 4, Thurleigh Road Balham, London, S.W.
- 1888 ... **Woodall, Major John W.**, M.A., J.P., F.G.S., etc., 5, Queen's Mansions, Victoria Street, London, S.W.

SCOTLAND AND IRELAND.

- ... **Clarke, Wm. Eagle**, F.L.S., M.B.O.U., Nat. Hist. Dept., Edinburgh Museum of Science and Art, 35, Braid Road, Edinburgh.
- 1885 ... **Harvie-Brown, John A.**, F.R.S.E., F.Z.S., M.B.O.U., etc., Dunipace House, Larbert, N.B.
- 1888 ... **Kidston, Robert**, F.R.S.E., F.G.S., 24, Victoria Place, Stirling, N.B.
- 1889 ... **Scharff, Robert F.**, Ph.D., B.Sc., M.R.I.A., etc., Keeper, Nat. Hist. Coll., Dublin Museum; Tudor House, Dundrum, co. Dublin.

BRITISH COLONIES.

- ... **Bairstow, Samuel Denton**, F.L.S., 120, Main Street, Port Elizabeth, Cape Colony.
- ... **Chadwick, Samuel**, F.G.S., Whetukura, Ormondville, Hawke's Bay, New Zealand.
- 1890 ... **LeTall, Benj. Bower**, M.A. Lond., Friends' School, Hobart, Tasmania.
- 1888 ... **Waite, Edgar R.**, F.L.S., Zoologist to the Australian Museum; Headingley, Mossman's Bay, Sydney, New South Wales.



38th Annual Report & Balance-Sheet for 1899.

List of Members, arranged Geographically,

Corrected to 26th October 1899.

YORKSHIRE NATURALISTS' UNION.

THIRTY-EIGHTH ANNUAL REPORT, for 1899.

THE Executive, while they have to congratulate the members on the undiminished scientific activity of the Union and of its Committees of Research, have to express their regret that the membership is not by any means commensurate with the importance of its work, and to urge upon the members the supreme importance of a very large increase in this respect. To this end they recommend that an organised systematic effort be made during the forthcoming winter to bring the claims of the Union for support before the naturalists and the public of the County of York. They would in this connection suggest that a series of evening meetings be held in different towns of the county for this purpose, and would invite assistance from members willing to take part in reading papers or giving short addresses, or exhibiting objects of interest at such meetings.

The Meetings held during the year have been six in number as usual, one for each division of the county, and also a Fungus Foray.

The districts chosen for investigation and the dates of the meetings were as follows :—

May 22, Whit-Monday : Dentdale.

June 10, Saturday : Tadcaster, for Stutton Carrs.

July 8, Saturday : Driffield, for Skerne and Wansford.

August 5—7, Saturday to Bank Holiday Monday : Ingleby Greenhow.

September 28, Thursday : Barnsley.

September 25—27, Monday to Wednesday : Fungus Foray, Campsall Woods.

The usual and much appreciated descriptive circular for each excursion was issued to members and associates.

The opening meeting was held in Dentdale at Whitsuntide, when a considerable number of members spent a most enjoyable week-end in the exploration of the dale.

The second meeting was held at Tadcaster, where there was a large attendance, and some good work in various departments was done, particularly in Stutton Carrs. At a conversazione

arranged in the evening, Mr. W. Callum read a paper on 'The Site of Roman Tadcaster,' and various local specimens were shown.

The third meeting was held at Driffield, when the geologists, led by Rev. E. Maule Cole, M.A., investigated the Wetwang and Fimber Valley, and the general body of naturalists explored the upper valley of the river Hull. The Union was on this occasion much indebted to Mr. J. R. Mortimer for throwing open his museum for inspection, and a resolution was passed hoping that the East Riding County Council would see their way to acquiring it from Mr. Mortimer, on account of its great local interest.

The fourth meeting was the August Bank Holiday one, held at Ingleby Greenhow and Carlton-in-Cleveland. The geological part of the programme was a four days' joint excursion with the Yorkshire Geological and Polytechnic Society. Both Societies are indebted to Rev. J. Hawell, of Ingleby Greenhow, for the success which attended the proceedings.

The fifth meeting was held late in the season at Barnsley, for the exploration of the Stainborough Park Estates, and the Union was much indebted to its Barnsley members for their services in organising and directing the excursion.

The Fungus Foray, which was remarkably successful from a scientific point of view, was held at Sutton, near Doncaster, for the exploration of the fine woods at Campsall, Owston, Skelbrooke, and Burghwallis.

The Union has once more to acknowledge the courtesy with which the landed gentry of the county have facilitated the Union's work by allowing permission for their estates to be visited on the occasion of the excursions.

The various railway companies have also most kindly granted such privileges as have been asked for on the occasion of each of the Union's meetings.

For the excursions of the coming year, 1900, your Executive recommend that the following programme of places and dates be adopted :—

For York Mid W.—Whit-Monday, 4th June : Askham Bog.

For York S.W.—Thursday, 28th June : Meltham Valley.

For York N.E.—In September : Fungus Foray, Mulgrave Woods.

For York N.W.—Bank-Holiday Monday, 6th August : Arkengarthdale.

For York S.E.—Saturday, 13th May : Hornsea for Skipsea.

Your Executive also recommend an excursion to Grassington on Saturday, 8th September, in connection with the meeting of the British Association at Bradford.

The Mycological Committee propose that the Fungus Foray shall be held at Mulgrave Woods at a date to be fixed to suit the circumstances of the case, in September, and your Executive have pleasure in recommending that the request be complied with.

For the Annual Meeting of next year (1900), the closing year of the century, an invitation to meet at Middlesbrough will be presented by the Cleveland Field Club, and your Executive cordially recommend its acceptance.

The Societies which constitute the Union are now 37 in number, same as last year.

The Statistics, which the Secretaries of the different Societies have again been kind enough to furnish, show a slight decrease in the number of associates, the aggregate membership of the 37 Societies now amounting to 2,418, a decrease of 28. Adding to this the number of direct members, the total numerical strength of the Union is 2,850.

The Membership of the Union now stands at 432, being 25 Life Members, 7 Honorary Life Members, and 400 Ordinary Members, a decrease of 8 members as compared with last year.

During the year only about half-a-dozen new members have been elected, much below the usual number, while on the other hand several members have died, a few resigned, and a few have been struck off the Rolls for non-payment of arrears of Subscriptions.

The Death-roll has been unusually heavy, including the names of an Ex-President (Mr. John Cordeaux) and of an active member of the Executive (Mr. H. T. Soppitt), as well as of Mr. E. Birks, Mr. H. B. Hewetson, and Mr. Geo. Jackson—all of them of distinguished attainments in their various branches of study, while in the Earl of Wharnccliffe and others the Union loses public-spirited supporters.

The Financial Position of the Union continues a source of anxiety, and your Executive regret that their anticipations, as named under this heading in last year's report, have not been nearly realised. To some extent this can be satisfactorily accounted for, but there is still an unsatisfactory residuum, which they venture to hope that some determined effort will be made to remove. There is much valuable work waiting to be published, which cannot be accomplished without a very considerable addition to the funds and a large addition to the membership.

The following is the Hon. Treasurer's Statement of Receipts and Payments during the year:—

FINANCIAL STATEMENT, 1899.

Receipts.

	£	s.	d.	£	s.	d.
Balance in hands of Treasurer				3	10	6
Interest allowed by Bank				1	19	0
Levies paid by Societies:—						
1897	0	15	6			
1898	0	18	0			
1899	9	17	0			
				11	10	6
Subscriptions paid by Mem- bers:—						
1887	0	5	0			
1888	0	10	0			
1890	0	5	0			
1891	0	5	0			
1892	0	5	6			
1893	0	5	0			
1894	0	8	0			
1895	0	5	6			
1896	2	5	6			
1897	4	8	0			
1898	12	0	0			
1899	85	0	0			
1900	0	18	6			
				107	0	6
Donations to Special Fund of 1898 ..				8	12	6
Receipts on behalf of 'The Naturalist'	130	1	1			
				£262	14	1
Balance				14	11	11
				£277	6	0

Payments.

	£	s.	d.	£	s.	d.
Members' Cards				9	6	0
General—Stationery	3	2	6			
Postages	2	4	7			
Printing	1	1	0			
				6	8	1
Expenses of Meetings:—						
Dentdale	9	2	1			
Tadcaster	7	10	0			
Driffild	8	12	1			
Ingleby	9	12	2			
Barnsley	7	4	8			
Fungus Foray	5	13	1			
Annual Meeting	7	16	6			
				55	10	7
Collectors' Commission				20	8	10
Treasurer—Circulars	4	15	6			
Postages	1	5	7			
				6	1	1
Expenses of Boulder Committee ..	0	8	0			
Subscription to Zoological Record ..	1	0	0			
Expenses of Library, Exchanges, etc. (includes charge for 'Naturalist' sent in exchange)				15	7	11
Subscription to Footpath Preservation Society				0	10	6
Paid on account of 'Transactions' (includes £6 5s. od. for 'Naturalist' sent to Life Members)				21	10	0
Paid on Account of 'The Naturalist'	140	15	0			
				£277	6	0

The financial position of the Union is shown by the statement of assets and liabilities, as follows:—

Assets.

Re 'NATURALIST.'		£	s.	d.	£	s.	d.
Cash in hands of Local and General Treasurers, or in Bank	18	12	1				
Subscriptions owing	30	0	0				
				48	12	1	
Re GENERAL ACCOUNT.							
Cash in hands of Local and General Treasurers, or in Bank	10	14	1				
Subscriptions owing	34	11	0				
				45	5	1	
				£93	17	2	
Book Cases valued at	8	0	0				
Books in Library valued at	160	0	0				
Stock of Transactions valued at	40	0	0				
Stock of 'Flora' valued at	100	0	0				
Stock of 'Naturalist' valued at	60	0	0				
Estimated to produce				185	0	0	
				£278	17	2	

Liabilities.

Re 'NATURALIST.'		£	s.	d.	£	s.	d.
Balance due to Treasurer					14	11	11
Re 'NATURALIST.'							
'Naturalist' for Aug., Sept., Oct., Nov., Dec. 1899, at say £10 each	50	0	0				
Owing to Secretary for Expenses	0	10	6				
				50	10	6	
Re GENERAL ACCOUNT.							
Owing to Secretaries				1	1	11	
Re TRANSACTIONS.							
Parts 22, 23, 24, and 25, at say £15 each				60	0	0	
				£126	4	4	
Balance of assets over liabilities ..				152	12	10	
				£278	17	2	

The separate account for 'The Naturalist' is as follows, showing a deficiency against which has to be set a considerable amount of stock of back volumes and numbers:—

'THE NATURALIST.'

	<i>£</i>	<i>s.</i>	<i>d.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
Receipts in 1899	130	1	1	Payments in 1899	140	15	0
Do. do.	18	12	1	Liabilities to end of 1899	50	10	6
Subscriptions owing	30	0	0				
	£178 13 2						
Balance	12	12	4				
	£191 5 6				£191 5 6		

Local Treasurers.—Your Executive recommend the re-election of the Hon. Local Treasurers as follows:—Beverley, T. J. Morley; Bingley, H. Speight; Doncaster, George Winter; Goole, Thomas Bunker; Halifax, Arthur Crabtree; Harrogate, K. McLean; Huddersfield, A. Clarke; Hull, John Stears; Malton, M. B. Slater, F.L.S.; Market Weighton, J. J. Marshall; Middlesbrough, T. F. Ward; Pickering, John Braim; Redcar, T. H. Nelson, M.B.O.U.; Ripon, Wm. Gregson, F.G.S.; Scarborough, J. H. Rowntree; Selby, W. Norwood Cheesman; Sheffield, A. T. Watson; Skipton, J. J. Wilkinson; Spen Valley, Albert Rothery; Wakefield, George Parkin; Whitby, Thos. Newbitt; York, H. J. Wilkinson. There are vacancies for the following and other districts, and your Executive would be glad if members would volunteer their services in this capacity:—Barnsley, Boston Spa, Bradford, Bridlington, Darlington, Dewsbury, Driffield, Keighley, Leeds, Richmond, Rotherham, Saltburn, Sedbergh, Settle, and Thirsk.

It is a great advantage to the Union to be represented by the Hon. Local Treasurers, and your Executive would here express the Hon. Treasurer's sense of indebtedness to them for the assistance they render him.

Your Executive propose that in future these officers shall be entitled 'Local Secretaries,' inasmuch as their function is not merely to collect subscriptions, but to act as local representatives in a much broader sense, and to keep the Union and its objects constantly in view, whether by way of enlisting new members or by keeping the Executive constantly informed as to local scientific occurrences.

The Publications of the Union have been as in former years, the 'Transactions' and the 'Naturalist.'

Another part, 22, of the Transactions is now in the printer's hands, and it is hoped to issue it very shortly. It includes Mr. W. Hewett's report on Yorkshire Lepidoptera.

The completion of the second edition of Mr. Baker's North Yorkshire is now assured—the revision of the Mosses and the new list of Hepatics being now finished by Mr. M. B. Slater, F.L.S., and in the hands of Mr. Baker for his final approval.

In other parts of this report reference is made to Mr. West's new and full List of Yorkshire Algæ which will shortly be ready for the printer, and to the new List of Yorkshire Fungi which the Mycological Committee have in preparation.

The '**Naturalist**' has been published monthly during the year under the sole editorship of Mr. W. Denison Roebuck, F.L.S., under whose direction it has fully sustained the reputation which it has for many years enjoyed as the recognised medium for the publication of natural history observations for the whole of the North of England.

Your Executive and the Editor would again take this opportunity of reminding members that the Journal has always been sufficiently catholic in its scope to welcome articles dealing with the life history of animals and plants as observed in the northern counties, as well as with any biological and general considerations that the local observations give rise to.

The **Library** continues steadily to increase in bulk, and has long ago outgrown the available accommodation. Your Executive have, however, been able to secure additional space at the Leeds Institute, so that your Hon. Librarian will shortly be able to proceed with the cataloguing and arrangement. To judge by those who already make use of the library, it may be anticipated that when a catalogue is available the books will be in considerable demand.

The **Sections** of the Union have more or less steadily carried on their work during the year, and as the success of the field excursions entirely depends upon the presence of the Union's best workers in every department, it is to be hoped that members will endeavour to support the arrangements made by the General and Sectional Officers by their presence at as many excursions as possible.

The **Committees of Research** have continued their investigations during the year with satisfactory results.

The **Yorkshire Boulder Committee**.—The Secretary, Mr. J. H. Howarth, F.G.S., furnishes the following report, as passed by the Committee:—The Yorkshire geologists have worked well during the year, and the results are equal in interest and importance to those of any previous year. The

Chairman, Mr. Kendall, has devoted much attention to North-East Yorkshire, and his records are most notable. He reports Shap Granite 675 feet above sea level, near Stanghow, on the outer face of the Cleveland Hills, and also in gravel in Commondale, which appears to have travelled through from Kildale. Along the northern portion of the Cleveland area Porphyrites of the Cheviot type occur plentifully, and up to 850 feet in the Lockwood Hills. The distribution of Liassic boulders is significant. Mr. Stather reports a huge mass of Upper Lias in the boulder clay at Filey, and Messrs. Kendall, Muff, and Stonegate at an altitude considerably above that of any neighbouring outcrop of the rock. Some additional information as to the pink flints in the Holderness drift is reported, while Rhomb Porphyry has been found by Mr. Stather 810 feet above sea level at West Rigg, the highest and most westerly point recorded.

It is recommended that the Committee be re-appointed as follows :—Percy F. Kendall, F.G.S., Leeds, Chairman ; J. H. Howarth, F.G.S., Bradford, Convener ; J. E. Bedford, F.G.S., Leeds ; John Burton, Horbury ; Rev. W. L. Carter, M.A., F.G.S., Hopton ; Rev. E. Maule Cole, M.A., F.G.S., Wetwang ; H. H. Corbett, M.R.C.S., Doncaster ; Wm. Gregson, F.G.S., Baldersby ; Rev. John Hawell, M.A., Ingleby Greenhow ; Edwin Hawkesworth, Leeds ; Wm. Horne, F.G.S., Leyburn ; Robert Law, F.G.S., Hipperholme ; T. H. Lofthouse, Harrogate ; H. M. Platnauer, B.Sc., F.G.S., York ; Thos. Sheppard, Hull ; Wm. Simpson, F.G.S., Halifax ; J. W. Stather, F.G.S., Hull ; and F. Fielder Walton, F.G.S., Hull.

The Yorkshire Fossil Flora Committee.—In the absence of the Secretary, Mr. Wm. Cash, F.G.S., Mr. Robert Kidston, F.R.S.E., Chairman, reports that little has been done by the members of the Committee during the last year, and that only two of them have supplied specimens for examination. These, however, have not afforded sufficient material on which to hand in a report, and it is hoped that before the next annual meeting is held the members of Committee will see that this state of matters is altered.

It is recommended that the Committee be re-elected as follows :—Robert Kidston, F.R.S.E., F.G.S., Stirling, N.B., Chairman ; Benjamin Holgate, F.G.S., Leeds, Vice-Chairman ; Wm. Cash, F.G.S., Halifax, Convener, J. W. Bond, Leeds ; W. Hemingway, Barnsley ; Robert Law, F.G.S., Hipperholme ; Wm. West, F.L.S., Bradford ; and J. E. Wilson, Ilkley.

The Yorkshire Geological Photographs Committee.—

Valuable additions of photographs of geological interest have again been contributed during the year. The Committee is again greatly indebted to its Chairman, Mr. Godfrey Bingley, for the bulk of the work. He has contributed a considerable number of photographs of interesting geological features of Yorkshire. Mr. S. W. Cuttriss has also sent a series of six views of potholes and caves of Yorkshire. In addition to the above the members have added largely to the British Association's collection of geological photographs at the Jermyn Street Museum. Geological photography is now a recognised branch of the science, and the collections at Jermyn Street are largely used by eminent students.

It is recommended that the Committee be re-appointed as follows:—Godfrey Bingley, Leeds, Chairman; J. E. Bedford, F.G.S., Leeds, Convener; Rev. W. Lower Carter, M.A., F.G.S., Hopton, Mirfield; Rev. E. Maule Cole, M.A., F.G.S., Wetwang; J. Hollingworth, M.R.C.S., Hull; and F. Fielder Walton, F.G.S., Hull; with W. W. Watts, London, as Hon. Member.

The Yorkshire Coast Erosion Committee, as re-organised, has undertaken a systematic survey of the coast between the Humber and the Tees, and is at present engaged in obtaining a series of measurements at frequent and fairly regular intervals along the coast. Some measurements in the Whitby district have been made by Mr. H. B. Muff, and the Rev. H. E. Maddock, M.A., F.G.S., and Mr. J. W. Stather, F.G.S., have visited the Spurn district on the work of the Committee. Other particulars are also forthcoming, but, as anything like a complete survey cannot be accomplished in one year, these particulars are held over.

It is recommended that the Committee be re-elected as follows:—Rev. E. Maule Cole, M.A., F.G.S., Wetwang, York, Chairman; T. Sheppard, Hull, Convener; Rev. H. E. Maddock, M.A., F.G.S., Patrington; J. W. Stather, F.G.S., Hull; F. Fielder Walton, F.G.S., Hull; and W. Y. Veitch, M.R.C.S., Middlesbrough; with C. E. DeRance, F.G.S., as Hon. Member.

The Yorkshire Micro-Zoology and Micro-Botany Committee.—No opportunities for concerted work on the part of this Committee have occurred during the past year, although a considerable amount has been done privately. Mr. W. West, F.L.S., aided by one of his sons, has been for some time engaged in the revision and extension of the List of Yorkshire Freshwater Algæ. This list, which is almost finished, will be published in the

Transactions as soon as the Union is in a position to do so. It will add to those already recorded nearly 350 species, many of which are new to Britain, and some new to science. The Secretary (Mr. M. H. Stiles) has also in hand a list of Diatoms found in the neighbourhood of Doncaster, which he hopes shortly to publish in 'The Naturalist.'

It is recommended that the Committee be re-elected as follows:—H. C. Sorby, LL.D., F.R.S., Sheffield, Chairman; M. H. Stiles, Doncaster, Convener; J. Newton Coombe, Sheffield; Prof. Alfred Denny, F.L.S., Sheffield; Charles P. Hobkirk, F.L.S., Ilkley; F. W. Mills, F.R.M.S., Huddersfield; and Wm. West, F.L.S., Bradford.

The Yorkshire Marine Biology Committee.—The Hon. Secretaries have to report that there have been no opportunities for research offered, none of the excursions having been on the coast-line.

It is recommended that the Committee be re-elected as follows:—H. C. Sorby, LL.D., F.R.S., Sheffield, Chairman; J. D. Butterell, Wansford, Hull; Fred. W. Fierke, M.C.S., Hull, Joint Conveners; W. Cash, F.G.S., Halifax; W. Eagle Clarke, F.L.S., Edinburgh; John Cordeaux, M.B.O.U., Great Cotes; Oxley Grabham, M.A., York; Rev. W. C. Hey, M.A., West Ayton; E. Howarth, F.R.A.S., F.Z.S., Sheffield; Geo. Masee, F.R.M.S., Kew; T. H. Nelson, M.B.O.U., Redcar; T. Petch, B.A., B.Sc., Hedon; J. Frazer Robinson, Hull; W. Denison Roebuck, F.L.S., Leeds; Rev. Henry Smith, M.A., Redcar; and Arnold T. Watson, F.L.S., Sheffield.

The Yorkshire Wild Birds' and Eggs Protection Acts Committee have nothing of moment to report at the present time, their functions being more of a watching than of an investigating character.

It is recommended that the Committee be re-appointed as follows:—Oxley Grabham, M.A., M.B.O.U., Heworth, York, Chairman and Convener; James Backhouse, F.Z.S., Harrogate; F. Boyes, Beverley; T. Bunker, Goole; H. E. Dresser, F.L.S., F.Z.S., London; R. Fortune, F.Z.S., Harrogate; Jno. Gerrard, M.B.O.U., Manchester; Rev. E. Ponsonby Knubley, M.A., Steeple Ashton, Wilts.; Claude Leatham, Wakefield; T. H. Nelson, M.B.O.U., Redcar; Geo. T. Porritt, F.L.S., Huddersfield; and Rev. W. T. Travis, M.A., Ripley.

The Yorkshire Mycological Committee.—The Secretary, Mr. Chas. Crossland, F.L.S., reports as follows:—Another comparatively dry summer, lasting almost to the end of September,

has somewhat retarded Mycological work, especially as regards the larger fungi. As a consequence the season's list of Agaricineæ, ending with the Fungus Foray held at Askern, is lighter than usual. The comparative scarcity of Agaricineæ has, however, stimulated the search for smaller game, and many microscopic species have been unearthed which, in all probability, would have been overlooked had their bigger relatives been more plentiful. The work has been steadily persevered in all through the year, particularly at Hebden Bridge and about Halifax; from the former place Mr. Needham has collected and sent on to Halifax consignments almost weekly. By the lamented death of Mr. H. T. Soppitt a severe gap has been made in the Mycological study of the county, which we do not at present see any prospect of filling up. Last November he collected a most interesting pyrenomycete, near Halifax, new to science, which will be described in a future issue of 'The Naturalist,' and named *Thielavia Soppittii*. Few species were recorded at the earlier excursions. At the Stokesley meeting 87 species were found, mostly of the smaller kinds, including 17 Uredines. The Askern Foray was considered by Mr. Massee to be a decided success, notwithstanding the previous dry weather. A full account of the work done there will be prepared for an early issue of 'The Naturalist.' Mr. A. Clarke and Mr. Crossland propose to prepare, with as little delay as possible, a complete Fungus Flora of the county of York, based on the latest and most approved classification.

It is recommended that the Committee be re-appointed as follows:—Geo. Massee, F.L.S., Kew, Chairman; Charles Crossland, Halifax, Convener; Thomas Birks, Rochdale; U. Bairstow, Halifax; W. Norwood Cheesman, Selby; Alfred Clarke, Huddersfield; Rev. William Fowler, M.A., Liversedge; Thomas Gibbs, Sheffield; James Needham, Hebden Bridge; J. Williams Sutcliffe, Halifax; and Harold W. T. Wager, F.L.S., Leeds.

The Yorkshire Bryological Committee.—The extremely abnormal and long-continued drought of the past summer has been very prejudicial to the growth and development of Mosses and Hepatics, both in the lowlands and on the hills. Notwithstanding these adverse circumstances, some very interesting species and varieties of both orders have been recorded. Mr. W. Ingham's industry has been singularly well rewarded in the detection of many new records of mosses, chiefly varieties, but including *Weissia dispersata* at Jackdaw Crag, and the rare *Mörckia Hibernica* Hook. at Coatham. Messrs. Marshall,

Needham, and Hobkirk also send new records, and Mr. M. B. Slater, F.L.S., announces that his MS. list of 'Mosses and Hepatics of North Yorkshire' is about completed, and is in the hands of Mr. J. G. Baker for final revision. It is intended that a full and complete list of these records shall be shortly published in 'The Naturalist,' and it is expected that an early part of the Transactions will include the further continuation of the second edition of Jno. G. Baker's North Yorkshire, including the full list of all the recorded Mosses and Hepatics up to the present date.

It is recommended that the Committee be re-elected as follows:—Matthew B. Slater, F.L.S., Malton, Chairman; J. J. Marshall, Market Weighton, R.S.O., Convener; Richard Barnes, Harrogate; Robert Braithwaite, M.D., F.L.S., London; Llewellyn J. Cocks, London; Charles Crossland, F.L.S., Halifax; Charles P. Hobkirk, F.L.S., Ilkley; William Ingham, B.A., York; James Needham, Hebden Bridge; and William West, F.L.S., Bradford.

The Yorkshire Coleoptera Committee.—Mr. M. L. Thompson, the Secretary, reports that members of the Committee have attended the excursions of the Union to Dentedale, Tadcaster, Carlton-in-Cleveland, and Barnsley, and preserved lists of the beetles observed on those occasions. The list of Clavicornia is still in course of preparation, and new material has been added during the course of the year. The Yorkshire species belonging to the remaining groups of the Coleoptera are being preliminarily arranged, and the Committee would be glad if those who have done any work at this order of insects during the season will forward the results of their investigations to the Secretary at an early date. In this way it is hoped to deal systematically with the observations of each successive year at its close.

It is recommended that the Committee be re-appointed as follows:—Rev. W. C. Hey, M.A., West Ayton, Chairman; M. L. Thompson, Saltburn, Convener; E. G. Bayford, Barnsley; H. H. Corbett, Doncaster; W. Foggitt, Thirsk; John Gardner, F.E.S., Hartlepool; Leonard Hawkesworth, Kirkstall, Leeds; Joseph Neale, B.A., Ackworth; H. Ostheide, Leeds; and W. Denison Roebuck, F.L.S., Leeds.

British Association.—The Union has again been appointed one of the Corresponding Societies of the Association, and was represented at the meeting at Bristol by Mr. Harold Wager, F.L.S., who attended both meetings of the delegates, at which

a paper was read by Rev. T. R. R. Stebbing, F.R.S., on 'The Living Subterranean Fauna of Great Britain and Ireland.' At the second meeting some discussion took place on the value of the Conference of Delegates to local Societies, and it was felt that more might be done to co-ordinate the work of the various societies. It is likely that the whole matter will be carefully considered in Bradford next year, when it is desirable that some scheme should be formulated for the future carrying on of the Conference.

The Secretariate.—The Union has been indebted during the year for assistance rendered to the Hon. Secretary by various members, viz.:—Messrs. J. Farrah, A. H. Pawson, J. Waddington, T. Sheppard, Rev. J. Hawell, E. G. Bayford, W. E. Brady, and more particularly by Mr. Edwin Hawkesworth, and your Executive have pleasure in announcing that Mr. Hawkesworth has—at their request—consented to be put in nomination as joint Hon. Secretary with Mr. Roebuck for the ensuing year.

The Presidency.—Your Executive have much satisfaction in announcing that the Presidency for the closing year of the century has been accepted by Mr. George T. Porritt, F.L.S., of Huddersfield, who is not only one of the oldest and most valued members of the Union, but one of the foremost entomologists of Britain.

In conclusion, your Executive have to express their thanks to Mr. William West, whose tenure of the presidential chair has so largely contributed to the advantage of the Union during the year.

LIST OF MEMBERS,

Arranged Geographically.

CORRECTED TO 26TH OCTOBER 1899.

The Members whose names are printed in heavy type are those of **Permanent Members of the General Committee**. The Dates preceding names are those of election; Original Members, being those elected previous to 1883, are marked —; those to whom **L.** is prefixed are Life Members, by virtue of a donation of not less than seven guineas; and those to whom **H.L.** is prefixed are Honorary Life Members, or Ex-Presidents of the Union.

Members changing their addresses are requested to inform the Secretary as soon as possible.

BARKSTON ASH DIVISION.

Pop. 48,470.

- **L. Cheesman, William Norwood**, The Crescent, Selby.
- ... **Emmet, John**, F.L.S., The Poplars, Boston Spa, R.S.O.
- 1887 ... Emmet, Mrs., The Poplars, Boston Spa, R.S.O.
- ... **Jackson, John**, M.P.S., High Street, Wetherby.
- ... **Nelson, William**, M.C.S., Prospect View, Crossgates, Leeds.

BARNSELY DIVISION.

Pop. 78,844.

- 1897 ... Barraclough, William, Union Foundry, Barnsley.
- 1889 ... **Bayford, Edwin G.**, 2, Rockingham Street, Barnsley.
- 1884 ... **Brady, William E.**, 5, Victoria Road, Barnsley.
- 1891 ... Hutchinson, Charles H., 37, Hopwood Street, Barnsley.
- 1889 ... **Johnson, Henry**, 62, Huddersfield Road, Barnsley.
- 1892 ... **Thirkell, Edward Walter**, Hummingley Cottage, Stairfoot, Barnsley.
- 1897 ... Tomlinson, John, York Terrace, Stairfoot, Barnsley.
- 1889 ... **Turner, Benjamin**, 10, Pitt Street, Barnsley.

BEVERLEY BOROUGH.

Pop. 11,425.

- ... **Boyes, Frederick**, Yorkshire Banking Company, Beverley.
- ... Davison, George, Garden House, Keldgate, Beverley.
- ... **Dobrée, N. F.**, F.E.S., The New Walk, Beverley.
- 1899 ... Lowther, J. R. A., Crane Hill, Beverley.
- 1892 ... Morley, Thomas John, Toll Gavel, Beverley.
- ... **Ridgway, J. Ambrose**, F.R.A.S., Beverley.

BRADFORD BOROUGH.

Pop. 216,361.

- 1899 ... Banney, A. E., 3, Ambler Street, Manningham, Bradford.
- 1894 ... Bradford Free Library and Art Museum, per Butler Wood, Librarian.
- ... **Carter, J. W.**, 25, Glenholme Road, Whetley Lane, Bradford.
- 1884 ... Clayton, John, Boxtree House, Thornton Road, Bradford.
- 1890 ... Dickons, J. Norton, 12, Oak Villas, Manningham, Bradford.
- 1893 ... **Hawkesworth, Leonard**, The Poplars, Bolton, Bradford.
- 1891 ... **Howarth, James Henry**, F.G.S., Spring Mount, Heaton, Bradford.
- 1884 ... **Lund, Percy**, 43, Athol Road, Bradford.

- ... **McLandsborough, John**, F.G.S., F.R.A.S., F.R.Met.S., etc.,
5, Lindum Terrace, Manningham, Bradford.
- ... **Meade, R. H.**, F.R.C.S., 1, Mount Royd, Manningham, Bradford.
- 1889 ... **Naylor, E.**, 48, Market Street, Bradford.
- ... **Nuttall, William**, Moorside, Eccleshill, Bradford.
- ... **Powell, Sir Francis Sharp, Bart.**, M.P., Horton Old Hall, Bradford.
- ... **West, William**, F.L.S., 26, Woodville Terrace, Horton Lane,
Bradford.

BUCKROSE DIVISION.

Pop. 50,877.

- 1895 ... **Bailey, Matthew**, Flamborough, viâ Hull.
- 1890 ... **Bell, James Lumsden**, M.D., White Hall, Driffield.
- ... **Butterell, Joseph Darker**, M.C.S., Park House, Wansford, Hull.
- ... **Cole, Rev. Edward Maule**, M.A., F.G.S., Vicarage, Wetwang-
on-the-Wolds, viâ York.
- 1889 ... **Davison, Richard**, Driffield.
- 1889 ... **Fountain, Joshua**, Ship Inn, Filey.
- 1890 **L. Hawkesbury**, Right Hon. Lord, Kirkham Abbey, York.
- 1895 ... **Lloyd-Greame, Yarburgh George**, J.P., D.L., Sewerby House, Hull.
- 1889 ... **Mortimer, J. R.**, F.G.S., Driffield.
- 1890 ... **St. Quintin, Wm. Herbert**, J.P., Scampston Hall, Rillington, York.
- ... **Tindall, Edward**, Knapton Hall, Rillington, York.
- 1889 ... **Wood, Richard**, M.D., Beverley Street, Driffield.

CLEVELAND DIVISION.

Pop. 55,882.

- ... **Birks, Thomas**, Southdene, Eaglescliffe Junction, Yarm-on-Tees.
- 1891 ... **Burton, J. J.**, Hambleton House, Nunthorpe, R.S.O., York.
- 1887 ... **Emerson, E. B.**, B.A., J.P., Tollesby Hall, Marton, R.S.O.
- 1890 ... **Hawell, Rev. John**, M.A., Vicarage, Ingleby Greenhow, Middlesbro'.
- 1897 ... **Lawrenson, William**, The Nursery, Eaglescliffe, Yarm-on-Tees.
- 1888 ... **Macpherson, Angus**, 16, Teresa Terrace, Coatham, Redcar.
- 1887 ... **Meek, J. M.**, M.A., -6, Nelson Terrace, Coatham, Redcar.
- 1887 ... **Nelson, Thomas H.**, M.B.O.U., Derby Villa, Redcar.
- 1883 ... **Smith, Rev. Henry**, M.A., Clarendon House, Redcar.

COLNE VALLEY DIVISION.

Pop. 59,344.

- 1890 **L. Hirst, Ben**, J.P., Tamewater, Dobcross, near Oldham.
- **L. Porritt, George T.**, F.L.S., F.E.S., Crosland Hall, near Huddersfield.
- 1897 ... **Tunstall, Wilmot**, F.E.S., Brook House, Meltham, Huddersfield.

DARLINGTON BOROUGH.

Pop. 35,100.

- 1898 ... **Summerson, Samuel J.**, West House, Darlington.
- 1898 ... **Thompson, Arthur Hart**, St. Medard's, Darlington.

DEWSBURY BOROUGH.

Pop. 72,986.

- 1887 ... **Crawshaw, C. B.**, J.P., Rufford Lodge, Oxford Road, Dewsbury.
- 1894 ... **Hemingway, Wilson**, Anroyd Villa, Dewsbury.
- ... **Hobkirk, Charles P.**, F.L.S., Hill House, Park Road, Dewsbury
(Ex-President).
- ... **Lee, Phineas Fox**, West Park Villas, Dewsbury.
- 1891 ... **Marriott, Arthur S.**, Ashlyn, Dewsbury.
- 1896 ... **Taylor, Herbert J.**, 9, Portland Villas, Bath Street, Dewsbury.

DONCASTER DIVISION.

Pop. 73,032.

- 1890 ... **Corbett, Herbert H.**, M.R.C.S., 9, Priory Place, Doncaster.
- 1898 ... **Darley, Rev. Bertram**, Harthill Rectory, Sheffield.
- 1897 ... **Duff, Francis**, 17, Thorne Road, Doncaster.

- 1898 ... Eden, Hon. Agnes, Armthorpe, Doncaster.
 1891 ... Gledhill, Edward, 48, Queen's Road, Doncaster.
 1897 ... Parkin, Leonard, Axholme House, Doncaster.
 1883 ... Paterson, A., 41, Cemetery Road, Doncaster.
 1890 ... **Roberts, Walter**, Ivy Bank, Avenue Road, Doncaster.
 1899 ... Skipwith, Mrs. S. F., Loversall Hall, Doncaster.
 1884 ... **Stiles, M. H.**, 2, Frenchgate, Doncaster.
 1887 ... **Wilson, J. Mitchell**, M.D., 51, Hall Gate, Doncaster.
 — ... **Winter, George**, 14, Baxtergate, Doncaster.

ELLAND DIVISION.

Pop. 64,632.

- 1896 ... **Crowther, John E.**, Portland Street, Elland.
 1888 ... **Law, Robert**, F.G.S., Fenny Royd Hall, Hipperholme, Halifax.

HALIFAX BOROUGH.

Pop. 82,863.

- 1895 ... Bairstow, Uriah, 48, Heath Crescent, Halifax.
 1887 ... Brooke, Ven. Archdeacon J. Ingham, M.A., The Vicarage, Halifax.
 1898 ... Carter, Walter L., Summergate, Parkinson Lane, Halifax.
 1887 ... **Cash, William**, F.G.S., 26, Mayfield Terrace, Halifax.
 1896 ... Crabtree, Arthur, Merlewood, Halifax.
 1887 ... **Crossland, Charles**, 4, Coleridge Street, Halifax.
 1894 ... Crump, W. B., M.A., 90, King Cross Street, Halifax.
 1891 ... Harding, George F., 33, Hope Street, Halifax.
 1894 ... Imbery, John, 16, Hyde Park Road, Halifax.
 1897 ... McCrea, Arthur Selby, Warley House, Halifax.
 1899 ... Moss, C. E., B.Sc., 23, Queen's Road, Halifax.
 1891 ... Shillito, John, J.P., 17, Cavendish Terrace, Halifax.
 1894 ... **Simpson, William**, F.G.S., The Gables, Halifax.
 1890 ... **Sutcliffe, J. Williams**, 27, West View, Hopwood Lane, Halifax.
 1890 ... Whitaker, J. Ackroyd, Craven Lodge, Halifax.
 1889 ... Whiteley, Frederick L., 10, Corn Market, Halifax.
 1891 ... Whitley, J. H., B.A., Brantwood, Halifax.

HALLAMSHIRE DIVISION.

Pop. 73,249.

- 1895 ... Payne, Richard, Newhill Hill, West Melton, Rotherham.
 1894 ... Young, J. J. Baldwin, M.A., M.B.O.U., Richmond Park, near Sheffield.

HARROGATE BOROUGH.

Pop. 13,917.

- 1883 ... **Backhouse, James**, F.L.S., F.Z.S., M.B.O.U., Daleside, Harrogate.
 1887 ... **Farrah, John**, Jefferies' Coate, York Road, Harrogate.
 1894 ... Farrar, Abrm., jun., F.G.S., The Grange, Beech Grove, Harrogate.
 1887 ... **Fortune, Riley**, F.Z.S., 16, Mount Parade, Harrogate.
 1868 ... Gaddes, Thomas, M.D., 104, Station Parade, Harrogate.
 1897 ... Haslam, William James, Sans Souci, Duchy Road, Harrogate.
 1889 ... **Lambert, Abrm.**, 25, Great George Street, West End Park, Harrogate.
 1891 ... Laycock, Thomas, jun., Deepdene, Franklin Road, Harrogate.
 1889 ... **Lofthouse, J. H.**, 42, Mayfield Grove, Harrogate.
 1891 ... **McLean, Kenneth**, Pennine View, Harrogate.
 1891 ... **Millward, Adam**, Cambridge Crescent, Harrogate.
 1886 ... **Naughton, John**, Ellesmere School, Park View, Harrogate.
 1898 ... Petty, William Edward, Cottingham, Harrogate.
 1883 ... Saynor, John, Woodside, Lancaster Road, Harrogate.
 1894 ... Scharff, W. E., M.C.S., The Red House, Duchy Road, Harrogate.
 1898 ... Thomson, George, 21, Beulah Street, Harrogate.
 1893 ... Waldby, Joseph Robert, 31, Grove Road, Harrogate.
 1893 ... Warwick, John Walton, 15, East Parade, Harrogate.

HOLDERNESS DIVISION.

Pop. 41,298.

- 1894 ... Haworth-Booth, Lieut.-Col. B. B., J.P., D.L., Hullbank Hall, Hull.
 — ... **Loten, Philip W.**, Easington, Hull.
 1891 ... **Maddock, Rev. Henry E.**, M.A., F.G.S., Patrington Rectory, Hull.
 1888 ... Oldroyd, Charles, Lund, near Beverley.
 1893 ... Petch, Tom, B.A., Hedon, Hull.
 1890 ... Scott, Frederick A., Sutton, near Hull.

HOLMFIRTH DIVISION.

Pop. 65,159.

- 1894 ... Clayton, John, Lidgett House, Wharnciffe, Silkstone, Barnsley.
 — ... Waite, William, Cliff Cottage, Clayton West, Huddersfield.

HOWDENSHIRE DIVISION.

Pop. 49,327.

- 1894 ... **Ash, Rev. Cyril D.**, B.A., Skipwith Vicarage, Selby.
 1896 ... Ash, Mrs. C. D., Skipwith Vicarage, Selby.
 1896 ... Banks, Ernest, Saltmarshe Cottage, Saltmarshe, Howden.
 — ... Herries, The Right Hon. Lord, Lord-Lieutenant of the East Riding, Everingham Park, York.
 1883 ... **Leadman, Alex. D. H.**, F.S.A., Oak House, Pocklington, York.
 1890 ... **Marshall, J. J.**, Market Weighton, R.S.O.
 — ... Proudlock, John, The Nurseries, Market Weighton, R.S.O.
 1886 ... **Stears, John**, Westholme, Hessle, Yorkshire.
 — ... Whitaker, T. Stephen, F.R.G.S., Everthorpe, Brough.

HUDDERSFIELD BOROUGH.

Pop. 96,495.

- 1885 ... Brooke, John Arthur, J.P., Fenay Hall, Huddersfield.
 1899 ... Brooke, Miss Blanche, Fenay Hall, Huddersfield.
 1892 ... **Clarke, Alfred**, 9, St. Andrew's Road, Huddersfield.
 1893 ... **L. Mills, F. W.**, F.R.M.S., Thornleigh, Huddersfield.
 1895 ... Sykes, A. W., Bronola House, Fisher Street, Huddersfield.
 1894 ... Wilkinson, Johnson, M.B.O.U., Verniont, Huddersfield.
 1890 ... **Woodhead, Thomas William**, Arnold Street, Birkby, Huddersfield.

KEIGHLEY DIVISION.

Pop. 63,272.

- ... Brigg, John, M.P., F.G.S., Kildwick Hall, Keighley.
 — ... **Butterfield, E. P. P.**, Wilsden, near Bingley.

KINGSTON-UPON-HULL BOROUGH.

Pop. 200,044.

- 1897 ... **Audas, Thomas**, L.D.S., 46, Anlaby Road, Hull.
 1895 ... Carlton, John, 48, Albany Street, Hull.
 1883 ... Dawson, Percival W., 101, Westbourne Avenue, Hull.
 1894 ... Dennis, Thomas, 21, Peel Street, Hull.
 1892 ... **Fierke, Frederick Wm.**, M.C.S., 20, Wyndham Street, Hull.
 1895 ... Hollingworth, John, M.R.C.S., 2, Hornsea Parade, Holderness Road, Hull.
 1890 ... Jackson, Andrew Marvell, Victoria Chambers, Hull.
 1892 ... **Robinson, James Frazer**, 37, Caroline Place, Hull.
 1897 ... Saner, Charles Otto Farmer, 2, Elgin Villas, Anlaby Road, Hull.
 1884 ... **Sawdon, Fred. John**, M.D., 32, Beverley Road, Hull.
 1897 ... **Sheppard, Thomas**, 78, Sherburn Street, Hull.
 1891 ... **Stather, John W.**, F.G.S., 16, Louis Street, Hull.
 1898 ... Sykes, William, 52, Park Grove, Hull.
 1892 ... Waller, Michael, 105, Westbourne Avenue, Hull.
 1884 ... **Walton, F. Fielder**, M.R.C.S., F.G.S., 10, Charlotte Street, Hull.
 1891 ... **Waterfall, Charles**, 10, De Grey Street, Beverley Road, Hull.

LEEDS CITY.

Pop. 387,505.

- 1886 ... **Addyman, James W.**, B.A.Lond., 15, East Parade, Leeds.
 1892 ... **Asquith, William E.**, 23, Cardigan Road, Headingley, Leeds.
 1892 ... **Baker, Walter Francis**, F.E.S., 1, Hillary Street, Leeds.
 1897 ... **Barley, D. H.**, Grove House, Burmantofts, Leeds.
 — ... **Barran, Sir John, Bart.**, Chapel-Allerton Hall, Leeds.
 — ... **Bedford, James**, Sycamore Lodge, Woodhouse, Leeds.
 — ... **Bedford, Jas. E.**, F.G.S., Arncliffe, Shireoak Road, Headingley, Leeds.
 1891 ... **Bell, Rev. John**, 50, Bankside Street, Roundhay Road, Leeds.
 1885 ... **Bingley, Godfrey**, Thorniehurst, Shaw Lane, Headingley, Leeds.
 — ... **Birchall, Edward**, 18, Moorland Road, Leeds.
 1897 ... **Bond, J. W.**, Torre Road, Burmantofts, Leeds.
 — ... **Bould, Charles Henry**, 5, Wrangthorne Place, Hyde Park, Leeds.
 1885 ... **Branson, Frederick W.**, F.I.C., F.C.S., Wynneholme, Far Headingley, Leeds.
 1896 ... **Broadhead, W. H.**, Craiglea, Headingley, Leeds.
 1897 ... **Butler, A. Edmund**, Kepstorn, Kirkstall, Leeds.
 1893 ... **Coe, Joseph**, 16, Bagby Road, Leeds.
 1896 ... **Crowther, Henry**, F.R.M.S., Curator of the Leeds Phil. and Lit. Society's Museum; 52, Brudenell Mount, Headingley, Leeds.
 1896 ... **Foster, George**, Mining Engineer, Bleak House, Harehills, Leeds.
 1891 ... **Hawkesworth, Edwin**, 11, Nursery Mount, Woodhouse Hill, Hunslet, Leeds.
 1896 ... **Holbrook, William**, St. Ann's Villa, Far Headingley, Leeds.
 1897 ... **Holbrook, Mrs. William**, St. Ann's Villa, Far Headingley, Leeds.
 — ... **L. Holgate, Benj.**, F.G.S., 4, Montpellier Terrace, Headingley, Leeds.
 1892 ... **Kendall, Percy F.**, F.G.S., Lecturer on Geology at the Yorkshire College; 5, Woodland Terrace, Stainbeck Lane, Leeds.
 1890 ... **L. Kitson, Sir James, Bart.**, M.P., Gledhow Hall, Leeds.
 1897 ... **Littlewood, H.**, F.R.C.S.Engl., 40, Park Square, Leeds.
 — ... **Lupton, Henry**, F.E.S., Lyndhurst, North Grange Road, Headingley.
 — ... **Miall, Louis C.**, F.R.S., F.L.S., F.G.S., Professor of Biology in the Yorkshire College; 8, Spring Road, Headingley, Leeds.
 1899 ... **Ostheide, H.**, The Hollies, Gledhow, Leeds.
 1890 ... **L. Oxley, Henry**, Spenfield, Weetwood, Leeds.
 1891 ... **L. Pawson, Albert Henry**, Lawns House, Farnley, Leeds.
 1891 ... **L. Pawson, Mrs. A. H.**, Lawns House, Farnley, Leeds.
 1893 ... **Parkinson, Stephen**, 59, Leopold Street, Leeds.
 — ... **Pocklington, Henry**, F.R.M.S., 41, Virginia Road, Leeds.
 1887 ... **Powys, Rev. H. Annesley**, M.A., Meanwood Vicarage, Leeds.
 1887 ... **Reynolds, Richard**, F.I.C., F.C.S., Cliff Lodge, Woodhouse, Leeds.
 1897 ... **Robson, A. W. Mayo**, F.R.C.S., 7, Park Square, Leeds.
 — ... **Roebuck, William Denison**, F.L.S., 259, Hyde Park Road, Leeds.
 — ... **Rowley, Walter**, M.I.C.E., F.G.S., etc., Alder Hill, Meanwood, Leeds.
 — ... **Teasdale, Washington**, F.R.A.S., F.R.M.S., 255, Hyde Park Road, Leeds.
 — ... **Tetley, Charles F.**, J.P., Spring Bank, Headingley, Leeds.
 — ... **Thrippleton, John**, Burley View, Burley, Leeds.
 1898 ... **Waddington, John**, 38, Leicester Grove, Blackman Lane, Leeds.
 1894 ... **Wager, Harold**, F.L.S., Bank View, Chapel-Allerton, Leeds.
 — ... **Ward, Geo.**, F.I.C., F.C.S., 1, Buckingham Terrace, Hyde Park, Leeds.
 1896 ... **Wilson, Henry B.**, Westfield, Armley, Leeds.
 1896 ... **Wurtzburg, John H.**, J.P., F.R.Hist.S., 2, De Grey Road, Leeds.
 — ... **Yewdall, Edwin**, 58, Wade Lane, Leeds.

MALTON TOWN.

Pop. 8,754.

- ... **Hodgson, William**, Wheelgate, Malton.
 1896 ... **Jenkinson, Rev. S.**, Prospect Villa, Norton, Malton.
 1889 ... **Longster, Thomas Piper**, Mowbray Terrace, Malton.
 1897 ... **Oldfield, George**, St. Nicholas Street, Norton, Malton.

- ... Pearson, Hugh W., Castle Howard Road, Malton.
 — ... **Slater, Matthew B.**, F.L.S., 84, West Grove Villas, Newbiggin, Malton.
 1889 ... Suddaby, W. M., Crown Hotel, Wheelgate, Malton.
 1888 ... Walker, A. W., 24, Yorkersgate, Malton.

MIDDLESBROUGH BOROUGH.

Pop. 98,982.

- 1898 ... Clayton, Robert George, 67, Douglas Terrace, Borough Road, Middlesbrough.
 1898 ... Hinton, Alderman Amos, Hilda House, Middlesbrough.
 1899 ... Jones, J. Archyll, B.Sc., F.G.S., 27, Southfield Road, Middlesbrough.
 1899 ... Lofthouse, Thomas Ashton, 62, Albert Road, Middlesbrough.
 1898 ... Punch, J. W. R., Hastoe House, Southfield Road, Middlesbrough.
 1890 ... **Veitch, W. Y.**, L.R.C.P., L.R.C.S., The Crescent, Middlesbrough.
 1890 ... Thomas, W. H., 7, Ryedale Terrace, Borough Road, Middlesbrough.
 1887 ... **Ward, Thomas F.**, Park Road South, Middlesbrough.

MORLEY DIVISION.

Pop. 65,216.

- 1890 ... **Carter, Rev. W. Lower**, M.A., F.G.S. The Manse, Hopton, Mirfield, Normanton.

NORMANTON DIVISION.

Pop. 72,012.

- 1894 ... Burton, John, Farmer, Horbury, Wakefield.
 — ... **Roberts, George**, Lofthouse, near Wakefield.

OSGOLDCROSS DIVISION.

Pop. 66,794.

- ... **Bunker, Thomas**, 9, East Parade, Goole.
 — ... Harrison, John, Tillage Works, Goole.
 1897 ... Jackson, Walter, 36, Vermuyden Terrace, Goole.
 1890 L. Jones, R. Heywood, J.P., Badsworth Hall, Pontefract.
 1893 ... **Leatham, Claude**, The Red House, Wentbridge, Pontefract.
 1898 ... Leatham, Claude Guy, The Red House, Wentbridge, Pontefract.
 1895 ... Neale, Joseph, B.A., Garden Villa, Ackworth, Pontefract.
 — ... Pease, W., Elm Cottage, Hook, near Howden.

OTLEY DIVISION.

Pop. 61,746.

- 1894 ... Angus, Henry, M.B., C.M., Burnage House, Bingley.
 1898 ... **Chorley, Mrs. Harry**, Moorville Cottage, Burley-in-Wharfedale.
 1893 ... Fawkes, Mrs. Edith M., Farnley Hall, Otley.
 1897 ... Metcalf, W. Day, 5, Springs Terrace, Ilkley.
 — ... **Miall, Louis C.**, F.R.S., F.L.S., F.G.S., Professor of Biology in the Yorkshire College; Crag Foot, Ben Rhydding, Leeds.
 1899 ... Savery, George B., Park House, Pool, Leeds.
 1885 ... **Speight, Harry**, Highfield Villas, Crownest Road, Bingley.
 1897 ... Teal, Joseph, Grange Terrace, Yeadon.
 1897 ... Whitham, Thomas, Bramhope, Leeds.
 — ... **Wilson, John E.**, Yew Bank House, Ilkley.

PICKERING TOWN.

Pop. 4,019.

- 1895 ... Ashton, James T., M.B., Kingthorpe House, Pickering.
 — ... **Braim, John**, Hungate, Pickering.
 1895 ... Comber, Charles Thomas Thornton, L.R.C.P., M.R.C.S., Pickering.
 1899 ... Kirk, John Lamplugh, B.A., The Laurels, Pickering.
 1886 ... Lightfoot, Rev. George H., M.A., The Rectory, Pickering.
 1889 ... Lucy, Charles T., York Union Bank, Pickering.
 1895 ... Mitchelson, Major J. M., The Hall, Pickering.
 1889 ... **Mitchelson, Thomas**, The Mount, Pickering.
 1884 ... Prodhams, Herbert, Allerston, near Pickering.

PONTEFRAC T BORO UGH.

Pop. 16,407.

PUDSEY DIVISION.

Pop. 49,252.

- 1883 ... **Gaunt, Leonard**, Prospect House, Farsley, Leeds.
 1886 ... **Gaunt, Mrs. L.**, Prospect House, Farsley, Leeds.
 — ... **Taylor, John W.**, F.L.S., M.C.S., etc., Spring Bank, Horsforth, Leeds.

RICHMOND DIVISION.

Pop. 54,439.

- 1891 L. **Carpenter, Hon. Mrs.** [Beatrice], Kiplin, Northallerton.
 — ... **Carter, James**, M.B.O.U., Burton House, Masham, R.S.O.
 1886 ... **Chaytor, R. C.**, M.C.S., Scrafton Lodge, Middleham, R.S.O.
 1897 ... **Hartshorn, John**, Leyburn, R.S.O.
 1898 ... **Herdman, William**, F.G.S., Lanehead Villa, Middleton-in-Teesdale
 Darlington.
 1884 ... **Horne, William**, F.G.S., Market Place, Leyburn, R.S.O.
 1885 ... **Huddart, Rev. G. A. W.**, M.A., LL.D., Kirklington Rectory, Bedale.
 1884 ... **Taylor, Rev. Richard** Vickerman, B.A., Melbecks Vicarage, viâ
 Richmond, Yorkshire.

RIPON DIVISION.

Pop. 54,925.

- 1886 ... **Clarkson, W. C.**, L.R.C.P., etc., Darley, Ripley, Leeds.
 1894 ... **Garrod, Rev. George** Watts, B.A., 11, Crescent Parade, Ripon.
 1891 ... **Heslington, Thos. Clarke**, 44, North Road, Ripon.
 1883 ... **Hurst, Joseph S.**, J.P., Copt Hewick Hall, Ripon.
 — ... **Ingleby, James**, Eavestone, near Ripon.
 1883 ... **Paver-Crow, Richard**, J.P., Ornhams Hall, Boroughbridge, York.
 1885 ... **Radcliffe, Sir J. Percival**, Bart., F.R.A.S., Rudding Park, Knares-
 borough.
 — ... **Ripon, The Most Hon. the Marquis of**, K.G., F.R.S., etc., Studley
 Royal, Ripon.
 1888 ... **St. Paul, Major Horace**, J.P., The Willows, Ripon.
 1891 L. **Stobart, William C.**, J.P., Spellow Hill, Leeds.
 1899 ... **Strother, T. W.**, F.Z.S., Westfield, Killinghall, Leeds.
 — ... **Summerfield, Rev. R. A.**, B.A., North Stainley Vicarage, near Ripon.
 1884 ... **Travis, Rev. William** Travis, M.A., The Rectory, Ripley, Leeds.

ROTHERHAM DIVISION.

Pop. 78,597.

- 1884 ... **Bennett, Samuel H.**, Mountenoy Road, Rotherham.
 1897 ... **Dufty, Ernest E.**, L.S.A., Victoria Terrace, Masborough, Rotherham.
 1896 ... **Howitt, John**, 12, Whiston Grove, Rotherham.
 1896 ... **Moore, Harry**, F.R.M.S., Curator of Rotherham Museum; 12,
 Whiston Grove, Rotherham.

SALTBURN-BY-THE-SEA.

Pop. 2,384.

- 1888 ... **Barnes, Richard**, The Gardens, Saltburn-by-the-Sea.
 1890 ... **Hallimond, Henry T.**, 3, Lune Street, Saltburn-by-the-Sea.
 1885 ... **Irvin, Rev. Benjamin**, M.A., The Vicarage, Saltburn-by-the-Sea.
 1890 ... **Thompson, M. Lawson**, Diamond Street, Saltburn-by-the-Sea.

SCARBOROUGH BORO UGH.

Pop. 33,776.

- 1893 ... **Barker, Reginald H.**, Grosvenor Bank, Scarborough.
 1892 L. **Clarke, William James**, 44, Huntriss Row, Scarborough.
 1892 ... **Hudson, George**, M.D., Westbourne House, Scarborough.
 1889 ... **Rowntree, Allan**, Broom Lodge, Scarborough.
 — L. **Rowntree, James Henry**, Westwood, Scarborough.
 1892 ... **Rowntree, William**, J.P., Westwood, Scarborough.
 1899 ... **Turnbull, Sydney P.**, 8, Glanville Square, Scarborough.

SHEFFIELD CITY.

Pop. 324,243.

- 1884 ... **Birks, Edward**, Birchcliffe, Broomhall Park, Sheffield.
 1884 ... **Brittain, Ald. Frederick**, Melbourne Avenue, Sheffield.
 1892 ... **Brittain, Ald. W. H.**, J.P., Storth Oaks, Ranmoor, Sheffield.
 1893 ... **Coombe, John Newton**, Brocas Bank, Sheffield.
 1885 ... **Denny, Alfred**, F.L.S., Professor of Biology in the Firth College ;
 9, Summerfield, Broomhill, Sheffield.
 1898 ... **Gibbs, Thomas**, 43, St. Ronan's Road, Sheffield.
 1889 L. **Hall, Albert Ernest**, F.E.S., Norbury, Pitsmoor, Sheffield.
 1889 ... **Howarth, Elijah**, F.R.A.S., Curator of Sheffield Public Museum,
 Weston Park; Hilbre Nest, Crookesmoor Road, Sheffield.
 1892 ... Sheffield Central Public Free Library, Surrey Street, Sheffield.
 1897 ... **Smith, F. E.**, 1, George Street, Sheffield.
 1897 ... **Snelgrove, Edward**, B.A., Camps Mount Villa, Meersbrook, Sheffield.
 — ... **Sorby, Henry Clifton**, LL.D., F.R.S., F.L.S., F.G.S., F.R.M.S., etc.,
 Broomfield, Sheffield (Ex-President).
 1897 ... **Stokes, John**, M.D., 82, Ecclesall Road, Sheffield.
 1895 ... **Tindall, Frederick** Markham, jun., 27, Victoria Road, Broomhall
 Park, Sheffield.
 1885 ... **Watson, Arnold Thomas**, F.L.S., Southwold, Tapton Crescent,
 Sheffield.
 1897 ... **Wheat, John B.**, M.A., Norwood Hall, Sheffield.
 1893 ... **White, William**, F.E.S., Curator, the Ruskin Museum, Sheffield.
 1890 ... **Wilson, H. J.**, M.P., Osgathorpe Hills, Sheffield.

SHIPLEY DIVISION.

Pop. 62,166.

SKIPTON DIVISION.

Pop. 58,209.

- 1899 ... **Dewhurst, Algernon**, Aireville, Skipton.
 — ... **Eddy, J. Ray**, F.G.S., F.R.M.S., The Grange, Carleton, Skipton.
 1898 ... **Handby, J.** Walling, Austwick, Lancaster.
 1887 ... **Handley, John**, Briggflats, Sedbergh, R.S.O.
 1887 ... **Mackie, Rev. John H.**, M.A., The Grammar School, Sedbergh, R.S.O.
 1883 ... **Morrison, Walter**, M.P., Malham Tarn House, Settle.
 1894 ... **Rickards, C. A.**, Bell Busk, Leeds.
 1887 ... **Robinson, William**, Green Bank, Sedbergh, R.S.O.
 — ... **Shuffrey, Rev. W. A.**, M.A., Vicarage, Arncliffe, Skipton.
 1896 ... **Slingsby, W. Cecil**, F.R.G.S., Carleton, Skipton-in-Craven
 1899 ... **Taylor, Charles Edward**, Akay, Sedbergh, R.S.O.
 1892 ... **Wilkinson, J. J.**, Burnside, Skipton.
 1890 L. **Wright, C. B. E.**, J.P., Bolton Hall, Clitheroe.

SOWERBY DIVISION.

Pop. 63,202.

- 1896 ... **Hellewell, Young**, 10, George Street, Todmorden.
 1894 ... **Needham, James**, Woodend, Hebden Bridge.

SPEN VALLEY DIVISION.

Pop. 57,402.

- ... **Blakeley, John Wesley**, Liversedge Hall, Liversedge.
 1891 L. **Cooke, James S.**, J.P., Springfield, Gomersal, Leeds.
 1895 ... **Crosland, Robert Wilfrid**, Oldfieldnook, Cleckheaton.
 1898 ... **Easton, Rev. E. W.**, M.A., St. Luke's Vicarage, Cleckheaton.
 — ... **Fowler, Rev. William**, M.A., Vicarage, Liversedge (Ex-President).
 1896 ... **Hind, Rev. H. N.**, M.A., Hightown, Liversedge, Normanton.
 1896 ... **Priestley, F. N.**, Littleton, Liversedge, Normanton.
 1893 ... **Rothery, Albert**, South Holme, Liversedge, Normanton.

STOCKTON-ON-TEES BOROUGH.

Pop. 55,202.

THIRSK AND MALTON DIVISION (For Malton Names see separate list).

Pop. 57,183.

- ... **Addison, Rev. Frederick, M.A.,** Sutton Road, Thirsk.
 1890 ... Buchanan, John Hamilton, M.D., Sowerby, Thirsk.
 1890 L. Carlisle, Right Hon. the Earl of, J.P., Castle Howard, York.
 1888 .. Fitzwilliam, Hon. W. H. Wentworth, M.P., Wiganthorpe, York.
 1897 .. Foggitt, Thomas Jackson, Market Place, Thirsk.
 — ... **Foggitt, William,** South Villa, Thirsk.
 1883 H.L. **Gallwey, Sir Ralph Payne, Bart.,** M.B.O.U., Thirkleby Park, Thirsk
 (Ex-President).
 — ... **Gregson, William, F.G.S.,** Baldersby, S.O., Yorkshire.
 1897 ... Harrison, W., Knayton, Thirsk.
 1884 ... **Mitchell, T. Carter, F.S.A.,** Topcliffe, near Thirsk.
 — ... Wright, John, Terrington, York.

THORNABY-ON-TEES BOROUGH.

Pop. 15,640.

WAKEFIELD CITY.

Pop. 37,269.

- 1892 ... **Parke, George Henry, F.L.S., F.G.S.,** St. John's, Wakefield.
 — ... **Parkin, George,** 15, York Street, Wakefield.

WHITBY DIVISION.

Pop. 54,776.

- 1889 ... Atkinson, Thomas, 7, Normanby Terrace, Whitby.
 — .. Colby, George, Brawby Park, Pickering.
 — H.L. **Hey, Rev. William Croser, M.A., M.C.S.,** Derwent House, West
 Ayton, Seamer, York.
 1885 ... **Newbitt, Thomas,** 17, Royal Crescent, West Cliff, Whitby.
 1894 ... Punshon, Mrs. R. M., Oldstead Hall, Ampleforth, York.
 1887 ... Pyman, Walter H. S., Moss Brow, Whitby.
 1888 ... Smith, Christopher W., Harome, Nawton, York.
 1889 ... Stewart, John T., 3, Belle Vue Terrace, Whitby.

YORK CITY.

Pop. 67,004.

- 1896 L. Anderson, Tempest, M.D., B.Sc., F.G.S., J.P., 17, Stonegate, York.
 1893 ... Bean, Eugene, 8, Nessgate, York.
 — ... **Dennis, George C., F.E.S.,** 39, Blossom Street, York.
 1893 ... Dutton, Robert, Castle Mills Bridge, York.
 1893 ... Elmhirst, Charles E., 17, Mount Parade, York.
 1894 ... **Grabham, Oxley, M.A., M.B.O.U.,** Chestnut House, Heworth, York.
 — ... **Hewett, William,** 12, Howard Street, Fulford Road, York.
 1889 ... Hodsman, George, 8, Feversham Terrace, York.
 1896 ... Ingham, William, B.A.Lond., 47, Haxby Road, York.
 1896 ... Leetham, Ernest, J.P., Alderside, Dringhouses, York.
 1893 ... Mackay, Donald S., 4, Lendal, York.
 1896 ... Melrose, James, Clifton Croft, York.
 — ... **Moiser, Henry R., F.G.S.,** Heworth Grange, York.
 1895 ... **Platnauer, Henry Maurice, B.Sc., F.G.S., etc.,** Curator of the
 Museum, York; and Low Royd, St. Olave's Road, York.
 1893 ... **Potter, Ernest Guy,** 14, Bootham Crescent, York.
 1890 ... Procter, John William, Ashcroft, York.
 1896 ... Raimes, Alwyn, M.D., 2, Scarcroft Road, York.
 1896 ... Rowntree, Theodore H., Mount Villas, York.
 1898 ... Terry, Thomas W. L. Trentholme, The Mount, York.
 1884 ... Thompson, Richard, Dringcote, York.
 1890 ... Walker, John Francis, M.A., F.G.S., F.L.S., F.C.S., F.I.C.,
 F.Z.S., etc., 45, Bootham, York.
 1893 ... Wilkinson, Arthur, 39, East Mount Road, York.
 1893 ... **Wilkinson, Henry J.,** 11, Chapter House Street, York.

DURHAM, NORTHUMBERLAND, CUMBERLAND, WESTMORLAND, CHESHIRE,
LANCASHIRE, AND ISLE OF MAN.

- 1886 ... **Brownridge, Charles**, Assoc.M.I.C.E., F.G.S., 26, North Road, Devonshire Park, Birkenhead.
- 1896 ... **Clarke, Henry Shortridge**, F.E.S., Sulby Parsonage, Lezayre, Isle of Man.
- 1891 ... **Collins, Francis Richard**, 21, Langworthy Road, Manchester.
- 1897 ... **Cradock, Charles M.**, B.A., Mayfield, Stockton-on-Tees.
- 1896 **H.L. Dawkins, Prof. W. Boyd**, M.A., F.R.S., F.G.S., Owens College, Manchester (President).
- 1894 ... **Foggritt, John B.**, 29, Neville Street, Southport.
- 1885 ... **Gardner, John**, F.E.S., 8, Friar Terrace, Hartlepool.
- 1887 ... **Gerrard, John**, M.B.O.U., H.M. Inspector of Mines Worsley, Manchester.
- 1897 ... **Herdman, William**, F.G.S., Lanehead Villa, Middleton-in-Teesdale, Darlington.
- 1892 ... **Howse, Richard**, Curator of the Newcastle Museum, and Hon. Sec. Tyneside Nat. Field Club; 12 St. Thomas Crescent, Newcastle-on-Tyne.
- 1898 ... **Hoyle, William Evans**, M.A., etc., Keeper of the Manchester Museum, Owens College, Manchester.
- 1888 .. **Leach, Richard Ernest**, M.A., F.L.S., F.G.S., Grammar School, Appleby, Westmorland.
- 1890 **L. Marshall, Arthur**, Hallsteads, Penrith.
- 1898 ... **Lucas, Bernard Richard**, 3, Dyer Terrace, Winnington, Northwich.
- 1894 ... **Melville, James Cosmo**, M.A., F.L.S., etc., Brook House Prestwich, Manchester.
- 1894 ... **Petty, S. Lister**, 24, Queen Street, Ulverston
- 1898 ... **Proud, J. T.**, Dellwood, Bishop Auckland.
- 1883 ... **Richmond, Right Rev. J. J. Pulleine**, D.D., Bishop of Stanhope Rectory, Darlington.
- 1898 ... **Smith, W. Herbert**, Pelaw House, Durham.
- 1889 ... **Trechmann, Chas. O.**, Ph.D., F.G.S., Hudworth Tower, Castle Eden, Durham.
- 1887 ... **Watts, Rev. Arthur**, F.G.S., F.R.G.S., The Rectory, Witton Gilbert, Durham.

COUNTIES SOUTH OF YORKSHIRE.

- 1883 **H.L. Baker, John Gilbert**, F.R.S., F.L.S., The Royal Gardens, Kew (Ex-President).
- ... **Beaumont, Alfred**, F.E.S., The Red Cottage, Pond Road, Blackheath, London, S.E.
- 1895 ... **Braithwaite, Robert**, M.D., F.L.S., F.R.M.S., 26, Endymion Road, Brixton Hill, London, S.W. (Ex-President).
- ... **Butterfield, J. A.**, B.Sc., 35, Wrottesley Road, Plumstead, London, S.E.
- 1891 **L. Champney, John E.**, J.P., Abchurch Chambers, London, E.C.
- 1890 **L. Charlesworth, John B.**, J.P., Hurts Hall, Saxmundham.
- 1896 ... **Cocks, Llewellyn Jameson**, Rosebank, Bromley Hill, Kent.
- ... **Clark, James Edmund**, B.A., B.Sc., 112, Wool Exchange, London, E.C.
- ... **Cordeaux, John**, M.B.O.U., Great Cotes House, R.S.O., Lincoln, (Ex-President).
- 1885 **H.L. Dallinger, Rev. W. H.**, LL.D., F.R.S., F.L.S., Sec.R.M.S., etc., Ingleside, Newstead Road, Lee, London, S.E. (Ex-President).
- 1889 **H.L. Dresser, Henry Eeles**, F.L.S., F.Z.S., etc., 110, Cannon Street, London, E.C. (Ex-President).
- 1899 **H.L. Foster, Prof. Sir Michael**, K.C.B., M.D., LL.D., Sec. R.S., Nine Wells, Great Shelford, Cambridge.
- 1884 ... **Fox, Rev. Henry E.**, M.A., M.B.O.U., Fairview, Norbiton, Surrey.
- 1883 ... **Gough, Rev. T.**, B.Sc., F.G.S., King Edward VI. School, East Retford.
- 1894 ... **Green, Upfield**, F.G.S., Tenter Street, Moorfields, London.
- 1887 ... **Haigh, G. H.** Caton, M.B.O.U., Aber-ia, Penrhyndeudraeth, Merionethshire; and Grainsby Hall, Great Grimsby, Lincs.

- ... **Harker, Alfred**, M.A., F.G.S., Woodwardian Museum, and St. John's College, Cambridge; and 3, Park Avenue, Princess Avenue, Hull.
- 1883 ... **Hopkinson, John**, F.L.S., F.G.S., F.R.M.S., etc., The Grange, St. Albans, Herts.
- 1884 ... **Hudleston, Wilfrid H.**, M.A., F.R.S., F.L.S., F.G.S., F.C.S., etc., 8, Stanhope Gardens, London, S.W. (Ex-President).
- 1884 ... **P'Anson, Joseph Coventry**, F.S.A., F.G.S., etc., 7, Campden Grove, Kensington, London, W.
- **L. Knubley, Rev. E. Ponsonby**, M.A., M.B.O.U., Steeple Ashton Vicarage, Trowbridge, Wilts.
- ... **Mason, Philip Brookes**, J.P., F.L.S., F.E.S., M.C.S., etc., Trent House, Bridge Street, Burton-on-Trent.
- ... **Massee, George E.**, F.L.S., F.R.M.S., 1, Kent Road, Kew, Surrey.
- 1890 **L. Newton**, Rev. Canon Horace, The Vicarage, Redditch.
- 1883 ... **Oldfield, George Wm.**, M.A., F.L.S., F.E.S., 21, Longridge Road, Earl's Court, London, S.W.
- 1888 ... **Oxley, Rev. W. H.**, M.A., Petersham Vicarage, Surrey.
- 1888 ... **Painter, Rev. W. Hunt**, Stirchley Rectory, near Shifnal, Shropshire.
- **H.L. Parsons, Henry Franklin**, M.D., F.G.S., 4, Park Hill Rise, Croydon, Surrey.
- 1893 ... **Peake, Rev. Edward**, M.A., Hillside, Bradfield, Berks.
- 1896 ... **Riddelsdell, Rev. Harry Joseph**, M.A., St. Michael's Theological College, Aberdare, South Wales.
- ... **Slater, Rev. Henry H.**, M.A., F.Z.S., M.B.O.U., etc., Thornhaugh Rectory, Wansford, Northamptonshire.
- 1890 ... **Spiers, Rev. William**, M.A., F.G.S., F.R.M.S., Victoria Place, Cheadle, Staffs.
- 1889 ... **Strickland, Walter W.** [Address unknown.]
- 1893 ... **Tiddeman, R. H.**, M.A., F.G.S., Glen View, Mumbles, R.S.O., Glamorganshire (Ex-President).
- **H.L. Walsingham**, The Right Hon. Lord, M.A., LL.D., F.R.S., F.L.S., F.E.S., etc. Merton Hall, Thetford, Norfolk; and Blubberhouses, Yorkshire (Ex-President).
- ... **Whitwell, William**, F.L.S., M.C.S., Roslin, 4, Thurlleigh Road, Balham, London, S.W.
- 1888 ... **Woodall, Major John W.**, M.A., J.P., F.G.S., etc. 5, Queen's Mansions, Victoria Street, London, S.W.

SCOTLAND AND IRELAND.

- ... **Clarke, Wm. Eagle**, F.L.S., M.B.O.U., Nat. Hist. Dept., Edinburgh Museum of Science and Art, 35, Braid Road, Edinburgh.
- 1885 ... **Harvie-Brown, John A.**, F.R.S.E., F.Z.S., M.B.O.U., etc., Dunipace House, Larbert, N.B.
- 1888 ... **Kidston, Robert**, F.R.S.E., F.G.S., 24, Victoria Place, Stirling, N.B.
- 1889 ... **Scharff, Robert F.**, Ph.D., B.Sc., M.R.I.A., etc., Keeper, Nat. Hist. Coll., Dublin Museum; Tudor House, Dundrum, co. Dublin.

BRITISH COLONIES.

- ... **Chadwick, Samuel**, F.G.S., Whetukura, Ormondville, Hawke's Bay, New Zealand.
- 1890 ... **LeTall, Benj. Bower**, M.A.Lond., Friends' School, Hobart, Tasmania.
- 1888 ... **Waite, Edgar R.**, F.L.S., Zoologist to the Australian Museum; Headingley, Mossman's Bay, Sydney, New South Wales.



39th Annual Report and Balance Sheet for 1900.

Presidential Address :

GEO. T. PORRITT, F.L.S., F.E.S.

List of Members arranged Geographically,

Corrected to 26th October, 1900.

THE YORKSHIRE NATURALISTS' UNION.

THIRTY-NINTH ANNUAL REPORT for 1900.

Your Executive have pleasure in submitting the following report of the operations of the Union and its Sections and Committees for the past year.

The Meetings held during the year have been seven in number; the usual one for each division of the county, and a Fungus Foray, and also a special excursion organised for the benefit of Members and Associates of the British Association.

The districts chosen for investigation and the dates of the meetings were as follows :—

The opening meeting was held on May 19th, at Hornsea. There was a large attendance, a good number of members staying over the week-end. The naturalists mainly devoted their attention to the investigation of Hornsea Mere, whilst the geologists examined the sections of boulder clay and more recent deposits, exposed on the coast line between Skipsea and Hornsea. A visit was also paid to the early British entrenchments at Skipsea Brough, which were ably explained by Mr. J. R. Boyle, F.S.A. The collection of Mr. Wm. Morfitt, at Atwick, was also visited by most of those taking part in the excursion.

The second meeting was held at York, on Whit-Monday, June 4th, a very large number of members and associates being present. The day was devoted to the investigation of the natural history of Askham Bog, with many interesting results. The geologists examined sections in the morainic deposits between York and Askham Bryan.

The third meeting was held on June 28th, at Crosland Hall, the residence of the President, by his invitation, and there was almost a record attendance. The museum in course of formation at the Huddersfield Technical College was first visited, by invitation of the Principal, Mr. S. G. Rawson, D.Sc., F.I.C., who entertained those present to luncheon. Three parties were then formed, and proceeding in different directions, examined the natural features of the country lying between Huddersfield, Holmfirth, and Meltham. In the evening the President entertained the members to tea, and at the meeting held afterwards he was cordially thanked for his hospitality.

The fourth meeting was held at Reeth, during the August Bank Holiday week-end. Considering the inaccessibility of the district, there was a fair attendance. The three days were spent in the investigation of the natural history and geology of Arken-garthdale, and much useful work was done. The Union was particularly fortunate in its leaders on this occasion, Mr. J. G. Goodchild, F.G.S., F.Z.S., M.B.O.U., coming specially from Edinburgh, and Mr. J. E. Tinkler from Leytonstone. The success of the meeting was somewhat interfered with by the bad weather which prevailed.

The fifth meeting was held at Grassington, for the week-end September 8th to 10th, in connection with the Bradford Meeting of the British Association, a number of leading members of which availed themselves of the Union's invitation to take part in the excursion. A fair number of our own members attended, and the meeting was very successful. As this meeting was in addition to the usual programme, extra expense was involved, to meet which an appeal has been sent out to our members, which has already met with some response.

The list of botanists and zoologists present at this Grassington excursion, included, amongst others:—

J. Beanland, Bradford.	Lister Rotheray, Skipton.
V. Crawford, Secretary Edinburgh Naturalists' Field Club.	Dr. A. H. Trow.
Charles Crossland, F.L.S., Halifax.	Gwynne Vaughan, M.A., Glasgow University.
J. E. Crowther, Elland.	Harold Wager, F.L.S., Leeds.
Rev. E. P. Knubley, M.A., M.B.O.U., Steeple Ashton, Wiltshire.	Prof. H. Marshall Ward, Sc.D., M.A., F.R.S., Member of Council of B.A., Cambridge.
C. E. Moss, B.Sc., Halifax.	Dr. Watson, Ex-President Edin- burgh Botanical Society.
Prof. R. W. Phillips, M.A., Sc.D., Bangor.	William West, F.L.S., Bradford, and
Fred. Rhodes, Bradford.	Ll. Williams, A.R.C.S.
W. Denison Roebuck, F.L.S., Leeds.	

The list of geologists is given in another place.

The sixth meeting was held at Whitby on August 15th. The naturalists spent the day in Mulgrave Woods, and the geologists examined the coast sections between Sandsend and Kettleless. This meeting was followed by the annual Fungus Foray in the neighbourhood of Lythe, some very good work being done.

Your Executive wishes to express its satisfaction at the general success of the year's meetings, which has been considerably enhanced by the presence of the President at all except one of them. Whilst doing so it wishes to point out the regrettable tendency of many members and associates not to avail themselves of the arrangements which are made, often at much trouble, for the carrying out of the meetings. For instance, a guarantee for a certain number has to be given for the tea, in order to secure a room for the meeting, and many

members absent themselves, thus involving the Union in the payment of the difference between the guaranteed number and those actually present. If all members attending the meetings would properly conform to the arrangements made by the honorary secretaries, and stated on the circular, they would not only save trouble to the officials, and loss to the Union's funds, but add to their own comfort.

The usual and much appreciated descriptive circular for each excursion was issued to members and associates.

The Union has again to acknowledge the uniform courtesy with which the landed gentry of the county facilitate the Union's work, by allowing permission for their estates to be visited on the occasion of the excursions.

The various railway companies—the North Eastern in particular—have also most kindly granted such privileges as have been asked for on the occasion of each of the Union's meetings. The North Eastern Company have continued to allow members and associates the privilege of booking on presentation of the card of membership, but the other companies have instituted a new system, whereby tickets at reduced fares are granted only on surrender of a special certificate signed by one of the honorary secretaries, a system of which a chief drawback is the increased amount of labour thrown upon honorary officers.

For the excursions of the coming year, 1901, your Executive recommend that the following programme of places and dates be adopted :—

For York S.E.—Whit Monday, May 27th : Brough.

For York N.E.—Saturday, June 22nd :

Scarborough for Beedale and Yedmandale.

For York Mid W.—Monday, July 15th : Wetherby.

For York N.W.—Bank Holiday Monday, August 5th : Masham.

For York S.W.—Thursday, Sept. 12th : Pontefract for Went Vale.

The Mycological Committee propose that the Fungus Foray shall be held in the Conisborough district at a date to be fixed to suit the circumstances of the case, in September, and your Executive have pleasure in recommending that the request be complied with.

For the Annual Meeting of next year (1901), the twenty-fifth year of the Union's existence under its present title, an invitation to meet at Wakefield is given by the Wakefield Naturalists' Society, and your executive cordially recommends its acceptance.

The Societies which constitute the Union are now 37 in number, the same as last year.

The Statistics which the Secretaries of the different Societies have again been kind enough to furnish show an

increase in the number of Associates, the aggregate membership of the 37 societies now amounting to 2,637, an increase of 219. Adding to this the number of direct members, the total numerical strength of the Union is 3,062.

The Membership of the Union now stands at 425, being 24 Life Members, 7 Honorary Life Members, and 394 Ordinary Members, a further decrease of 7 members as compared with last year.

During the year only about sixteen new members have been elected, much below the usual number, while on the other hand a few members have died, a few resigned, and a number have been struck off the rolls for non-payment of arrears of subscriptions.

The Union has had to mourn the loss of three old and distinguished members, by the decease of Mr. R. H. Meade, the distinguished dipterist and arachnologist, of Bradford, Mr. J. MacLandsborough, of Bradford, and Mr. Richard Reynolds, of Leeds, both of whom had rendered valuable service to science by long-continued series of observations on meteorological phenomena.

The Financial Position of the Union remains practically as it was last year.

The following, which has been duly audited and found correct, is the Hon. Treasurer's Statement of Receipts and Payments during the year :—

FINANCIAL STATEMENT to 5th Oct., 1900.

RECEIPTS.

	£	s.	d.	£	s.	d.
Interest allowed by Bank				0	19	0
Levies paid by Associated Societies :—						
1897	0	11	6			
1898	1	4	6			
1899	5	1	0			
1900	7	1	6			
				13	18	6
Subscriptions paid by Members :—						
1894	0	5	6			
1895	0	11	0			
1896	0	5	6			
1897	1	13	0			
1898	3	9	6			
1899	16	8	0			
1900	83	16	0			
1901	0	13	6			
				107	2	0
Donation for Life Membership ..	7	7	0			
Donations to Special Fund of 1898 ..	1	16	0			
Library :—						
Soppitt Memorial Fund for Book Case ..	3	15	0			
Borrowers in repayment of postages	0	2	9			
				3	17	9
Receipts on account of 'The Naturalist'	182	12	1			
	£317	13	4			
Balance due to Treasurer	20	3	4			
	£337	15	8			

PAYMENTS.

	£	s.	d.	£	s.	d.
Balance due to Treasurer	14	11	11			
Members' & Associates' Cards	9	18	0			
General Expenses :—						
Stationery	1	15	3			
Printing	4	11	3			
Postages	3	11	7			
				9	18	1
Expenses of Meetings :—						
Hornsea	7	12	7			
Askham Bog	7	4	1			
Crosland Hall	7	2	6			
Arkengarthdale	13	5	1			
Sandsend						
Fungus Foray	8	7	2			
Annual Meetings	10	18	10			
				54	10	3
Reception of British Association at Grassington	11	13	1			
Commission paid to Collector	15	19	2			
Bank for Subscription wrongly credited	1	1	0			
Hon. Treasurer's Expenses :—						
Printing	1	14	0			
Postages	1	6	4			
				3	0	4
Conference of Delegates, British Association ; Circular & postages				0	10	0
Subscription to Commons and Footpath Preservation Society				0	10	6
Circulars to East Riding County Council re Mortimer's Museum ..				0	10	0
Library and Exchanges :—						
'Naturalist' sent in exchange	11	10	0			
Postages, etc.	0	7	6			
New Bookcases (3)	10	15	0			
Expenses of Removal	1	7	3			
Rent and gratuities (2 years)	2	14	6			
Insurance Premium	0	6	0			
Books and Binding	2	0	1			
Subscription to Zoological Record	1	0	0			
Boxes for Storage	1	4	0			
				31	4	4
Transactions :—						
'Naturalist' sent to Life Members	5	15	0			
Binding Stock of Porritt's Lepidoptera	0	14	6			
Reprints of Excursion Circulars & Reports	10	17	6			
Postage of part 22	2	5	10			
Envelopes	0	19	0			
				20	11	10
Payments on account of 'The Naturalist'	163	17	2			
	£337	15	8			

The financial position of the Union is shown by the statement of assets and liabilities, as follows :—

ASSETS.				LIABILITIES	
‘Naturalist.’				‘Naturalist.’	
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Cash in hands of Local and General Treasurers, or in Bank	13 15 6		Balance due to Treasurer	20 3 4	
Cash paid in advance for 1901, 1902, 1903	2 16 6		‘Naturalist.’		
Subscriptions owing	22 5 0	38 17 0	‘Naturalist’ for Sept., &c.	40 0 0	
			Owing to Sec. for expenses	0 7 6	40 7 6
General Account.			General Account.		
Cash in hands of Local and General Treasurers, or in Bank	11 5 6		Three small accounts owing	0 14 0	
Cash received for Sales of ‘Flora of West Yorkshire’	1 18 0		Owing to Secretaries for Expenses	0 13 9	1 7 9
Donations received towards cost of British Association Reception at Grasington	6 15 6		Transactions.		
Subscriptions owing	29 14 0	49 13 0	Parts 22 to 26, at say £15	60 0 0	
Book Cases valued at	8 0 0		Library.		
Books in Library valued at	160 0 0		Joiner's Account for Fittings and Removals	1 11 0	
Stock of Transactions valued at	40 0 0		<u>£123 9 7</u>		
Stock of ‘Flora’ valued at	100 0 0		Balance of assets over liabilities	147 0 5	
Stock of ‘Naturalist’ valued at	60 0 0		<u>£270 10 0</u>		
Estimated to produce	185 0 0				
Less depreciation 20%	37 0 0	148 0 0			
Additions in 1900 :—					
Book Cases	9 0 0				
Stock of ‘Naturalist’	12 0 0				
Stock of Part 22	3 0 0				
Books added	10 0 0	34 0 0			
		<u>£270 10 0</u>			

The separate account for ‘The Naturalist’ is as follows, showing a slight deficiency against which has to be set a considerable amount of stock of back volumes and numbers :—

‘THE NATURALIST.’

Receipts in 1900	182 10 7		Payments in 1900	163 17 2
Do. do.	16 12 0		Liabilities to end of 1900	59 8 10
Subscriptions owing	22 5 0			
	<u>£221 7 7</u>			
Balance	1 18 5			
	<u>£223 6 0</u>			<u>£223 6 0</u>

Local Secretaries.—Your Executive recommends the re-election of the Hon. Local Secretaries as follows:—Beverley, J. J. Marshall; Bingley, H. Speight; Doncaster, George Winter; Goole, Thomas Bunker; Halifax, Arthur Crabtree, F.L.S.; Harrogate, K. McLean; Huddersfield, A. Clarke; Hull, John Stears; Malton, M. B. Slater, F.L.S.; Middlesbrough, T. F. Ward; Pickering, John Braim; Redcar, T. H. Nelson, M.B.O.U.; Ripon, Wm. Gregson, F.G.S.; Scarborough, J. H. Rowntree; Selby, W. Norwood Cheesman; Sheffield, A. T. Watson; Skipton, J. J. Wilkinson; Spen Valley, Albert Rothery; Whitby, Thomas Newbitt; York, H. J. Wilkinson. There are vacancies for the following and other districts, and your Executive would be glad if members would volunteer their services in this capacity:—Barnsley, Boston Spa, Bradford, Bridlington, Darlington, Dewsbury, Driffield, Keighley, Leeds, Market Weighton, Richmond, Rotherham, Saltburn, Sedbergh, Settle, Thirsk, and Wakefield.

It is a great advantage to the Union to be represented by the Hon. Local Secretaries, and your Executive would here express the hon. secretaries' sense of indebtedness to them for the assistance which they render.

Your Executive hopes that the Local Secretaries will keep ever in mind that their main function is not merely to collect subscriptions, but to act as local representatives in a much broader sense, and to keep the Union and its objects constantly in view, whether by way of enlisting new members or by keeping the Executive constantly informed as to local scientific occurrences.

The Publications of the Union have been as in former years, the 'Transactions' and the 'Naturalist.'

Part 22 of the 'Transactions' has just been issued to the members, and consists of the first instalment of a valuable "Alga-Flora of Yorkshire," by Messrs. W. West, F.L.S., and G. S. West, B.A., A.R.C.S.

Another part, 23, of the 'Transactions' is now in the printer's hands, and it is hoped to issue it very shortly. It includes Mr. W. Hewett's report on Yorkshire Lepidoptera.

The completion of the second edition of Mr. Baker's 'North Yorkshire' is now assured—the revision of the Mosses and the new list of Hepatics having been finished by Mr. M. B. Slater, F.L.S., and finally approved by Mr. John Gilbert Baker, F.R.S., F.L.S.

'The Naturalist' has been published monthly during the year, under the sole editorship of Mr. W. Denison Roebuck, F.L.S., under whose direction it has fully sustained the reputation which it has for many years enjoyed as the

recognised medium for the publication of natural history observations for the whole of the North of England.

Your Executive and the Editor would again take this opportunity of reminding members that the journal has always been sufficiently catholic in its scope to welcome articles dealing with the life history of animals and plants as observed in the northern counties, as well as with any biological and general considerations that the local observations give rise to.

The Library continues to increase in bulk. The lending out of books has been stopped for some time, owing to the Committee of the Leeds Institute, where the books are housed, having given the Hon. Librarian notice to move the books to another room. This has now been done. It is hoped shortly to have them arranged, when the many who make use of the library will be able to have their requirements. The removal has caused an increased expenditure. Two new bookcases have already been bought, and if some kindly-disposed members would present others, the gifts would be fully appreciated.

Flora of West Yorkshire. — Your Executive has resolved to offer the remaining stock of this work at 7/6 (post free for 8/-), in order to gain space in the Library, and it is trusted that a speedy clearance may be made of the copies remaining.

The Sections of the Union have more or less steadily carried on their work during the year, and as the success of the field excursions entirely depends upon the presence of the Union's best workers in every department, it is to be hoped that members will endeavour to support the arrangements made by the general and sectional officers by their presence at as many excursions as possible.

Vertebrate Section.—Mr. Kenneth MacLean, the secretary, and Mr. Riley Fortune, F.Z.S., president, report that there is little of special interest to record. The spring was very late, cold and wet weather prevailing throughout April and well into May, consequently the winter visitors stayed longer than usual, and the majority of the summer visitors were exceptionally late in making their appearance. The excursions in connection with the Y.N.U. have been as interesting and popular as in previous years, the one to Hornsea being without doubt the most interesting one of late years. Several species of rare birds were noted, and in most cases were found nesting. Reports of animals and birds seen have been given in the 'Naturalist' from time to time. One of the most interesting ornithological events of the year is the occurrence of the Levantine Shearwater (*Puffinus yelkouanus*), a specimen of which, shot at Scarborough on September 13th, has come into the possession of Mr. Riley Fortune.

Conchological Section.—Mr. J. E. Crowther, the president, reports that as there is not much hope of adding any new species of land and fresh-water mollusca to the British list, the work of this section is mainly confined to investigating the distribution of the various species. With this object in view, members of the section have attended the excursions of the Union, and their efforts have been attended with more or less success. Perhaps one of the most interesting records is *Limax arborum* at Marsden. This species was fairly plentiful at Grassington, as was also *Arion minimus*. Several other species not previously recorded for Grassington were also met with. It has been suggested that this section should be formed into a Committee of Research. If that were done, perhaps more and better work would be accomplished, as it would be a means of drawing the members more closely together, both at the excursions and at other times.

Entomological Section.—Mr. William Hewett and Mr. John Waddington, the secretaries, report that there is not much of special interest to record for this section's work during the year. A brief summary of the more interesting species taken by Yorkshire collectors this season will appear later in the pages of the 'Naturalist.' The following usually uncommon species in Yorkshire have been fairly common—viz., the Clouded Yellow Butterfly (*Colias edusa*), larvæ of the Death's Head Hawk Moth (*Acherontia atropos*), and imagines of the Humming Bird Hawk Moth (*Macroglossa stellatarum*), which, whilst not so common as last year, has yet been widely distributed. It is recommended that the section be formed into a committee of research, and that at least two meetings be held during 1901. The Committee to be elected at the annual meeting at Middlesbrough.

Botanical Section (Phanerogamic).—Mr. John Farrah, F.L.S., the secretary, reports that but little has been reported during the year, a sad and deplorable statement to make (especially in connection with our county), and should stimulate all botanists to more strenuous efforts. There is but little chance of making any startling discoveries, as the keen eyes of our older botanists have spied out all the rarities and left but little for the plant lover to do beyond reverently and devoutly paying his annual pilgrimages to the shrines where flora still guards for his own special delight some of her rarest gems. But woe be to him if in a weak moment he betrays the hiding place to a mere plant collector, lest in future he should seek for the habitats of his loved ones in vain. It may be suggested that all botanists should give their attention to the flora of their own district, noting and naming the plants most carefully, tabulating with the utmost care every home, and all its surroundings. There are other and innumerable paths into which the phanerogamic botanist may turn his steps with the greatest profit and

pleasure; to some of these it is hoped to draw attention at the annual meeting. In conclusion it may be suggested that some special effort be made by this section during the forthcoming season to mark the progress of botanical science during the twenty-five years that the Y.N.U. has been in existence.

Geological Section.—Messrs. J. H. Lofthouse and T. Sheppard, F.G.S., secretaries, write that it is pleasing to report that from the number of geologists who take part in the excursions of the Yorkshire Naturalists' Union it is evident that this section is not lacking in interest. On some of the excursions during the past summer the number of geologists present in the party has really been quite out of proportion. On most of the excursions this section has been officially represented. On the 19th of May the members visited Hornsea and Skipsea. After hearing Mr. J. R. Boyle, F.S.A., deliver an address on the remarkable pre-historic earthworks at Skipsea Brough, the party walked along the beach between Skipsea and Hornsea, examining the lacustrine deposits, peat beds, and boulder-clay en route. The members of the Coast Erosion Committee met on this occasion. At the meeting at York, for Askham Bog, the few geologists present had an opportunity of examining the wonderful moraines, laid down by the Vale of York Glacier, which were so ably described by Mr. P. F. Kendall, F.G.S., in the circular for the meeting. The Roman Road from York to Tadcaster runs along one of these morainic ridges. Unfortunately there were not many suitable sections visible at the time of this meeting. The district visited on June 28th, viz., Crosland Hall, being situated amidst the Millstone Grits, did not offer very great attractions—from a geological point of view. Nevertheless, geologists are but human, and they were present, and shared in the kind hospitality of the Union's President, Mr. Porritt. Notwithstanding the many attractions offered to geologists on the occasion of the excursion to Arkengarthdale on August 4th, partly on account of the inaccessibility of the place to South Yorkshire folk, and partly on account of holidays, the geological section was not officially represented. The hammermen, however, had a very pleasant and profitable outing, under the able leadership of Mr. J. G. Goodchild, F.G.S., F.Z.S., M.B.O.U., of H.M. Geological Survey. In connection with the British Association Meeting at Bradford, in September, the Union arranged an excursion to Grassington. This was exceedingly well attended, both by the members of the geological section of the Union and by members of the British Association. In reference to this excursion, Mr. J. H. Howarth, F.G.S., who was one of the leaders, writes that in this section, as in others, the year will be long remembered for the excursion to Grassington in connection with the British Association Meeting in Bradford. The principal object in view was an investigation of the reef knolls of Mr. Tiddeman. Leading geologists holding different views as to the origin of

those knolls were present, with a considerable number of men distinguished in the science, who had been attracted to the subject and the district by Mr. Tiddeman's paper, and the discussion which followed it. The excursion was most successful. The evidences for and against contending theories were shown to the visitors, and points were raised and discussed which will no doubt be heard of again in the near future. The list of geologists—between 30 and 40 in number—who were present is worth placing on record as being exceptional, if not unique, at any single gathering in the field.

Alfred Birtwhistle, M.A., Skipton.	John E. Marr, M.A., F.R.S., F.G.S., Cambridge.
Rev. J. F. Blake, M.A., F.G.S., London.	H. W. Monckton, F.L.S., F.G.S., Temple, E.C.
J. Wesley Carr, M.A., F.L.S., F.G.S., Nottingham.	J. R. Mortimer, Driffield.
Wm. Cash, F.G.S., Halifax.	H. B. Muff, Bradford.
Capt. A. R. Dwerryhouse, F.G.S., Leeds.	R. D. Oldham, F.G.S., Superintendent Geological Survey of India.
F. W. Harmer, F.G.S., Norwich.	Clement Reid, F.L.S., F.G.S., Geological Survey.
Edwin Hawkesworth, Leeds.	Thos. Sheppard, F.G.S., Hull.
Wheulton Hind, M.D., B.S. Lond., F.R.C.S., F.G.S.	Wm. Simpson, F.G.S., Halifax.
J. H. Howarth, F.G.S., Halifax.	J. W. Stather, F.G.S., Hull.
Percy F. Kendall, F.G.S., Leeds.	R. H. Tiddeman, M.A., F.G.S., Geological Survey (Leader).
G. W. Lamplugh, F.G.S., Geological Survey, Tonbridge.	Wm. Whitaker, B.A., F.R.S., F.G.S., Croydon.
Robert Law, F.G.S., Hipperholme .	J. J. Wilkinson, Skipton.
Joseph Lomas, F.G.S., Birkenhead.	

Only a few geologists were present on September 15th, on the occasion of the excursion to Whitby and Sandsend. The liassic beds, however, with their plentiful store of attractive fossils, amply repaid those few who were able to attend. The fact, however, that this excursion fell so soon after the British Association and Grassington excursion had something to do with the small attendance.

The Committees of Research have continued their investigations during the year with more or less satisfactory results.

The Yorkshire Micro-Zoology and Micro-Botany Committee.—Mr. M. H. Stiles, F.R.M.S., the convener, reports that the past year has been signalised by the publication of the first part of the *Alga-Flora of Yorkshire*, written by Mr. W. West, F.L.S. (ex-President of the Y.N.U.), assisted by his son, Mr. G. S. West, B.A., A.R.C.S. The result is a great increase in the number of species and varieties over those given in Lees' *Flora of West Yorkshire*, and also in the number of localities for species already recorded. Mr. West hopes to further amplify this list, and additional gatherings and verified records will be gladly welcomed by him. Mr. Stiles (convener of the Committee) has continued his examination of diatomaceous gatherings from various parts of the Doncaster district, and hopes at an early date to publish a list in the 'Naturalist.'

It is recommended that the Committee be re-elected as follows:—H. C. Sorby, LL.D., F.R.S., Sheffield, Chairman; M. H. Stiles, F.R.M.S., Doncaster, Convener; J. Newton Coombe, Sheffield; Prof. Alfred Denny, F.L.S., Sheffield; Charles P. Hobkirk, F.L.S., Ilkley; F. W. Mills, F.R.M.S., Huddersfield; Wm. West, F.L.S., Bradford; and George Winter, F.R.M.S., Doncaster.

The Yorkshire Coleoptera Committee.—Mr. M. L. Thompson, the Secretary, reports that the work of this committee has been continued with vigour during the year; and that members who attended meetings of the Union have investigated the districts visited as far as the time at their disposal would allow, the meeting at Askham Bog, York, being the most productive of interesting results. The increased interest manifested in Coleoptera is noted with satisfaction; but the beetle fauna of many promising districts is yet practically unknown, and whilst gladly acknowledging the valuable assistance rendered by other members of the Union who are not coleopterists, it is hoped that an increased number will be disposed to further the special work of the committee during the coming year. No further portions of the list of Yorkshire Coleoptera have been published, the secretary being still engaged in the preparation of the list of Clavicornia, and the species belonging to the remaining groups.

It is recommended that the Committee be re-appointed as follows:—Rev. W. C. Hey, M.A., West Ayton, Chairman; M. L. Thompson, Saltburn, Convener; E. G. Bayford, Barnsley; H. H. Corbett, M.R.C.S., Doncaster; W. Foggitt, J.P., Thirsk; John Gardner, F.E.S., Hartlepool; Joseph Neale, B.A., Ackworth; H. Ostheide, Leeds; and W. Denison Roebuck, F.L.S., Leeds.

Yorkshire Boulder Committee.—Mr. J. H. Howarth, F.G.S., the secretary, reports that the work of the committee has been continued throughout the year with unremitting energy, especially in the North and East Ridings; and, although the actual records may be less numerous than heretofore, a keen look out for any new facts is maintained by many watchful observers over a large area. It is now abundantly shown that Scandinavian rocks are not only distributed many miles inland from the coast, but that they reach high levels. Shap Granite and the Norwegian Rhomb Porphyry lie side by side in the Burstwick gravel pit in Holderness, and in a quarry of thick glacial gravel at 600 feet O.D. above the Railway Station at Peak. Rhomb Porphyry, found last year at 810 feet O.D. in the Lockwood Hills, is again reported at 650 feet O.D. 8 miles west of Whitby. Careful examination by Mr. John Burton of a new rock surface exposure in his district adds to previous records that there is no evidence of a glacier in the Calder lower

valley. Mr. Corbett continues attention to the most interesting problem which lies at Balby and around Doncaster, where rocks occur from both N.E. and S.W. Cumberland, Westmorland, the Tees Valley, the East Coast, and probably Northumberland and Scandinavia. The attention of members interested is directed to the Don Valley, and all the Vale of York from the Tees southward. In the latter nothing has been diligently looked for over a large area but Shap Granite. A look out should be kept for other igneous rocks.

The Committee ask for re-appointment as follows:—Percy F. Kendall, F.G.S., Leeds, chairman; J. H. Howarth, F.G.S., Halifax, convener; J. E. Bedford, F.G.S., Leeds; John Burton, Normanton; Rev. W. Lower Carter, M.A., F.G.S., Hopton; Rev. E. Maule Cole, M.A., Wetwang; H. H. Corbett, M.R.C.S., Doncaster; Wm. Gregson, F.G.S., Baldersby; Rev. John Hawell, M.A., F.G.S., Ingleby Greenhow; Edwin Hawkesworth, Leeds; Wm. Horne, F.G.S., Leyburn; Robert Law, F.G.S., Hipperholme; J. H. Lofthouse, Harrogate; H. M. Platnauer, B.Sc., F.G.S., York; Thomas Sheppard, F.G.S., Hull; William Simpson, F.G.S., Halifax; J. W. Stather, F.G.S., Hull; F. Fielder Walton, F.G.S., Hull, with the additional names of Mr. Herbert B. Muff, of Bradford, and Mr. J. E. Wilson, of Ilkley.

The Yorkshire Wild Birds' and Eggs Protection Acts Committee.—Mr. Oxley Grabham, M.A., M.B.O.U., the chairman and convener, reports that several members of the Committee have effected an important piece of work in joining with other gentlemen to place a watcher on the Spurn to protect the Lesser Terns, for particulars of which see the report in 'The Naturalist', for October, 1900. Good results have accrued, and it is hoped if pecuniary assistance is forthcoming next year, to protect other rare and vanishing species which are sadly in need of help, if they are to be retained as breeding species in the county.

It is recommended that the Committee be re-appointed as follows:—Oxley Grabham, M.A., M.B.O.U., Heworth, York, chairman and convener; James Backhouse, F.Z.S., Harrogate; F. Boyes, Beverley; T. Bunker Goole; H. E. Dresser, F.L.S., F.Z.S., London; R. Fortune, F.Z.S., Harrogate; Jno. Gerrard, M.B.O.U., Manchester; Rev. E. Ponsonby Knubley, M.A., Steeple Ashton, Wilts.; Claude Leatham, Wakefield; Kenneth MacLean, Harrogate; T. H. Nelson, M.B.O.U., Redcar; T. Petch, B.A., B.Sc., Hedon; Geo. T. Porritt, F.L.S., Huddersfield; W. H. St. Quintin, J.P., D.L., M.B.O.U.; and Rev. W. T. Travis, M.A., Ripley.

Yorkshire Bryological Committee.—Mr. J. J. Marshall, the secretary, reports that it is almost too early yet to sum up exactly the work of this season, but it may safely be said that good results will appear. Messrs. Marshall, Ingham, Needham,

and Webster have been as active as usual, and will have to record several new records of localities, both for mosses and hepatics, of which the Committee propose to give full particulars in their detailed report in 'The Naturalist' in the course of a month or two.

It is recommended that the Committee be re-elected as follows:—Matthew B. Slater, F.L.S., Malton, chairman; J. J. Marshall, Beverley, convener; Richard Barnes, Harrogate; Robert Braithwaite, M.D., F.L.S., London; Llewellyn J. Cocks, London; Charles Crossland, F.L.S., Halifax; Charles P. Hobkirk, F.L.S., Ilkley; William Ingham, B.A., York; James Needham, Hebden Bridge; and William West, F.L.S., Bradford; and that Mr. C. P. Hobkirk continue to be its representative on the Executive Committee of the Union.

The Yorkshire Mycological Committee.—The Secretary, Mr. Charles Crossland, F.L.S., reports that the work of the Committee has been steadily progressive. Since the last annual report six species new to Britain and three new to science have been published in 'The Naturalist.' Besides these, a most interesting Hyphomycete, found by Mr. A. Clarke during last year's fungus foray at Askern, has been successfully cultivated by Mr. Masee, F.R.M.S., at Kew, with a view to learning something of its life history. This year the weather has been much more propitious to the growth of fungi than for several previous seasons; but however favourable a season may be, the bulk of the crop of larger species of fungi does not show itself until into September. Micro-species are with us more or less all the year round, and of these Mr. Needham, Hebden Bridge, has forwarded regular supplies. The Grassington Meeting in connection with the British Association was well attended by mycologists, and was a decided success. Several eminent British botanists, including Prof. Marshall Ward, F.R.S., Cambridge University, took part, and highly appreciated the district and the field work done. Grass Woods proved most prolific in fungi, and over 100 species were collected. The ordinary fungus foray at Mulgrave Woods has proved the most successful annual foray the Union has yet held. More than 400 species were found, including many new to the Yorkshire fungus flora, and two or three not hitherto found in Britain. A full report and list of species will be published in 'The Naturalist.'

It is recommended that the next year's foray be in the neighbourhood of Conisborough; also that the Committee be re-appointed as follows:—Geo. Masee, F.L.S., Kew, chairman; Charles Crossland, F.L.S., Halifax, convener; U. Bairstow, Halifax; Thomas Birks, Yarm-on-Tees; W. N. Cheesman, Selby; A. Clarke, Huddersfield; Rev. W. Fowler, M.A., Liversedge; Thomas Gibbs, Sheffield; James Needham, Hebden Bridge; J. W. Sutcliffe, Halifax; and Harold W. T. Wager, F.L.S., Leeds.

The Yorkshire Fossil Flora Committee.—The committee regret to report that the appeals made in past years to colliery managers and local geologists have met with little or no response, and that there is therefore little to report; but the convener of the committee (Mr. W. Cash, F.G.S.) has had personal interviews during September with several colliery managers who have promised to help, and from this source it is hoped that next year's report may prove of interest. The committee has not met during the past year.

It is recommended that the Committee be re-elected as follows:—Robert Kidston, F.R.S.E., F.G.S., Stirling, N.B., chairman; Benjamin Holgate, F.G.S., Leeds, vice-chairman; Wm. Cash, F.G.S., Halifax, convener; J. W. Bond, Leeds; W. Hemingway, Barnsley; Robert Law, F.G.S., Hipperholme; and Wm. West, F.L.S., Bradford.

Yorkshire Geological Photographs Committee.—Mr. J. E. Bedford, F.G.S., convener, reports that the additions made to the Y.N.U. collection of geological photographs have not been quite so numerous as in previous years. It is to be regretted that greater interest is not taken in this valuable geological record work. The only contributions received this year are from the Hull Geological Society and Mr. Godfrey Bingley.

It is recommended that the Committee be re-appointed as follows:—Godfrey Bingley, Leeds, chairman; J. E. Bedford, F.G.S., Leeds, convener; Rev. W. Lower Carter, M.A., F.G.S., Hopton, Mirfield; Rev. E. Maule Cole, M.A., Wetwang; J. Hollingworth, M.R.C.S., Hull; and F. Fielder Walton, F.G.S., Hull; with Prof. W. W. Watts, M.B., F.G.S., London, the Secretary of the British Association Committee on Geological Photographs, as Hon. Member.

Yorkshire Coast Erosion Committee.—Mr. Thomas Sheppard, F.G.S., the secretary, reports that, following up the lines of research indicated in last year's report, the members of this committee have been accumulating records during the past summer, and these, together with those previously obtained, will be arranged and tabulated in due course. The Committee do not consider it necessary, however, to publish any detailed accounts at present, beyond what is set out in their full report for last year, which will shortly be printed in 'The Naturalist.' In May last, on the occasion of the visit of the Yorkshire Naturalists' Union to Hornsea and Skipsea, an excellent opportunity of examining the condition of the Holderness cliffs was afforded, and this was taken advantage of by most of the members of the committee and others. The manner in which the land is disappearing in this part of the coast was most obvious. In previous years this committee had taken measurements of the distance between the cliffs and Sands Cottage,

situated just north of the promenade at Old Bridlington. A year or two ago this cottage was quite close to the cliffs. The promenade, however, has now been extended beyond the cottage, and a road has been made and a sea-wall erected in front of it. The actual distance of the cottage from the edge of the sea wall therefore is now much greater than it was a short time ago. This should be borne in mind for the future in calculating the measurements at this point.

It is recommended that the Committee be re-elected as follows:—Rev. E. Maule Cole, M.A., Wetwang, chairman; T. Sheppard, F.G.S., 432, Holderness Road, Hull, convener; Rev. H. E. Maddock, M.A., Patrington; J. W. Stather, F.G.S., Hull; F. F. Walton, F.G.S., Hull; and W. Y. Veitch, M.R.C.S., Middlesbrough; and that the name of Mr. C. E. De Rance be omitted, for the very sufficient reason that the British Association Committee on Coast Erosion is not now in existence.

The Yorkshire Marine Biology Committee.—Mr. J. Darker Butterell and Mr. F. W. Fierke, the joint conveners, have to report that at the two excursions held this year on the coast, circumstances were not sufficiently favourable for systematic work at Hornsea and Skipsea, but that at Sandsend Mr. Lister Petty collected a number of Polyzoa, upon which he has furnished a detailed report for publication in 'The Naturalist.'

It is recommended that the Committee be re-elected as follows:—H. C. Sorby, LL.D., F.R.S., Sheffield, chairman; J. D. Butterell, Wansford, Hull; Fred. W. Fierke, M.C.S., Hull, joint conveners; W. Eagle Clarke, F.L.S., Edinburgh; Oxley Grabham, M.A., York; Rev. W. C. Hey, M.A., West Ayton; E. Howarth, F.R.A.S., F.Z.S., Sheffield; Geo. Masee, F.R.M.S., Kew; T. H. Nelson, M.B.O.U., Redcar; T. Petch, B.A., B.Sc., Hedon; J. Frazer Robinson, Hull; W. Denison Roebuck, F.L.S., Leeds; Rev. Henry Smith, M.A., Redcar; and Arnold T. Watson, F.L.S., Sheffield; with the addition of Mr. S. Lister Petty, of Ulverston.

British Association.—The Union has again been appointed one of the Corresponding Societies of the Association, and was represented at the meeting at Bradford by Mr. Harold Wager, F.L.S., who reports that two meetings of the Conference of Delegates were held. The resolutions submitted by the British Association Committee of the Y.N.U. were fully discussed. The first resolution was strongly opposed, and it was ultimately decided that no change in the days and hours of meeting could be made. The second resolution was favourably received, and the Committee of the Corresponding Societies willingly undertook to make arrangements to discuss suggestions made to them by the corresponding societies, and to do everything that lay in their power to make the meeting successful. It was felt that the matter might be safely left in the hands of the committee,

and the resolution was then by leave withdrawn. The discussion was a very useful one, and clearly indicated that the corresponding societies themselves do not give that attention to the work of the conference of delegates which is desirable, if the meetings are to be of real use to local societies. At the second meeting an interesting paper was read by Prof. L. C. Miall, F.R.S., on Dew Ponds. At the request of the Y.N.U. delegate the local committee at Bradford was cordially thanked for their courtesy in placing a room entirely at the disposal of the conference for the whole of the meeting instead of, as has been the case heretofore, for the two delegates' meetings only.

Winter Programme.—For some time past it has been felt that it is desirable that the work of the Union should be brought more into evidence during the winter season, and that its claims to both financial and scientific support should be more forcibly and effectually brought before the public. Arrangements are accordingly being made to have lectures, papers, demonstrations, and exhibits to be given by members at the meetings of such of the associated societies as are wishful to include them in their programmes.

The Year 1901.—Your Executive has to draw the attention of the members to the fact that next year—1901—will be the twenty-fifth of active and systematic work carried on continuously from the time that the West Riding Consolidated Naturalists' Society was re-organized and assumed its present title of Yorkshire Naturalists' Union. It is proposed to celebrate this by restoring as far as possible the conditions which obtained in the year 1877. For this object it is proposed to repeat the excursions to Wetherby and to Went Vale, and to accept the invitation of the Wakefield Society to hold the Annual Meeting in that city. In harmony with this idea, it is proposed that the excursions in the S.E., N.E., and N.W. divisions be to Brough, to Scarborough, and to Masham, being the places first visited by the Union in those divisions of the county. For the same reason, the Rev. William Fowler, M.A., of Liversedge, has been invited to occupy next year the office of President, which he so worthily filled in the year 1877, and it is respectfully suggested to the Sections that they should each select their President from among those members who were upon the roll for the year 1877, and your Executive ventures to submit that the following list of names affords ample liberty of choice of members fully worthy of becoming Vice-Presidents of the Union during Mr. Fowler's second year of presidency :—

- The Marquis of Ripon, K.G., F.R.S.
 Lord Walsingham, M.A., F.R.S.
 Rev. Frederick Addison, M.A., Thirsk.
 Alfred Beaumont, F.E.S., London.
 Thomas Birks, Yarm.
 J. W. Blakeley, Liversedge.
 C. H. Bould, Leeds.
 John Brigg, M.P., Keighley.
 J. Darker Butterell, Hull.
 E. P. P. Butterfield, Wilsden.
 J. A. Butterfield, London.
 J. W. Carter, Bradford.
 William Cash, P.G.S., Halifax.
 W. Norwood Cheesman, Selby.
 J. Edmund Clark, B.A., B.Sc., London.
 Wm. Eagle Clarke, F.L.S., Edinburgh.
 Rev. E. Maule Cole, M.A., Wetwang.
 N. F. Dobrée, Beverley.
 John Emmet, F.L.S., Boston Spa.
 Rev. William Fowler, M.A., Liversedge (*President*).
 William Gregson, F.G.S., Baldersby.
 Alfred Harker, M.A., F.G.S., Hull.
 Chas. P. Hobkirk, F.L.S., Ilkley.
 Benj. Holgate, F.G.S., Leeds.
 P. F. Lee, Dewsbury.
 Philip B. Mason, F.L.S., Burton-on-Trent.
 H. R. Moiser, F.G.S., York.
 William Nelson, Leeds.
 William Nuttall, Bradford.
 George Parkin, Wakefield.
 H. Franklin Parsons, M.D., F.L.S., London.
 W. Pease, Hook.
 Henry Pocklington, Leeds.
 George T. Porritt, F.L.S., Huddersfield (*Sec. Ent. Section*).
 Walter Rowley, F.G.S.
 W. Denison Roebuck, F.L.S. (*Hon. Secretary*), Leeds.
 James H. Rowntree, Scarborough.
 R. F. Scharff, Ph.D., Dublin.
 Rev. H. H. Slater, M.A., F.Z.S., Northants.
 John W. Taylor, F.L.S., Leeds.
 Washington Teasdale, F.R.A.S., Leeds.
 John Thrippleton, Leeds.
 William Waite, Clayton West.
 George Ward, F.I.C., Leeds.
 William West, F.L.S., Bradford.
 John Wright, Terrington.
 Edwin Yewdall, Leeds.

The Presidency.—Reference has just been made to the fact of the Rev. William Fowler having consented to accept the presidency for the coming year, and your Executive has now to express the great obligation under which the Union has been laid by its old and faithful friend, Mr. Porritt, whose term of office expires with the present annual meeting, whose attainments as an entomologist have made for him a world-wide reputation, and whose presence at the meetings has so materially contributed to the prosperity and well-being of the Union during the year.

PRESIDENTIAL ADDRESS
TO THE YORKSHIRE NATURALISTS'
UNION,

Delivered at Middlesborough, October 26th, 1900,

Colonel Sadler, M.P., in the Chair.

GEORGE T. PORRITT, F.L.S., F.E.S.,

President of the Yorkshire Naturalists' Union, 1900.

At the end of the closing year of the nineteenth century, during nearly forty years of which era our own Union has been in existence, either under its present or its original title, it seems to me fitting that we should examine our whereabouts, as professedly scientific naturalists, as compared with our scientific notions during the early years of our association. Naturalists' societies and associations are essentially products of the nineteenth century; for although the Linnean and one or two other societies certainly were founded prior to its commencement, it is this century, and indeed the latter part of it, which has witnessed such a marvellous multiplicity of them.

Our own Union was formed expressly for the purpose of investigating every nook and corner of our large county, and so in time gain a sufficiently complete knowledge of its geology, fauna, and flora, to justify the publication of lists with localities, etc., of the species in all the various branches; but I fear that in its early days comparatively few of our members at all realized the necessity and importance of these aims.

My own connection with the Union dates from near its formation, and what strikes me most now, as compared with the early days, is the altogether different method of study adopted. The days I allude to may be described as the collecting age of the Union. Collecting and the acquisition of specimens in those days appeared to be the highest ambition of members, i.e., of the majority of those members who did

any real work at all, for then, as ever since, there were many associated with our Union merely through having a sort of general interest in objects of nature, and consequently interested in what others did, but who did practically nothing themselves. The collectors obtained their specimens and made a collection, and there was an end of it; in most cases no record even of the locality in the collector's cabinet, much less in the Union's journal or record books for the benefit of fellow workers

Now, far be it for me to decry either collectors or collections. Perhaps few in the United Kingdom have during the past thirty or more years been greater enthusiasts over both than myself, and I shall probably continue to be so as long as I am able to do it at all. But what I mean is that a collection should be 'the means to an end,' instead of what it so often was in the old days 'the end of the means.'

No naturalist will for a moment deny the use of collections. Such when well labelled and accurately named, become at once standards of reference, and are indeed necessities for biological research in the particular branches of science they represent; they are indispensable for a proper study of the variation, distribution, and even the origin of the various species; they are instruments of civilization by which our thoughts are widened; apart altogether from the intense pleasure and relaxation with which we regard them, when every specimen brings back to our mind some enjoyable outing, or associates some place, probably a lovely wood, or mountain, heath, marsh, river side, or stream, where with some friend,—possibly now gone to his rest,—we captured or found these identical specimens.

I have already incidentally alluded to the labelling of specimens in collections, and as labelling at the present day means giving on a small ticket or label a complete history as to the locality, date of capture (or find as the case may be), name of captor, etc., it will at once be seen what an advance this was on the old method, which involved in the case of entomology, merely the filling up of a short space in the drawer with two to four specimens of the species for which it had been prepared; but the specimens might have come from the extreme north of Scotland, or the remotest corner of Cornwall, so far as the collector either knew or *cared*. One thing only was essential for the comfort of the possessor, *they must be British specimens*,—or supposed to be so! But even that method of collecting, poor as it now seems to us, was a big advance on the custom of our earliest entomologists (they called themselves entomologists even then), whose highest notion of the use of insects was that the showiest of them might be collected or bred in large numbers, and made up into pictures. Many old members of our Union remember those pictures well: let us be thankful it is but a memory, the reality being now a thing of the past!

I am giving my illustrations almost entirely from my experience among lepidopterists, because I know most about them ; but I doubt not the geologists, botanists, ornithologists and others will bear me out in saying that the study of their branches was carried out in pretty much the same way, and that similar advances, though sometimes in different directions, have been slowly but surely made.

Labelling soon led the way to a further advance—larger series of each species. Labelling often shewed that specimens of a species received from a certain area, perhaps of considerable extent, or sometimes of only a mile or two square, say in West Yorkshire or Scotland, varied very little among themselves, but when placed alongside the specimens of the same species from areas in the South of England, were altogether different from them, whilst both forms might again be widely different from the same species from localities in Wales or Ireland, and so on. It became apparent at once that our cabinets must be re-arranged, and instead of leaving space for two or four specimens, the orthodox way with our entomological fathers, we must have room enough for at least ten or a dozen, and in the case of many species for even 70 or 80 or more, in order to adequately represent and study their local and racial variations. Possibly the extraordinary interest aroused by and through the study of this local variation in lepidoptera has had more to do with the immense advance made in lepidoptero-logical science during the past 20 years or more than anything else. To find out the causes one had to become interested in the geology, the botany, the dryness or the moistness of the climate, the amount of sun, and a score of other things affecting the different areas, including the amount of smoke or soot, which in the south West Riding districts of our county, has, by some been considered responsible, in the struggle for existence (for indirectly of course, through these various agencies, it must be the survival of the fittest which has created the variation), for the many extreme melanic forms, some of them clearly of comparatively recent formation, for which especially the south West Riding district has become so notorious. This is not the time to enter into a discussion on variation and melanism ; suffice it to say that the study of it at once opened out interest in numberless other complex problems ; such as the origin of the bands, spots, etc., so constant in entire groups of otherwise dissimilar species ; how these bands and spots have become altogether eliminated in other groups having clearly a common ancestral origin with the banded forms, etc. Other students became fascinated with the study of the antennæ ; studied the scent glands ; the folds of the wing-membranes ; the venation ; and a hundred other things in connection with the perfect insect. Then the study of the earlier stages,—the eggs, the larvæ, the pupæ, all have their votaries, though the first and last have perhaps not so much engaged the attention of our

own members as have the larvæ. But those who have paid much attention to the eggs of butterflies and moths, have found that the diversity in form and colour in birds' eggs, great as it appears to be when we see a large and well arranged collection, becomes absolutely insignificant in comparison with the beauty, both in form and design, in those of insects, and those thoroughly conversant with them, can tell on seeing an insect's egg, just as surely as can the oologist on seeing a bird's egg, the exact species to which it belongs; it seems not unlikely, indeed in some genera it has already been attempted, that classification of species will in the future be based largely on the form and structure of the egg.

Dr. Chapman, Mr. F. Merrifield, and others, too, have shewn us of what scientific importance are the pupæ, and the results of the experiments of the latter gentleman, from the aspect of protection of species, have been very extraordinary. An exhibit by Mr. Merrifield at the meeting of the London Entomological Society on October 5th, 1898, was the most remarkable thing of its kind I have ever seen. Mr. Merrifield had obtained a large quantity of the larvæ of *Pieris napi*, one of our common white butterflies, and when nearly full fed had enclosed a considerable quantity in each of a large number of differently coloured receptacles in such a way that they were forced to pupate on the particular colour of glass or paper, etc., in which they were enclosed. The result was most striking, With a very small percentage of exceptions, these larvæ (and it must be remembered that all the larvæ were pretty much alike in appearance) which had pupated on a green surface produced bright green pupæ; those on gold coloured or gilt surfaces were yellow; those on stone colour, grey; and most remarkable of all, those on white paper were white, and, so far as I observed, quite devoid of markings. A better instance of assimilation to the colour of the environment could not be. All these pupæ would of course remain as such through the winter, and it will be at once grasped how a far higher percentage of them would, if at large, escape the prying eyes of birds, when similar in colour to the substance they were attached to, than would be the case if, when at the change to pupæ, the colours were thrown hap-hazard, resulting in a green pupa being on a white ground, a yellow one on a stone ground, etc.

Another interesting item came out in the course of the discussion, and after conversation on these pupæ. The very closely allied and still commoner *Pieris rapæ* is, like *P. napi*, a double-brooded species, and its autumn larvæ produce pupæ varying in colour in just the same way as do those of *P. napi*; but it was elicited that the larvæ from the spring brood, which have only to pass a fortnight or so in the pupal stage, do not leave the green plants on which they have fed, but change to pupæ on them—the pupæ in that case being almost invariably green. But on the other hand the larvæ of the autumn brood,

instinctively,—shall I say knowing that before next spring the low plants would all have died down and been destroyed, the pupæ with them,—crawl away from the plants, often long distances, to some wall or solid substance, and thereon pupate, the pupæ then being stone or other colour in accordance with the surroundings. I questioned members on the matter, but found, as was my own experience, that none of those I asked could remember a single instance of finding a green pupa of *Pieris rapæ* in winter. That this is also the case with *Pieris napi* there is little doubt, though on it the necessary record of absolute observation to establish the fact was not forthcoming at the meeting referred to.

In larvæ of lepidoptera some of our members have taken considerable interest, and to myself at any rate, their study has always had an intense fascination. And who indeed of the most casual observers has not in one way or another been interested in caterpillars? When we consider their wonderful mode of life, some species spending the whole of their existence in the solid trunks of trees, others in small stems or twigs, a host of them underground, light and sun, and apparently too much fresh air even, being fatal to them. To others, sun and light, and plenty of it, seems essential to their existence, the genera *Melitæa*, *Argynnis*, *Vanessa*, and others among the butterflies; the gaily coloured species of *Deilephila*, *Cucullia*, etc.; the hairy *Cheloniæ*, *Arctiæ*, and many others among the moths, delighting to bask in its full rays; the grotesque appearance assumed by those of the *Cuspidatæ*, including the threatening attitude of *Dicranura vinula*, our familiar puss moth; and the weird and uncanny posture assumed by the larva of *Stauropus fugi*, the lobster moth. The whole genus *Dianthæciæ* feed in the seed-capsules of the various species of *Silene* and *Lychnis*, the species of *Hydrocampa* and several allied genera on aquatic plants, under water; the species of *Ephestiiæ* investigate our dried fruits,—who has not been disgusted to find the fat maggot-looking larva of *Ephestia ficella* in the middle of a choice looking fig? whilst our ripe apples, plums, and other 'green' fruits, all have their lepidopterous tenants. Then turn to the leaf-rolling Tortrices; leaves rolled and spun together in every conceivable way, but each species adhering to its own method, generally having two orifices for exit, so that when a hungry bird puts in his beak at one end, to his astonishment he does not always swallow the larva; he would find it if he looked, but that does not occur to him—dropped one or two or even three or more yards below, hanging by a single and almost invisible thread, up which it climbs to its leaf again when danger is over. Or go on to the infinite variety of methods employed by the Tineæ; the species of *Psyche*, *Coleophora*, etc., entirely cover themselves with cases formed of grass, moss, dead leaves, etc., the case of every

species of different form and shape, and the larva only protruding the head and jaws for purposes of feeding. The various species of *Tinea* feed on our furs, hair cushions, wool, clothes, etc., the large group of *Elachista* nearly all mine the various species of grasses and rushes; *Lithocolletidæ* and *Nepticulæ* find their entire world often beneath the cuticle of a single leaf, the former genus making unsightly brown blotches on the leaves, the latter long tortuous mines; they are so minute too, that as the late Mr. Stainton said "a nut leaf containing from twenty to thirty larvæ of *Nepticula microtheriella* is no unusual sight."

But it is in the larvæ of the great group of the Geometræ that such intense interest has centred with so many of us of late years. With a very few exceptions the larvæ of the group feed quite exposed, consequently have to rely on their colour and attitude for protection against enemies. Hence they have, far more than those of any other group, provided evidences of mimicry; and the diversity of their ways, together with their perfect assimilation in appearance to their food plants is marvellous. Examine the larvæ of the extensive family of the *Eupitheciæ* or 'Pugs' as we familiarly call them. Exclusive in their habits, each species, speaking generally, confining itself to one plant, and then often to the flowers or seeds only, some of them having towards a dozen different varieties; and yet although we may know there are numbers of them feeding on a flower head, how very few we can see. Half a dozen varieties, totally different in colour, for the flower feeders are generally of several colours, though the pattern is usually the same, but all equally inconspicuous on the flower. Tap the plant sharply over a net or inverted umbrella, and they fall into it in numbers, and are then striking and conspicuous enough. On the flower head, the green forms were resting on the green under parts, the yellow with red or purple lozenge-shaped marks, among the fresh, bright, or partially withered flowers as the case may be; the varieties of different shades of brown among the unripe, or further advanced seeds, etc. This of course is in the daytime, when the larvæ are usually at rest and absolutely quiet; at night they might all be seen with the aid of a lamp, feeding on the flowers, and lively enough, but at that time there are no birds on the look-out for them, and they are comparatively out of danger. The pretty caterpillar of *Eupithecia nanata*, the 'Pug' we are so familiar with on our Yorkshire heaths, is a good example; it has two very distinct forms, the more numerous being bright pinkish-purple and white, exactly like the ling flowers on which it feeds; the other green and white, assimilating just as closely with the leaves. But the most striking example I know among the *Eupitheciæ* is in the case of the very local *Eupithecia extensaria*, which is only known in Britain as occurring on a small area on the Norfolk coast, near Hunstanton. It feeds on the *Artemisia*

maritima, a pale green plant, with stripes of a whitish powdering, and bearing pink flowers. In August, 1889, I beat out a considerable number of these larvæ, and the colour and marking were so exactly similar to the leaves and stems of the *Artemisia maritima* that it would probably have been almost impossible to have detected them by searching. But I found further, that a good number of the full grown larvæ, besides being of the colour of the plant, were very prettily marked with pink, precisely assimilating to the flowers of the *Artemisia*, which was also just getting well into bloom. A still more curious fact is to be related. From the moths reared from these larvæ I obtained two further generations, consisting of many hundreds of the larvæ, but of course in Huddersfield was unable to feed them on their natural food, except by sending to the coast for it, which I had done with the original lot of larvæ collected. Experimentally, *Artemisia vulgaris* and *A. abrotanum*, the latter the familiar 'Southernwood' of our gardens were tried, and although the former was almost refused, they took to the southernwood with relish, feeding up in every way satisfactorily. But what did I find? That the larvæ all assimilated at once in colour to the different tint of green which *A. abrotanum* possesses as compared with *A. maritima*; and still more extraordinary, that not the slightest trace of the pink ever appeared on a single larvæ, in complete harmony with the fact that southernwood does not flower in West Yorkshire. This experiment has been absolutely verified by everyone who has since tested it.

But perhaps it is the tree-feeding species which afford our finest illustrations. Who is there among us who has not at some time attempted to break off an apparently dead twig from a garden rose bush, and on grasping it with the fingers has as suddenly 'let go' on finding it the soft wriggling caterpillar of *Odontopera bidentata*? The resemblance was perfect, and so it is with scores of species. Professor Poulton and others have made numerous experiments with the larvæ of this group, and the more one experiments, the more fascinating the study becomes. One of Professor Poulton's first subjects consisted of larvæ of the common brimstone moth, *Rumia cratægata*, a familiar object, probably with everyone in this room, who has taken evening walks along hawthorn hedges in early summer. The caterpillars of this month precisely resemble in appearance the short gnarled twigs of the hawthorn, but they are of two distinct varieties in colour, one very dark, almost black, the other green. In common with nearly all the species which affect mimicry, these larvæ feed chiefly at night, when colour apparently is of no advantage, and Professor Poulton wished to find out why some should be green and others black. By constant and close observation he found that the dark larvæ almost invariably rested on the dark stems of the hawthorn, whilst the green larvæ were almost always to be found among

the young green twigs near the leaves. What he did not find out was how a black larva knew a black stem from a green one, and vice versâ as regards the green larvæ.

During the lecture in which Professor Poulton detailed the fact I have just noted, he gave the results obtained by feeding larvæ of the same brood, on a variety of foods having the leaves or the stems of the plants of different shades of colour, and also by keeping them in cages of different coloured glass, or wood painted in different colours, in pretty much the same way as Mr. Merrifield afterwards made experiments on pupæ, and with exactly the same results. Professor Poulton found that the larvæ strongly partook of the colour of the food and environment, and from the same batch of eggs he was able to produce, of course within limits, larvæ of almost any shade of colour he wished. Some species, as was to be expected, were much more sensitive than others, but probably even the least sensitive would in the course of two or three generations continued on the same colours, gradually give way to the influence. At the close of the lecture, I suggested to Professor Poulton that the larvæ of *Odontopera bidentata* would make an excellent subject for further experiments, as I had noticed the great diversity of colour in larvæ of this species, when at large, in accordance with the paler or darker appearance of the food they happened to be feeding upon; and at his request I subsequently sent him some batches of eggs of the species. He told me afterwards that, just as I had anticipated, the results were among the most remarkable he had yet had.

A striking instance of protective mimicry in this group is afforded by the fine larva of *Boarmia roboraria*. Several years ago I had a brood hibernating, and which on being shewn to a friend, he was quite unable to distinguish from the oak twigs about which they were resting, so perfect an imitation were they. Every excrescence on the twig, the bud at the top being exactly counterfeited by the swollen head, together with an exact similarity in colour, were apparent. The species is in fact about the most perfect example of mimetic resemblance I know among larvæ, and its necessity for the preservation of the species is obvious. It belongs to the group which hibernate as larvæ, and spends all the winter motionless and perfectly exposed on a leafless oak, a twig being grasped by the claspers, and the body stretched out sideways, imitating in every detail a short side shoot, and consequently safe probably even from the sharp eyes of a greedy tom-tit. Other illustrations will at once occur to everyone familiar with the subject. Larvæ of the 'Pepper moth,' *Amphydasis betularia*, a general tree feeder, are green, grey, brown or black, just in accordance with the tree on which they are feeding, wonderfully like the twigs of whatever tree they favour, even the tips being deceptively reproduced in the deeply notched head. A similar case occurs in the long tapering

birch-twigg-like larvæ of *Ennomos autumnaria*, and indeed in the larvæ of all the species of *Ennomos* and the allied genus *Selenia*, with many others. And how marvellously too do the green larvæ of *Pseudoterpna cytisaria* resemble the shoots of broom ; and young *Geometra papilionaria*, the brown catkins of birch ; those of *Fidonia piniaria* and *Theru variata* the 'needles' of pines ; *Cleora glabraria*, *C. lichenaria*, and *Boletobia fuliginaria*, the respective lichens to which they are attached ; and so on. But the larvæ of two of our most beautiful 'Green Emerald Moths,' *Phorodesma bajularia* and *P. smaragdaria*, contrive their mimicry in an altogether different fashion. Their natural colours are not conducive to their continuity as species, and so their first performance immediately on quitting the egg, even before feeding, is to secure protection by *dressing* themselves. *P. bajularia* at once cuts out pieces of oak leaf, and fastens them one by one all over its body, whilst *P. smaragdaria* does precisely the same thing with the leaves of its food plant, *Artemisia maritima*, until they are quite covered. When the process is completed, they are of course exactly the colours of their food in a fresh state, but even as their dresses gradually become discoloured and finally brown, through the withering of the fragments of leaf, they just as strongly resemble the dead and dying leaves, of which there are always plenty in the same stages of decay, on the trees and plants. For many years the larva of *P. smaragdaria* completely baffled the close search of lepidopterists, until Mr. Elisha at length discovered it through the moving of a bit of apparently dead *Artemisia* he had beaten into his umbrella. Time will not permit of my continuing this subject further, but enough has been said to shew the lines on which this single branch of a wide subject is being now pursued. And we know that our botanists and the other scientists have made equally wide and advanced strides in their researches and methods of work.

A few words on Field Meetings may not be out of place. Our Union is essentially a field meeting association, and indeed almost all the work it does collectively is in this way. During the past 25 years we have explored nearly every part of our county, though it must be confessed in many cases not very thoroughly. Sometimes the weather has been dead against outside scientific investigation, as those of us, for instance, who attended the Arkengarthdale excursion in August last well remember. No doubt this uncontrollable element is a considerable drawback, for it is not pleasant after we have made all arrangements for an enjoyable and successful expedition, and have perhaps already reached our ground, to have all operations stopped by a deluge of rain, as was the experience in the one to which I have alluded ; for even if it clears up shortly afterwards, everything is often so completely soaked, that it requires an exceptionally ardent naturalist to thoroughly enjoy his or her collecting and investigation among

it. The weather we have to risk, and when the elements are propitious, and with us they have been much more often so than not, what can be more enjoyable than joining a party of *real* naturalists bent on unravelling the marvellous wonders contained in the woodlands, heaths, commons, ponds, streams, etc., around them? It will be noted that my allusion is to *real* naturalists, and that because I have in my mind, what I fear too often constitute the majority of our field meeting parties—those who make the excursions so far as they are concerned, merely pleasurable jauntings and cheerful picnics in the country. Do not suppose that I wish in the least to do away with pleasure and cheerfulness from our out-door gatherings, but I do think we ought to combine those good qualities with a share of real observation and interpretation of the works of Nature: and that as naturalists we should go into the fields and woods under another character than that of mere excursionists. One great value of field meetings is, I think, the much better opportunities they afford for friendly intercourse among members, than is afforded by an ordinary indoor meeting; the restraint of the meeting room being thrown off, there is a freedom in the open country which inspires in us fresh energy and interest in the objects around us. Who can measure the friendships thus engendered? But here I must say that I do not think that our members attend the excursions in anything like the numbers they might and ought. Our secretaries will tell you that they have on the books 2637 names of members and associates, and yet out of that number it is rarely we get an attendance of 100. Many of our members, probably the majority, are working men, and I know of course that the expense of getting to districts so remote as where many of the meetings are held, together with the incidental expenses entailed through the necessary refreshments, etc., form a serious obstacle to some: but the advantages of getting on new grounds, where the fauna and flora are often so totally different to what we are accustomed in our own districts, together with the facilities for making those friendships I have already alluded to with fellow workers in other districts, often much better informed than we, in our own particular branches of study, and whom we should otherwise probably never have met; these advantages I say, seem to me so valuable, I wonder that not more of our members avail themselves of them, especially now that our railway companies afford us in reduced fares such facilities for doing it. I can truly say that some of my own closest friendships have been made through these meetings, and the mutual benefit arising out of them has been incalculable. Another result of these field meetings is the breaking down of class distinctions among its members. As the only Union of the kind in our large county, it naturally includes members of every position in the social scale, and I venture to say that each rank is distinctly the better

for it. In our field meetings everyone meets on equal footing, and in the mutual intercourse between class and class, it is inevitable that each will find out the good qualities of the other, and admiration of, and respect for these, completely oust in the one, those paltry and contemptible notions of superior caste so largely prevailing in society now-a-days; and in the other those prejudices through which, often not without reason, they have been accustomed to regard them.

As I stated at the commencement of this address, our field excursions were instituted with the object of working out the fauna and flora of our county; and that its object has already to a considerable extent been fulfilled, anyone looking through the Union's Transactions, and especially through its separate county lists, will at once acquiesce. Mr. F. Arnold Lees' 'Flora of West Yorkshire' is a monument of painstaking research and compilation. And the same may be said of Mr. J. G. Baker's 'North Yorkshire'; of Mr. W. Eagle Clarke's 'Birds of Yorkshire'; Messrs. Clarke and Roebuck's 'Yorkshire Vertebrata' and others. We have published my own lists of 'Yorkshire Lepidoptera' and 'Yorkshire Neuroptera and Trichoptera'; Messrs. J. W. Taylor and W. Nelson's 'List of Yorkshire Mollusca'; Mr. Robt. Kidston's 'Yorkshire Carboniferous Flora'; Mr. W. West's 'Alga-Flora of Yorkshire'; whilst the Lists of 'Yorkshire Coleoptera' and other similar lists are in course of publication. I believe that all these lists are as accurate as it was possible to make them, and may be consulted with the greatest confidence.

I have drawn on your patience long enough, and can only just allude to the advance in our knowledge made through our numerous committees of research. These committees work more individually than through our field meetings, and with perhaps greater beneficial results. One need only turn to the pages of our 'Transactions,' and to our journal 'The Naturalist,' to note what energy especially the 'Boulder Committee' and the 'Mycological Committee' have thrown into their work; and it is not too much to hope that our 'Wild Birds and Eggs Protection Acts Committee' has, through its influence with County Councils, etc., done a good deal towards the preservation of many of our charming feathered residents and visitors. With this record of work done, I feel I am thoroughly justified in appealing to you assembled here to-night for more members and more subscriptions, with which to still further carry on this scientific investigation. Like every society doing real work, we want adequate funds, and Mr. Roebuck, as editor of our Transactions, will tell you that he has even now an abundance of valuable contributions to our fauna and flora in manuscript, which is only waiting for the means with which to pay the printer to ensure its publication and dispersion among the members. Many of you may have no special inclination or aptitude for hard scientific investiga-

tion, but your presence here proves you to be in thorough sympathy with those who are willing to do it, and we ask you to help us by becoming subscribing members.

It now only remains for me to thank all the members for the courtesy and forbearance I have received at their hands during my year of office, and to express my gratification and pleasure, that in the opening year of the new century, the chair will again be occupied by the gentleman who was the Union's President nearly 25 years ago, and who during the whole of the intervening years has been one of the most active and most esteemed of its members.

LIST OF MEMBERS,

Arranged Geographically.

CORRECTED TO 15TH OCTOBER 1900.

The Members whose names are printed in heavy type are those of **Permanent Members of the General Committee**. The Dates preceding names are those of election; Original Members, being those elected previous to 1883, are marked —; those to whom **L.** is prefixed are Life Members, by virtue of a donation of not less than seven guineas; and those to whom **H.L.** is prefixed are Honorary Life Members, or Ex-Presidents of the Union.

Members changing their addresses are requested to inform the Secretary as soon as possible.

BARKSTON ASH DIVISION.

Pop. 48,470.

- **L. Cheesman, William Norwood**, The Crescent, Selby.
- ... **Emmet, John**, F.L.S., The Poplars, Boston Spa, R.S.O.
- 1887 ... Emmet, Mrs., The Poplars, Boston Spa, R.S.O.
- ... **Jackson, John**, M.P.S., High Street, Wetherby.
- ... **Nelson, William**, M.C.S., Prospect View, Crossgates, Leeds.

BARNSELY DIVISION.

Pop. 78,844.

- 1897 ... Barraclough, William, Victoria Street, Barnsley.
- 1889 ... **Bayford, Edwin G.**, 2, Rockingham Street, Barnsley.
- 1884 ... **Brady, William E.**, 4, Gawber Road, Barnsley.
- 1891 ... Hutchinson, Charles H., 37, Hopwood Street, Barnsley.
- 1889 ... **Johnson, Henry**, 62, Huddersfield Road, Barnsley.
- 1892 ... **Thirkell, Edward Walter**, Hunningley Cottage, Stairfoot, Barnsley.
- 1897 ... Tomlinson, John, York Terrace, Stairfoot, Barnsley.
- 1889 ... **Turner, Benjamin**, 10, Pitt Street, Barnsley.

BEVERLEY BOROUGH.

Pop. 11,425.

- ... **Boyes, Frederick**, Yorkshire Banking Company, Beverley.
- ... Davison, George, Garden House, Keldgate, Beverley.
- ... **Dobrée, N. F.**, F.E.S., The New Walk, Beverley.
- 1899 ... Lowther, J. R. A., Crane Hill, Beverley.
- 1890 ... **Marshall, J. J.**, North Bar Street, Beverley.
- 1892 ... Morley, Thomas John, Toll Gavel, Beverley.
- ... **Ridgway, J. Ambrose**, F.R.A.S., Beverley.

BRADFORD CITY.

Pop. 216,361.

- 1900 ... Benney, A. E., 3, Ambler Street, Manningham, Bradford.
- 1894 ... Bradford Free Library and Art Museum, Butler Wood, Librarian.
- ... **Carter, John William**, 25, Glenholme Road, Whetley Lane, Bradford.
- 1884 ... Clayton, John, Boxtree House, Thornton Road, Bradford.
- 1890 ... Dickons, J. Norton, 12, Oak Villas, Manningham, Bradford.
- 1893 ... **Hawkesworth, Leonard**, The Poplars, Bolton, Bradford.
- 1884 ... **Lund, Percy**, 43, Athol Road, Bradford

- 1889 ... Naylor, E., Heather Bank, Hazelhurst Road, Bradford.
 — ... Nuttall, William, Moorside, Eccleshill, Bradford.
 — ... Powell, Sir Francis Sharp, Bart., M.P., Horton Old Hall, Bradford.
 — ... **West, William**, F.L.S., 26, Woodville Terrace, Horton Lane,
 Bradford (Ex-President).

BUCKROSE DIVISION.

Pop. 50,877.

- 1895 ... **Bailey, Matthew**, Flamborough, viâ Hull.
 1890 ... Bell, James Lumsden, M.B., White Hall, Driffield.
 — ... **Butterell, Joseph Darker**, M.C.S., Manor House, Wansford, Hull.
 — ... **Cole, Rev. Edward Maule**, M.A., Vicarage, Wetwang-on-the-Wolds,
 viâ York.
 1889 ... Davison, Richard, Beverley Road, Driffield.
 1889 ... Fountain, Joshua, Ship Inn, Filey.
 1890 L. Hawkesbury, Right Hon. Lord, Kirkham Abbey, York.
 1895 ... Lloyd-Greame, Yarburgh George, J.P., D.L., Sewerby House, Hull.
 1889 ... **Mortimer, J. R.**, Driffield.
 1890 ... St. Quintin, Wm. Herbert, J.P., D.L., Scampston Hall, Rillington,
 York.
 — ... **Tindall, Edward**, Knapton Hall, Rillington, York.
 1889 ... Wood, Richard, M.D., Beverley Street, Driffield.

CLEVELAND DIVISION.

Pop. 55,882.

- ... **Birks, Thomas**, Southdene, Eaglescliffe Junction, Yarm-on-Tees.
 1891 ... **Burton, J. J.**, Hambleton House, Nunthorpe, R.S.O., York.
 1887 ... Emerson, E. B., B.A., J.P., Tollesby Hall, Marton, R.S.O.
 1890 ... **Hawell, Rev. John**, M.A., Vicarage, Ingleby Greenhow, Middlesbro'.
 1897 ... Lawrenson, William, The Nursery, Eaglescliffe, Yarm-on-Tees.
 1888 ... **Macpherson, Angus**, 16, Teresa Terrace, Coatham, Redcar.
 1887 ... Meek, J. M., M.A., 6, Nelson Terrace, Coatham, Redcar.
 1887 ... **Nelson, Thomas H.**, M.B.O.U., The Cliffe, Redcar.
 1883 ... **Smith, Rev. Henry**, M.A., Clarendon House, Redcar.
Desires notes and lists for use in continuing Mr. Clarke's 'Birds of Yorkshire.'

COLNE VALLEY DIVISION.

Pop. 59,344.

- 1890 L. Hirst, Ben, J.P., Tamewater, Dobcross, near Oldham.
 — L. **Porrirt, George T.**, F.L.S., F.E.S., Crosland Hall, near Huddersfield
 (President).
 1897 ... Tunstall, Wilmot, F.E.S., Brook House, Meltham, Huddersfield.

DARLINGTON BOROUGH.

Pop. 35,100.

- 1898 ... Summerson, Samuel J., West House, Darlington.

DEWSBURY BOROUGH.

Pop. 72,986.

- 1887 ... Crawshaw, C. B., J.P., Rufford Lodge, Oxford Road, Dewsbury.
 1894 ... Hemingway, Wilson, Anroyd Villa, Dewsbury.
 — ... **Lee, Phineas Fox**, West Park Villas, Dewsbury.
 1891 ... Marriott, Arthur S., Ashlyn, Dewsbury.

DONCASTER DIVISION.

Pop. 73,032.

- 1890 ... **Corbett, Herbert H.**, M.R.C.S., 9, Priory Place, Doncaster.
 1898 ... Darley, Rev. Bertram, Harthill Rectory, Sheffield.
 1897 ... Duff, Francis, 17, Thorne Road, Doncaster.
 1898 ... Eden, Hon. Agnes, Armthorpe, Doncaster.

LIST OF MEMBERS.

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- 1897 ... Parkin, Leonard Maurice, B.A., Axholme, Doncaster.
 1883 ... Paterson, A., 41, Cemetery Road, Doncaster.
 1890 ... Roberts, Walter, Ivy Bank, Avenue Road, Doncaster.
 1899 ... Skipwith, Mrs. S. F., Loversall Hall, Doncaster.
 1884 ... Stiles, M. H., F.R.M.S., 2, Frenchgate, Doncaster.
 — ... Winter, George, F.R.M.S., 14, Baxtergate, Doncaster.

ELLAND DIVISION.

Pop. 64,632.

- 1896 ... Crowther, John E., Portland Street, Elland.
 1888 ... Law, Robert, F.G.S., Fenny Royd Hall, Hipperholme, Halifax.

HALIFAX BOROUGH.

Pop. 82,863.

- 1895 ... Bairstow, Uriah, 48, Heath Crescent, Halifax.
 1887 ... Brooke, Ven. Archdeacon J. Ingham, M.A., The Vicarage, Halifax.
 1898 ... Carter, Walter L., Summergate, Parkinson Lane, Halifax.
 1887 ... Cash, William, F.G.S.; 26, Mayfield Terrace, Halifax.
 1896 ... Crabtree, Arthur, F.L.S., Merlewood, Halifax.
 1887 ... Crossland, Charles, F.L.S., 4, Coleridge Street, Halifax.
 1894 ... Crump, W. B., M.A., 90, King Cross Street, Halifax.
 1891 ... Howarth, James Henry, F.G.S., Stoneygate, Savile Park, Halifax.
 1897 ... McCrea, Arthur Selby, Warley House, Halifax.
 1899 ... Moss, C. E., B.Sc., 23, Queen's Road, Halifax.
 1891 ... Shillito, John, J.P., 17, Cavendish Terrace, Halifax.
 1894 ... Simpson, William, F.G.S., The Gables, Halifax.
 1890 ... Sutcliffe, J. Williams, The Hollies, Greenroyd, Halifax.
 1890 ... Whitaker, J. Ackroyd, Craven Lodge, Halifax.
 1889 ... Whiteley, Frederick L., 10, Corn Market, Halifax.
 1891 ... Whitley, J. H., M.P., B.A., Brantwood, Halifax.

HALLAMSHIRE DIVISION.

Pop. 73,249.

- 1895 ... Payne, Richard, Newhill Hall, West Melton, Rotherham.
 1894 ... Young, J. J. Baldwin, M.A., M.B.O.U., Richmond Park, near Sheffield.

HARROGATE BOROUGH.

Pop. 13,917.

- 1883 ... Backhouse, James, F.L.S., F.Z.S., M.B.O.U., Daleside, Harrogate.
 1888 ... Barnes, Richard, Franklin Road, Harrogate.
 1887 ... Farrah, John, F.L.S., Jefferies' Coate, York Road, Harrogate.
 1887 ... Fortune, Riley, F.Z.S., 16, Mount Parade, Harrogate.
 1898 ... Gaddes, Thomas, M.D., L.D.S., 104, Station Parade, Harrogate.
 1897 ... Haslam, William John, Sans Souci, Duchy Road, Harrogate.
 1889 ... Lambert, Abram, 25, Great George Street, West End Park, Harrogate.
 1891 ... Laycock, Thomas, jun., Deepdene, Franklin Road, Harrogate.
 1889 ... Lofthouse, J. H., Lyell House, Dragon Parade, Harrogate.
 1891 ... McLean, Kenneth, Pennine View, Harrogate.
 1891 ... Millward, Adam, Cambridge Crescent, Harrogate.
 1886 ... Naughton, John, Ellesmere School, Park View, Harrogate.
 1898 ... Petty, William Edward, Cottingham, Harrogate.
 1900 ... Pincham, George, 9, Stonefall Terrace, Starbeck, Harrogate.
 1883 ... Sayner, John, Woodside, 6, Lancaster Road, Harrogate.
 1894 ... Scharff, W. E., M.C.S., The Red House, Duchy Road, Harrogate.
 1898 ... Thomson, George, 21, Beulah Street, Harrogate.
 1893 ... Waldby, Joseph Robert, 31, Grove Road, Harrogate.

HOLDERNESS DIVISION.

Pop. 41,298.

- 1894 ... Haworth-Booth, Lieut.-Col. B. B., J.P., D.L., Hullbank Hall, Hull.
 — ... **Loten, Philip W.**, Easington, Hull.
 1891 ... **Maddock, Rev. Henry E.**, M.A., Patrington Rectory, Hull.
 1888 ... Oldroyd, Charles, Lund, near Beverley.
 1893 ... **Petch, Tom**, B.A., Hedon, Hull.
 1890 ... Scott, Frederick A., Sutton, near Hull.

HOLMFIRTH DIVISION.

Pop. 65,159.

- 1900 ... Broadhead, C. H., Wooldale, Thongsbridge, Huddersfield.
 1894 ... Clayton, John, Lidgett House, Wharneliffe, Silkstone, Barnsley.
 — ... Waite, William, Cliff Cottage, Clayton West, Huddersfield.

HOWDENSHERE DIVISION.

Pop. 49,327.

- 1894 ... **Ash, Rev. Cyril D.**, B.A., Skipwith Vicarage, Selby.
 1896 ... Ash, Mrs. C. D., Skipwith Vicarage, Selby.
 1896 ... Banks, Ernest, Saltmarshe Cottage, Saltmarshe, Howden.
 — ... Herries, The Right Hon. Lord, Lord-Lieutenant of the East Riding, Everingham Park, York.
 — ... Proudlock, John, The Nurseries, Market Weighton, R.S.O.
 1886 ... **Stears, John**, Westholme, Hessle, Yorkshire.
 — ... Whitaker, T. Stephen, F.R.G.S., Everthorpe, Brough.

HUDDERSFIELD BOROUGH.

Pop. 96,495.

- 1885 ... Brooke, John Arthur, J.P., Fenay Hall, Huddersfield.
 1899 ... Brooke, Miss Blanche, Fenay Hall, Huddersfield.
 1892 ... **Clarke, Alfred**, 9, St. Andrew's Road, Huddersfield.
 1900 ... Lees, Tom, L.D.S.Engl., 1, Wood Street, Longwood, Huddersfield.
 1893 ... **L. Mills, F. W.**, F.R.M.S., Thornleigh, Huddersfield.
 1900 ... Moore, H. H., 8, Wood Street, Longwood, Huddersfield.
 1895 ... Sykes, A. W., Bronola House, Fisher Street, Huddersfield.
 1894 ... Wilkinson, Johnson, M.B.O.U., Vermont, Huddersfield.
 1890 ... **Woodhead, Thomas William**, F.L.S., Arnold Street, Birkby, Huddersfield.

KEIGHLEY DIVISION.

Pop. 63,272.

- ... Brigg, John, M.P., F.G.S., Kildwick Hall, Keighley.
 — ... **Butterfield, E. P. P.**, Wilsden, Bradford.

KINGSTON-UPON-HULL BOROUGH.

Pop. 200,044.

- 1897 ... **Audas, Thomas**, L.D.S., 46, Anlaby Road, Hull.
 1892 ... **Baker, Walter Francis**, F.E.S., Neptune Street, Hull.
 1895 ... Carlton, John, 48, Albany Street, Hull.
 1883 ... Dawson, Percival W., 101, Westbourne Avenue, Hull.
 1894 ... Dennis, Thomas, 21, Peel Street, Hull.
 1892 ... **Fierke, Frederick Wm.**, M.C.S., 73, Redbourne Street, Hull.
 1895 ... Hollingworth, John, M.R.C.S., 2, Hornsea Parade, Holderness Road, Hull.
 1890 ... Jackson, Andrew Marvell, Victoria Chambers, Hull.
 1892 ... **Robinson, James Frazer**, 22, Harley Street, Hull.
 1897 ... Saner, Charles Otto Farmer, 2, Elgin Villas, Anlaby Road, Hull.

- 1897 ... **Sheppard, Thomas**, F.G.S., 432, Holderness Road, Hull.
 1891 ... **Stather, John W.**, F.G.S., 16, Louis Street, Hull.
 1898 ... **Sykes, William**, 52, Park Grove, Hull.
 1892 ... **Waller, Michael**, 105, Westbourne Avenue, Hull.
 1884 ... **Walton, F. Fielder**, M.R.C.S., F.G.S., 10, Charlotte Street, Hull.
 1891 ... **Waterfall, Charles**, 10, De Grey Street, Beverley Road, Hull.

LEEDS CITY.

Pop. 387,505.

- 1886 ... **Addyman, James W.**, B.A. Lond., 15, East Parade, Leeds.
 1892 ... **Asquith, William E.**, 23, Cardigan Road, Headingley, Leeds.
 1897 ... **Barley, D. H.**, Grove House, Burmantofts, Leeds.
 — ... **Barran, Sir John, Bart.**, Chapel-Allerton Hall, Leeds.
 — ... **Bedford, James**, Sycamore Lodge, Woodhouse, Leeds.
 — ... **Bedford, Jas. E.**, F.G.S., Arncliffe, Shireoak Road, Headingley, Leeds.
 1891 ... **Bell, Rev. John**, 50, Bankside Street, Roundhay Road, Leeds.
 1885 ... **Bingley, Godfrey**, Thorniehurst, Shaw Lane, Headingley, Leeds.
 — ... **Birchall, Edward**, 18, Moorland Road, Leeds.
 1897 ... **Bond, J. W.**, Torre Road, Burmantofts, Leeds.
 — ... **Bould, Charles Henry**, 5, Wrangthorne Place, Hyde Park, Leeds.
 1900 ... **Bradley, A. E.**, 26, Hillcrest Avenue, Spencer Place, Leeds.
 1885 ... **Branson, Frederick W.**, F.I.C., F.C.S., Wynneholme, Far Headingley, Leeds.
 1897 ... **Butler, A. Edmund**, Kepstorn, Kirkstall, Leeds.
 1896 ... **Foster, George**, Mining Engineer, Bleak House, Harehills, Leeds.
 1891 ... **Hawkesworth, Edwin**, 11, Nursery Mount, Woodhouse Hill, Hunslet, Leeds.
 — **L. Holgate, Benj.**, F.G.S., The Briers, North Park Avenue, Roundhay, Leeds.
 1892 ... **Kendall, Percy F.**, F.G.S., Lecturer on Geology at the Yorkshire College; 5, Woodland Terrace, Stainbeck Lane, Leeds.
 1890 **L. Kitson, Sir James, Bart.**, M.P., Gledhow Hall, Leeds.
 — ... **Lupton, Henry**, F.E.S., Lyndhurst, North Grange Road, Headingley.
 — ... **Miall, Louis C.**, F.R.S., F.L.S., F.G.S., Professor of Biology in the Yorkshire College; 8, Spring Road, Headingley, Leeds.
 1899 ... **Ostheide, H.**, Frankland House, Leopold Street, Leeds.
 1890 **L. Oxley, Henry**, Spensfield, Weetwood, Leeds.
 1891 **L. Pawson, Albert Henry**, J.P., F.L.S., F.G.S., Lawns House, Farnley, Leeds.
 1891 **L. Pawson, Mrs. A. H.**, Lawns House, Farnley, Leeds.
 1893 ... **Parkinson, Stephen**, 59, Leopold Street, Leeds.
 — ... **Pocklington, Henry**, F.R.M.S., 41, Virginia Road, Leeds.
 1887 ... **Powys, Rev. H. Annesley**, M.A., Meanwood Vicarage, Leeds.
 1897 ... **Robson, A. W. Mayo**, F.R.C.S., 7, Park Square, Leeds.
 — ... **Roebuck, William Denison**, F.L.S., 259, Hyde Park Road, Leeds.
 — ... *Is collecting material for a future account of Yorkshire Mammalia.*
 — ... **Rowley, Walter**, M.I.C.E., F.G.S., etc., Alder Hill, Meanwood, Leeds.
 1900 ... **Studd, E. A. C.**, 19, Granby Grove, Headingley, Leeds.
 1900 ... **Taylor, T. H.**, M.A., The Yorkshire College, Leeds.
 — ... **Teasdale, Washington**, F.R.A.S., F.R.M.S., 255, Hyde Park Road, Leeds.
 — ... **Tetley, Charles F.**, J.P., Spring Bank, Headingley, Leeds.
 — ... **Thrippleton, John**, Burley View, Burley, Leeds.
 1898 ... **Waddington, John**, 38, Leicester Grove, Blackman Lane, Leeds.
 — ... *Collects British Dragonflies, etc.*
 1894 ... **Wager, Harold**, F.L.S., Bank View, Chapel-Allerton, Leeds.
 — ... **Ward, Geo.**, F.I.C., F.C.S., 1, Buckingham Terrace, Hyde Park, Leeds.
 1899 ... **White, Alfred**, F.Z.S., Derwentdale, Oakwood Avenue, Roundhay, Leeds.
 1896 ... **Wilson, Henry B.**, Westfield, Armley, Leeds.
 1896 ... **Wurtzburg, John H.**, J.P., F.R.Hist.S., 2, De Grey Road, Leeds.
 — ... **Yewdall, Edwin**, 58, Wade Lane, Leeds.

MALTON TOWN.

Pop. 8,754.

- ... Hodgson, William, Wheelgate, Malton.
 1896 ... **Jenkinson, Rev. S.**, Prospect Villa, Norton, Malton.
 1889 ... Longster, Thomas Piper, Mowbray Terrace, Malton.
 1897 ... Oldfield, George, St. Nicholas Street, Norton, Malton.
 — ... Pearson, Hugh W., Castle Howard Road, Malton.
 — ... **Slater, Matthew B.**, F.L.S., 84, West Grove Villas, Newbiggin,
 Malton.
 1889 ... Suddaby, W. M., Crown Hotel, Wheelgate, Malton.

MIDDLESBROUGH BOROUGH.

Pop. 98,982.

- 1898 ... Clayton, Robert George, 67, Douglas Terrace, Borough Road,
 Middlesbrough.
 1898 ... Hinton, Alderman Amos, Hilda House, Middlesbrough.
 1899 ... Jones, J. Archyll, B.Sc., F.G.S., 27, Southfield Road, Middlesbrough.
 1899 ... **Lofthouse, Thomas Ashton**, A.R.I.B.A., The Croft, Linthorpe,
 Middlesbrough.
 1898 ... Punch, J. W. R., Hastoe House, Southfield Road, Middlesbrough.
 1890 ... Thomas, W. H., 7, Ryedale Terrace, Borough Road, Middlesbrough.
 1890 ... **Veitch, W. Y.**, L.R.C.P., L.R.C.S., The Crescent, Middlesbrough.
 1887 ... **Ward, Thomas F.**, Park Road South, Middlesbrough.

MORLEY DIVISION.

Pop. 65,216.

- 1890 ... **Carter, Rev. W. Lower**, M.A., F.G.S. The Manse, Hopton, Mirfield,
 Normanton.

NORMANTON DIVISION.

Pop. 72,012.

- 1894 ... Burton, John, Woodbine Villa, Normanton.

OSGOLDCROSS DIVISION.

Pop. 66,794.

- ... **Bunker, Thomas**, 9, East Parade, Goole.
 1897 ... Jackson, Walter, 36, Vermuyden Terrace, Goole.
 1893 ... **Leatham, Claude**, The Red House, Wentbridge, Pontefract.
 1898 ... Leatham, Claude Guy, The Red House, Wentbridge, Pontefract.
 1895 ... Neale, Joseph, B.A., Garden Villa, Ackworth, Pontefract.
 — ... Pease, W., Elm Cottage, Hook, near Howden.

OTLEY DIVISION.

Pop. 61,746.

- 1898 ... **Chorley, Mrs. Harry**, F.E.S., Moorville Cottage, Burley-in-Wharfe-
 dale.
 — ... **Hobkirk, Charles P.**, F.L.S., 9, Parish Ghyll Road, Ilkley (Ex-
 President).
 1899 ... Savery, George B., Park House, Pool, Leeds.
 1885 ... **Speight, Harry**, Highfield Villas, Crownest Road, Bingley.
 1897 ... Teal, Joseph, Grange Terrace, Yeadon.
 1897 ... Whitham, Thomas, Bramhope, Leeds.
 — ... **Wilson, John E.**, Yew Bank House, Ilkley.

PICKERING TOWN.

Pop. 4,019.

- 1895 ... Ashton, James T., M.B., Kingthorpe House, Pickering.
 1896 ... Ashton, Mrs. J. T., Kingthorpe House, Pickering.
 — ... **Braim, John**, Hungate, Pickering.

- 1895 ... **Comber, Charles Thomas Thornton**, L.R.C.P., M.R.C.S., Pickering.
 1899 ... **Kirk, John Lamplugh**, B.A., The Laurels, Pickering.
 1889 ... **Lucy, Charles T.**, York Union Bank, Pickering.
 1895 ... **Mitchelson, Major J. M.**, The Hall, Pickering.
 1889 ... **Mitchelson, Thomas**, The Mount, Pickering.
 1884 ... **Prodhams, Herbert**, Allerston, near Pickering.

PONTEFRAC T BORO UGH.

Pop. 16,407.

PUDSEY DIVISION.

Pop. 49,252.

- 1883 ... **Gaunt, Leonard**, Hazelbrae, Farsley, Leeds.
 1886 ... **Gaunt, Mrs. L.**, Hazelbrae, Farsley, Leeds.
 — ... **Taylor, John W.**, F.L.S., M.C.S., etc., North Grange, Horsforth, Leeds.

RICHMOND DIVISION.

Pop. 54,439.

- 1891 L. **Carpenter, Hon. Mrs. [Beatrice]**, Kiplin, Northallerton.
 — ... **Carter, James**, M.B.O.U., Burton House, Masham, R.S.O.
 1886 ... **Chaytor, R. C.**, M.C.S., Scrafton Lodge, Middleham, R.S.O.
 1897 ... **Hartshorn, John**, Leyburn, R.S.O.
 1898 ... **Herdman, William**, F.G.S., Lanehead Villa, Middleton-in-Teesdale, Darlington.
 1884 ... **Horne, William**, F.G.S., Market Place, Leyburn, R.S.O.
 1885 ... **Huddart, Rev. G. A. W.**, M.A., LL.D., Kirklington Rectory, Bedale.
 1898 ... **Lee, John**, Hude Gate, Middleton-in-Teesdale, Darlington.
 1894 ... **Punshon, Mrs. R. M.**, Ingleby Manor, Northallerton.
 1884 ... **Taylor, Rev. Richard** Vickerman, B.A., Melbecks Vicarage, viâ Richmond, Yorkshire.

RIPON DIVISION.

Pop. 54,925.

- 1886 ... **Clarkson, W. C.**, L.R.C.P., etc., Darley, Ripley, Leeds.
 1894 ... **Garrod, Rev. George** Watts, B.A., 11, Crescent Parade, Ripon.
 1891 ... **Heslington, Thos. Clarke**, 44, North Road, Ripon.
 1883 ... **Hurst, Joseph S.**, J.P., Copt Hewick Hall, Ripon.
 — ... **Ingleby, James**, Eavestone, near Ripon.
 1883 ... **Paver-Crow, Richard**, J.P., Ornham's Hall, Boroughbridge, York.
 1885 ... **Radcliffe, Sir J. Percival**, Bart., F.R.A.S., Rudding Park, Knaresborough.
 — ... **Ripon, The Most Hon. the Marquis of**, K.G., F.R.S., etc., Studley Royal, Ripon.
 1900 ... **Rudd, H. Bulmer**, 29, Westgate, Ripon.
 1888 ... **St. Paul, Major** Horace, J.P., The Willows, Ripon.
 1899 ... **Strother, T. W.**, F.Z.S., Westfield, Killinghall, Leeds.
 — ... **Summerfield, Rev. R. A.**, B.A., North Stainley Vicarage, near Ripon.
 1884 ... **Travis, Rev. William** Travis, M.A., The Rectory, Ripley, Leeds.
 1893 ... **Warwick, John** Walton, Bilton View, Knaresborough.

ROTHERHAM DIVISION.

Pop. 78,597.

- 1884 ... **Bennett, Samuel H.**, Mountenoy Road, Rotherham.
 1897 ... **Duffy, Ernest E.**, L.S.A., Victoria Terrace, Masborough, Rotherham.
 1896 ... **Howitt, John**, 12, Whiston Grove, Rotherham.
 1896 ... **Moore, Harry**, F.R.M.S., Curator of Rotherham Museum; 12, Whiston Grove, Rotherham.

SALTBURN-BY-THE-SEA.

Pop. 2,384.

- 1890 ... Hallimond, Henry T., 3, Lune Street, Saltburn-by-the-Sea.
 1885 ... Irvin, Rev. Benjamin, M.A., The Vicarage, Saltburn-by-the-Sea.
 1890 ... **Thompson, M. Lawson**, 35, Leven Street, Saltburn-by-the-Sea.

SCARBOROUGH BOROUGH.

Pop. 33,776.

- 1893 ... **Barker, Reginald H.**, Grosvenor Bank, Scarborough.
 1892 L. Clarke, William James, 44, Huntriss Row, Scarborough.
 1892 ... Hudson, George, M.D., Westbourne House, Scarborough.
 1889 ... Rowntree, Allan, Broom Lodge, Scarborough.
 — L. **Rowntree, James Henry**, Westwood, Scarborough.
 1892 ... Rowntree, William, J.P., Westwood, Scarborough.
 1884 ... **Sawdon, Fred. John**, M.D., 70, North Marine Road, Scarborough.
 1899 ... Turnbull, Sydney P., 8, Glanville Square, Scarborough.

SHEFFIELD CITY.

Pop. 324,243.

- 1884 ... **Brittain, Ald. Frederick**, Melbourne Avenue, Sheffield.
 1892 ... Brittain, Ald. W. H., J.P., Storth Oaks, Ranmoor, Sheffield.
 1893 ... **Coombe, John Newton**, Brocas Bank, Sheffield.
 1885 ... **Denny, Alfred**, F.L.S., Professor of Biology in the Firth College ;
 9, Summerfield, Broomhill, Sheffield.
 1900 ... Doncaster, Edwin D., 2, Severn Road, Sheffield.
 1898 ... **Gibbs, Thomas**, 43, St. Ronan's Road, Sheffield.
 1889 L. **Hall, Albert Ernest**, F.E.S., Norbury, Pitsmoor, Sheffield.
 1889 ... **Howarth, Elijah**, F.R.A.S., Curator of Sheffield Public Museum,
 Weston Park ; Hilbre Nest, Crookesmoor Road, Sheffield.
 1900 ... Newsholme, G. T. W., F.C.S., 27, High Street, Sheffield.
 1900 ... Parkin, William, F.A.I., The Mount, Sheffield.
 1892 ... Sheffield Central Public Free Library, Surrey Street, Sheffield.
 1897 ... **Snelgrove, Edward**, B.A., Camps Mount Villa, Meersbrook, Sheffield.
 — ... **Sorby, Henry Clifton**, LL.D., F.R.S., F.L.S., F.G.S., F.R.M.S., etc.,
 Broomfield, Sheffield (Ex-President).
 1895 ... Tindall, Frederick Markham, jun., 27, Victoria Road, Broomhall
 Park, Sheffield.
 1885 ... **Watson, Arnold Thomas**, F.L.S., Southwold, Tupton Crescent,
 Sheffield.
 1897 ... Wheat, John B., M.A., Norwood Hall, Sheffield.
 1890 ... Wilson, H. J., M.P., Osgathorpe Hills, Sheffield.

SHIPLEY DIVISION.

Pop. 62,166.

- ... Nuttall, William, Baildon, Shipley.

SKIPTON DIVISION.

Pop. 58,209.

- 1900 ... Burra, Robert, J.P., Gate, Dent, Sedbergh, R.S.O.
 1900 ... Burra, Miss Agnes, Gate, Dent, Sedbergh, R.S.O.
 1899 ... Dewhurst, Algernon, Aireville, Skipton.
 — ... **Eddy, J. Ray**, F.G.S., F.R.M.S., The Grange, Carleton, Skipton.
 1898 ... **Handby, J. Walling**, Austwick, Lancaster.
 1887 ... **Handley, John**, Briggflats, Sedbergh, R.S.O.
 1887 ... **Mackie, Rev. John H.**, M.A., The Grammar School, Sedbergh, R.S.O.
 1883 ... Morrison, Walter, J.P., Malham Tarn House, Settle.
 1894 ... Rickards, C. A., Bell Busk, Leeds.
 1887 ... **Robinson, William**, Green Bank, Sedbergh, R.S.O.
 — ... **Shuffrey, Rev. W. A.**, M.A., Vicarage, Arncliffe, Skipton.

- 1896 ... **Slingsby, W. Cecil**, F.R.G.S., Beech Hill, Carleton, Skipton-in-Craven
 1899 ... Taylor, Charles Edward, Akay, Sedbergh, R.S.O.
 1892 ... **Wilkinson, John J.**, Burnside, Skipton.
 1890 L. **Wright, C. B. E.**, J.P., Bolton Hall, Clitheroe.

SOWERBY DIVISION.

Pop. 63,202.

- 1896 ... Helliwell, Young, Cornfield Villas, Millwood, Todmorden.
 1894 ... Needham, James, Woodend, Hebden Bridge.
 1900 ... Pearson, T. Arthur, Birchcliffe, Hebden Bridge.
 1899 ... Robertshaw, Arthur, Ellenroyde, Luddenden Foot, R.S.O.

SPEN VALLEY DIVISION.

Pop. 57,402.

- ... Blakeley, John Wesley, Liversedge Hall, Liversedge.
 1891 L. **Cooke, James S.**, J.P., F.R.A.S., Springfield, Gomersal, Leeds.
 1895 ... Crosland, Robert Wilfrid, Oldfieldnook, Cleckheaton.
 1898 ... Easton, Rev. E. W., M.A., St. Luke's Vicarage, Cleckheaton.
 — ... **Fowler, Rev. William**, M.A., Vicarage, Liversedge (Ex-President).
 1896 ... Hind, Rev. H. N., M.A., Hightown, Liversedge, Normanton.
 1896 ... Priestley, F. N., Littleton, Liversedge, Normanton.
 1893 ... Rothery, Albert, South Holme, Liversedge, Normanton.

STOCKTON-ON-TEES BOROUGH.

Pop. 55,202.

THIRSK AND MALTON DIVISION (For Malton Names see separate list).

Pop. 57,183.

- ... **Addison, Rev. Frederick**, M.A., Sutton Road, Thirsk.
 1890 ... Buchanan, John Hamilton, M.D., Sowerby, Thirsk.
 1890 L. **Carlisle, Right Hon. the Earl of**, J.P., Castle Howard, York.
 1888 ... Fitzwilliam, Hon. W. H. Wentworth, M.P., Wiganthorpe, York.
 1897 ... Foggitt, Thomas Jackson, Market Place, Thirsk.
 — ... **Foggitt, William**, J.P., South Villa, Thirsk.
 1883 H.L. **Gallwey, Sir Ralph Payne**, Bart., M.B.O.U., Thirkleby Park, Thirsk (Ex-President).
 — ... **Gregson, William**, F.G.S., Baldersby, S.O., Yorkshire
 — ... Wright, John, Terrington, York.

THORNABY-ON-TEES BOROUGH.

Pop. 15,640.

WAKEFIELD CITY.

Pop. 37,269.

- 1892 ... **Parke, George Henry**, F.L.S., F.G.S., St. John's, Wakefield.
 — ... **Parkin, George**, 15, York Street, Wakefield.

WHITBY DIVISION.

Pop. 54,776.

- 1889 ... Atkinson, Thomas, 7, Normanby Terrace, Whitby.
 — ... Colby, George, Brawby Park, Pickering.
 1894 ... **Grabham, Oxley**, M.A., M.B.O.U., Thornton-le-Dale, Pickering.
 — ... Harrison, John, 7, Broomfield Terrace, Bagdale, Whitby.
 — H.L. **Hey, Rev. William Croser**, M.A., M.C.S., Derwent House, West Ayton, Seamer, York.
 1885 ... **Newbitt, Thomas**, F.G.S., Curator of the Whitby Museum, 17, Royal Crescent, West Cliff, Whitby.

- 1887 ... Pyman, Walter H. S., Moss Brow, Whitby.
 1900 ... Sewell, Joseph J., Church Hill Road, Whitby.
 1888 ... Smith, Christopher W., Harome, Nawton, York.
 1889 ... Stewart, John T., 3, Belle Vue Terrace, Whitby.

YORK CITY.

Pop. 67,004.

- 1896 L. Anderson, Tempest, M.D., B.Sc., F.G.S., J.P., 17, Stonegate, York.
 1893 ... Bean, Eugene, 8, Nessgate, York.
 1898 ... Dennis, Mrs. George C., 39, Blossom Street, York.
 1893 ... Dutton, Robert, Castle Mills Bridge, York.
 1893 ... Elmhirst, Charles E., 17, Mount Parade, York.
 — ... Hewett, William, 12, Howard Street, Fulford Road, York.
 Collects Lepidoptera, particularly as regards Variation.
 1889 ... Hodsmen, George, 8, Feversham Terrace, York.
 1896 ... Ingham, William, B.A.Lond., 52, Haxby Road, York.
 1896 ... Leatham, Ernest, J.P., Alderside, Dringhouses, York.
 1896 ... Melrose, James, Clifton Croft, York.
 — ... Moiser, Henry R., F.G.S., Heworth Grange, York.
 1895 ... Platnauer, Henry Maurice, B.Sc., F.G.S., etc., Curator of the
 Museum, York; and Low Royd, St. Olave's Road, York.
 1893 ... Potter, Ernest Guy, 14, Bootham Crescent, York.
 1890 ... Procter, John William, Ashcroft, York.
 1896 ... Raimes, Alwyn, M.D., 2, Scarcroft Road, York.
 1898 ... Terry, Thomas W. L., Trentholme, The Mount, York.
 1884 ... Thompson, Richard, Dringcote, York.
 1890 L. Walker, John Francis, M.A., F.G.S., F.L.S., F.C.S., F.I.C.,
 F.Z.S., etc., 45, Bootham, York.
 1893 ... Wilkinson, Arthur, 39, East Mount Road, York.
 1893 .. Wilkinson, Henry J., The Lodge, St. Helen's Square, York.

DURHAM, NORTHUMBERLAND, CUMBERLAND, WESTMORLAND, CHESHIRE,
 LANCASHIRE, AND ISLE OF MAN.

- 1886 ... Brownridge, Charles, Assoc.M.I.C.E., F.G.S., 26, North Road,
 Devonshire Park, Birkenhead.
 1896 ... Clarke, Henry Shortridge, F.E.S., Sulby Parsonage, Lezayre, Isle
 of Man.
 1897 ... Cradock, Charles M., B.A., Mayfield, Stockton-on-Tees.
 1896 H.L. Dawkins, Prof. W. Boyd, M.A., F.R.S., F.G.S., Owens College,
 Manchester (Ex-President).
 1894 ... Foggitt, John B., 29, Neville Street, Southport.
 1885 ... Gardner, John, F.E.S., 8, Friar Terrace, Hartlepool.
 1887 ... Gerrard, John, M.B.O.U., H.M. Inspector of Mines Worsley,
 Manchester.
 1892 ... Howse, Richard, Curator of the Newcastle Museum, and Hon. Sec.
 Tyneside Nat. Field Club; 10, Bolton Terrace, Newcastle-
 on-Tyne.
 1898 ... Hoyle, William Evans, M.A., etc., Keeper of the Manchester
 Museum, Owens College, Manchester.
 1888 .. Leach, Richard Ernest, M.A., F.L.S., F.G.S., Grammar School,
 Appleby, Westmorland.
 1898 ... Lucas, Bernard Richard, 3, Dyer Terrace, Wimington, Northwich.
 1890 L. Marshall, Arthur, Hallsteads, Penrith.
 1894 ... Melvill, James Cosmo, M.A., F.L.S., etc., Brook House, Prestwich,
 Manchester.
 1894 ... Petty, S. Lister, 24, Queen Street, Ulverston
 1898 ... Proud, J. T., H.M. Coroner, Dellwood, Bishop Auckland.
 1883 ... Richmond, Right Rev. J. J. Pulleine, D.D., Bishop of, Stanhope
 Rectory, Darlington.
 1898 ... Smith, W. Herbert, Pelaw House, Durham.

- 1889 ... Trechmann, Chas. O., Ph.D., F.G.S., Hudworth Tower, Castle Eden, Durham.
 1887 ... Watts, Rev. Arthur, F.G.S., F.R.G.S., The Rectory, Witton Gilbert, Durham.

COUNTIES SOUTH OF YORKSHIRE.

- 1900 ... Austen, John, Dore, near Sheffield.
 1883 **H.L. Baker, John Gilbert**, F.R.S., F.L.S., 3, Cumberland Road, Kew (Ex-President).
 — ... Beaumont, Alfred, F.E.S., The Red Cottage, Pond Road, Blackheath, London, S.E.
 1895 ... Braithwaite, Robert, M.D., F.L.S., F.R.M.S., 26, Endymion Road, Brixton Hill, London, S.W. (Ex-President).
 — ... Butterfield, J. A., B.Sc., 35, Wrottesley Road, Plumstead, London, S.E.
 1900 ... Cassal, R. T., M.R.C.S., Ashby, Doncaster.
 1891 L. Champney, John E., J.P., Abchurch Chambers, London, E.C.
 1890 L. Charlesworth, John B., J.P., The Ashe, Etwell, Derby.
 1896 ... Cocks, Llewellyn Jameson, Rosebank, Bromley Hill, Kent.
 1891 ... Collins, Francis Richard, 24, Fitzroy Road, Regent's Park, London, N.W.
 — ... Clark, James Edmund, B.A., B.Sc., 112, Wool Exchange, London, E.C.
 1900 ... Cordeaux, Mrs. John, Great Cotes House, R.S.O., Lincolnshire.
 1885 **H.L. Dallinger**, Rev. W. H., LL.D., D.C.L., D.Sc., F.R.S., F.L.S., Sec. R.M.S., etc., Ingleside, Newstead Road, Lee, London, S.E. (Ex-President).
 1889 **H.L. Dresser, Henry Eeles**, F.L.S., F.Z.S., etc., 110, Cannon Street, London, E.C. (Ex-President).
 1899 **H.L. Foster**, Prof. Sir Michael, K.C.B., M.P., M.D., LL.D., Sec. R.S., Nine Wells, Great Shelford, Cambridge.
 1884 ... Fox, Rev. Henry E., M.A., M.B.O.U., The Croft, Putney Hill, London, S.W.
 1883 ... Gough, Rev. T., B.Sc., F.G.S., King Edward VI. School, East Retford.
 1894 ... Green, Upfield, F.G.S., Tenter Street, Moorfields, London.
 1887 ... Haigh, G. H. Caton, M.B.O.U., Aber-iâ, Penrhyndeudraeth, Merionethshire; and Grainsby Hall, Great Grimsby, Lincs.
 — ... Harker, Alfred, M.A., F.G.S., Woodwardian Museum, and St. John's College, Cambridge; and 3, Park Avenue, Princess Avenue, Hull.
 1883 ... Hopkinson, John, F.L.S., F.G.S., F.R.Met.S., Assoc. Inst. C.E., etc., Weetwood, Watford, Herts.
 1884 ... Hudleston, Wilfrid H., M.A., F.R.S., F.L.S., F.G.S., F.C.S., etc., 8, Stanhope Gardens, London, S.W. (Ex-President).
 — L. Knubley, Rev. E. Ponsonby, M.A., M.B.O.U., Steeple Ashton Vicarage, Trowbridge, Wilts.
 — ... Mason, Philip Brookes, J.P., F.L.S., F.E.S., M.C.S., etc., Trent House, Bridge Street, Burton-on-Trent.
 — ... Masee, George E., F.L.S., F.R.M.S., Gateacre, Sandycombe Road, Kew Gardens, Surrey.
 1890 L. Newton, Rev. Canon Horace, The Vicarage, Redditch.
 1883 ... Oldfield, George Wm., M.A., F.L.S., F.E.S., 21, Longridge Road, Earl's Court, London, S.W.
 1888 ... Oxley, Rev. W. H., M.A., Petersham Vicarage, Surrey.
 1888 ... Painter, Rev. W. Hunt, Stirchley Rectory, near Shifnal, Shropshire. Collects Phanerogams and Musci.
 — **H.L. Parsons, Henry Franklin**, M.D., F.G.S., 4, Park Hill Rise, Croydon, Surrey.
 1893 ... Peake, Rev. Edward, M.A., Hillside, Bradfield, Berks.
 1896 ... Riddelsdell, Rev. Harry Joseph, M.A., St. Michael's Theological College, Aberdare, South Wales.
 — ... Slater, Rev. Henry H., M.A., F.Z.S., M.B.O.U., etc., Thornhaugh Rectory, Wansford, Northamptonshire.
 1889 ... Strickland, Walter W. [Travelling; Address uncertain.]
 1893 ... Tiddeman, R. H., M.A., F.G.S., Glen View, Mumbles, R.S.O., Glamorganshire (Ex-President).

- **H.L. Walsingham**, The Right Hon. Lord, M.A., LL.D., F.R.S., F.L.S., F.E.S., etc. Merton Hall, Thetford, Norfolk; and Blubberhouses, Yorkshire (Ex-President).
- ... **Whitwell, William**, F.L.S., M.C.S., Roslin, 4, Thurleigh Road, Balham, London, S.W.

SCOTLAND AND IRELAND.

- ... **Clarke, Wm. Eagle**, F.L.S., M.B.O.U., Nat. Hist. Dept., Edinburgh Museum of Science and Art, 35, Braid Road, Edinburgh.
- 1885 ... **Harvie-Brown, John A.**, F.R.S.E., F.Z.S., M.B.O.U., etc., Dunipace House, Larbert, N.B.
- 1888 ... **Kidston, Robert**, F.R.S.E., F.G.S., 12, Clarendon Place, Stirling, N.B.
- 1889 ... **Scharff, Robert F.**, Ph.D., B.Sc., M.R.I.A., etc., Keeper, Nat. Hist. Coll., Dublin Museum; Tudor House, Dundrum, co. Dublin.

BRITISH COLONIES.

- ... **Chadwick, Samuel**, F.G.S., Whetukura, Ormondville, Hawke's Bay, New Zealand.
- 1890 ... **LeTall, Benj. Bower**, M.A. Lond., Friends' School, Hobart, Tasmania.
- 1888 ... **Waite, Edgar R.**, F.L.S., Zoologist to the Australian Museum, Headingley, Mosman's Bay, Sydney, New South Wales.

S-Y
64.5

TRANSACTIONS OF THE YORKSHIRE NATURALISTS' UNION.

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Museum of Comparative Zoology
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THE
ALGA-FLORA OF YORKSHIRE:

A COMPLETE ACCOUNT OF THE KNOWN
FRESHWATER ALGÆ OF THE COUNTY.

BY

W. WEST, F.L.S.,

An Ex-President of the Yorkshire Naturalists' Union ;

AND

G. S. WEST, B.A., A.R.C.S.,

Hutchinson Research Student, and formerly Scholar of St. John's College,
Cambridge ; Professor of Natural History at the Royal
Agricultural College, Cirencester.

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PRINTED FOR THE YORKSHIRE NATURALISTS' UNION
BY TAYLOR BROTHERS.

JULY, 1901.



80A24

W. WEST AND G. S. WEST : ALGA-FLORA OF YORKSHIRE. 165

825. **Stauroneis Legumen** Ehrenb. [Syn. *Pleurostaurum Legumen* Rabenh. ; *Stauroneis Smithii* Grun. ; *S. linearis* W. Sm.].

S.W.—Rossington (M. H. Stiles). Marley, near Bingley. Shipley.

MID W.—Killinghall (G. Norman). Baildon.

S.E.—Beverley ; Cottingham ; Market Weighton Canal (G. Norman).

GENUS NAVICULA Bory (1822).

826. **Navicula nobilis** (Ehrenb.) Kütz.

[Syn. *Pinnularia nobilis* Ehrenb.].

S.W.—Askern district (M. H. Stiles). Marley, near Bingley. Cullingworth. Hatfield Chase (J. M. Kirk). Doncaster.

MID W.—Austwick. Baildon. Rombald's Moor. Eldwick. Moughton Fell. Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall. Pilmoor, near Thirsk. Terrington. Seamer.

S.E.—Beverley. Cottingham ; Hornsea Peat Deposit (G. Norman).

Var. **Dactylus** (Ehrenb.) V.H.

[Syn. *Pinnularia Dactylus* Ehrenb.].

MID W.—Wigton Moor.

N.W.—Mickle Fell. Great Shunnor Fell.

827. **Navicula major** Kütz.

[Syn. *Pinnulara major* (Kütz.) Rabenh.].

S.W.—Askern, Cusworth, and Hatfield districts ; Firsby Reservoirs (M. H. Stiles). Bradford. Swill Hill. Ogden Clough. Keighley Moor. Doncaster.

MID W.—Baildon. Eldwick. Harrogate (G. Norman). Malham Tarn. Wigton Moor. Ilkley. Bolton Woods. Boston Spa. Black Hill, near Settle. Bog two miles south of Clapham.

N.W.—Great Sleddale. Jervaulx Abbey. Bog near Widdale Beck. Cronkley Fell. Mickle Fell.

N.E.—Pilmoor, near Thirsk. Carlton Bank. Stokesley. Strensall. Seamer. Levisham.

S.E.—Market Weighton!; Hornsea Peat Deposit; Spring Ditch (G. Norman).

828. **Navicula viridis** Kütz.

[Syn. *Pinnularia viridis* (Ehrenb.) Rabenh.].

S.W.—Askern, Cusworth, and Hatfield districts; Firsby Reservoirs; Rossington; Doncaster (!) town water (M. H. Stiles). Cragg Vale, towards Blackstone Edge. Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Greetland, near Halifax. Bradford. Oxenhope. Keighley Moor.

MID W.—Harrogate (G. Norman). South Milford (W. B. Turner). Ilkley. Kildwick. Malham Tarn. Leathley. Black Hill, near Settle. Cowgill Wold Moss, Widdale Fell. Boston Spa. Horsforth. Bowland Knotts (pure gathering). Bog two miles south of Clapham. Whernside. Penyghent. Ribbleshead.

N.W.—Penhill Beacon. Bog near Widdale Beck (with auxospores). Jervaulx Abbey. Mickle Fell. Baugh Fell.

N.E.—Saltburn. Saltersgate (G. Norman).

S.E.—Beverley. Loftsome Bridge, near Wressle. Near Meaux Abbey. Tickton. Near Sutton. Newsholme. Skipwith Common (Rev. W. Fowler!) Market Weighton. Cottingham; Spring Ditch; Skirlaugh; Driffield; Haltenprice; Hornsea Peat Deposit; reservoir waterworks, Hull (G. Norman).

Var. **commutata** Grun.

[Syn. *Navicula hemiptera* auct. nec Kütz.].

S.W.—Askern district; Doncaster town water (M. H. Stiles).

829. **Navicula hemiptera** Kütz.

N.E.—Rocky stream, Saltersgate (G. Norman).

830. **Navicula cardinalis** Ehrenb.

[Syn. *Pinnularia cardinalis* Ehrenb.].

S.W.—Doncaster.

MID W.—Adel Bog. Baildon.

N.W.—Cronkley Fell.

S.E.—Hornsea Peat Deposit (G. Norman).

831. **Navicula lata** Bréb.

[Syn. *Pinnularia lata* (Bréb.) Rabenh.]. Rare.

MID W.—Blubberhouses (W. B. Turner). Appletreewick.
Malham Tarn. Near Buckden.

N.W.—Mickle Fell. Great Shunnor Fell. Great Sleddale.
Snaizeholme Fell.

N.E.—Moorland stream, near Scarborough.

832. **Navicula alpina** (W. Sm.) Ralfs.

[Syn. *Pinnularia alpina* W. Sm.].

Rare.

S.W.—Cullingworth. Keighley Moor (iv. 1897).

N.W.—Mickle Fell. Bog near Widdale Beck.

833. **Navicula borealis** (Ehrenb.) Kütz.

[Syn. *Pinnularia borealis* Ehrenb.].

MID W.—Bolton Woods. Ingleton.

N.E.—Carlton Bank.

S.E.—Benningholme; Market Weighton Canal (G. Norman).

834. **Navicula Rabenhorstii** (Ralfs) Grun. [Syn.

Pinnularia Rabenhorstii Ralfs; *P. interrupta* Rabenh.].

S.W.—Marley, near Bingley.

MID W.—Harrogate (G. Norman).

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Levisham. Glaisedale.

S.E.—Risby Pond; Wawne (G. Norman).

835. **Navicula divergens** (W. Sm.) Ralfs.

[Syn. *Pinnularia divergens* W. Sm.].

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Carlton Bank. Seamer.

S.E.—Cottingham (G. Norman).

836. **Navicula Hilseana** Janisch.

S.W.—Cragg Vale, towards Blackstone Edge.

MID W.—Near Buckden. Bog two miles south of Clapham.

N.W.—Mickle Fell.

837. **Navicula Brebissonii** Kütz. [Syn. *Pinnularia*

Brebissonii (Kütz.) Rabenh.; *Pinnularia stauroneiformis* W. Sm.].

S.W.—Manningham Park, Bradford. Cullingworth. Keighley Tarn. Cragg Vale, towards Blackstone Edge.

MID W.—Adel Bog. Eldwick. Wigton Moor. Earl's Seat. Whernside. Cocket Moss, near Giggleswick. Bolton Woods. Bog two miles south of Clapham. Penyghent. Harrogate (G. Norman).

N.W.—Mickle Fell. Penhill Beacon. Near Keld. Cronkley Fell. Up to 2200 ft. in Swaledale. Bog near Widdale Beck.

N.E.—Carlton. Lockton. Cleava Cliffs, north of Scalby. Terrington.

S.E.—Tickton. Near Meaux Abbey. Beverley. Skipwith Common (Rev. W. Fowler !). Cottingham; Spring Ditch; Skirlaugh; Reservoir waterworks, Hull (G. Norman).

838. **Navicula Tabellaria** (Ehrenb.) Kütz.

[Syn. *Pinnularia Tabellaria* Ehrenb.].

MID W.—Eldwick. Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.W.—Great Shunnor Fell.

N.E.—Lockton. Saltersgate (G. Norman).

Var. **acrosphæria** Rabenh.

[Syn. *Pinnularia acrosphæria* Rabenh.].

MID W.—Eldwick.

N.W.—Birkdale Tarn Moss.

N.E.—Terrington.

S.E.—Peat Deposit, Filey.

839. **Navicula gibba** (Ehrenb.) Kütz.

[Syn. *Pinnularia gibba* Ehrenb.].

S.W.—Cullingworth.

MID W.—Boston Spa. Wigton Moor. Eldwick. Horsforth.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Great Sleddale.

N.E.—Lockton. Terrington. Pilmoor, near Thirsk. Saltersgate (G. Norman).

S.E.—Risby Pond; Haltenprice; Cottingham (G. Norman).

840. **Navicula bicapitata** Lagerstedt.

S.W.—Cullingworth.

MID W.—Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

841. **Navicula appendiculata** (Ag.) Kütz.

S.W.—Shipley. Cragg Vale, towards Blackstone Edge.

MID W.—Linn Gill. Cocket Moss, near Giggleswick. Bowland Knotts. Giggleswick Common.

N.W.—Bog near Widdale Beck.

N.E.—Carlton Bank. Near Scarborough.

S.E.—Newsholme.

842. **Navicula mesolepta** Ehrenb.

[Syn. *Pinnularia mesolepta* W. Sm.].

S.W.—Marley, near Bingley. Cullingworth. Farnley. Cragg Vale, towards Blackstone Edge. Near Shipley.

MID W.—Harrogate (G. Norman). Boston Spa. Whernside. Ribbleshead.

N.W.—Mickle Fell.

N.E.—Near Scarborough. Terrington. Saltersgate (G. Norman).

S.E.—Tickton. Beverley. Near Meaux Abbey. Haltenprice; Hornsea Peat deposit; Beverley Parks (G. Norman).

843.—**Navicula Legumen** Ehrenb.

S.W.—Firsby reservoirs and Doncaster town water (M. H. Stiles).

844. **Navicula oblonga** Kütz.

[Syn. *Pinnularia oblonga* (Kütz.) Rabenh.].

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles). Roche Abbey (M. H. Stiles; J. N. Coombe). Doncaster. Bradford. Bingley.

MID W.—Baildon. Adel. Harrogate; Malham Cove (J. M. Kirk).

N.W.—Jervaulx Abbey.

N.E.—Strensall. Seamer.

S.E.—Wressle. Cottingham; Spring Ditch; Skirlaugh; Hornsea Peat Deposit (G. Norman).

845. **Navicula peregrina** (Ehrenb.) Kütz.

[Syn. *Pinnularia peregrina* Ehrenb.].

S.W.—Hatfield district; Rossington (M. H. Stiles). Goole. Coley, near Shelf. Allerton.

S.E.—Tickton. Newsholme, near Howden. Stoneferry (G. Norman).

Var. **menisculus** Schum.

MID W.—Linn Gill. Hawksworth Springs.

N.W.—Mickle Fell.

N.E.—Ingleby Greenhow.

846. **Navicula gracilis** Kütz.

S.W.—Cusworth district; Firsby reservoirs; Roche Abbey (M. H. Stiles). Shipley Glen.

MID W.—Penyghent. Moughton Fell.

N.E.—Ingleby Greenhow. Saltersgate (G. Norman).

S.E.—Spring Ditch; Marfleet; Ditch near River Hull (G. Norman).

Var. **neglectum** (Thw.): [Syn. *Schizonema neglectum* (Thw.)

Rabenh.; *Colletonema neglectum* Thw.; *Navicula gracilis* Kütz. var. *schizonemoides* V.H.].

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe).

MID W.—Ingleton. Shipley Glen. Ribblehead.

S.E.—Hull; Wawne (G. Norman).

847. **Navicula acuminata** (W. Sm.).

[Syn. *Pinnularia acuminata* W. Sm.].

MID W.—Adel Bog.

N.W.—Cronkley Fell.

N.E.—Scarborough Mere.

848. **Navicula viridula** Kütz.

[Syn. *Pinnularia viridula* (Kütz.) Rabenh.].

S.W.—Roche Abbey (J. N. Coombe; M. H. Stiles). Askern and Cusworth districts (M. H. Stiles).

MID W.—Killinghall (G. Norman).

N.W.—Mickle Fell. Dodd Fell.

S.E.—Tickton. Wawne; Cottingham; Stoneferry (G. Norman).

849. **Navicula radiosa** Kütz.

[Syn. *Pinnularia radiosa* (Kütz.) Rabenh.].

S.W.—Askern, Cusworth and Hatfield districts; Rossington; Doncaster (!) town water and Firsby reservoirs (M. H. Stiles). Morley. Elslack. Mirfield. Greetland, near Halifax. Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Denholme.

MID W.—Baildon. South Milford (W. B. Turner). Harrogate (G. Norman). Malham Tarn. Moughton Fell. Adel. Above Eldwick. Holden Gill, near Keighley. Otley. Bolton Woods. Knaresborough. Boston Spa. Crook Gill, one mile from Buckden.

N.W.—Cautley Spout. Jervaulx Abbey. Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Scarborough Mere. Scalby Beck. Hayburn Wyke. River Derwent at Forge Valley. Staindale. Ingleby Greenhow.

S.E.—Beverley. Tickton. Near Meaux Abbey. Routh. Waghon. Newsholme, near Howden. Riccall Common. Market Weighton. Cottingham; River Hull; Haltenprice; Hornsea Peat Deposit; Reservoir Waterworks, Hull (G. Norman).

Var. **acuta** (W. Sm.) V. H.

[Syn. *Pinnularia acuta* W. Sm.].

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe). Cusworth district (M. H. Stiles). Near Shipley.

MID W.—Malham Tarn Bog. Penyghent.

N.W.—Mickle Fell.

N.E.—Strensall. Near Scarborough.

S.E.—Cottingham; Skirlaugh; Risby Pond; Driffield; Wawne; Market Weighton Canal; Spring Ditch; Beverley (G. Norman).

Var. **silesiaca** (Bleisch). [Syn. *Pinnularia radiosa* var. *silesiaca* (Bleisch) Rabenh.].

S.E.—Beverley.

850. **Navicula cryptocephala** Kütz.

S.W.—Bradford. Cullingworth. Roche Abbey (J. N. Coombe; M. H. Stiles).

MID W.—Wigton Moor. Moughton Fell. Baildon. Kildwick.

N.W.—Jervaulx Abbey. Dodd Fell.

N.E.—Carlton Bank. Saltburn.

S.E.—Tickton. Waghen. Newsholme, near Howden. River Hull; Market Weighton Canal; Dairycoats (G. Norman).

Var. **veneta** (Kütz.) V. H. [Syn. *Navicula veneta* Kütz.].

S.W.—Cullingworth.

MID W.—ShIPLEY Glen. Boston Spa.

N.E.—Pilmoor, near Thirsk.

S.E.—Newsholme. Market Weighton.

851. **Navicula angustata** W. Sm.

S.W.—Doncaster. Greetland, near Halifax. Chellow Dean. Bingley. Worth Valley, near Keighley. Thorne Moor (G. Norman). Crimsworth Dean. Ogden Clough.

MID W.—Dropping Well, Knaresborough. Moughton Fell. Holden Gill, near Keighley.

N.W.—Mickle Fell. Cautley Spout.

N.E.—Scarborough Mere.

S.E.—Near Meaux Abbey. Beverley. Tickton. Waghen. Newsholme.

852. **Navicula rhynchocephala** Kütz.

S.W.—Greetland, near Halifax. Chellow Dean. Cullingworth. Doncaster town water (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Marley, near Bingley.

MID W.—Harrogate (G. Norman). Pond at Horsforth. Hawksworth Springs.

N.W.—Reeth.

S.E.—Loftsome Bridge, near Wressle. Beverley. Waghen. Tickton. Near Meaux Abbey. Market Weighton. Cottingham; Risby Pond; Haltenprice; Market Weighton Canal (G. Norman).

853. *Navicula Dirhyncus* Ehrenb.

S.W.—Morley.

MID W.—Adel Bog. Malham Tarn.

S.E.—Near Sutton. Routh. Beverley.

854. *Navicula humilis* Donk.

[Syn. *Navicula inflata* W. Sm., non Kütz.].

S.W.—Hatfield district; Rossington (M. H. Stiles). Allerton. Cullingworth. Roche Abbey (J. N. Coombe).

MID W.—Hawsworth Springs. Holden Gill, near Keighley. Boston Spa. Killinghall (G. Norman). Kildwick.

N.W.—Mickle Fell.

N.E.—Saltburn. Carlton Bank.

S.E.—Waghen. Tickton. Beverley. Wawne; Market Weighton Canal; Beverley Parks; Cottingham (G. Norman).

855. *Navicula nana* Greg.

[Syn. *Pinnularia pygmaea* Ehrenb.].

S.E.—River Hull; Cottingham; near Stoneferry (G. Norman).

856. *Navicula digitato-radiata* Greg.

Var. *Cyprinus* (W. Sm.) V.H.

[Syn. *Navicula Cyprinus* W. Sm.].

S.E.—Dairycoats; ditch near River Hull (G. Norman).

857. *Navicula Reinhardtii* Grun.

S.W.—Hatfield district (M. H. Stiles).

MID W.—In River Skell, Fountains Abbey (G. Stuart; E. Grove). Ribbleshead.

858. *Navicula lanceolata* Kütz.

S.W.—Cusworth District (M. H. Stiles). Bradford. Cullingworth.

MID W.—Kildwick.

S.E.—Beverley Parks, near Woodmancy (G. Norman).

859. *Navicula Gastrum* (Ehrenb.) Donk.

MID W.—Cocket Moss, near Giggleswick.

860. *Navicula tumida* W. Sm., 1853.

[Syn. *Navicula anglica* Ralfs, 1861].

S.W.—Roche Abbey (M. H. Stiles).

MID W.—Shipley. Hawksworth Springs.

N.W.—Reeth.

N.E.—Seamer. Saltburn.

S.E.—Loftsome Bridge, near Wressle. Cottingham (G. Norman).

861. **Navicula Semen** Ehrenb.

S.W.—Hatfield district (M. H. Stiles).

S.E.—Cottingham; Hornsea Peat deposit; Risby Pond (G. Norman).

862. **Navicula dicephala** Ehrenb.

S.W.—Doncaster town water (M. H. Stiles). Halifax. Allerton. Marley, near Bingley. Ogden Clough. Cragg Vale, towards Blackstone Edge.

MID W.—Whernside. Malham Tarn Bog. Bowland Knotts. Hawksworth Springs. Near Buckden. Kildwick.

N.W.—Mickle Fell. Great Shunnor Fell. Dodd Fell (in great abundance in stream at 1500 ft.). Muker. Bog near Widdale Beck. Snaizeholme Beck.

N.E.—Goathland.

S.E.—Near Meaux Abbey. Beverley. Routh. Waghen. Tickton. Cottingham; Haltenprice (G. Norman).

863. **Navicula gracillima** Ralfs.

[Syn. *Pinnularia gracillima* Greg.].

N.E.—Rocky stream, Saltersgate (G. Norman).

864. **Navicula Smithii** Bréb.

S.E.—Ditch near River Hull (G. Norman).

865. **Navicula elliptica** Kütz. [Syn. *N. ovalis* W. Sm.].

S.W.—Chellow Dean. Marley, near Bingley. Cullingworth. Roche Abbey (M. H. Stiles; J. N. Coombe). Ogden Clough. Askern, Cusworth and Hatfield districts; Firshy reservoirs (M. H. Stiles).

MID W.—Baildon. Penyghent. Near Buckden. South of Cray Moss. Moughton Fell. Markington (Rev. J. S. Tute!).

N.W.—Sedbergh. Mickle Fell. Dodd Fell.

N.E.—Seamer. Moist ground, Whitenab, Scarborough.
Beast Cliff. Staindale. Carlton Bank.

S.E.—Market Weighton. Hornsea Peat deposit; Halten-
price; River Hull and Reservoir Waterworks, Hull; Newbald;
Cottingham (G. Norman).

Var. **ovalis** Hilse.

S.W.—Cusworth district; Doncaster town water (M. H. Stiles).

866. **Navicula pygmæa** Kütz.

[Syn. *Navicula minutula* W. Sm.].

S.W.—Cullingworth. Cusworth near Doncaster! (M. H. Stiles).

S.E.—Stoneferry; ditch near River Hull (G. Norman).

867. **Navicula mutica** Kütz.

S.W.—Thorne Moor (G. Norman). Cullingworth.

868. **Navicula crucicula** (W. Sm.) V. H. [Syn. *Stauroneis crucicula* W. Sm.; *S. dilatata* W. Sm.].

S.E.—Ditch near River Hull; in brackish water (G. Norman).

869. **Navicula integra** W. Sm.

MID W.—Hawksworth Springs.

870. **Navicula scita** W. Sm.

S.E.—Newbald; Cottingham (G. Norman).

871. **Navicula elegans** W. Sm.

S.E.—Near Stoneferry (G. Norman).

872. **Navicula latissima** Greg.

S.W.—Roche Abbey (E. Hunter).

873. **Navicula granulata** Bréb. MS. Var. **maculosa**
(Donk.) V. H. [Syn. *Navicula maculosa* Donk.].

S.W.—Rossington (M. H. Stiles).

874. **Navicula tumens** W. Sm.

S.E.—Near Stoneferry (G. Norman).

875. **Navicula lepida** Greg.

S.E.—Very rare in fresh water, Spring Ditch (G. Norman).

876. **Navicula pusilla** W. Sm.

[Syn. *Navicula gastroides* Greg.].

MID W.—Hawksworth Springs, near Shipley.

N.E.—Whitby.

S.E.—Tickton. Routh. Beverley. Near Meaux Abbey. Waghon. Near Stoneferry; Wawne; Market Weighton Canal; Cottingham (G. Norman).

877. *Navicula Trochus* Ehrenb.

MID W.—In River Skell, Fountains Abbey (G. Stuart; E. Grove).

878. *Navicula cuspidata* Kütz.

S.W.—Askern, Cusworth, and Hatfield districts; Firsby reservoirs; Rossington (M. H. Stiles). Hatfield Chase (J. M. Kirk). Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Elslack.

MID W.—Roundhay; South Milford; Blubberhouses (W. B. Turner). Harrogate (G. Norman). Baildon. Moughton Fell. Pond at Pool. Pond at Horsforth. Boston Spa.

N.W.—Great Shunnor Fell.

N.E.—Scarborough Mere. Carlton Bank. Seamer. Malton.

S.E.—Riccall Common. Skipwith Common. Market Weighton. Loftsome Bridge, near Wressle. Wressle. Cottingham; Hornsea Mere and Hornsea Peat Deposit; Risby Pond; Spring Ditch; Stepney; Haltenprice (G. Norman).

879. *Navicula ambigua* Ehrenb.

S.W.—Rossington; Firsby Reservoirs (M. H. Stiles).

N.E.—Strensall.

S.E.—Market Weighton. Wressle. Stoneferry; Hornsea Peat Deposit (G. Norman).

880. *Navicula sculpta* Ehrenb.

S.W.—Askern district (M. H. Stiles).

881. *Navicula sphærophora* Kütz.

S.W.—Doncaster.

S.E.—Near Meaux Abbey. Beverley. Wressle. Haltenprice; Hornsea Peat Deposit (G. Norman).

882. *Navicula serians* (Bréb.) Kütz.

S.W.—Hatfield district (M. H. Stiles). Cullingworth.

N.W.—Mickle Fell.

N.E.—Strensall.

883. **Navicula garganica** Rabenh.

MID W.—Harrogate (G. Norman).

S.E.—Cottingham ; ditch near River Hull ; Anlaby to Hessle Road (G. Norman).

884. **Navicula exilis** (Kütz.) Grun.

S.W.—Askern and Hatfield districts ; Firsby Reservoirs ; Doncaster (!) town water ; Rossington (M. H. Stiles). Woolley. Cullingworth. Keighley. Liversedge (Rev. W. Fowler !) Coley, near Shelf. Hebden Bridge.

MID W.—Baildon. Boston Spa. Horton-in-Ribblesdale.

N.E.—Cornelian Bay. Saltburn. Terrington.

S.E.—Near Meaux Abbey. Beverley. Routh. Waghen. Tickton. Loftsome Bridge, near Wressle. Newsholme.

885. **Navicula follis** Ehrenb.

S.E.—Market Weighton Canal ; Beverley Parks (G. Norman).

886. **Navicula latiuscula** Kütz.

S.W.—Hatfield district (M. H. Stiles).

887. **Navicula Amphibœna** Bory.

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles). Near Doncaster. Goole ; Roche Abbey (E. Hunter ; M. H. Stiles ; J. N. Coombe). Shipley. Near Bingley.

MID W.—Harrogate ; Ripley (G. Norman). Adel. Arthington.

N.E.—Whitby. Marske. Scarborough Mere. Seamer. Strensall.

S.E.—Waghen. Beverley. Loftsome Bridge, near Wressle. Near Stoneferry ; Cottingham ; Haltenprice ; Market Weighton Canal (G. Norman).

888. **Navicula limosa** Kütz.

S.W.—Cusworth, near Doncaster. Askern and Hatfield districts ; Firsby reservoirs ; Roche Abbey ; Rossington (M. H. Stiles).

MID W.—Cocket Moss, near Giggleswick. Hawksworth Springs. Ingleton.

N.W.—Mickle and Cronkley Fells.

N.E.—Carlton Bank.

S.E.—Beverley. Market Weighton. River Hull near Wawne; Cottingham (G. Norman).

Var. **gibberula** (Kütz.) V.H. [Syn. *N. gibberula* Kütz.].

S.W.—Marley, near Bingley. Roche Abbey (J. N. Coombe).

MID W.—Baildon. Eldwick.

N.W.—Mickle Fell.

N.E.—Staindale. Hayburn Wyke.

S.E.—Risby Pond; Skirlaugh; Cottingham; Hornsea Mere and Peat deposit; near Stoneferry; Wawne; Haltenprice; Spring Ditch; Market Weighton Canal (G. Norman).

889. **Navicula ventricosa** (Ehrenb.?) Donkin.

MID W.—Baildon.

890. **Navicula Iridis** Ehrenb. [Syn. *N. firma* W. Sm.].

S.W.—Askern district and Roche Abbey (M. H. Stiles).

MID W.—Bog two miles south of Clapham.

S.E.—Risby Pond; Cottingham; Haltenprice; Spring Ditch (G. Norman).

Var. **Amphigomphus** (Ehrenb.) V. H.

[Syn. *Navicula Amphigomphus* Ehrenb.].

S.W.—Shipley.

MID W.—Harrogate (G. Norman). Langcliffe near Settle.

Bog two miles south of Clapham.

N.E.—Near Scarborough.

S.E.—Skipwith Common. Cottingham; Wawne (G. Norman).

Var. **Amphirhyncus** (Ehrenb.) De Toni.

[Syn. *Navicula Amphirhyncus* Ehrenb.].

S.W.—Hatfield district; Rossington (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Cullingworth.

MID W.—Roundhay (Abbott, Emsley, and Turner). Harrogate (G. Norman). Adel Bog. Eldwick. Ilkley. Hawksworth Springs. Malham Tarn. Bowland Knotts.

N.W.—Mickle Fell.

N.E.—Seamer. Strensall (W. B. Turner).

S.E.—Beverley. Cottingham; Skirlaugh (G. Norman).

Var. **affinis** (Ehrenb.) V. H.

[Syn. *Navicula affinis* Ehrenb.].

S.W.—Goole (J. Harrison). Roche Abbey (M. H. Stiles; J. N. Coombe). Chellow Dean. Bradford. Cullingworth. Keighley Moor.

MID W.—Adel Bog. Rombald's Moor. Holden Gill, near Keighley. Moughton Fell.

N.E.—'Common.' Cornelian Bay. Saltburn. Carlton Bank.

S.E.—Market Weighton. Spring Ditch; Cottingham (G. Norman).

Var. **producta** (W. Sm.) V. H.

[Syn. *Navicula producta* W. Sm.].

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe).

MID W.—Boston Spa.

N.E.—Marske. Strensall. Pilmoor, near Thirsk.

S.E.—Loftsome Bridge, near Wressle. Skirlaugh; Cottingham; Haltenprice; Hornsea Peat deposit (G. Norman).

891. **Navicula bacillum** Ehrenb.

[Syn. *N. bacillaris* Greg.].

S.E.—Hornsea Peat deposit; Cottingham (G. Norman).

892.—**Navicula lævissima** (Kütz. ?) Grun.

N.E.—Saltergate (G. Norman).

S.E.—Cottingham; Hornsea Peat deposit; Haltenprice; Wawne (G. Norman).

893. **Navicula Pupula** Kütz.

S.W.—Ogden Clough. Near Bingley.

MID W.—Baildon. Harrogate. Linn Gill. Hawksworth Springs. Moughton Fell.

S.E.—Wressle.

894. **Navicula binodis** (Ehrenb.) W. Sm.

MID W.—Baildon. Hawksworth Springs. Rombald's Moor.

N.W.—Mickle Fell.

N.E.—Staithes.

S.E.—Beverley; Market Weighton Canal (G. Norman).

895. **Navicula Gallica** (W. Sm.) V.H.

[Syn. *Diadesmis Gallica* W. Sm.].

MID W.—Near Knaresborough. Wigton Moor. Malham Tarn Bog.

N.E.—Pilmoor, near Thirsk. Terrington.

GENUS COLLETONEMA (Bréb., 1849) V.H.

896. **Colletonema lacustre** (Ag.) V.H.

[Syn. *Schizonema lacustre* Ag.].

S.W.—Hatfield district (M. H. Stiles).

GENUS VANHEURCKIA Bréb., 1868.

897. **Vanheurckia rhomboides** (Ehrenb.) Bréb. [Syn.

Navicula rhomboides Ehrenb.; *Frustulia rhomboides* (Ehrenb.) De Toni].

Frequent in sphagnum bogs and peat bogs generally, sometimes occurring in pure gelatinous masses.

S.W.—Thorne Moor (G. Norman). Greetland, near Halifax. Morley. Near Bradford. Cullingworth. Keighley Tarn.

MID W.—Milford; Blubberhouses (W. B. Turner). Baildon. Moughton Fell. Near Buckden. Ribblehead. Bowland Knotts.

N.W.—Baugh Fell. Penhill Beacon. Lund's Fell. Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Carlton Bank.

S.E.—Skipwith Common (Rev. W. Fowler!).

Var. **saxonica** (Rabenh.). [Syn. *Frustulia saxonica*

Rabenh., 1851; *Navicula crassinervia* Bréb., 1852; *Vanheurckia rhomboides* var. *crassinervia* V.H.].

S.W.—Askern (J. M. Kirk). Cullingworth. Ogden Clough. Cragg Vale, towards Blackstone Edge.

MID W.—Adel Bog. Whernside. Cocket Moss, near Giggleswick. Near Buckden.

N.W.—Mickle Fell. Cronkley Fell. Bog near Widdale Beck. Snaizholme Beck. Dodd Fell. Cowgill Wold Moss, Widdale Fell.

N.E.—Carlton Bank. Saltersgate (G. Norman).

S.E.—Beverley. Waghen. Cottingham; River Hull (G. Norman).

898. **Vanheurckia vulgaris** (Thw.) V.H.

[Syn. *Colletonema vulgaris* Thw.].

S.W.—Marley, near Bingley.

MID W.—Rombald's Moor. Ribblehead.

Hawsworth Springs (near Shipley).

S.E.—Market Weighton. Cottingham (G. Norman).

N.E.—Carlton Bank.

GENUS AMPHIPLEURA Kütz., 1844.

899. **Amphipleura pellucida** Kütz.

S.W.—Near Doncaster. Askern and Hatfield districts; Roche Abbey (M. H. Stiles). Cullingworth.

MID W.—Roundhay (J. Abbott). Staveley Dam, near Knaresborough. Shipley Glen. South of Cray Moss.

N.W.—Jervaulx Abbey. Mickle Fell.

N.E.—Scarborough Mere. Pilmoor, near Thirsk. Ingleby Greenhow.

S.E.—Skipwith Common (Rev. W. Fowler!). Cottingham; Risby Pond; Botanic Gardens, Hull (G. Norman).

GENUS SCOLIOPLEURA Grun., 1860.

900. **Scoliopleura Westii** (W. Sm.) Grun.

[Syn. *Navicula Westii* W. Sm.].

S.E.—In brackish water, River Hull (G. Norman).

GENUS PLEUROSIGMA W. Sm., 1853.

901. **Pleurosigma attenuatum** (Kütz.) W. Sm.

S.W.—Askern, Cusworth, and Hatfield districts; Doncaster town water; Firsby Reservoirs (M. H. Stiles). Bradford. Marley, near Bingley. Goole; Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe).

MID W.—Baildon. South Milford (W. B. Turner). Staveley Dam, near Knaresborough.

N.W.—Rokeby.

N.E.—Rievaulx Abbey. Carlton Bank. Stokesley.

S.E.—Beverley. Spring Ditch; Haltenprice; Cottingham; Newbald; Risby Pond; Hornsea Peat Deposit; Wawne; Reservoir Waterworks, Hull (G. Norman).

Var. **scalprum** (Gaill.) Grun.

S.W.—Hatfield district (M. H. Stiles).

902. **Pleurosigma acuminatum** (Kütz.) Grun.

[Syn. *Pleurosigma lacustre* W. Sm.].

S.W.—Bradford. Chellow Dean. Askern (M. H. Stiles; F. H. Allen). Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Doncaster.

MID W.—Baildon. Malham Tarn. Harrogate (G. Norman). Roundhay (W. B. Turner). Adel. Arthington. Horsforth. Ripley (G. Norman). Boston Spa. Hawksworth Springs.

N.E.—Seamer. Scarborough Mere. Cornelian Bay. Saltburn.

S.E.—Hornsea Mere. Tickton. Beverley! Waghen. Loftsome Bridge, near Wressle. Newsholme. Skipwith Common. Cottingham; River Hull; Risby Pond; Market Weighton; Haltenprice; Hornsea Peat Deposit (G. Norman).

903. **Pleurosigma Spencerii** (Quekett) W. Sm.

S.W.—Cusworth and Hatfield districts; Firsby Reservoirs (M. H. Stiles). Roche Abbey (J. Newton Coombe). Goole (E. Hunter). Doncaster. Fixby. Bradford.

MID W.—South Milford (W. B. Turner). Leathley.

N.W.—Mickle Fell. Reeth.

N.E.—Seamer. Strensall. Hayburn Wyke. River Derwent, Forge Valley. Saltburn. Carlton Bank.

S.E.—Beverley. Routh. Skipwith Common. Market Weighton. Spring Ditch; Hornsea Mere; Wawne; Risby Pond; Hornsea Peat Deposit; Haltenprice (G. Norman).

904. **Pleurosigma scalproides** Rabenh.

S.W.—Hatfield district (M. H. Stiles).

MID W.—Amongst *Cladophora glomerata* in stream, Ingleton.

GENUS AMPHIPRORA (Ehrenb.) Cleve, 1891.

905. **Amphiprora alata** Kütz.

S.E.—Near Stoneferry (G. Norman).

906. **Amphiprora paludosa** W. Sm.

S.E.—Stoneferry to Sutton ; ditch, near River Hull ; Anlaby Road to Hessle Road (G. Norman).

907. **Amphiprora constricta** Ehrenb.

S.E.—Dairycoates ; pure near Marfleet (G. Norman).

FAMILY GOMPHONEMEAÆ.

GENUS GOMPHONEMA Ag., 1824.

908. **Gomphonema geminatum** (Lyngb.) Ag.

S.W.—Askern district (M. H. Stiles).

MID W.—Roundhay (W. B. Turner). Leathley. Moughton Fell. Ribblehead. Bolton Woods. Buckden. Oughtershaw Moss.

N.W.—Cautley Spout. Upper Teesdale. Dodd Fell, waterfall in Gill.

N.E.—Strensall (W. B. Turner).

909. **Gomphonema constrictum** Ehrenb.

S.W.—Askern and Hatfield districts ; Doncaster (!) town water ; Rossington ; Firsby Reservoirs (M. H. Stiles). Roche Abbey (M. H. Stiles ; J. N. Coombe). Woolley. Heaton.

MID W. — Harrogate ! (G. Norman). Holden Gill, near Keighley. Shipley Glen. Adel. Boston Spa. Staveley Dam, near Knaresborough. Linn Gill. Buckden.

N.W.—Jervaulx Abbey. Sedbergh.

N.E.—Whitby. Staithes. Scarborough Mere. Scalby Beck. Malton.

S.E.—Loftsome Bridge, near Wressle. Newsholme. Wawne ; Cottingham ; Hornsea Peat deposit ; Market Weighton Canal (G. Norman).

Var. **capitatum** (Ehrenb.) V.H.

[Syn. *Gomphonema capitatum* Ehrenb.]

S.W.—Doncaster town water ; Hatfield district (M. H. Stiles).
Near Mirfield. Bradford. Cullingworth. Bingley.

MID W.—Malham Tarn. Boston Spa. Baildon. Ribbleshead.

N.W.—Cronkley Fell. Great Shunnor Fell. Dodd Fell.
Sedbergh.

N.E.—Seamer. Terrington.

S.E.—Loftsome Bridge, near Wressle. Cottingham ; Hornsea
deposit (G. Norman). Anlaby Road (Dr. Munroe).

910. **Gomphonema acuminatum** Ehrenb.

S.W.—Askern, Cusworth, and Hatfield districts ; Firsby
reservoirs ; Doncaster (!) town water ; Rossington (M. H. Stiles).
Goole ; Roche Abbey (E. Hunter). Askern ; Hatfield Chase
(J. M. Kirk). Denholme.

MID W.—Wigton Moor. Roundhay (W. B. Turner).
Markington (Rev. J. S. Tute !). Baildon. Bolton Woods.
Boston Spa.

N.W.—Sedbergh. Mickle Fell. Great Shunnor Fell. Jervaulx
Abbey.

N.E.—Seamer. Egton. Staindale. Pilmoor, near Thirsk.
Scarborough Mere. Terrington. Malton. Carlton Bank.

S.E.—Near Stetton. Newsholme. Loftsome Bridge, near
Wressle. Market Weighton. Driffield ; Newsham Lake ;
Cottingham ; Wawne ; Beverley ; Reservoir waterworks, Hull
(G. Norman).

Var. **coronatum** (Ehrenb.) V.H.

S.W.—Doncaster town water (M. H. Stiles).

911. **Gomphonema Augur** Ehrenb.

[Syn. *G. cristatum* Ralfs].

MID W.—Staveley Dam, near Knaresborough.

N.W.—Cronkley Fell.

S.E.—Wressle.

912. **Gomphonema montanum** Schumann.

Var. **commutatum** Grun.

S.W.—Askern district; Firsby reservoir; Doncaster town water; Rossington (M. H. Stiles).

913. **Gomphonema tenellum** Kütz.

S.W.—Marley, near Bingley. Liversedge (Rev. W. Fowler!), Heaton. Keighley. Ogden Clough.

MID W.—Wherside. Ribbleshead. Baildon. Wigton Moor. Eldwick.

N.E.—Scarborough Mere. Staindale. Cornelian Bay, Pilmoor, near Thirsk. Ingleby Greenhow.

S.E.—Near Meaux Abbey. Routh. Waghen. Beverley. Near Sutton. Newsholme. Near Stoneferry; Driffield; Skirlaugh; Hull (G. Norman).

914. **Gomphonema gracile** Ehrenb.

MID W.—Staveley Dam, near Knaresborough. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Carlton Bank.

Var. **dichotomum** (Kütz.) V.H.

[Syn. *G. dichotomum* Kütz.].

MID W.—ShIPLEY Glen. Pond at Horsforth.

N.W.—Cronkley Fell.

N.E.—Strensall.

S.E.—Waghen. Near Sutton. Near Meaux Abbey. Routh. Tickton. Newbald; Wawne; Market Weighton (G. Norman).

915. **Gomphonema intricatum** Kütz.

S.W.—Askern, Cusworth and Hatfield districts; Firsby reservoirs (M. H. Stiles). Ogden Clough. Morley. Goole. Elslack.

MID W.—Wherside. Baildon. Bolton Woods.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell, Dodd Fell.

N.E.—Saltburn. Pilmoor, near Thirsk.

S.E.—Loftsome Bridge, near Wressle. Market Weighton. Wawne; Anlaby to Hessele; Benningholme; River Derwent (G. Norman).

Var. **Vibrio** (Ehrenb.) V. H. [Syn. *G. Vibrio* Ehrenb.].

S.W.—Askern district (M. H. Stiles). Ogden Clough. Cullingworth. Crimsworth Dean.

MID W.—Holden Gill, near Keighley. Baildon. Linn Gill. Near Knaresborough.

N.W.—Sedbergh.

S.E.—River Hull at Wawne (G. Norman).

916. **Gomphonema ventricosum** Greg.

N.W.—Cautley Spout, with sporangial valves.

917. **Gomphonema olivaceum** (Lyngb.) Kütz.

S.W.—Rossington (M. H. Stiles). Hatfield Chase (J. M. Kirk). Bradford.

MID W.—Roundhay (W. B. Turner). Kilnsey. Ingleton. Malham Tarn. Whernside.

N.W.—Near Sedbergh. Jervaulx Abbey. Snaizeholme Beck. Dodd Fell. Mickle Fell.

N.E.—Scarborough Mere. Terrington.

S.E.—Near Sutton. Newsholme. Near Meaux bbey. Benningholme; Cottingham; Reservoir Waterworks, Hull (G. Norman).

918. **Gomphonema parvulum** Kütz.

S.W.—Marley, near Bingley.

MID W.—Boston Spa.

N.W.—Jervaulx Abbey.

N.E.—Terrington.

Var. **lanceolatum** V.H.

N.W.—Jervaulx Abbey.

919. **Gomphonema angustatum** Kütz.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Bog, near Widdale Beck.

N.E.—Pilmoor, near Thirsk.

920. **Gomphonema insigne** Greg

S.E.—Newbald (G. Norman).

GENUS RHOICOSPHENIA Grun., 1860.

921. **Rhoicosphenia curvata** (Kütz.) Grun.

[Syn. *Gomphonema curvatum* Kütz.].

S.W.—Hatfield district; Rossington (M. H. Stiles). Bradford. Holbeck. Roche Abbey (M. H. Stiles; J. N. Coombe). Shipley. Castleford.

MID W.—Baildon. Harrogate (G. Norman). Markington (Rev. J. S. Tute). Ingleton.

N.W.—Holwick. Romaldkirk.

N.E.—Staithe. Hayburn Wyke. Scalby Beck. Saltburn. Malton.

S.E.—Newsholme. Cottingham; Reservoir waterworks, Hull (G. Norman).

922. **Rhoicosphenia fracta** (Schum.) Rabenh.

[Syn. *Gomphonema fractum* Schum.].

S.W.—Cullingworth. Kildwick.

MID W.—Adel Bog.

FAMILY ACHNANTHÆ.

GENUS ACHNANTHIDIUM (Kütz.) Grun., 1880.

923. **Achnanthidium flexellum** (Kütz.) Bréb.

[Syn. *Cocconeis Thwaitesii* W. Sm.].

S.W.—Askern district (M. H. Stiles). Bingley. Ogden Clough, with auxospores and sporangial valves. Cusworth, near Doncaster! (M. H. Stiles). Hebden Bridge.

MID W.—Dripping rocks, Shipley Glen, abundant. Dripping rocks, Holden Gill, near Keighley. Ingleton. South of Cray Moss. Adel (W. B. Turner).

N.W.—Cautley Spout. Mickle and Cronkley Fells.

N.E.—Staindale.

S.E.—Newbald; Cottingham (G. Norman).

GENUS ACHNANTHES Bory, 1822.

924. **Achnanthes coarctata** (Bréb.) Grun.

[Syn. *Achnanthidium coarctatum* Bréb.].

S.W.—Bingley.

925. **Achnanthes microcephala** (Kütz.) Grun.[Syn. *Achnanthidium microcephalum* Kütz.].

S.W.—Ogden Clough.

MID W.—Chapel Allerton (J. Abbott). Baildon. Linn Gill. Penyghent. Dropping Well, Knaresborough.

N.W.—Jervaulx Abbey. Lund's Fell.

N.E.—Scarborough Mere. Terrington.

S.E.—Tickton. Waghen. Routh. Hull (G. Norman).

926. **Achnanthes exilis** Kütz.

S.W.—Cusworth and Hatfield districts (M. H. Stiles). Roche Abbey (J. N. Coombe; M. H. Stiles). Mirfield. Cullingworth. Frizinghall. Coley, near Shelf. Denholme.

MID W.—Baildon. Malham Tarn. Horsforth. Arthington. Bolton Woods. Whernside. Buckden. Simon's Fell. Boston Spa. Wigton Moor.

N.W.—Cautley Spout. Mickle Fell. Snaizeholme Beck.

N.E.—Hayburn Wyke. River Derwent, Forge Valley. Beast Cliff. Saltburn. Pilmoor, near Thirsk.

S.E.—Near Meaux Abbey. Newsholme. Tickton. Beverley. Newbald; Cottingham; Hull; Wawne (G. Norman).

927. **Achnanthes linearis** (W. Sm.) Grun.[Syn. *Achnanthidium lineare* W. Sm.].

N.W.—Dodd Fell.

N.E.—Ingleby Greenhow.

S.E.—Cottingham; Skirlaugh; Benningholme (G. Norman).

928. **Achnanthes lanceolata** (Bréb.) Grun.[Syn. *Achnanthidium lanceolatum* Bréb.].

S.W.—Askern district (M. H. Stiles). Cullingworth. Liversedge (Rev. W. Fowler!). Shipley. Denholme. Farnley. Near Bingley. Doncaster. Cragg Vale, towards Blackstone Edge. Woolley. Elslack.

MID W.—Baildon. Whernside. Boston Spa. Ribbleshead. Penyghent. Moughton Fell.

N.W.—Jervaulx Abbey. Mickle Fell.

N.E.—Strensall (W. B. Turner). Saltburn.

S.E.—Beverley. Routh. Near Meaux Abbey. Waghen. Cottingham; Wawne (G. Norman).

929. **Achnanthes Biasolettiana** Grun.

N.W.—Jervaulx Abbey.

930. **Achnanthes Hungarica** Grun.

S.W.—Horton Park, Bradford.

N.W.—Jervaulx Abbey, vii., 1898, abundant.

GENUS COCCONEIS Ehrenb., 1835.

931. **Cocconeis Pediculus** Ehrenb.

S.W.—Cusworth and Hatfield districts; Rossington (M. H. Stiles). Castleford.

MID W.—Roundhay (W. B. Turner). Wetherby. Baildon. Esholt. Holden Gill, near Keighley. Arthington. Harrogate. Bolton Woods. Near Settle. Kilnsey. Cowside Beck, Arncliffe. Oughtershaw Moss. Ingleton. Ribbleshead. Bog two miles south of Clapham. Moughton Fell. Knaresborough.

N.W.—Duerley Beck, near Hawes.

N.E.—Frequent. Hayburn Wyke. Scalby Beck. Terrington. Rievaulx Abbey. Malton. Stôkesley.

S.E.—Beverley. Cottingham; River Hull, etc. (G. Norman).

932. **Cocconeis Placentula** Ehrenb.

S.W.—Askern and Hatfield districts; Firsby Reservoirs; Rossington (M. H. Stiles). Roche Abbey (M. H. Stiles; J. N. Coombe). Marley, near Bingley. Ogden Clough. Doncaster. Frizinghall.

MID W.—Harrogate (G. Norman). Baildon. Malham Tarn. Moughton Fell. Cowside Beck, Arncliffe. Hawksworth Springs.

N.W.—Masham. Great Shunnor Fell. Jervaulx Abbey. Dodd Fell.

N.E.—River Derwent, Forge Valley. Seamer. Saltburn. Carlton Bank.

S.E.—Hornsea Mere. Routh. Newsholme. Beverley. Loftsome Bridge, near Wressle.

Forma **perpusilla** Rabenh.

MID W.—Baildon. Ribbleshead. Moughton Fell.

ORDER PSEUDORAPHIDIEÆ.

FAMILY *EPITHEMIEÆ*.

GENUS *EPITHEMIA* Bréb, 1838.

933. **Epithemia turgida** (Ehrenb.) Kütz.

S.W.—Askern and Hatfield districts (M. H. Stiles). Cullingworth. Near Doncaster.

MID W.—Bramhope (J. Abbott). Baildon. Malham. Ingleton. Holden Gill, near Keighley. Bolton Woods. Boston Spa. Crook Gill, one mile from Buckden.

N.W.—Cautley Spout. Jervaulx Abbey.

N.E.—‘Common.’ Levisham. Hayburn Wyke. On moist ground, Whitenab, Scarborough. Cleava Cliffs, north of Scalby. Carlton Bank. Stokesley. Malton.

S.E.—Newsholme. Market Weighton. Wressle. Peat Deposit, Hornsea; Risby Pond; Stepney Lane (G. Norman).

Var. **Westermanni** Kütz.

[Syn. *Epithemia Westermanni* Kütz.].

S.W.—Ogden Clough.

MID W.—Penyghent.

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Staindale. Levisham.

Var. **granulata** (Kütz.) Van Heurck.

[Syn. *Epithemia granulata* Kütz.].

S.E.—Hornsea Mere; Hornsea Deposit (G. Norman).

934. **Epithemia Sorex** Kütz.

S.W.—Hatfield district (M. H. Stiles).

MID W.—Malham Tarn.

N.W.—Cotterdale.

N.E.—Malton. Stokesley.

S.E.—Hornsea Mere. Stepney Lane (G. Norman).

935. **Epithemia gibba** Kütz.

S.W.—Askern and Hatfield districts; Doncaster (!) town

water (M. H. Stiles). Cullingworth. Ogden Clough. Crimsworth Dean.

MID W.—Baildon. Adel Bog. Malham Tarn. Holden Gill, near Keighley. South of Cray Moss. Near Buckden.

N.W.—Cautley. Cronkley Fell. Great Shunnor Fell. Cotterdale.

N.E.—Scarborough Mere. Staindale. Levisham. Moist ground, Whitenab, Scarborough (with sporangial forms). Carlton Bank. Malton. Stokesley.

S.E.—Market Weighton. Risby Pond; Driffield (G. Norman).

Var. **ventricosa** (Kütz.) V.H.

[Syn. *Epithemia ventricosa* Kütz.].

S.W.—Roche Abbey (M. H. Stiles).

MID W.—Moughton Fell.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Lockton.

S.E.—Risby Pond; Wawne; Hornsea Peat Deposit (G. Norman).

936. **Epithemia Argus** (Ehrenb.) Kütz.

S.W.—Near Bradford. Cullingworth.

MID W.—South of Cray Moss.

N.W.—Masham. Holwick. Mickle Fell. Great Shunnor Fell. Cotterdale. Great Sleddale.

N.E.—Moist ground, Whitenab, Scarborough. Great Ayton. Stokesley.

S.E.—Newsholme. Hornsea Deposit (G. Norman).

Var. **alpestris** (W. Sm.) Rabenh. [Syn. *Epithemia alpestris* W. Sm.; *E. Argus* var. *amphicephala* Grun.].

S.W.—Cullingworth. Ogden Clough, in gelatinous masses with auxospores and sporangial valves. Hebden Bridge.

MID W.—Cray Moss.

N.W.—Cautley Spout.

N.E.—Staindale. Beast Cliff.

S.E.—Hornsea Deposit (G. Norman).

937. **Epithemia gibberula** (Ehrenb.) Kütz.

S.W.—Cragg Vale, towards Blackstone Edge.

S.E.—Market Weighton.

Var. **rupestris** (W. Sm.) Rabenh.[Syn. *Epithemia rupestris* W. Sm.].

S.W.—Crimsworth Dean.

Mid W.—Cray Moss.

N.W.—Great Shunnor Fell.

938. **Epithemia Zebra** (Ehrenb.) Kütz.

S.W.—Hatfield district (M. H. Stiles).

N.W.—Cronkley Fell. Cotterdale.

S.E.—Hornsea Mere; Driffield: Wawne (G. Norman).

Var. **proboscidea** (Kütz.) Grun.

S.E.—Hornsea Deposit (G. Norman).

939. **Epithemia Hyndmanni** W. Sm.

S.E.—Peat Deposit, Hornsea (G. Norman).

GENUS EUNOTIA Ehrenb., 1837.

940. **Eunotia Arcus** Ehrenb.[Syn. *Himantidium Arcus* W. Sm.].

S.W.—Askern and Cusworth districts; Roche Abbey (M. H. Stiles). Cullingworth. Oxenhope. Ogden Clough.

Mid W.—Cocket Moss, near Giggleswick. Penyghent.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Goathland.

S.E.—Wawne (G. Norman).

Var. **minor** V.H.

S.W.—Hatfield district; Rossington (M. H. Stiles).

Var. **bidens** V.H.

S.W.—Askern district; Roche Abbey (M. H. Stiles).

941. **Eunotia major** (W. Sm.) Rabenh.[Syn. *Himantidium majus* W. Sm.].

S.W.—Cullingworth. Keighley Moor.

Mid W.—Black Hill, near Settle.

N.W.—Cronkley Fell. Great Shunnor Fell. Bog near Widdale Beck.

N.E.—Seamer. Carlton Bank.

S.E.—Cottingham (G. Norman).

942. **Eunotia gracilis** (Ehrenb.) Rabenh.

[Syn. *Himantidium gracile* Ehrenb.].

S.W.—Hatfield district (M. H. Stiles). Cullingworth. Marley, near Bingley. Greetland, near Halifax. Ogden Clough. Elslack.

MID W.—Blubberhouses (W. B. Turner). Adel Bog. Ilkley. Cam Fell. Whernside. Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.W.—Penhill Beacon. Jervaulx Abbey. Bog near Widdale Beck. Dodd Fell. Cowgill Wold Moss, Widdale Fell. Leeming. Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Near Scarborough. Ingleby.

S.E.—River Hull (G. Norman).

943. **Eunotia exigua** (Bréb.) Rabenh.

S.W.—Askern district (M. H. Stiles). Wibsey. Ogden Clough.

MID W.—Near Buckden. Giggleswick Common.

N.W.—Bog near Widdale Beck. Dodd Fell.

N.E.—Carlton Bank. Malton.

944. **Eunotia pectinalis** (Dillw.) Rabenh.

[Syn. *Himantidium pectinale* (Dillw.) Kütz.].

S.W.—Firsby reservoirs (M. H. Stiles). Bingley. Cullingworth. Ogden Clough. Doncaster. Cragg Vale, towards Blackstone Edge.

MID W.—Wetherby (F. A. Lees). Baildon. Near Knaresborough. Earl Seat. Kilnsey. Cray Moss. Ribbleshead. Giggleswick Common. Ingleton.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Great Sleddale.

N.E.—Beast Cliff. Terrington. Staindale. Carlton Bank. Scarborough. Saltersgate (G. Norman).

S.E.—Cottingham (G. Norman).

Var. **ventricosa** Grun.

S.W.—Hatfield district ; Doncaster town water (M. H. Stiles).

Var. **undulata** (W. Sm.) Ralfs.

[Syn. *Himantidium undulatum* W. Sm.].

S.W.—Roche Abbey (M. H. Stiles). Cullingworth.

MID W.—Blubberhouses (W. B. Turner). Hawksworth
(E. Hunter). Whernside. Adel Dam. Baildon.

N.E.—Goathland. Near Scarborough. Saltersgate (G. Norman.)

945. **Eunotia Faba** (Ehrenb.) Grun.

[Syn. *Himantidium Soleirolei* Kütz.].

S.W.—Kildwick. Ogden Clough.

MID W.—Ingleton.

N.W.—Cotterdale.

N.E.—Ingleby.

646. **Eunotia Veneris** Kütz. [Syn. *E. incisa* Greg.].

S. W.—Ogden Clough. Near Shipley.

MID W.—Giggleswick Common.

N.W.—Mickle Fell.

N.E.—Carlton Bank.

S.E.—Riccall Common. Skipwith Common.

947. **Eunotia prærupta** Ehrenb.

Var. **bidens** (Ehrenb.) Grun.

[Syn. *E. bidens* (Ehrenb.) W. Sm.].

MID W.—Holden Gill, near Keighley.

S.E.—Riccall Common. Newsholme, near Howden.

948. **Eunotia monodon** Ehrenb.

S.W.—Roche Abbey (M. H. Stiles ; J. N. Coombe).

N.W.—Mickle Fell.

949. **Eunotia robusta** Ralfs.

Var. **tetraodon** V.H.

S.W.—Doncaster town water (M. H. Stiles).

N.E.—Strensall. Lockton.

950. **Eunotia triodon** Ehrenb.

MID W.—Roundhay (W. B. Turner).

951. **Eunotia diodon** Ehrenb.

MID W.—Ilkley. Near Buckden.

N.W.—Cronkley Fell.

N.E.—Strensall.

952. **Eunotia Smithii** Gutw., 1895. [Syn. *E. gracilis*
W. Sm.; non *E. gracilis* (Ehrenb.) Rabenh.].

S.W.—Saltaire, in great abundance among *Microspora floccosa* in boggy field.

MID W.—Baildon.

953. **Eunotia lunaris** (Ehrenb.) Grun.

[Syn. *Synedra lunaris* Ehrenb.].

S.W.—Doncaster town water; Firsby reservoirs; Hatfield district (M. H. Stiles). Cullingworth. Chellow Dean. Mirfield. Elslack. Keighley Moor. Ogden Clough.

MID W.—Wigton Moor. Baildon. Adel Bog. Penyghent. Eldwick. Ilkley. Bolton Woods. Boston Spa. Black Hill, near Settle. Cam Fell. Wherside. Cocket Moss, near Giggleswick. Bowland Knotts. Bog, two miles south of Clapham.

N.W.—Sedbergh. Great Sleddale. Jervaulx Abbey. Lund's Fell. Bog near Widdale Beck. Cronkley Fell. Mickle Fell. Great Shunnor Fell.

N.E.—Staindale. Terrington. Carlton Bank. Malton.

S.E.—Skipwith Common (Rev. W. Fowler!). Market Weighton.

Var. **bilunaris** (Ehrenb.) Grun.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

S.E.—Beverley. Market Weighton.

Var. **undulata** Rabenh.

N.E.—Goathland.

954. **Eunotia flexuosa** Kütz.

Var. **bicapitata** Grun.

S.W.—Hatfield district (M. H. Stiles). Cullingworth.

GENUS CERATONEIS Ehrenb., 1840.

955. **Ceratoneis Arcus** (Ehrenb.) Kütz.[Syn. *Eunotia Arcus* (Ehrenb.) W. Sm.].

MID W.—Wherside. Holden Gill, near Keighley. Simon Seat.

N.W.—Calf Beck, Howgill Fells. Cautley Spout. Great Shunnor Fell. Muker. Hunter's Hole, Craydale Moor (1900 ft.). Mickle Fell. Cowgill Wold Moss, Widdale Fell.

Var. **Amphioxys** (Rabenh.) De Toni.[Syn. *Ceratoneis Amphioxys* Rabenh.].

MID W.—Wherside. Leathley. Holden Gill, near Keighley. Harrogate. Oak Beck.

N.W.—Calf Beck, Howgill Fells. Lund's Fell.

FAMILY *SYNEDRÆE*.

GENUS SYNEDRA Ehrenb., 1831.

956. **Synedra pulchella** Kütz.

S.W.—Doncaster town water; Firsby reservoirs; Hatfield district (M. H. Stiles). Bingley. Liversedge (Rev. W. Fowler!). Keighley. Shipley. Farnley.

MID W.—Baildon. Wherside. Arthington. Otley. Kilnsey. Boston Spa. Harrogate. Ribbleshead.

N.W.—Mickle Fell. River Ure.

N.E.—Hayburn Wyke. Rievaulx Abbey. Ingleby Greenhow. Malton.

S.E.—Tickton. Loftsome Bridge, near Wressle. Riccall Common. Reservoir Waterworks, Hull (G. Norman).

Var. **acicularis** (W. Sm.). [Syn. *Synedra acicularis* W. Sm.; *S. Smithii* Ralfs; *S. pulchella* var. *Smithii* (Ralfs) V.H.].

S.W.—Mirfield.

Var. **minutissima** (W. Sm.). [Syn. *Synedra minutissima* W. Sm.; *S. pulchella* var. *lanceolata* O'Meara].

MID W.—Buckden.

N.E.—Scarborough Mere. Hayburn Wyke. Scalby Beck. River Derwent, Forge Valley.

S.E.—Newsholme. Near Stoneferry (G. Norman).

957. **Synedra Vaucherix** Kütz.

S.W.—Mirfield. Allerton. Frizinghall. Cragg Vale, towards Blackstone Edge. Halifax.

MID W.—Baildon. Hawksworth Springs.

S.E.—Newsholme. Loftsme Bridge, near Wressle.

958. **Synedra Ulna** (Nitzsch) Ehrenb.

S.W.—Askern, Cusworth, and Hatfield districts; Firsby reservoirs: Rossington (M. H. Stiles). Roche Abbey (M. H. Stiles; J. N. Coombe). Woolley. Doncaster. Bingley. Fixby. Denholme. Bradford. Mirfield. Morley. Ogden Clough.

MID W.—Markington (Rev. J. S. Tute). Ripley; Harrogate! (G. Norman). Blubberhouses (W. B. Turner). Baildon. Kildwick. Ilkley. Otley. Holden Gill, near Keighley. Leathley. Above Eldwick. Bolton Woods. Boston Spa. Menston.

N.W.—Cautley Spout. Great Sleddale. Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Peat deposit, Filey. Scalby Beck. River Derwent, Forge Valley. Staindale. Rievaulx Abbey. Pilmoor, near Thirsk. Malton! (G. Norman). Ingleby.

S.E.—Loftsme Bridge, near Wressle. Beverley. Waghien. Haltenprice. Wawne; Reservoir waterworks, Hull; Hornsea Peat Deposit (G. Norman).

Forma **salina** (W. Sm.). [Syn. *Synedra salina* W. Sm.; *S. Ulna* forma *marina* Rabenh.].

S.E.—Market Weighton Canal (G. Norman).

Var. **splendens** (Kütz.) Brun.

[Syn. *S. splendens* Kütz.; *S. radians* W. Sm.].

S.W.—Firsby reservoirs (M. H. Stiles). Askern (Rev. F. H. Allen). Woolley. Bradford. Bingley. Doncaster. Goole. Roche Abbey (J. N. Coombe). Farnley. Elslack.

MID W.—Roundhay; South Milford (W. B. Turner). Austwick. Baildon. Malham Cove (J. M. Kirk). Boston Spa. Knaresborough. Bell Busk.

N.W.—Sedbergh. Mickle and Cronkley Fells.

N.E.—Malton. Scarborough.

S.E.—Beverley. Routh. Spring Ditch; Risby Pond; River Derwent; Cottingham; Newbald; Wawne; Reservoir Waterworks, Hull (G. Norman).

Var. **subæqualis** (Grun.) V.H.

S.W.—Hatfield district (M. H. Stiles).

Var. **æqualis** (Kütz.) Rabenh. [Syn. *S. æqualis* Kütz.].

S.E.—Riccall Common.

Var. **longissima** (W. Sm.) Grun.

[Syn. *S. longissima* W. Sm.].

S.W.—Wilsden.

MID W.—Rombald's Moor.

Var. **amphirhynchus** (Ehrenb.) V.H.

[Syn. *S. amphirhynchus* Ehrenb.].

S.W.—Doncaster town water (M. H. Stiles).

Var. **obtusa** (W. Sm.) V.H. [Syn. *S. obtusa* W. Sm.].

N.E.—Egton.

Var. **oxyrhynchus** (Kütz.) V.H.

[Syn. *S. oxyrhynchus* Kütz.].

S.W.—Cullingworth.

959. **Synedra Acus** (Kütz.) Grun.

S.W.—Hatfield district; Rossington (M. H. Stiles). Greetland, near Halifax. Fixby.

MID W.—Kilusey. Bell Busk. Wigton Moor. Bolton Woods. Harrogate. Ilkley.

N.E.—Pilmoor, near Thirsk. Ingleby. Malton.

S.E.—Loftsome Bridge, near Wressle. Newsholme. Near Meaux Abbey. Skipwith Common.

Var. **delicatissima** (W. Sm.) Grun.

[Syn. *S. delicatissima* W. Sm.].

S.W.—Fixby. Marley, near Bingley.

N.W.—Jervaulx Abbey.

N.E.—Scarborough Mere. Strensall. Terrington. Malton.

S.E.—Market Weighton.

960. **Synedra radians** (Kütz.) Grun.

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles).
Doncaster. Ogden Clough.

MID W.—Rombald's Moor. Near Buckden.

S.E.—Market Weighton. Skipwith Common.

961. **Synedra capitata** Ehrenb.

S.W.—Askern and Hatfield districts (M. H. Stiles). Hunslet
(J. Abbott). Goole; Roche Abbey (E. Hunter). Near Shipley.

MID W.—South Milford (W. B. Turner). Malham Cove
(J. M. Kirk). Staveley Dam, near Knaresborough.

N.E.—Strensall. Near Scarborough.

S.E.—Beverly. Spring Ditch; Risby Pond; Reservoir
Waterworks, Hull; Hornsea Peat Deposit (G. Norman).

962. **Synedra famelica** Kütz.

MID W.—Harrogate. Hawksworth Springs. Bog two miles
south of Clapham. Malham Tarn.

N.W.—Cautley Spout. Snaizeholme Beck.

963. **Synedra affinis** Kütz. var. **fasciculata** (Kütz.) V. H.
[Syn. *S. fasciculata* Kütz.].

MID W.—Outlet to lake, Ripley (G. Norman).

[*S. hamata* W. Sm., recorded for the outlet of the lake, Ripley
Castle, is probably a variety of *S. affinis* Kütz.].

964. **Synedra amphicephala** Kütz.

MID W.—Ingleton, on wet rocks, amongst *Cladophora*
glomerata.

GENUS ASTERIONELLA Hass., 1850.

965. **Asterionella formosa** Hass.

S.W.—Askern district (M. H. Stiles). Greetland, near
Halifax.

MID W.—Ripley Castle (G. Norman). Cowthorpe. Peny-

ghent. Holden Gill, near Keighley. Wigton Moor. Moughton Fell.

N.W.—Mickle Fell. Romalldkirk.

N.E.—Strensall.

FAMILY *FRAGILARIEÆ*.

GENUS *FRAGILARIA* Lyngb., 1819.

966. ***Fragilaria virescens*** Ralfs.

S.W.—Not uncommon about Bradford. Marley, near Bingley.

MID W.—Hawksworth Springs (H. F. Parsons). Bowland Knotts.

N.E.—Terrington.

S.E.—Cottingham ; Wawne ; Inglemire Lane (G. Norman).

967. ***Fragilaria capucina*** Desmaz.

S.W.—Cusworth and Hatfield districts ; Rossington (M. H. Stiles). Askern (J. M. Kirk ; M. H. Stiles). Hatfield Chase (J. M. Kirk). Roche Abbey (J. N. Coombe ; M. H. Stiles). Bradford. Cullingworth. Doncaster. Bingley. Denholme. Oxenhope. Worth Valley and Keighley Tarn.

MID W.—Chapelton ; Roundhay (W. B. Turner). Malham Cove (J. M. Kirk). Adel Bog. Holden Gill, near Keighley. Whernside. Arthington. Ilkley.

N.W.—Sedbergh. Mickle Fell.

N.E.—Lockton. Egton. Strensall. Scarborough Mere. Terrington. Malton. Stokesley.

S.E.—Tickton. Near Meaux Abbey. Newsholme. Beverley. Loftsome Bridge, near Wressle. Hull ; Cottingham ; Inglemire Lane (G. Norman).

Var. ***mesolepta*** Rabenh.

S.W.—Firsby reservoirs (M. H. Stiles).

MID W.—Cocket Moss, near Giggleswick.

N.E.—Lockton.

968. ***Fragilaria construens*** (Ehrenb.) Grun.

[Syn. *Odontidium Tabellaria* W. Sm.].

S.W.—Cusworth, near Doncaster. Doncaster town water ; Hatfield district ; Rossington (M. H. Stiles).

MID W.—Langcliffe, near Settle. Malham Tarn Bog.

S.E.—Beverley. Hornsea Mere ; Risby Pond ; Wawne ; Hornsea Peat Deposit (G. Norman).

Var. **binodis** Grun.

[Syn. *Odontidium parasiticum* W. Sm., pro parte].

MID W.—Pond at Horsforth ! (Miss J. Town), attached to *Swirella biseriata* and *Cymatopleura Solea*.

S.W.—Roche Abbey (M. H. Stiles ; J. N. Coombe).

S.E.—Market Weighton Canal ; Beverley Parks (G. Norman).

969. **Fragilaria Harrisonii** (W. Sm.) Grun.

[Syn. *Odontidium Harrisoni* W. Sm.].

S.W.—Cusworth district (M. H. Stiles). Roche Abbey (J. N. Coombe ; M. H. Stiles).

MID W.—Langcliffe, near Settle.

S.E.—Haltenprice ; Spring Head ; Hornsea Peat Deposit ; Spring Ditch ; Cottingham ; near Hull (G. Norman).

970. **Fragilaria mutabilis** (W. Sm.) Grun.

[Syn. *Odontidium mutabile* W. Sm.].

S.W.—Cusworth district (M. H. Stiles). Marsden. Cullingworth. Roche Abbey (M. H. Stiles ; J. N. Coombe). Fixby.

MID W.—Holden Gill, near Keighley. Baildon. Staveley Dam, near Knaresborough. Ribbleshead.

N.W.—Howgill Fells. Great Shunnor Fell.

N.E.—Saltburn. Scarborough.

S.E.—Beverley. Waghen. Loftsom Bridge, near Wressle. Risby Pond ; Wawne ; Market Weighton Canal ; Cottingham ; Spring Ditch (G. Norman).

FAMILY *MERIDIONID.E.*

GENUS *MERIDION* Ag., 1824.

971. **Meridion circulare** (Grev.) Ag.

S.W.—Cusworth and Hatfield districts ; Roche Abbey ; Doncaster town water (M. H. Stiles). Woolley. Saltaire. Marley, near Bingley. Elslack. Coley, near Shelf (pure gathering).

MID W.—Near Norwood Hall, above Lindley Reservoir. Kilnsey. Malham Cove. Malham Tarn Bog. Horton-in-Ribblesdale. Ribbleshead. Whernside. Boston Spa. Baildon. Eldwick.

N.W.—Lund's Fell. Dodd Fell. Howgill Fells. Widdale Fell. Mickle Fell. Great Shunnor Fell. Hawes.

S.E.—Beverley. Routh. Loftsome Bridge, near Wressle. Tickton. Near Meaux Abbey. Haltenprice. Cottingham; Market Weighton; Driffield (G. Norman).

Var. **constrictum** (Ralfs) V.H.

[Syn. *Meridion constrictum* Ralfs].

S.W.—Keighley.

N.W.—Cronkley Fell. Great Shunnor Fell. Cotterdale.

S.E.—Spring Ditch (Dr. Munroe).

FAMILY *DIATOMACEÆ*.

GENUS *DIATOMA* DC., 1805.

972. *Diatoma vulgare* Bory.

S.W.—Cusworth district; Rossington; Roche Abbey (M. H. Stiles). Askern (G. Norman; M. H. Stiles). Hatfield Chase (G. Norman). Roche Abbey (J. N. Coombe). Shipley.

MID W.—Harrogate (G. Norman). Arthington. Near Norwood Hall, above Lindley Reservoir. Holden Gill, near Keighley. Bolton Woods. Otley. Oughtershaw Moss. Whernside. Ripley; Knaresborough (G. Norman).

N.W.—Winch Bridge. Mickle Fell.

N.E.—Whitby. Lockton. Strensall (W. B. Turner). Hayburn Wyke. Scalby Beck. Malton (G. Norman).

S.E.—Loftsome Bridge, near Wressle. Skipwith Common. Wawne; Reservoir Waterworks, Hull (G. Norman).

973. *Diatoma elongatum* Ag.

S.W.—Cusworth and Hatfield districts; Firsby reservoirs; Rossington (M. H. Stiles). Roche Abbey (J. N. Coombe; M. H. Stiles). Shipley. Doncaster. Liversedge (Rev. W. Fowler!). Fixby. Goole. Heaton.

MID W.—Ripley (G. Norman). Blubberhouses; Roundhay (W. B. Turner). Holden Gill, near Keighley. Adel. Buckden. Staveley Dam, near Knaresborough. Hawksworth.

N.W.—Winch Bridge.

N.E.—Whitby. Scarborough Mere. Strensall! (W. B. Turner). Scalby Beck.

S.E.—Beverley. Newsholme. Loftsome Bridge, near Wressle. Skirlaugh. Reservoir Waterworks, Hull; Market Weighton (G. Norman).

Var. **Ehrenbergii** (Kütz.) V.H.

[Syn. *D. Ehrenbergii* Kütz.; *D. grande* W. Sm.].

S.W.—Trough near Shipley.

MID W.—Markington (Rev. J. S. Tute). Malham Tarn Bog.

S.E.—Hull (G. Norman).

974. **Diatoma hiemale** (Lyngb.) Heib.

[Syn. *Odontidium hiemale* (Lyngb.) Kütz.].

S.W.—Wilsden. Greetland, near Halifax. Crimsworth Dean.

MID W.—Blubberhouses (W. B. Turner). Holden Gill, near Keighley.

N.W.—Mickle Fell. Sedbergh. Howgill Fells.

N.E.—Lockton. Scarborough Mere. Rievaulx Abbey. Carlton Bank.

S.E.—Beverley.

Var. **mesodon** (Kütz.) V.H.

[Syn. *Odontidium mesodon* Kütz.].

S.W.—Bradford. Roche Abbey (J. N. Coombe). Worth Valley, near Keighley. Denholme. Ogden Clough. Crimsworth Dean. Hebden Bridge.

MID W.—Blubberhouses; Roundhay (W. B. Turner) Shipley Glen. Holden Gill, near Keighley. Malham Cove. Whernside. Kilnsey.

N.W.—Mickle Fell. Holwick. Dodd Fell. Great Shunnor Fell. Calf Beck, Howgill Fells.

975. **Diatoma anceps** (Ehrenb.) Grun.

N.W.—Bog, near Widdale Beck, abundant, iv. 1898.

GENUS DENTICULA Kütz., 1844.

976. *Denticula tenuis* Kütz.

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles).
Crimsworth Dean.

MID W.—Holden Gill, near Keighley. Shipley Glen. Simon's
Fell. Ingleton.

N.W.—Cautley Spout.

N.E.—Beast Cliff.

S.E.—Wressle. Wawne (G. Norman). Anlaby Road (Dr.
Munroe).

Var. *crassula* (Näg.). [Syn. *D. crassula* Næg., 1849; *D.*
inflata W. Sm., 1856].

MID W.—Ingleton.

N.W.—Great Shunnor Fell.

S.E.—Newbald (G. Norman).

977. *Denticula elegans* Kütz.

S.W.—Ogden Clough.

FAMILY *TABELLARIÆ*.GENUS *TABELLARIA* Ehrenb., 1839.978. *Tabellaria fenestrata* (Lyngb.) Kütz.

S.W.—Cullingworth. Greetland, near Halifax. Skelmanthorpe.
Keighley Moor.

MID W.—Blubberhouses (W. B. Turner). Ilkley.

N.W.—Baugh Fell. Mickle Fell. Cotterdale.

N.E.—Carlton Bank.

S.E.—Skipwith Common.

979. *Tabellaria flocculosa* (Roth.) Kütz.

S.W.—Bradford. Doncaster town water; Hatfield district
(M. H. Stiles). Keighley Moor. Cragg Vale, towards Blackstone
Edge. Cullingworth.

MID W.—Blubberhouses; Horsforth (W. B. Turner). Black
Hill, near Settle. Near Buckden. Cam Fell. Ilkley. Cocket
Moss, near Giggleswick. Bowland Knotts. Giggleswick
Common.

N.W.—Sedbergh. Baugh Fell. Wherside. Mickle and Cronkley Fells. Great Shunnor Fell. Hawes.

N.E.—Pilmoor, near Thirsk. Saltersgate (G. Norman). Scarborough.

S.E.—Riccall Common. Cottingham; Spring Head; Spring Ditch; Risby Pond (G. Norman).

Var. **ventricosa** (Kütz.) Rabenh.

S.W.—Cullingworth.

MID W.—Wigton Moor. Rombald's Moor. Baildon. Adel Dam.

N.W.—Leeming. Mickle Fell. Great Shunnor Fell.

N.E.—Scarborough Mere.

GENUS TETRACYCLUS Ralfs, 1843.

980. **Tetracyclus rupestris** (A. Br.) Grun.

[Syn. *Gomphogramma rupestris* A. Br.].

S.W.—Goole (J. Harrison).

981. **Tetracyclus lacustris** Ralfs.

MID W.—Roundhay (W. B. Turner).

FAMILY SURIRELLÆ.

GENUS CYMATOPLEURA W. Sm., 1851.

982. **Cymatopleura elliptica** (Bréb.) W. Sm.

S.W.—Askern, Cusworth, and Hatfield districts; Rossington (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Heaton. Cullingworth. Fixby.

MID W.—Roundhay; South Milford (W. B. Turner). Hawksworth. Baildon. Malham Tarn Bog. Bolton Woods. Near Settle. Staveley Dam, near Knaresborough.

N.W.—Cronkley Fell. Dodd Fell.

N.E.—Levisham.

S.E.—Routh; Risby Pond; Wawne; Haltenprice; Hornsea Deposit; Cottingham; Spring Ditch; Beverley; Market Weighton Canal (G. Norman).

Var. **constricta** Grun.

S.W.—Goole.

Var. **Hibernica** (W. Sm.) V.H. [Syn. *C. Hibernica* W. Sm.].

S.W.—Firsby reservoirs; Hatfield district (M. H. Stiles).
Marley, near Bingley.

MID W.—Hawksworth.

983. **Cymatopleura Solea** (Bréb.) W. Sm.

S.W.—Cusworth and Hatfield districts; Firsby reservoirs;
Rossington (M. H. Stiles). Goole (E. Hunter). Roche Abbey
(M. H. Stiles; E. Hunter). Askern (M. H. Stiles; F. H. Allen).
Hatfield Chase (J. M. Kirk). Doncaster.

MID W.—Roundhay (W. B. Turner). South Milford (F.
Emsley). Hawksworth. Moughton Fell. Penyghent. Wherside.
Pool. Malham Tarn Bog. Baildon. Horsforth. Boston Spa.
Harrogate.

N.W.—Cronkley Fell. Great Shunnor Fell. Hawes Junction.

N.E.—Levisham. Saltburn. Rievaulx Abbey. Malton.
Carlton Bank.

S.E.—Beverley. Tickton. Newsholme. Routh. Loftsome
Bridge, near Wressle. Market Weighton. Skipwith Common.
Skirlaugh; Hornsea Deposit; Wawne; Reservoir, Hull; Cot-
tingham; Haltenprice; Spring Ditch; Beverley (G. Norman).

Var. **apiculata** (W. Sm.) Ralfs. [Syn. *C. apiculata* W. Sm.].

S.W.—Marley, near Bingley. Roche Abbey (M. H. Stiles;
J. N. Coombe). Horton Park, Bradford.

N.W.—Mickle Fell.

S.E.—Cottingham; Skirlaugh (G. Norman).

GENUS SURIRELLA Turp., 1827.

984. **Surirella biseriata** Bréb.

S.W.—Cusworth, near Doncaster (M. H. Stiles). Roche
Abbey (J. N. Coombe; M. H. Stiles). Cullingworth. Marley,
near Bingley.

MID W.—Blubberhouses; Roundhay; South Milford (W. B.
Turner). Baildon. Eldwick. Saltaire. Adel Bog. Leathley.
Cocket Moss, near Giggleswick.

N.W.—Leeming. Mickle Fell. Great Shunnor Fell.

N.E.—Scarborough Mere. Staindale. Carlton Bank.

S.E.—Beverley. Cottingham: River Hull; Market Weighton Canal; Wawne (G. Norman).

985. **Surirella linearis** W. Sm.

S.W.—Roche Abbey (J. N. Coombe; M. H. Stiles). Marley, near Bingley. Cullingworth. Greetland, near Halifax. Ogden Clough. Cragg Vale, towards Blackstone Edge.

MID W.—Adel Bog. Eldwick. Kildwick. Appletreewick. Leathley. Black Hill, near Settle.

N.W.—Wherside. Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell.

N.E.—Staindale. Terrington. Carlton Bank.

S.E.—Cottingham; Beverley Parks; Wawne; Hornsea Peat Deposit; Market Weighton Canal (G. Norman).

Var. **constricta** Grun.

N.W.—Baugh Fell.

986. **Surirella elegans** Ehrenb.

[Syn. *Campylodiscus elegans* (Ehrenb.) Rabenh.].

MID W.—River Skell, Fountain's Abbey (G. Stuart; E. Grove).

S.E.—Hull (G. Norman).

987. **Surirella robusta** Ehrenb. [Syn. *S. nobilis* W. Sm.].

MID W.—Cocket Moss, near Giggleswick. Bowland Knotts.

N.W.—Mickle Fell.

N.E.—Terrington.

S.E.—Hornsea Peat Deposit; Stoneferry; Cottingham; Market Weighton Canal (G. Norman).

Var. **splendida** (Ehrenb.) V.H.

[Syn. *S. splendida* (Ehrenb.) Kütz.].

S.W.—Doncaster town water; Rossington (M. H. Stiles). Horton Park.

MID W.—Markington (Rev. J. S. Tute). Harrogate.

N.E.—Strensall. Scarborough Mere.

S.E.—Beverley: Spring Ditch; near Stoneferry; Market Weighton Canal (G. Norman).

988. *Surirella striatula* Turp.

S.W.—Goole (J. Harrison).

S.E.—Near Stoneferry; Market Weighton Canal (G. Norman).

989. *Surirella ovalis* Bréb.

S.W.—Askern and Hatfield districts; Doncaster town water; Firsby reservoirs (M. H. Stiles). Roche Abbey (J. N. Coombe). Goole. Farnley.

MID W.—Baildon. Saltaire.

N.E.—Seamer. Staithes. Beast Cliff.

S.E.—Near Stoneferry; Hornsea Peat Deposit; Anlaby to Hessle Road (G. Norman).

Var. **ovata** (Kütz.) V.H. [Syn. *Surirella ovata* Kütz.].

S.W.—Rossington (M. H. Stiles). Chellow Dean. Bingley. Goole. Near Shipley.

MID W.—Roundhay; South Milford (W. B. Turner). Harrogate (G. Norman).

N.E.—Strensall. Whitby. Staindale.

S.E.—Routh. Beverley. Near Meaux Abbey. River Hull; Skirlaugh; Dairycoats; Cottingham (G. Norman).

Var. **minuta** (Bréb.) V.H. [Syn. *Surirella minuta* Bréb.].

S.W.—Bradford. Allerton. Marley, near Bingley. Goole. Heaton. Fixby. Coley, near Shelf. Liversedge! (Rev. W. Fowler).

MID W.—Above Eldwick. Bolton Woods. Harrogate. Baildon.

N.W.—Mickle Fell. Reeth.

N.E.—Strensall. Seamer. Scalby Beck.

S.E.—Routh. Beverley. Newsholme. Tickton. Near Meaux Abbey. Waghen.

Var. **salina** (W. Sm.) V.H. [Syn. *Surirella salina* W. Sm.].

S.E.—Waghen.

Var. **angusta** (Kütz.) V.H.[Syn. *Surirella angusta* Kütz.; *S. apiculata* W. Sm.].

S.W.—Cusworth, near Doncaster (!) (M. H. Stiles). Chellow Dean. Keighley Moor.

MID W.—Rombald's Moor. Near Otley. Moughton Fell.

N.W.—Rokeby.

N.E.—Marske. Strensall.

S.E.—Near Meaux Abbey. Stoneferry Lane (Dr. Munroe).

Var. **pinnata** (W. Sm.) V.H.

[Syn. *Surirella pinnata* W. Sm.].

S.W.—Rossington (M. H. Stiles). Near Bradford. Chellow Dean. Bingley. Ogden Clough. Near Shipley. Farnley.

MID W.—Eldwick. Adel Bog. Oughtershaw Moss.

N.E.—Strensall. Dalton. Seamer. Scalby Beck. Rievaulx Abbey. Malton.

S.E.—Beverley. Routh. Newsholme. Market Weighton. Risby Pond; Cottingham; Haltenprice; Hornsea Peat Deposit; ditch near river Hull (G. Norman).

Var. **panduriformis** (W. Sm.).

[Syn. *Surirella panduriformis* W. Sm.].

S.W.—Allerton.

MID W.—Harrogate (G. Norman).

N.W.—Mickle Fell. Rokeby.

S.E.—Tickton. Skirlaugh; Market Weighton Canal (G. Norman).

Var. **Crumena** (Bréb.) Van Heurck. [Syn. *Surirella Crumena* Bréb.; *S. Brightwellii* W. Sm.].

S.W.—Firsby reservoirs; Rossington (M. H. Stiles).

MID W.—Birk Craggs, Harrogate (G. Norman).

N.E.—Saltersgate (G. Norman).

S.E.—Outlet, Hornsea Mere; Hornsea Peat Deposit; river Hull; near Stoneferry; Reservoir Waterworks, Hull; Market Weighton Canal; Haltenprice (G. Norman).

990. **Surirella spiralis** Kütz.

[Syn. *Campylodiscus spiralis* W. Sm.].

S.W.—Roche Abbey (E. Hunter). Askern district (M. H. Stiles). Cullingworth. Marley, near Bingley. Hebden Bridge.

MID W.—Baildon, Hawksworth.

N.W.—Cronkley Fell. Dodd Fell.

N.E.—Staindale. Carlton Bank.

S.E.—Haltenprice ; Skirlaugh (G. Norman).

991. **Surirella Craticula** Ehrenb.

S.E.—Hornsea Peat Deposit, very rare (G. Norman).

GENUS CAMPYLODISCUS Ehrenb., 1841.

992. **Campylodiscus Hibernicus** Ehrenb.

[Syn. *Campylodiscus costatus* W. Sm.].

S.W.—Cusworth (!) and Askern Districts (M. H. Stiles).
Cullingworth.

MID W.—Baildon. Malham Tarn. Horton-in-Ribblesdale.
South of Cray Moss.

S.E.—Spring Ditch ; Cottingham ; Haltenprice ; Newbald ;
Hornsea Peat Deposit ; Market Weighton Canal (G. Norman).

FAMILY NITZSCHIEÆ.

GENUS HANTZSCHIA Grun., 1877.

993. **Hantzschia amphioxys** (Ehrenb.) Grun.

[Syn. *Nitzschia amphioxys* (Ehrenb.) W. Sm.].

S.W.—Askern and Cusworth districts ; Doncaster (!) town
water ; Rossington (M. H. Stiles). Roche Abbey (M. H. Stiles ;
J. N. Coombe). Goole. Bradford. Chellow Dean: Shipley.

MID W.—Killinghall ; Harrogate (G. Norman). Baildon.
Bolton Woods.

N.W.—Mickle Fell. River Ure.

N.E.—Strensall. Scarborough Mere. Rievaulx Abbey.
Saltburn. Carlton Bank.

S.E.—Routh. Near Meaux Abbey. Waghen. Benning-
holme ; Wawne ; Cottingham ; Market Weighton Canal (G.
Norman).

GENUS NITZSCHIA Hass., 1845.

994. **Nitzschia punctata** (W. Sm.) Grun.

[Syn. *Tryblionella punctata* W. Sm.].

S.E.—Market Weighton Canal ; pond, Stepney (G. Norman).

995. *Nitzschia Tryblionella* Hantzsch.

[Syn. *Tryblionella gracilis* W. Sm.].

S.W.—Goole (J. Harrison). Roche Abbey (M. H. Stiles ; J. N. Coombe). Doncaster town water ; Firsby reservoirs ; Rossington (M. H. Stiles).

N.E.—Saltburn.

S.E.—Market Weighton. Stoneferry ; Hornsea Peat Deposit (G. Norman).

996. *Nitzschia angustata* (W. Sm.) Grun.

[Syn. *Tryblionella angustata* W. Sm.].

S.W.—Roche Abbey (M. H. Stiles ; J. N. Coombe).

S.E.—Newsholme. Beverley ! ; Market Weighton Canal ; Anlaby (G. Norman).

997. *Nitzschia constricta* (Kütz.) Pritch.

[Syn. *N. dubia* W. Sm.].

S.W.—Goole (J. Harrison).

MID W.—Boston Spa. Hawksworth Springs. Bolton Woods. Ribbleshead.

S.E.—Beverley. Loftsome Bridge, near Wressle. Tickton. Routh. Near Meaux Abbey. Waghon. Market Weighton. Cottingham ; near Stoneferry ; Wawne ; Haltenprice ; Dairycoats ; Anlaby to Hessle Road ; Skirlaugh ; Stepney Lane (G. Norman).

Forma **minor** Rabenh.

MID W.—Baildon.

S.E.—Market Weighton.

998. *Nitzschia plana* W. Sm.

S.E.—Brackish ditch, near River Hull (G. Norman).

999. *Nitzschia parvula* W. Sm.

Often found on damp ground and amongst damp moss.

S.W.—Doncaster. Roche Abbey (J. N. Coombe). Ogden Clough.

MID W.—Boston Spa. Bolton Woods. Holden Gill, near Keighley.

N.W.—Great Shunnor Fell.

N.E.—Strensall. Marske. Rievaulx Abbey.

S.E.—Riccall Common. Beverley. Waghen. Market Weighton. Withernsea; Cottingham (G. Norman).

1000. **Nitzschia apiculata** (Greg.) Grun.

[Syn. *Tryblionella apiculata* Greg.].

S.E.—Patrington (G. Norman).

1001. **Nitzschia acuminata** (W. Sm.) Grun.

[Syn. *Tryblionella acuminata* W. Sm.].

S.W.—Goole (J. Harrison).

S.E.—Cottingham (G. Norman). Timber Pond, Hull (R. Harrison).

1002. **Nitzschia circumsuta** (Bail.) Grun.

[Syn. *Surirella circumsuta* Bail.; *Tryblionella Scutellum* W. Sm.].

S.W.—Goole (J. Harrison). Askern district (M. H. Stiles).

MID W.—Roundhay (W. B. Turner).

1003. **Nitzschia bilobata** W. Sm.

S.E.—Outlet of Hornsea Mere; Dairycoats; ditch near River Hull (G. Norman).

1004. **Nitzschia Denticula** Grun.

[Syn. *Denticula obtusa* W. Sm.].

MID W.—Malham Cove (J. M. Kirk). Bingley. Holden Gill, near Keighley.

N.E.—Beast Cliff. Near Scarborough.

1005. **Nitzschia sinuata** (W. Sm.) Grun.

[Syn. *Denticula sinuata* W. Sm.].

S.W.—Askern district (M. H. Stiles). Ogden Clough.

MID W.—Baildon. Holden Gill, near Keighley. Cowside Beck, Arncliffe.

S.E.—Market Weighton. Cottingham; Beverley Parks (G. Norman).

1006. **Nitzschia paradoxa** (Gmel.) Grun.

[Syn. *Bacillaria paradoxa* Gmel.].

S.W.—Goole.

S.E.—Near Stoneferry; Market Weighton Canal (G. Norman).

1007. *Nitzschia vivax* W. Sm.

S.E.—Near Stoneferry (G. Norman).

1008. *Nitzschia dissipata* (Kütz.) Grun.

[Syn. ? *N. minutissima* W. Sm.].

MID W.—Roundhay (W. B. Turner). Baildon. Hawksworth Springs. Malham Tarn.

N.W.—Mickle Fell.

N.E.—Whitby. Seamer. Rievaulx Abbey. Strensall (W. B. Turner).

S.E.—Near Hull (G. Norman).

Var. *media* Van Heurck.

MID W.—Hawksworth Springs. Penyghent.

S.E.—Market Weighton.

1009. *Nitzschia Sigmoidea* (Ehrenb.) W. Sm.

S.W.—Abundant in the Bradford, Halifax, and Keighley districts. Cusworth and Hatfield districts; Firsby reservoir; Rossington (M. H. Stiles). Askern; Hatfield Chase (J. M. Kirk). Roche Abbey (J. N. Coombe). Doncaster. Wibsey. Allerton.

MID W.—Malham Cove (J. M. Kirk). Arthington. Bolton Woods. Staveley Dam, near Knaresborough. Wherside.

N.W.—Dodd Fell. Mickle and Cronkley Fells.

N.E.—Seamer. Near Scarborough. Malton. Carlton Bank.

S.E.—Beverley. Routh. Market Weighton. Skipwith Common. Cottingham; Risby Pond; Wawne; Haltenprice; Spring Ditch; Beverley (G. Norman).

1010. *Nitzschia vermicularis* (Kütz.) Grun.

S.W.—Hatfield district (M. H. Stiles).

1011. *Nitzschia Brébissonii* W. Sm.

MID W.—Gordale.

S.E.—Near Stoneferry (G. Norman).

1012. *Nitzschia Sigma* (Kütz.) W. Sm.

S.W.—Goole (J. Harrison).

1013. *Nitzschia curvula* (Ehrenb.) W. Sm.

S.W.—Doncaster town water (M. H. Stiles). Allerton.
Cullingworth.

MID W.—Adel Bog. Cocket Moss, near Giggleswick.

N.E.—Rievaulx Abbey.

S.E.—Stoneferry to Sutton (R. Harrison). Routh. Beverley.
Waghen.

1014. *Nitzschia fasciculata* Grun.

S.W.—Hatfield district (M. H. Stiles).

1015. *Nitzschia obtusa* W. Sm.

Var. *scalpelliformis* Grun.

S.E.—Loftsome Bridge, near Wressle.

Var. *nana* Grun.

MID W.—Hawksworth Springs.

S.E.—Skipwith Common.

1016. *Nitzschia linearis* (Ag.) W. Sm.

S.W.—Hatfield district (M. H. Stiles). Goole. Doncaster.
Woolley. Denholme. Farnley. Shipley. Frizinghall.

MID W.—Holden Gill, near Keighley. Gordale. Above Eldwick. Boston Spa. Cray Moss. Baildon.

N.W.—Jervaulx Abbey. Mickle Fell.

N.E.—Hayburn Wyke. Saltburn.

S.E.—Beverley. Tickton. Routh. Near Meaux Abbey.
Haltenprice; Cottingham (G. Norman).

Var. *tenuis* (W. Sm.) Grun. [Syn. *N. tenuis* W. Sm.].

S.W.—Bradford. Chellow Dean. Allerton. Doncaster. Cragg
Vale, towards Blackstone Edge.

MID W.—Moughton Fell. Gordale. Pond at Pool.

N.E.—Rievaulx Abbey. Malton.

S.E.—Beverley. Newsholme. Loftsome Bridge, near
Wressle. Tickton. Routh. Market Weighton. Haltenprice;
Spring Ditch; Cottingham (G. Norman).

1017. *Nitzschia vitrea* Norman.

S.E.—Near Stoneferry in brackish ditch (G. Norman).

Var. **recta** (Hantzsch) V.H.

S.W.—Hatfield district (M. H. Stiles).

1018. **Nitzschia lanceolata** W. Sm.

S.W.—Roche Abbey (E. Hunter). Near Mirfield.

MID W.—Roundhay; South Milford; Killingbeck (W. B. Turner).

N.E.—Strensall! (W. B. Turner).

1019. **Nitzschia Palea** (Kütz.) W. Sm.

S.W.—Hatfield district (M. H. Stiles). Allerton. Crimsworth Dean. Cragg Vale, towards Blackstone Edge. Marley, near Bingley.

MID W.—Rombald's Moor. Boston Spa. Near Buckden. Bog, two miles south of Clapham. Malham Tarn Bog. Moughton Fell.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk. Ingleby Greenhow. Saltburn.

S.E.—Market Weighton. Wressle. Newsholme, near Howden. Cottingham; Stoneferry (G. Norman).

Var. **fonticola** Grun.

MID W.—Baildon. Harrogate.

Var. **debilis** V.H.

S.W.—Saltaire. Cullingworth.

MID W.—Rombald's Moor.

N.W.—Jervaulx Abbey.

Var. **tenuirostris** V.H.

S.W.—Horton Park, Bradford. Near Shipley.

N.W.—Jervaulx Abbey.

1020. **Nitzschia communis** Rabenh.

S.W.—Allerton. Horton Park, Bradford.

N.W.—Jervaulx Abbey.

1021. **Nitzschia amphibia** Grun.

S.W.—Near Bingley.

N.W.—Mickle Fell.

1022. *Nitzschia longissima* (Bréb.) Ralfs.

Var. *Closterium* (W. Sm.) V.H.

[Syn. *N. Closterium* W. Sm.].

S.E.—Beverley.

Var. *reversa* (W. Sm.) V.H. [Syn. *N. reversa* W. Sm.].

S.E.—Ditch near Stoneferry (G. Norman).

1023. *Nitzschia Smithii* Ralfs. [Syn. *N. spectabilis*
W. Sm. non *N. spectabilis* (Ehrenb.) Ralfs].

S.E.—Rare in a brackish ditch near Stoneferry (G. Norman).

1024. *Nitzschia acicularis* (Kütz.) W. Sm.

[Syn. *Nitzschiella acicularis* Rabenh.].

S.W.—Hatfield district (M. H. Stiles). Mirfield.

MID W.—Austwick. Adel Bog. Pond at Pool. Hawksworth.
Bolton Woods. Boston Spa.

N.W.—Mickle Fell. Dalton.

N.E.—Whitby. Seamer. Scalby Beck. Saltburn. Carlton
Bank.

S.E.—Routh. Near Sutton. Beverley. Loftsome Bridge,
near Wressle. Newsholme. Dairycoats; Cottingham (G.
Norman).

1025. *Nitzschia gracilis* (Bréb.).

[Syn. *Nitzschiella gracilis* (Bréb.) Rabenh.].

MID W.—Roundhay (W. B. Turner).

S.E.—Waghen.

GENUS CYLINDROTHECA Rabenh., 1859.

1026. *Cylindrotheca gracilis* (Bréb.) Grun.

[Syn. *Nitzschia Tenia* W. Sm.].

S.E.—Marfleet Clough (pure) (G. Norman).

ORDER CRYPTORAPHIDIEÆ.

FAMILY MELOSIREÆ.

GENUS MELOSIRA Ag., 1824.

1027. *Melosira nummuloides* (Bory) Ag.

S.W.—Goole (E. Hunter).

S.E.—Dairycoats; ditch near Stoneferry (G. Norman).

1028. **Melosira varians** Ag.

S.W.—‘Common’ in the millstone grit districts. ‘Abundant.’ Roche Abbey (M. H. Stiles; J. N. Coombe). Fixby. Heaton. Askern and Hatfield districts; Doncaster (!) town water; Firsby reservoirs; Rossington (M. H. Stiles). Farnley.

MID W.—Arthington. Leathley. Baildon. Bolton Woods. Otley. Staveley Dam, near Knaresborough. Harrogate; Ripley (G. Norman).

N.W.—Jervaulx Abbey. Masham.

N.E.—‘Frequent.’ Scalby Beck. Carlton Bank.

S.E.—Beverley. Newsholme. Haltenprice (pure and with sporangia); Spring Ditch; Cottingham; Wawne; Reservoir Waterworks, Hull; Hornsea Peat Deposit (G. Norman).

1029. **Melosira distans** Kütz.

Var. **nivalis** (W. Sm.) V.H. [Syn. *M. nivalis* W. Sm.].

MID W.—Gilstead.

N.E.—Lockton.

1030. **Melosira Arenulata** Kütz.

[Syn. *M. orichalcea* W. Sm.].

S.W.—Very rare, in a boggy puddle, Thorne Moor (G. Norman). Plentiful near Marsden.

N.W.—Rokeby.

1031. **Melosira arenaria** Moore.

S.W.—Roche Abbey (M. H. Stiles).

MID W.—Baildon. Gordale. Holden Gill, near Keighley. Kildwick.

N.E.—Near Scarborough. Rievaulx Abbey.

S.E.—Newbald; Hornsea Peat Deposit; Hull (G. Norman).

1032. **Melosira granulata** (Ehrenb.) Ralfs.

[Syn. *Orthosira punctata* W. Sm.].

S.W.—Chellow Dean.

S.E.—Hornsea Peat Deposit; in brackish ditch, Stoneferry to Sutton (G. Norman).

1033. **Melosira Roesiana** Rabenh.

[Syn. *Orthosira spinosa* W. Sm.].

S.W.—On wet rocks near Bingley.

S.E.—Hornsea Peat Deposit (G. Norman).

1034. **Melosira Jurgensii** Ag.

[Syn. *M. subflexilis* Kütz.].

S.E.—Brackish water ditch running from Stoneferry to Sutton (pure) (G. Norman).

GENUS CYCLOTELLA Kütz., 1833.

1035. **Cyclotella comta** (Ehrenb.), Kütz.

S.W.—Doncaster town water (M. H. Stiles).

1036. **Cyclotella operculata** Kütz.

S.W.—Cusworth district ; Doncaster town water (M. H. Stiles). Goole (E. Hunter). Near Bradford.

MID W.—Ripley (G. Norman). Roundhay (J. Abbott). Staveley Dam, near Knaresborough. Moughton Fell. Arthington.

S.E.—Spring Ditch ; Cottingham (G. Norman). Loftsome Bridge, near Wressle. Skipwith Common.

1037. **Cyclotella Meneghiniana** Kütz.

MID W.—Baildon.

N.E.—Carlton Bank.

1038. **Cyclotella minutula** Kütz.

S.E.—Hornsea Peat Deposit (G. Norman).

1039. **Cyclotella Kützingiana** Chauvin.

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles). Roche Abbey (J. N. Coombe ; M. H. Stiles). Doncaster. Cullingworth.

N.E.—Near Scarborough, abundant (vi. 1896). Carlton Bank.

S.E.—Spring Ditch ; Cottingham ; Stoneferry ; Market Weighton Canal ; Wawne (G. Norman).

1040. **Cyclotella Astræa** (Ehrenb.) Kütz.

[Syn. *C. rotula* Kütz.].

S.E.—Market Weighton Canal ; Hornsea Peat Deposit (G. Norman).

FAMILY *COSCINODISCIDEÆ*.

GENUS *COSCINODISCUS* Ehrenb., 1838.

1041. ***Coscinodiscus lacustris*** Grun. .

[Syn. *Cyclotella punctata* W. Sm.].

S.E.—Market Weighton Canal, near the River Foulney, attached to *Myriophyllum* and *Potamogeton* (G. Norman; Grunow).

1042. ***Coscinodiscus radiatus*** Ehrenb.

S.E.—Market Weighton Canal; Reservoir Waterworks, Hull (G. Norman). Usually marine.



ADDENDA.

GENUS COSMARIUM Corda, 1834.

1043. **Cosmarium subreniforme** Nordst. in Öfvers.
af K. Vet. Akad. Förh. 1875, no. 6, p. 24, t. vii.,
f. 16.

N.E.—Strensall Common.

This species has not previously been recorded for the British Isles.

GENUS TETRAGONIUM West & G. S. West, 1896.

1044. **Tetragonium lacustre** West & G. S. West, in
Journ. Roy. Micr. Soc., 1896, p. 160, t. ii., f. 1—13.

S.W.—Shelf: abundant in pools.

This plant is known elsewhere from Surrey and Lancashire.

The following is a summary of the known algæ of Yorkshire:—

		Genera. Species.	
Class FLORIDEÆ.			
	Fam. BATRACHOSPERMEÆ	2	7
	Fam. HILDENBRANDTIACEÆ	1	1
	Fam. LEMANEACEÆ	1	2
Class FUCOIDEÆ.			
	Fam. HYDRURACEÆ	1	1
Class CHLOROPHYCEÆ.			
Ord. <i>CONFERVOIDEÆ HETEROGAMÆ.</i>			
	Fam. COLEOCHÆTACEÆ	2	6
	Fam. CEDOGONIACEÆ	2	30
	Fam. CYLINDROCAPSACEÆ	1	1
Ord. <i>CONFERVOIDEÆ ISOGAMÆ.</i>			
	Fam. ULVACEÆ	3	3
	Fam. ULOTRICHACEÆ.		
	Sub-fam. ULOTRICHIEÆ	7	14
	Sub-fam. CHÆTOPHOREÆ	7	15
	Fam. CONFERVACEÆ	3	16
	Fam. CHROOLEPIDACEÆ	3	4
	Fam. CLADOPHORACEÆ	3	6
Ord. <i>CONJUGATÆ.</i>			
	Fam. ZYGNEMACEÆ.		
	Sub-fam. MESOCARPEÆ	1	10
	Sub-fam. ZYGNEMEÆ	4	30
	Fam. DESMIDIACEÆ	23	383
Ord. <i>SIPHONÆÆ.</i>			
	Fam. VAUCHERIAACEÆ	1	7
	Fam. HYDROGASTRACEÆ	1	1
Ord. <i>PROTOCOCCOIDEÆ.</i>			
	Fam. VOLVOCINEÆ	8	10
	Fam. PALMELLACEÆ		
	Sub-fam. CÆNOBIEÆ	6	20
	Sub-fam. PSEUDOCÆNOBIEÆ	1	1
	Sub-fam. RHAPHIDIEÆ	7	32
	Sub-fam. CHARACIÆÆ	2	10
	Sub-fam. ENDOSPHEREÆ	1	1
	Sub-fam. TETRASPOREÆ	6	11
	Sub-fam. DICTYOSPHEREIÆ	4	7
	Sub-fam. GLÆOCYSTIDÆ	7	24
	Sub-fam. PROTOCOCCACEÆ	5	16

Class MYXOPHYCEÆ.		Genera. Species.	
Ord. <i>HORMOGONEÆ.</i>			
Sub-ord. <i>HETEROCYSTEÆ.</i>			
Fam. RIVULARIACEÆ	...	...	4 7
Fam. SIROSIPHONIACEÆ	...	...	2 8
Fam. SCYTONEMACEÆ	...	...	4 8
Fam. NOSTOCACEÆ	...	...	4 18
Sub-ord. <i>HOMOCYSTEÆ.</i>			
Fam. VAGINARIÆ	...	...	1 3
Fam. LYNGBYÆ	...	...
Sub-fam. LYNGBYOIDEÆ	...	...	3 10
Sub-fam. OSCILLATORIOIDEÆ	...	...	4 24
Sub-fam. SPIRULINOIDEÆ	...	...	1 2
Ord. <i>CHAMÆSIPHONACEÆ</i>	...	...	1 1
Ord. <i>CHROOCOCCOIDEÆ.</i>			
Fam. CHROOCOCCACEÆ	...	...
Sub-fam. CHROOCYSTEÆ	...	...	1 2
Sub-fam. EUCHROOCOCCACEÆ	...	...	15 44
Class BACILLARIÆ.			
Ord. <i>RAPHIDIÆ.</i>			
Fam. CYMBELLEÆ	...	...	3 28
Fam. NAVICULEÆ	...	...	9 93
Fam. GOMPHONEMEÆ	...	...	2 15
Fam. ACHNANTHEÆ	...	...	3 10
Ord. <i>PSEUDORAPHIDIÆ.</i>			
Fam. EPITHEMIEÆ	...	...	3 23
Fam. SYNEDREÆ	...	...	2 10
Fam. FRAGILARIÆ	...	...	1 5
Fam. MERIDIONIDÆ	...	...	1 1
Fam. DIATOMEÆ	...	...	2 6
Fam. TABELLARIÆ	...	...	2 4
Fam. SURIRELLEÆ	...	...	3 11
Fam. NITZSCHIEÆ	...	...	3 34
Ord. <i>CRYPTORAPHIDIÆ.</i>			
Fam. MELOSIREÆ	...	...	2 14
Fam. COSCINODISCIDEÆ	...	...	1 2
		TOTAL	189 1044

Some ten or a dozen species which have at different times been recorded for the county are much too doubtful and uncertain for inclusion in this flora.

I N D E X .



IN this Index, which has been compiled by Mr. W. DENISON ROEBUCK, F.L.S., are given all names of classes, orders, sub-orders, families, sub-families, genera, sub-genera, species, sub-species, varieties, and forms, with most of the specific synonyms, but no attempt is made to discriminate in the Index between species, varieties, and synonyms, nor to indicate the authorship of the various names. In short, the Index is simply an Index of Names.

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July, 1901.

THE NATURALIST, a Monthly Journal of Natural History for the North of England, edited by WM. DENISON ROEBUCK, F.L.S., with the assistance in Special Departments of J. GILBERT BAKER, F.R.S., W. EAGLE CLARKE, F.L.S., ALFRED HARKER, M.A., F.G.S., CHAS. P. HOBKIRK, F.L.S., GEORGE T. PORRITT, F.L.S., JOHN W. TAYLOR, F.L.S., and W. BARWELL TURNER, F.C.S., F.R.M.S., 8vo., monthly, price 6d. (Annual Subscription, payable in advance, 6/6 post free; 5/- accepted in case of Subscriptions paid direct to the Leeds office on or before 31st March in each year).

THE
ALGA-FLORA
OF
YORKSHIRE.

BOTANICAL TRANSACTIONS OF
THE YORKSHIRE NATURALISTS' UNION.
VOL. 5.

THE
ALGA-FLORA OF YORKSHIRE:

A COMPLETE ACCOUNT OF THE KNOWN
FRESHWATER ALGÆ OF THE COUNTY,

WITH MANY NOTES ON
THEIR AFFINITIES AND DISTRIBUTION.

BY

W. WEST, F.L.S.,

President of the Yorkshire Naturalists' Union, 1899;

AND

G. S. WEST, B.A., A.R.C.S.,

Hutchinson Research Student, and formerly Scholar of St. John's College, Cambridge;
Professor of Natural History at the Royal Agricultural College,
 Cirencester.

LEEDS :

PUBLISHED FOR THE YORKSHIRE NATURALISTS' UNION
BY TAYLOR BROS., PRINTERS, SOVEREIGN STREET.

1901.

BIBLIOGRAPHY OF THIS VOLUME.

—:—

First Instalment : Sheets A, B, C, pages 5-52, forming Part 22 of the Transactions of the Yorkshire Naturalists' Union, published September, 1900.

Second Instalment : Sheets D, E, F, pages 53-100, forming Part 23, published December, 1900.

Third Instalment : Sheets G, H, I, J, pages 101-164, forming Part 25, published July, 1901.

Fourth Instalment : Sheets K, L, M, N, O, P, pages 165-239, including Title-Page and Index, forming Part 27, published July, 1901.

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THE

FUNGUS-FLORA OF YORKSHIRE:

A COMPLETE ACCOUNT OF THE KNOWN
FUNGI OF THE COUNTY.

BY

G. MASSEE, F.L.S., F.R.M.S.,

Principal Assistant (Cryptogams) Royal Herbarium, Kew,
Chairman of the Yorkshire Mycological Committee;

AND

C. CROSSLAND, F.L.S.,

Halifax, Hon. Secretary of the Yorkshire Mycological Committee.

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LEEDS:

PRINTED FOR THE YORKSHIRE NATURALISTS' UNION
BY TAYLOR BROTHERS.

NOVEMBER, 1902.



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THE
FUNGUS-FLORA OF YORKSHIRE.

After eleven successive annual Fungus Forays within the county, added to records previously and contemporaneously made, it has been considered advisable to summarize the results in the form of an annotated list of known Yorkshire species.

In addition to the work accomplished at the Fungus Forays and Field Meetings of the Yorkshire Naturalists' Union, a considerable amount of independent collecting and recording has been done by individual members and others. In this connection James Needham stands out pre-eminent, having worked continuously and with marked success for the past fourteen years in the Hebden Bridge district.

The following districts have also been more or less investigated:—

Liversedge and district, including Coxley Valley, by Rev. W. Fowler, M.A.

Goole district by H. Franklin Parsons, M.D., and Thos. Birks.

Selby district by W. Norwood Cheesman.

Bradford, Airedale and Wharfedale by W. West, F.L.S., and the late H. T. Soppitt.

East Yorkshire by W. W. Strickland ('Nat.', June and July 1889).

Huddersfield district by Alfred Clarke.

Cullinworth, Goitstock Woods, etc., by Thos. Hebden.

Langstrothdale by Rev. C. H. B. Woodd, B.A. ('Nat.', May 1891).

Swinton by W. Forbes.

Swinton and Masham by W. A. Thwaites, of Masham.

Sheffield district by Thos. Gibbs.

Scarborough district by Geo. Masee, F.L.S., F.R.M.S., V.M.H.

Halifax Parish by Charles Crossland, F.L.S.

In order to avoid the constant repetition of the names of districts and their investigators it may be here stated that, throughout the list, they stand connected. In exceptional cases the name or initials of the authority for the record is given in brackets.

To render intelligible the method followed, the following abbreviations have been adopted to indicate the various sources of information as to records:—

The tab. number following Bolton's name refers to the page and plate in his 'History of Fungusses growing about Halifax,' pub. 1788-1791. With very few exceptions, Bolton's figures represent either new species or first British records. Most of the specific names vary from those at present in use, but it is not considered necessary to give synonyms in all cases.

When Dr. M. C. Cooke's Illustrations are quoted it signifies that the figures were drawn from specimens gathered at the locality stated in the text.

Records published in 'The Naturalist' are denoted thus— ('Nat.' ...); those resting on the authority of F. A. Lees' 'Flora of West Yorkshire'—(Lees' Fl.); and those from L. Rotheray's 'Flora of Skipton'—(Fl. Skipt.).

Other abbreviations and signs are—

(Tr. Y.N.U.)—Transactions of the Yorkshire Naturalists' Union.

(Mass. Mon. Brit. Gastr.)—Masee's Monograph of the British Gastromycetes, 1889.

(*Nat. ...) denotes that the species was seen at an ordinary Y.N.U. Excursion, and record published in the 'Naturalist' on date given.

F.F.—Fungus Foray.

(Hud. Bot. Soc.)—Huddersfield Botanical Society. Report, 1883. A. Clarke.

Hx.—Halifax, following a station, or string of stations, indicates that the place, or places, are within the parish of Halifax.

(W.W.S.)—W. W. Strickland.

(H.T.S.)—H. T. Soppitt.

The Union Fungus Forays have been held as follows :—

1881.—Harrogate and Studley Royal, with Leeds as centre.

(Tr. Y.N.U., Part 9, March 1886, pp. 207-224).

1884.—Selby ('Nat.', Jan. 1885, pp. 140-1).

1888.—Bramham and Harewood, with Leeds as centre ('Nat.', Nov. 1888, pp. 321-29).

1891.—Doncaster ('Nat.', Nov. 1891, pp. 339-348).

1892.—Castle Howard, with Malton as centre ('Nat.', Dec. 1892, pp. 355-365).

1893.—Pocklington ('Nat.', March 1894, pp. 69-76).

1894.—Whitby and Arncliffe (MS.) C. Crossland.

1895.—Huddersfield (Huddersfield Naturalist and Photographic Soc. Circular. A. Clarke).

1896.—Selby ('Nat.', Dec. 1896, pp. 355-365).

1897.—Barnsley ('Nat.', Nov. 1897, pp. 341-348).

1898.—East Keswick ('Nat.', Dec. 1898, pp. 357-362).

1899.—Sutton, near Askern ('Nat.', Nov. 1899, pp. 337-39 ; Dec., pp. 367-372).

1900.—Mulgrave Woods ('Nat.', Nov. 1900, pp. 337-350).

1901.—Cadeby, etc., S. Yorks. ('Nat.', Nov. 1901, pp. 333-350).

The records are arranged under the five county divisions, or vice-counties, employed by H. C. Watson in 'Cybele Britannica,' viz. :—61, South-east York ; 62, North-east York ; 63, South-west York ; 64, Mid-west York ; 65, North-west York ; and are given in the order of priority of date in each county division so far as could be ascertained, hence the divisions do not follow a fixed sequence.

Although the following may prove a 'record' county list, yet this is not the object in view, consequently certain species which have crept into some of the records, without any apparent justification, are here omitted.

A critical summary of the records to the present time, bearing on the Yorkshire Fungus Flora, with comparisons and indications as far as possible of the strong and weak points as compared with those published for other counties and other countries, can be made with greater exactitude at the end rather than at the beginning of the list, and this course will be adopted.

In conclusion it may be well to intimate that the present list must not be considered as more than a commencement to enumerate the Fungi indigenous to Yorkshire; many new county records are added at every Foray, and probably at least nineteen-twentieths of the county yet remains to be thoroughly investigated.

FUNGI.

CLASS BASIDIOMYCETES.

ORDER GASTROMYCETES.

FAMILY NIDULARIACEÆ.

GENUS NIDULARIA Bull., 1780.

1. *Nidularia pisiformis* Tul.

N.E.—On heap of rotten leaves, Scarborough.

S.W.—On the ground among logwood chips, Salterhebble; and on twigs, Elland Hall Wood, Hx. (H.T.S.).

GENUS CYATHUS Hall, 1768.

2. *Cyathus striatus* Hoff.

S.W.—Halifax, 1788 (Bolton's Hist. Fung., Tab. 102, f. 2).

N.E.—Scarborough. Mulgrave Woods, 1902.

S.E.—Escrick (Selby F.F., 1896).

MID W.—Bishop's Wood, Selby (Y.N.U. Bot. Report, 1878). Harewood (F.F., 1898).

3. *Cyathus vernicosus* DC.

S.W.—Halifax, 1788, 'grows on putrid wood, or in gravel walks' (Bolton's Hist. Fung., Tab. 102, f. 1). In a cucumber frame at Hainworth; Undercliffe, near Bradford (Lees' Fl.). Hewenden Wood, Cullingworth. Cadeby and Melton (F.F., 1901).

MID W.—Newland and Brayton; Selby (Tr. Y.N.U., ix; p. 221). Bishop's Wood (F.F., 1896). East Keswick (F.F., 1898). On stubble, Leeds district (Lees' Fl.).

N.E.—Castle Howard. Scarborough. Bulmer, on soil in potato field.

S.E.—Hull, in great abundance on dock-yard sweepings (C. Waterfall). North Grimston, W. N. Cheesman.

N.W.—Masham.

Var. **agrestes** [Syn. *Cyathus agrestis* Fr.].

N.E.—On chips, Bulmer (Mass. Mon. Brit. Gast., p. 56).

GENUS CRUCIBULUM Tul., 1844.

4. **Crucibulum vulgare** Tul.

MID W.—Hawkesworth (Bradford Nat. Soc.). Bolton Woods (Fl. Skipt.).

S.W.—Goole (Y.N.U. Bot. Report, 1878). Leeds district; Saltaire (Lees' Fl.). Edlington Woods (Doncaster F.F., 1891). Rockley (Barnsley F.F., 1897). On worked timber, Keighley (Fl. Skipt.). Cadeby; Melton; Potridings Wood (F.F., 1901). On decaying timber, railway bridge, Salterhebble, Hx. (H.T.S.).

S.E.—Escrick (Selby F.F., 1896).

N.W.—Masham.

N.E.—On dead wood, chips, etc., Scarborough. Castle Howard (G.M.).

GENUS SPHEROBOLUS Tode, 1791.

5. **Sphærobolus stellatus** Tode.

On moist rotting wood, bark, twigs, sawdust, etc., in shaded places. Common. Has been met with at all the Forays, and in each of the five county divisions.

GENUS THELEBOLUS Tode.

6. **Thelebolus terrestris** (A. & S.) Tode.

N.W.—On fir leaves, Richmond (Cooke's Hdbk.).

S.W.—On decorticated oak stick buried in grass, Cullingworth (Fl. Skipt.).

7. **Thelebolus stercoreus** Tode.

S.W.—On rabbit dung, Ecclesall, Sheffield (Nat., April, 1902, p. 132).

First Yorkshire record.

FAMILY LYCOPERDACEÆ.

GENUS TULOSTOMA Pers., 1798.

8. **Tulostoma mammosa** Fr.

N.E.—Among moss on old wall, Castle Howard (R. Spruce, Mass. Mon. Brit. Gastr., pp. 85-6).

GENUS GEASTER Mich., 1729.

9. **Geaster Bryantii** Berk.

N.E.—On wood, among leaves, Castle Howard (G.M.).

10. **Geaster limbatus** Fr.

N.E.—On the ground, Castle Howard (Mass. Mon. Brit. Gastr., p. 79).

11. **Geaster fornicatus** Fr.

S.W.—Near Doncaster (Lees' Fl.).

N.E.—On the ground, Castle Howard (Mass. Mon. Brit. Gastr., p. 80).

12. **Geaster fimbriatus** Fr.

MID W.—Hambleton Haugh (Lees' Fl.). Studley Royal (F.F., 1881).

N.E.—On the ground, Castle Howard (Mass. Mon. Brit. Gastr., pp. 81-2).

[**Geaster rufescens** Pers.

S.E.—Boynton (W.W.S., 'Nat.', July 1889). A doubtful species].

13. **Geaster hygrometricus** Pers.

[Syn. *Lycoperdon stellatum* Bull.].

S.W.—Halifax, 1790 (Bolton's Hist. Fung., Tab. 179).

N.E.—Scarborough (Mass. Mon. Brit. Gastr., p. 83). Castle Howard and Malton (F.F., 1892). Egton (F.F., 1902).

MID W.—Rombald's Moor (P. H. Grimshaw, 'Nat.', Sep., 1891).

14. **Geaster lageniformis** Vitt.

S.W.—Beckfoot Lane, Bingley (1822-3; not seen since). (Lees' Fl.).

Probably a subspecies of *G. fimbriatus*, Sacc. Syl., vii., p. 86.

15. **Geaster Michelianus** Worthington G. Smith.

N.E.—On the ground in woods. Mulgrave Woods, Whitby.

S.W.—Campsall Woods, Sutton (F.F., 1899).

16. **Geaster striatus** DC.

N.E.—Among dead leaves, Castle Howard (G.M.).

GENUS LYCOPERDON Tourn., 1700.

17. **Lycoperdon echinatum** Pers.

N.E.—Scarborough (Mass. Mon. Brit. Gastr., p. 67).

S.W.—Among dead leaves, Pecket Wood, Hebden Bridge.

18. **Lycoperdon Hoylei** Berk.

S.W.—Doncaster (F.F., 1891).

N.E.—Egton (F.F., 1902).

19. **Lycoperdon atropurpureum** Vitt.

N.E.—Castle Howard (Mass. Mon. Brit. Gastr., pp. 68-9).

20. **Lycoperdon saccatum** Vahl.

MID W.—Bolton Woods, 1878 (Lees' Fl.). Bramham (F.F., 1888).

N.E.—Goathland (exhib. at the Leeds Foray, 1888; E. R. Waite). Scarborough (Mass. Mon. Brit. Gastr., pp. 69-70). Bulmer. Arncliffe (Whitby F.F., 1894).

S.W.—Heaton Woods (Lees' Fl.). Birdwell (Barnsley F.F., 1897). Pecket Wood, Hebden Bridge. Whitley Woods, Huddersfield, several years in succession.

S.E.—Escrick (Selby F.F., 1884 and 1896).

21. **Lycoperdon gemmatum** Batsch.

On the ground among grass in woods and shady places; also frequent in meadows and pastures.

S.W.—Halifax, 1788 (Bolton's Hist. Fung., Tab. 117). Saltaire (Tr. Y.N.U., ix., p. 221). Edlington Woods (Doncaster F.F., 1891). Midge Hole Wood, Hebden Bridge. Fixby pastures; Luddenden Dean: Hx. Sheffield.

MID W.—Studley Royal; Micklefield (Tr. Y.N.U., ix., p. 221). Langstrothdale ('Nat.', May 1891). Bishop's Wood (Selby F.F., 1896). Harewood (East Keswick F.F., 1898). Bolton Woods (Fl. Skipt.).

N.E.—Scarborough (Mass. Mon. Brit. Gastr., p. 71). Castle Howard (F.F., 1892). Mulgrave Woods and Arncliffe (F.F., 1894).

S.E.—Escrick (Selby F.F., 1896).

22. **Lycoperdon pyriforme** Schæff.

On the ground, and on rotten stumps and branches; in fields and woods. Common. Has been met with at nearly all the Fungus Forays, and in each of the county divisions. Stations too numerous to give in detail.

Var. **excipuliforme** Desm. (not of Scop.).

N.E.—Castle Howard (F.F., 1892).

23. **Lycoperdon perlatum** Pers.

MID W.—Bramham (Leeds F.F., 1888). Bolton Woods (H.T.S.).

N.E.—Bulmer; Scarborough (Mass. Mon. Brit. Gastr., pp. 72-3). Egton (F.F., 1902).

S.W.—Goitstock, near Cullingworth (Fl. Skipt.). Pecket Wood, Hebden Bridge. Elland Park Wood, Hx. (A. Clarke).

24. **Lycoperdon cælatum** Bull.

MID W.—Bramham Park (Lees' Fl.). Langstrothdale ('Nat.', May 1891).

S.W.—Roche Abbey Valley; Heaton; Cullingworth (Lees' Fl.). Hebden Bridge. Mixenden, Hx.

N.E.—Scarborough (Mass. Mon. Brit. Gastr., p. 74).

In fields and woods, on grassy road sides, etc. Frequent.

25. **Lycoperdon bovista** L. [Syn. *L. giganteum* Fl. Dan.].

S.W.—Halifax, 1788 (Bolton's Hist. Fung., Tab. 117, f.a.). Roche Abbey Valley; Saltaire; Cullingworth (Lees' Fl.). Wakefield ('Nat.', 1875-6). Hebden Bridge. Fixby, Ludden Dean, etc., Hx. Deighton, Huddersfield, July 1890, one specimen, 32 in. circumference. Wooldale, Thongsbridge (C. H. Broadhead).

MID W.—Arthington, 1881 (Tr. Y.N.U., ix.). Langstrothdale ('Nat.', May 1891). East Keswick (F.F., 1898). Crookrise (Fl. Skipt.). Leeds (Lees' Fl.).

N.E.—Castle Howard; Scarborough (Mass. Mon. B. Gastr., p. 75). Bulmer. Mulgrave Woods (F.F., 1890). Coxwold (W. Foggitt, Y.N.U. Ex. Circ., May 1902). Helmsley, one 7 lbs. weight, 44 in. circumference; later, same season (1900), "one scaling 10½ lbs. Such specimens have been phenomenally numerous in our district this year, mostly in 'fog' fields" (H. Slater).

N.W.—Masham.

S.E.—Hornsea (*Nat., May 1900).

Frequent in pastures and meadows, and occasionally in open, grassy woods. Edible when young and white throughout.

GENUS BOVISTA Dill., 1719.

26. **Bovista nigrescens** Pers.

In pastures, poor meadows, and heathy places.

S.W.—Halifax, 1775 (Bolton's Hist. Fung., Tab. 118). Goitstock; Roche Abbey Valley (Lees' Fl.). Sprotborough (Cadeby F.F., 1901). Luddenden Dean, Hx. (H.T.S.).

N.E.—Scarborough. Castle Howard (F.F., 1892). Mulgrave Woods (F.F., 1900).

MID W.—Harewood and East Keswick (F.F., 1898).

N.W.—Masham. Cotherstone (Exc. 1897).

27. **Bovista plumbea** Pers.

S.W.—Wakefield ('Nat.', 1875-6). Cullingworth; Endcliffe Valley; Roche Abbey Valley (Lees' Fl.). Deighton, Huddersfield. Golcar.

MID W.—Leeds district (Lees' Fl.).

N.E.—Heaths, Scarborough. Mulgrave Woods (F.F., 1900). Egton (F.F., 1902).

[**Bovista ammophila** Lev.

S.W.—In pasture, Cullingworth, 1885 (Lees' Fl.). An imperfectly known species. Probably this record represents a form of *Bovista plumbea*].

28. **Bovista cepæformis** (Bull.) Mass.

MID W.—Harewood and East Keswick (F.F., 1898).

29. **Bovista pusilla** (Fr.) DeToni.

S.W.—Halifax (Bolton's Hist. Fung., Tab. 117, f.c.). Near Hebden Bridge.

MID W.—Bolton Woods (Lees' Fl.). Langstrothdale ('Nat.', May 1891).

N.E.—Castle Howard (Mass. Mon. Brit. Gastr., pp. 65-6).

SCLERODERMACEÆ.

GENUS SCLERODERMA Pers., 1801.

30. **Scleroderma vulgare** Fr.

On the ground in open woods. Common. Distribution general.

31. **Scleroderma verrucosum** Pers.

N.E.—Scarborough (Mass. Mon. Brit. Gastr., pp. 50-1).
Bulmer.

MID W.—Harewood (F.F., 1898).

32. **Scleroderma bovista** Fr.

MID W.—Studley Royal, 1881 (Tr. Y.N.U., ix., p. 221).
Harewood (F.F., 1898).

S.W.—Heaton Wood (Lees' Fl.). Hebden Bridge.

N.E.—Castle Howard (Mass. Mon. Brit. Gastr., p. 51).

33. **Scleroderma geaster** Fr.

N.E.—On the ground in shrubbery, Malton (M. B. Slater).
Scarborough. Rare.

HYMENOGASTRACEÆ.

GENUS MELANOGASTER Corda, 1857.

34. **Melanogaster variegatus** Tul.

MID W.—Ilkley, 1883 (Lees' Fl.).

N.E.—On soil under beech trees. Scarborough. Rare.

35. **Melanogaster ambiguus** Tul.

S.E.—Hollokill Wood, Boynton (W.W.S., 'Nat.', June 1889).

S.W.—In soil under beeches, Goitstock (Fl. Skipt.).

Has not been found at any of the Union Forays.

GENUS RHIZOPOGON Fries, 1818.

36. **Rhizopogon luteolus** Tul.

S.W.—In soil under beech trees, Goitstock Wood (T. Hebden).
The only British record, with the exception of one for Scotland,
in Mass. Mon. Brit. Gastr., p. 41.

GENUS HYMENOGASTER Vitt., 1831.

37. **Hymenogaster vulgaris** Tul.

N.E.—In loose soil, Castle Howard (G.M.).

38. **Hymenogaster Klotzschii** Tul.

S.W.—In sandy soil, Pecket Wood, Hebden Bridge. When
the Mon. Brit. Gastr. was published (1889) this species had
only been recorded in Britain for Edinburgh and Tunbridge
Wells.

*PHALLACEÆ.*GENUS *ITHYPHALLUS* Fischer, 1883.39. *Ithyphallus impudicus* (L.).

'Grows in woods and hedges about Halifax, 1776' (Bolton's Hist. Fung., Tab. 91). On the ground in woods, shrubberies, shady hedge banks, etc. Often detected at a distance by its unpleasant odour. Frequent; distribution general; has been met with at most of the Forays, and reported from all the county divisions.

GENUS *MUTINUS* Fries, 1849.40. *Mutinus caninus* (Huds.) Fisch.

S.W.—Halifax (Bolton's unpublished drawing). In woods and moist bushy places, often among moss; not infrequent.

N.E.—Buttercrambe ('Nat.', 1878-9). Scarborough (Mass. Mon. Brit. Gastr., p. 89). Castle Howard (F.F., 1892). Mulgrave Woods (F.F., 1900). Egton (F.F., 1902).

S.W.—Wharcliffe Woods (*'Nat.', 1878-9). Saltaire; Bingley Woods; New Wortley; Roche Abbey (Lees' Fl.). Warmsworth (Cadeby F.F., 1901). Ovenden, Hx. (G. L. Lister). Hebden Bridge.

MID W.—Harewood (Leeds F.F., 1888). Bishop's Wood (Selby F.F., 1896). Bolton Woods, etc. (Fl. Skipt.).

S.E.—Allerthorpe (Pocklington F.F., 1893).

N.W.—Masham.

HYMENOMYCETES.

*AGARICACEÆ.**AGARICEÆ.**LEUCOSPOREÆ.*GENUS *AMANITA* Pers., 1797.41. *Amanita virosa* Fr.

N.E.—Scarborough.

S.E.—Everingham and Pocklington (F.F., 1893).

MID W.—Harewood (F.F., 1898).

In damp woods. Poisonous. Smell strong and disagreeable.

42. **Amanita phalloides** Fr.

S.W.—Halifax, 1787 (Bolton's Hist. Fung., Tab. 48). Bingley; Nab Wood, Saltaire (Lees' Fl.). Edlington (Doncaster F.F., 1891). Huddersfield (F.F., 1895). Notton (Barnsley F.F., 1897). Ovenden; Northdean Wood; Luddenden Dean; Stainland, etc., Hx. Several woods about Hebden Bridge. Coxley Valley. Goitstock. Wharnccliffe and Ecclesall, Sheffield.

N.E.—Scarborough. Mulgrave Woods (F.F., 1894). Staithes (* 'Nat.', April, 1898).

S.E.—Skipwith (Goole S. Soc., 'Nat.', 1878-9). Escrick and Blackwood (Selby F.F., 1896).

MID W.—Haddlesey (Lees' Fl.). Stainor and Bishop's Woods (Selby F.F., 1896). Shipley Glen (Lees' Fl.).

N.W.—Masham.

Frequent in woods, August to November. Occasionally appearing in spring. Variable in size and colour. Probably the most poisonous of European fungi; and, along with *Amanita mappa* and *Amanita pantherina*, causing the majority of deaths due to fungus poisoning. 'It is of a poisonous quality and many have suffered by eating it' (Bolton, p: 48).

[**Amanita verna** Bull.

S.W.—Bradley Gate and other woods about Huddersfield (Hud. Bot. Soc., 1883).

This is a form of *Amanita phalloides*].

43. **Amanita mappa** (Batsch).

S.W.—Bingley Woods (Lees' Fl.). Sandal Beat (Doncaster F.F., 1891). Huddersfield (F.F., 1895). Hugsett; Birdwell; and Notton (Barnsley F.F., 1897). Goitstock (Fl. Supt.). Hebden Bridge. Northdean Wood; Luddenden Dean, etc., Hx.

MID W.—Bramham (Leeds F.F., 1888).

N.E.—Mulgrave Woods (F.F., 1894). Scarborough.

S.E.—Blackwood (Selby F.F., 1896).

On the ground in mixed woods. Frequent. Poisonous; odour strong; colour variable; some of its forms resemble *Amanita phalloides*.

44.—**Amanita muscaria** (L.) Fr.

S.W.—Halifax (Bolton's Hist. Fung., Tab. 46). Near Bradford ('Nat.', 1876-7). Wharnccliffe Woods (* 'Nat.', 1878-9). Huddersfield (Hud. Bot. Soc., 1883). Hainworth; Saltaire (Lees' Fl.). Notton (Barnsley F.F., 1897). Goitstock (Fl. Skipt.). Lee; and Midgehole Wood, Hebden Bridge. Luddenden Dean, Hx. (G. L. Lister). Wyming Brook, and Strines, Sheffield.

MID W.—Beckwithshaw; Ledstone Park; Horsforth; Micklefield; Camblesforth (Tr. Y.N.U., ix., p. 210). Stainor Wood; Hawkesworth; Bolton Woods; Adel (Lees' Fl.).

N.E.—Scarborough (Bot. Report, 1879). Castle Howard (F.F., 1892). Cloughton, Scarborough (H.T.S.). Egton (F.F. 1902).

S.E.—Blackwood (Selby F.F., 1896). A specimen from Grindale near Malton with pileus eleven inches across (exhibited by S. Chadwick at the Mulgrave Woods F.F., 1894).

In mixed woods, especially where birch and fir prevail; not common. Poisonous; produces intoxication, delirium, and death; 'used in Kamschatka as a narcotic.'

45. **Amanita pantherina** (DC.) Fr.

S.W.—Northdean' Wood (* 'Nat.', 1877-8). Huddersfield (Hud. Bot. Soc., 1883). Goitstock (Fl. Skipt.). Hebden Bridge. Luddenden Dean, etc., Hx. (H.T.S.).

MID W.—Beckwithshaw (Harrogate F.F.; Tr. Y.N.U., ix., p. 210). Bramham and Harewood (F.F., 1888). Stainor Wood (Selby F.F., 1896). Bolton Woods (Fl. Skipt.).

N.E.—Scarborough (Y.N.U. Bot. Report, 1879). Castle Howard (F.F., 1892). Mulgrave Woods (F.F., 1894). Egton.

S.E.—Escrick (Selby F.F., 1896).

N.W.—Masham.

In open woods and woodside pastures; generally distributed. Poisonous.

46. **Amanita excelsa** Fr.

S.W.—Halifax (Bolton's Hist. Fung., Tab. 47). Meltham Woods and Roche Abbey Valley (Lees' Fl.).

N.E.—Scarborough.

In woods, chiefly under beech. Poisonous.

[**Amanita strobiliformis** (Vitt.).

S.W.—The Dict. Icon. Champ. quotes Bolton's plate 47 as this species. The figure more likely represents *Amanita excelsa*.

MID W.—Bingley Woods (Fl. Skipt.). Doubtful record].

47. **Amanita rubescens** (Pers.) Fr.

(Bolton's Hist. Fung., Tab. 27). Common in woods and plantations; generally distributed; stations where noted too numerous to specify. Edible; much appreciated as an esculent species on account of its delicious flavour.

48. **Amanita spissa** Fr.

S.W.—Nab Wood, Saltaire (H.T.S., 'Nat.', 1891, p. 279). Crimsworth Dean and Hardcastle, near Hebden Bridge.

N.E.—Scarborough.

In mixed woods. Uncommon.

49. **Amanita nitida** Fr.

S.W.—Crimsworth Dean, Hebden Bridge ('Nat.', June 1894).

50. **Amanita aspera** Fr.

S.W.—Halifax, 1790 (Bolton's Hist. Fung., Tab. 139). Luddenden Dean, Hx.

N.W.—Masham.

In woods. Rare.

GENUS AMANITOPSIS Roze, 1876.

51. **Amanitopsis vaginatus** (Bull.).

Common in woods; distribution general. Edible, but not considered of much value on account of the thinness of its flesh.

Form **fulva** Schæff.

S.W.—Storthes Hall woods, etc. (Huddersfield F.F., 1895).

N.W.—Sedbergh (Exc. 1902).

Hebden Bridge. Luddenden Dean, Hx.

Dr. Cooke considers this to be a distinct species, mainly on account of its not being esculent.

52. **Amanitopsis strangulatus** Fr.

[Syn. *Amanitopsis Cecilie* B. & Br.].

S.W.—Roche Abbey Valley (Lees' Fl.). Goitstock, and Eller Carr, near Cullingworth. Hebden Bridge.

MID W.—Shipley Glen; rare (Lees' Fl.).

S.E.—Pocklington (* 'Nat.', Aug. 1885, p. 308).

53. **Amanitopsis adnatus** W.G.S.

S.W.—Heaton, and Nab Woods, Bingley ('Nat.', 1891, p. 279). Notton (Barnsley F.F., 1897).

GENUS LEPIOTA Pers., 1797.

54. **Lepiota procera** (Scop.).

S.W.—Halifax (Bolton's Hist. Fung., Tab. 23). Huddersfield (H.B. Soc., 1883). Bradford. Rockley (Barnsley F.F., 1897). Cadeby (F.F., 1901). Hebden Bridge. Elland Park Wood; Luddenden Dean, etc., Hx. Goitstock. Doncaster (H. H. Corbett).

S.E.—Market Weighton (* 'Nat.', 1880-1). Kirkham Abbey (* 'Nat.', Nov. 1889). Grindale (W.W.S.). Pocklington (F.F., 1893). Escrick (Selby F.F., 1896).

MID W.—Stainor Wood, Selby (Tr. Y.N.U., ix.). Harrogate; Headingley; Hawkesworth; Brayton (Lees' Fl.). Bishop's Wood (Selby F.F., 1896). East Keswick (F.F., 1898). Ilkley (Fl. Supt.).

N.E.—Scarborough (Y.N.U. Bot. Report, 1879). Castle Howard; Pickering (F.F., 1892). Stokesley (*1899). Mulgrave Woods (F.F., 1900). Thirsk (W. Foggitt, Y.N.U. Exc. Circ., May 1902). Egton (F.F., 1902).

N.W.—Masham.

Edible. In open woods, plantations and adjoining fields.

55. **Lepiota rachodes** (Vitt.).

S.W.—Bradford; Roche Abbey Valley (Lees' Fl.). Edlington Wood (Doncaster F.F., 1891). Campsall (Sutton F.F., 1899). Well Head greenhouses, Hx.

S.E.—Firby Woods, Kirkham Abbey, abundant (* 'Nat.', Nov. 1889). Escrick (Selby F.F., 1896).

N.E.—Scarborough. Egton (W.W.S.).

Edible; appears to have a special liking for greenhouses.

56. **Lepiota excoriata** (Schæff.).

N.E.—Scarborough.

S.W.—Sprotborough and Conisborough (F.F., 1901).

57. **Lepiota Friesii** (Lasch).

MID W.—Leeds F.F., 1881 (Fr. Y.N.U., ix., p. 210).

N.E.—Mulgrave Woods (F.F., 1900).

S.W.—Potridings Wood (Cadeby F.F., 1901).

58. **Lepiota gracilentia** (Kromb.).

N.E.—Scarborough. Mulgrave Woods (F.F., 1900).

59. **Lepiota acutesquamosa** (Weinm.).

S.W.—Huddersfield, A. Clarke (exhib. Doncaster F.F., 1891).
Ingham Park, Mirfield, 1891, and several succeeding years
(H. Parkinson). Campsall (Sutton F.F., 1899). Hebden
Bridge. Skircoat, Hx.

N.E.—Scarborough. Mulgrave Woods (F.F., 1894).

MID W.—Stainor Wood (Selby F.F., 1896). Grassington
(Exc. 1900).

N.W.—Masham.

60. **Lepiota Badhami** (B. & Br.).

S.W.—Under yews, Roche Abbey Valley, Oct. 1876 (Lees'
Fl.).

61. **Lepiota biornata** (B. & Br.).

S.W.—In greenhouse, Halifax. Rare.

62. **Lepiota hispida** (Lasch).

S.W.—In plantation near Longley Hall (Hud. B.S., 1883).
Potridings Wood (Cadeby F.F., 1901).

N.W.—Masham.

63. **Lepiota clypeolaria** (Bull.).

MID W.—Bramham (F.F., 1888).

N.E.—Scarborough.

64. **Lepiota felina** (Pers.).

N.E.—Scarborough (Cooke's Illustr. pl. 943a, figured from
these Scarborough specimens).

S.E.—Everingham (Pocklington F.F., 1893). Escrick (Selby
F.F., 1896).

65. **Lepiota metulæspora** (B. & Br.).

S E.—Blackwood (Selby F.F., 1896).

66. *Lepiota cristata* (A. & S.).

S.W.—'Grows in gardens, but not common . . . Warley (Hx.) Sep., 1787' (Bolton, Tab. 7). Bingley (Lees' Fl.). Edlington (Doncaster F.F., 1891). Coxley Valley. Huddersfield (F.F., 1895). Rockley, Darton, and Hugsett (Barnsley F.F., 1897). Campsall (Sutton F.F., 1899). Luddenden Dean, Hx. Melton and Potridings Woods (Cadeby F.F., 1901). Shelley, Huddersfield. Kirklees (C.C.).

MID W.—Studley Royal (F.F., 1881). Ilkley; Harewood, 1886 (Lees' Fl.). Bramham (F.F., 1888). Langstrothdale. Bolton Woods (Fl. Skipt.). Grassington (Exc. 1900).

N.E.—Scarborough (Y.N.U. Bot. Report, 1879). Welham Park (Castle Howard F.F., 1892). Mulgrave Woods (F.F., 1900).

Among grass on shaded roadsides, lawns, fields, and on the margins of woods. Smell strong and unpleasant.

67. *Lepiota erminea* Fr.

S.W.—Huddersfield, found in considerable quantity on the ballast heap at Deighton Corn Mills (exhibited by A. Clarke at the Selby F.F., 1896).

68. *Lepiota naucina* Fr.

N.E.—Scarborough. Egton (F.F., 1902).

69. *Lepiota cepæstipes* (Sow.).

S.W.—'Amongst the bark in pine-stove, Halifax, 1785' (Bolton's Hist. Fung., Tab. 50). Ousefleet (T. Birks, Bot. Rep., 1878). Ravensthorpe, 1890 (H. Parkinson).

MID W.—Ilkley (P. H. Grimshaw).

N.E.—In a conservatory, Scarborough.

Pileus white or yellow.

70. *Lepiota martialis* C. & M.

N.E.—In Mr. Woodall's greenhouse, Scarborough. The species was founded on these specimens, and figured in Cooke's Illustr., Pl. 944b. Probably an introduced species.

71. *Lepiota licmophora* (B. & Br.).

S.W.—In a fernery at Bradford (Lees' Fl.). In greenhouse, Huddersfield, J. Sutcliffe (exhib. Castle Howard F.F., 1892). A. Clarke (F.F., 1895). Greenhouses at Well Head and Manor Heath, Hx.

72. *Lepiota carcharia* (Pers.).

MID W.—Beckwithshaw (Harrogate F.F., 1881; Tr. Y.N.U., ix.). Baildon (Lees' Fl.). Bramham (F.F., 1888). Bishop's Wood (Selby F.F., 1896).

N.E.—Scarborough. Castle Howard (F.F., 1892).

S.W.—Bingley (Lees' Fl.). Pecket Wood, etc., Hebden Bridge. Northdean Wood; Luddenden Dean; Mixenden; Fixby; Heath; Elland Park Wood, etc., Hx.

S.E.—Escrick (Selby F.F., 1884; 'Nat.', Jan. 1885).

Not common. Smell strong, taste bitter.

73. *Lepiota granulosa* (Batsch).

Common in woods and heathy fields. Distribution general; has been recorded in all the county divisions. Stations too numerous to give in detail.

74. *Lepiota amianthina* (Scop.).

S.W.—'Burks and other woods about Halifax, 1788' (Bolton's Hist. Fung., Tab. 51, f. 2). Hebden Bridge. Wharncliffe Woods; Ecclesall; Wyming Brook, near Sheffield.

MID W.—Bramham (F.F., 1888).

Bolton's Tab. 51, fig. 2, has been considered by some mycologists to represent *Lepiota granulosa*, but there cannot be much doubt as to its belonging here.

75. *Lepiota polysticta* (Berk.).

N.E.—Scarborough ('Nat.', 1880-1).

S.W.—'In old pasture fields Fixby, Lepton, and Bradley' (Hud. Bot. Soc., 1883).

N.W.—Masham, among grass near footpath.

76. *Lepiota parvannulata* (Lasch).

MID W.—Harewood (F.F., 1888).

77. *Lepiota seminuda* (Lasch).

MID W.—Studley Royal (F.F.; Tr. Y.N.U., ix.). Bramham (F.F., 1888). Harewood (F.F., 1898).

N.E.—Scarborough.

N.W.—Masham.

In woods. Rare.

78.—*Lepiota Bucknallii* (B. & Br.).

MID W.—Studley Royal (F.F.; 'Very rare, only occurred once before in Britain,' Tr. Y.N.U., ix., p. 211).

S.W.—Potridings Wood (Cadeby F.F., 1901). Kiveton Park, near Sheffield.

79. *Lepiota mesomorpha* (Bull.).

S.W.—Fagley Woods, near Calverley, rare, Sept. 1887 (Lees' Fl.).

80. *Lepiota delicata* Fr.

MID W.—Selby (F.F., 1884; 'Nat.', Jan. 1885).

81. *Lepiota lenticulare* (Lasch).

N.W.—Masham.

GENUS ARMILLARIA Fr., 1821.

82. *Armillaria ramentacea* (Bull.).

N.E.—Scarborough.

83. *Armillaria mellea* (Vahl).

S.W.—Halifax, 1786, etc. (Bolton's Hist. Fung., Tabs. 16, 136, 140, 141).

Grows in dense fascicles about new stumps, and the base of living trees; also solitary and scattered among grass, but then the mycelium is traceable to underlying tree-roots. Decidedly parasitic and destructive. Extremely variable in appearance, so much so that it is difficult to find two tufts alike. A form was collected at Masham in 1891, with a blackish, shining stem. Edible, but tough.

Var *laricina*.

S.W.—Halifax, 1788 (Bolton's Hist. Fung., Tab. 19). Liver-sedge ('Nat.', 1891, p. 279).

84. *Armillaria mucida* (Schrad.).

N.E.—Scarborough.

S.E.—Boynton (W.W.S.).

GENUS TRICHOLOMA Fries, 1821.

85. *Tricholoma onychinum* Fr.

S.E.—Escrick (Selby F.F.: 'Nat.', Dec. 1896). First British record.

86. *Tricholoma equestre* (L.).

N.E.—Scarborough. In fir woods.

87. *Tricholoma sejunctum* (Sow.).

MID W.—Selby ('Nat.', Jan. 1885).

N.E.—Scarborough.

88. *Tricholoma portentosum* Fr.

N.E.—Castle Howard (exhibited at the Harewood F.F., 1888).

89. *Tricholoma fucatum* Fr.

N.E.—Scarborough. In pine woods.

90. *Tricholoma resplendens* Fr.

MID W.—Selby (F.F., 1884; 'Nat.', Jan. 1885).

S.W.—Huddersfield (F.F., 1895). Luddenden Dean, Hx.

N.E.—Scarborough.

In beech and other woods.

91. *Tricholoma spermaticum* Fr.

MID W.—Adel Dam Wood (Lees' Fl.).

N.E.—Scarborough. Egton (F.F., 1902).

N.W.—Masham.

S.E.—Allerthorpe (Pocklington F.F., 1893).

On the ground in fir woods. Smell strong, unpleasant.

92. *Tricholoma fulvellum* Fr.

S.W.—In woods, not common, Bingley (Lees' Fl.).

93. *Tricholoma flavo-brunneum* Fr.

MID W.—Selby (F.F., 1884 and 1896). Barlow Woods (Lees' Fl.).

N.E.—Mulgrave Woods (F.F., 1894 and 1900). Scarborough.

S.W.—Goitstock. Hardcastle, and High Greenwood, near Hebden Bridge. Luddenden Dean, Hx.

N.W.—Masham.

In mixed woods.

94. *Tricholoma albo-brunneum* (Pers.).

N.E.—Scampton. Bulmer (exhibited at the 1888 F.F.).
Scarborough.

MID W.—Bramham (F.F., 1888). Esholt (H.T.S.).

S.E.—Everingham (Pocklington F.F., 1893).

N.W.—Masham.

S.W.—Luddenden Dean, Hx.

95. *Tricholoma ustulum* Fr.

S.W.—Pecket Wood, Hebden Bridge.

96. *Tricholoma stans* Fr.

N.E.—Mulgrave Woods (F.F., 1900). Egton (F.F., 1902).

S.W.—Crinsworth Dean, Hebden Bridge.

97. *Tricholoma frumentaceum* Fr.

N.E.—Robin Hood's Bay (Whitby F.F., 1894).

98. *Tricholoma rutilans* (Schæff.).

MID W.—Bramham Park, 1786 (Bolton's Hist. Fung., Tab. 14). Beckwithshaw (F.F., 1881). Blubberhouses (*'Nat.', 1884-5). Selby (F.F., 1884; 'Nat.', Jan. 1885). Adel; Barlow (Lees' Fl.). Bramham and Harewood (F.F., 1888). Grassington (Exc. 1900).

S.W.—Northdean Wood, Hx. (*'Nat.', 1877-8). Wharncliffe Woods (*'Nat.', 1878-9). Meltham Woods (Hud. Bot. Soc., 1883). Heaton and Bingley (Lees' Fl.). Huddersfield (F.F., 1895). Sutton (F.F., 1899). Melton (Cadeby F.F., 1901). Goitstock. Several woods near Hebden Bridge.

N.E.—Scarborough. Castle Howard (F.F., 1892). Arncliffe Woods (Whitby F.F., 1894). Mulgrave Woods (F.F., 1900).

S.E.—Escrick, and Blackwood (Selby F.F., 1896).

On the ground in woods among rotting branches; also on tree stumps, chiefly pine; and in sawdust. Not uncommon.

99. *Tricholoma variegatum* (Scop.).

S.W.—Luddenden Dean, Hx. Denby Dale (Huddersfield F.F., 1895). Cullingworth.

N.E.—Scarborough.

MID W.—Harewood (F.F., 1898).

100. *Tricholoma luridum* (Schæff.).

S.E.—Skipwith ('Nat.', 1878-9).

N.E.—Scarborough (Bot. Report, 1879).

MID W.—Camblesforth (Lees' Fl.).

101. *Tricholoma columbella* Fr.

S.E.—Everingham (Pocklington F.F., 1893).

102. *Tricholoma sculpturatum* Fr.

S.E.—Skipwith ('Nat.', 1878-9).

N.E.—Castle Howard (F.F., 1892).

103. *Tricholoma imbricatum* Fr.

S.W.—Roche Abbey Valley (Lees' Fl.). Ingham Park,
Mirfield (H. Parkinson).

N.E.—Scarborough.

MID W.—Bramham and Harewood (F.F., 1888). Langstrothdale.

104. *Tricholoma vaccinum* (Pers.).

N.E.—In fir woods. Arncliffe (Whitby F.F., 1894). Scarborough.

105. *Tricholoma immundum* (Berk.).

S.W.—In pastures, rare; Huddersfield (Lees' Fl.).

106. *Tricholoma murinaceum* (Bull.).

S.W.—Huddersfield; Heaton Woods (Lees' Fl.). Mollicar Wood, Huddersfield.

N.E.—Mulgrave Woods (F.F., 1894 and 1900). Scarborough.

107. *Tricholoma terreum* (Schæff.).

MID W.—Studley Royal and Harrogate (F.F., 1881). Adel, 1876 (Lees' Fl.). Bramham (F.F., 1888). Langstrothdale. Very common.

N.E.—Welham Park (Castle Howard F.F., 1892). Mulgrave Woods, abundant (F.F., 1894 and 1900).

S.E.—Everingham (Pocklington F.F., 1893).

S.W.—Melton (Cadeby F.F., 1901). Crimsworth Dean, Hebden Bridge.

N.W.—Masham.

Not uncommon in beech and fir woods.

Var. **orirubens** Quel.

N.E.—Scarborough.

108. **Tricholoma saponaceum** Fr.

MID W.—Studley Royal. Selby (F.F., 1884; 'Nat.', Jan. 1885). Hawkesworth (Fl. Skipt.). Blackwood (Selby F.F., 1896).

S.W.—Thorne Waste (Lees' Fl.). Goitstock (Fl. Skipt.). Hebden Bridge. Luddenden Dean; Northdean Wood, Hx.

N.E.—Castle Howard (F.F., 1892). Scarborough.

N.W.—Masham.

Frequent, in mixed woods. Smell peculiar; more soapy than nitrous.

109. **Tricholoma cuneifolium** Fr.

N.E.—Castle Howard (F.F., 1892).

S.W.—Pasture, Seven Arches, Bingley (H.T.S., 'Nat.', Sep. 1891).

Var. **cinereo-rimosum** Batsch.

S.W.—Crimsworth Dean, Hebden Bridge. Under hedge-row, garden, Halifax (J. W. Sutcliffe).

110. **Tricholoma crassifolium** (Berk.).

N.E.—Scarborough ('Nat.', 1880-1).

S.W.—Keighley (Lees' Fl., p. 812).

111. **Tricholoma virgatum** Fr.

N.E.—Mulgrave Woods (F.F., 1900).

112. **Tricholoma sulphureum** (Bull.).

S.W.—Nab Wood, Saltaire (Lees' Fl.).

N.E.—Castle Howard (F.F., 1892). Scarborough. Arncliffe Woods (Whitby F.F., 1894).

Poisonous. In woods, not common.

113. **Tricholoma bufonium** (Pers.).

S.W.—Huddersfield (Hud. Bot. Soc., 1883). Generally distributed throughout the district.

MID W.—In fir wood, Langstrothdale.

N.E.—Scarborough.

114. **Tricholoma lascivum** Fr.

MID W.—Selby (F.F., 1884; 'Nat.', Jan. 1885).

115. **Tricholoma inamœnum** Fr.

S.E.—Blackwood (Selby F.F., 1896).

N.E.—Mulgrave Woods (Whitby F.F., 1900).

S.W.—Luddenden Dean, Hx. (H.T.S.).

116. **Tricholoma fallax** Peck.

N.E.—In fir wood, Scarborough. Cooke's Illustr. pl. 1151a, from the Scarborough specimens. First British record.

117. **Tricholoma ionides** (Bull.).

S.W.—'Grows under close plantations of fir about Halifax, 1787' (Bolton's Hist. Fung., Tab. 41fb). Among dead leaves, Cromwell Wood, Hx.

MID W.—Ilkley; Hawkesworth; Goole (Lees' Fl., p. 812).

118. **Tricholoma carneum** (Bull.).

MID W.—Hambleton, near Selby (Lees' Fl.). Fields near Stainor Wood, and Bishop's Wood (Selby F.F., 1896). Harewood (F.F., 1898).

N.E.—Welham Park, Malton; Castle Howard (F.F., 1892). Scarborough. Mulgrave Woods (Whitby F.F., 1900).

S.W.—Denby Dale (Huddersfield F.F., 1895). Sutton (F.F., 1899). Cadeby (F.F., 1901). Hebden Bridge. Ovenden; Luddenden Dean; Stainland; Hx.

N.W.—Masham.

Frequent in pastures and path-sides in woods.

119. **Tricholoma gambosum** Fr.

N.E.—Scarborough (Y.N.U. Bot. Report, 1879).

S.W.—Carr Pit ballast heap, and Shelley, near Huddersfield (Hud. Bot. Soc., 1883). Bingley; Adlingfleet (Lees' Fl.). Elland; Coley; Skircoat, etc., Hx.

MID W.—Bramhope; Hawkesworth (Lees' Fl.). Brennand Valley, Bowland.

Frequent in pastures during spring. A fine substantial edible species; may be dried and stored for future use.

120. *Tricholoma albellum* Fr.

S.W.—Goitstock Wood, near Cullingworth (Fl. Skomt.). Rare.

121. *Tricholoma tigrinum* (Schæff.).

S.W.—Liversedge. Rare.

N.E.—Scarborough (Y.N.U. Bot. Report, 1879).

122. *Tricholoma boreale* Fr.

S.W.—Crimsworth Dean, Hebden Bridge. Rare.

123. *Tricholoma arcuatum* (Bull.).

N.E.—Castle Howard (F.F., 1892).

MID W.—Harewood (F.F., 1898). In pasture.

S.W.—Among grass, Skircoat Moor, Hx. (H.T.S.).

124. *Tricholoma orienum* Fr.

S.W.—High Greenwood, near Hebden Bridge. Rare.

125. *Tricholoma album* (Schæff.).

S.W.—Halifax, 1791 (Bolton's Hist. Fung., Tab. 153). Cottingley (H.T.S., 'Nat.', Sep, 1891).

126. *Tricholoma leucocephalum* Fr.

S.W.—Skircoat Moor, Hx. (J. W. Sutcliffe). Melton Woods, growing through the flattened remains of a dead hedgehog (Cadeby F.F., 1901).

127. *Tricholoma personatum* Fr.

S.W.—Roche Abbey Valley; Lepton; Eccleshill, etc. (Lees' Fl.). Mirfield. Southwram. Many places about Hebden Bridge. Barkisland; Cragg Vale; Lightcliffe, Hx. Eller Carr, etc., Cullingworth. Cadeby (F.F., 1901). Ravensthorpe (H. Parkinson). Ecclesall, near Sheffield.

MID W.—Meanwood; Harrogate; Hawkesworth (Lees' Fl.).

N.E.—Scarborough. Bulmer. Mulgrave Woods (Whitby F.F., 1900). Thirsk (W. Foggitt, Y.N.U. Exc. Circ., May 1902).

N.W.—Masham.

In pastures, meadows, margins of woods, etc. Common. Edible.

128. *Tricholoma nudum* (Bull.).

S.W.—Halifax, 1790 (Bolton's Hist. Fung., Tab. 147). Wharnccliffe; Cantley; Roche Abbey Valley (Lees' Fl.).

Edlington (Doncaster F.F., 1891). Liversedge. Goitstock. Fixby, Hx. (U. Bairstow). Kebroyd, Hx., 1901 (A. Clarke). Cadeby (F.F., 1901). Castle Hill Side, and several other places about Huddersfield.

MID W.—Studley Royal (F.F., 1881). Harewood (F.F., 1888). Bramham and Adel (Lees' Fl.).

N.E.—Scarborough. Castle Howard (F.F., 1892).

In pastures and on margins of woods. Edible.

129. **Tricholoma cinerascens** (Bull.).

MID W.—Barlow Woods (Lees' Fl.).

S.W.—Hardcastle, Hebden Bridge.

130. **Tricholoma panæolum** Fr.

MID W.—Studley Royal (Tr.Y.N.U., ix.). Baildon (Lees' Fl.).

S.W.—Cottingley (Lees' Fl.). Denby Dale (Huddersfield F.F., 1895). Cullingworth. Hebden Bridge. Luddenden Dean, Hx.

N.E.—Scarborough.

N.W.—Masham.

In pastures.

131. **Tricholoma grammopodium** (Bull.).

S.W.—Carr Pit ballast heap; Mollicar Wood (Hud. Bot. Soc., 1883). Goole Moor (Lees' Fl.). In rich pasture, near dung-heap, Ovenden, Hx. Hardcastle, Hebden Bridge. Honley.

MID W.—Hawkesworth (Lees' Fl.).

N.E.—Scarborough. Field near Arncliffe Woods (Whitby F.F., 1894). Mulgrave Woods (F.F., 1900). Egton (F.F., 1902).

132. **Tricholoma melaleucum** (Pers.).

MID W.—Temple Hurst (Lees' Fl.). Harewood (F.F., 1888). Stainor Wood (Selby F.F., 1896).

N.E.—Scarborough. Castle Howard (F.F., 1892). Mulgrave Woods (Whitby F.F., 1900).

S.W.—Denby Dale (Huddersfield F.F., 1895). Hebden Bridge. Luddenden Dean, Hx.

S.E.—Escrick (Selby F.F., 1896).

N.W.—Masham.

Among grass in open woods. Not common.

Var. **porphyroleucum** Fr.

S.E.—Pocklington (F.F., 1893).

S.W.—High Greenwood, near Hebden Bridge. Potridings Wood (Cadeby F.F., 1901). Among grass. Sprotborough (* 'Nat.', April, 1892).

133. **Tricholoma brevipes** (Bull.).

S.W.—Farnley Tyas, etc., near Huddersfield (Hud. Bot. Soc., 1883). Near Fixby (Huddersfield F.F., 1895). Cullingworth. Honley.

N.E.—Scarborough.

MID W.—Otley Chevin (H.T.S.).

In fields and open woods. Edible.

134. **Tricholoma humile** Fr.

N.E.—Scarborough. Castle Howard (F.F., 1892).

S.W.—Denby Dale (Huddersfield F.F., 1895). Skircoat; Copley; Ovenden, etc., Hx. Several places about Hebden Bridge. Honley.

N.W.—Masham.

S.E.—Hornsea (A. R. Warnes).

Frequent in gardens, path sides, etc.

Var. **blandum** Berk.

S.W.—Fixby pastures, Hx.

135. **Tricholoma subpulverulentum** (Pers.).

S.W.—Several places about Huddersfield (Hud. Bot. Soc., 1883). Hirst fields, near Hebden Bridge. Luddenden Dean, Hx. (H.T.S.).

In pastures. Not common.

136. **Tricholoma sordidum** Fr.

N.E.—Scarborough. Castle Howard (F.F., 1892). Egton.

S.W.—In fields, Cullingworth. On newly manured garden-bed, and among grass near dunghill, Liversedge. On dunghill, Hebden Bridge (H.T.S.). Skircoat; Luddenden Dean, Hx.

MID W.—Near Stainor and Bishops Woods (Selby F.F., 1896).

137. **Tricholoma pædidum** Fr.

N.E.—Scarborough.

GENUS CLITOCYBE Fr.

138. **Clitocybe nebularis** (Batsch).

S.W.—‘Grows in the dry parts of woods, and in pastures about Halifax; not infrequently’ (Bolton’s Hist. Fung., Tab. 40). Bolton’s figure is considered by some authorities to represent *Clitocybe clavipes*, by others *Clitocybe nebularis*. Edlington Woods (Doncaster F.F., 1891). High Greenwood, and Pecket Wood, near Hebden Bridge. Storthes Hall Woods, Huddersfield.

N.E.—Scarborough (Y.N.U., Bot. Report, 1879). Mulgrave.

S.E.—Blackwood (Selby F.F., 1884).

MID W.—Meanwood Wood (Tr. Y.N.U., ix.). Wistow (Lees’ Fl.). Bramham (F.F., 1888). Stainor Wood (Selby F.F., 1896).

On the ground in open woods; frequent. A fine edible species.

139. **Clitocybe clavipes** (Pers.).

MID W.—Selby (F.F., 1884). Bramham (F.F., 1888). Langstrothdale (‘Nat.’, May 1891, as *Collybia*). Bishop’s Wood (Selby F.F., 1896).

N.E.—Scarborough. Bulmer. Castle Howard (F.F., 1892).

S.W.—Sandal Beat (Doncaster F.F., 1891).

On the ground in woods.

140. **Clitocybe hirneola** Fr.

S.W.—Owston (Sutton F.F., 1899).

141. **Clitocybe venutissima** Fr.

S.W.—Among larch leaves, Hardcastle, Hebden Bridge.

142. **Clitocybe odora** (Bull.).

MID W.—Horton-in-Ribblesdale (H.T.S., ‘Nat.’, 1880-1). Harewood (F.F., 1888).

S.W.—Possibly Bolton’s Tab. 12, *Ag. cœruleus*, belongs here. Heaton Woods (Lees’ Fl.). Ovenden, Hx. (G. L. Lister). Sutton (F.F., 1899). Bingley (Fl. Skipt.).

N.E.—Castle Howard (F.F., 1892). Mulgrave Woods (F.F., 1900).

143. **Clitocybe Trogii** Fr.

N.E.—Mulgrave Woods (Whitby F.F., 1900).

144. **Clitocybe cerussata** Fr.

N.E.—Ganton.

MID W.—Bramham (F.F., 1888).

S.E.—Allerthorpe (Pocklington F.F., 1893).

S.W.—Savin royd (Barnsley F.F., 1897). Cragg Vale, Hx.

145. **Clitocybe phyllophila** Fr.

S.W.—Huddersfield (Hud. Bot. Soc., 1883). Shipley Glen (Lees' Fl.). Sandal Beat (Doncaster F.F., 1891). Goitstock (Fl. Skipt.).

MID W.—Meanwood Wood; Bingley (Tr. Y.N.U., ix.). Selby (F.F., 1884). Carlton Woods (Lees' Fl.). Bramham and Harewood (F.F., 1888).

N.E.—Scarborough. Arncliffe (Egton F.F., 1902).

S.E.—Skipwith (Goole Sci. Soc., 'Nat.', 1878-9).

Frequent in beech woods among dead leaves.

146. **Clitocybe pithyophila** Fr.

S.W.—Fixby Hall Woods. 'Grows in close plantations, particularly those of fir or larch' (Bolton, Tab. 17). This figure has been quoted as *Clitocybe candicans* and also as *Clitocybe difformis*. 'This species (*Clitocybe difformis*) must be excluded from the British list, the figure of Bolton, Tab. 17, supposed to be this sp. is *Clitocybe pithyophila*' (Mass. Brit. Fung. Fl., vol. 2, p. 441). The Dict. Icon. Champign. (1894) gives it as *Omphalia umbilicata*.

N.E.—Scarborough.

147. **Clitocybe candicans** (Pers.).

MID W.—Horsforth (Tr. Y.N.U., ix.).

N.E.—Scarborough.

S.W.—Heaton, near Bradford (H.T.S., 'Nat.', 1880-1). Allerton; Birstall (Tr. Y.N.U., ix.). Hebden Bridge. Luddenden Dean; Lightcliffe, Hx.

S.E.—Escrick (Selby F.F., 1896).

Common in woods, among dead leaves, in late autumn.

148. **Clitocybe dealbata** (Sow.).

N.E.—Scarborough (Bot. Report, 1879).

MID W.—Selby (F.F., 1884). Brayton (Lees' Fl.).

S.W.—Thornes Park, Wakefield (Lees' Fl.). Cullingworth. High Greenwood, and Pecket Wood, near Hebden Bridge. Luddenden Dean; Lightcliffe, Hx.

Fairly common in pastures and open woods. Edible.

149. **Clitocybe gallinacea** (Scop.).

N.E.—Scarborough.

MID W.—Harewood (F.F., 1888).

N.W.—Masham.

In pastures and meadows under trees, or in open woods.

150. **Clitocybe aggregata** (Schæff.).

S.W.—At the base of *Sambucus nigra*, garden, Huddersfield (A. Clarke).

151. **Clitocybe fumosa** (Pers.).

MID W.—Studley Royal (F.F., 1881). Selby (F.F., 1884). Bramham and Harewood (F.F., 1888).

S.W.—Waste ground, Bradford, 1880 (Lees' Fl.). Shelley (Hud. Bot. Soc., 1883). Hugsett (Barnsley F.F., 1897).

In woods, not common.

152. **Clitocybe tumulosa** (Kalchbr.).

MID W.—Bishop's Wood (Selby F.F., 1896).

153. **Clitocybe subdecastes** Cke. & Mass.

S.W.—Notton (Barnsley F.F., 1897).

154. **Clitocybe opaca** (With.).

S.W.—Shipley Glen (H.T.S., 'Nat.', 1880-1). Beneath the wood floor of an old building, Bradford (B. Illingworth, 'Nat.', Sep. 1891).

155. **Clitocybe gigantea** (Sow.) [= **Paxillus giganteus** Fr.].

S.W.—There is an unpublished drawing by Bolton in the British Museum (Natural History) n. 1172, named *Agaricus maximus*, which is considered to represent the above species. It is accompanied by the following note, 'In several meadows

in the neighbourhood of Halifax, this present year 1793, in the months of August and September. I find no description or figure that will agree properly with it. . . . Some I measured more than a foot diameter' (Bolton)

156. **Clitocybe maxima** Fr.

MID W.—Leeds district (Lees' Fl.).

S.E.—Escrick (Selby F.F., 1896).

N.W.—Masham.

S.W.—Bare ground under trees, Goitstock.

157. **Clitocybe infundibuliformis** (Schæff.).

Common among grass and dead leaves in open woods. Has been recorded from all the divisions.

In the Dictionnaire Iconographique Champignons, Bolton's Tab. 59, is referred to this species; other authorities consider it to represent *Clitocybe brumalis*.

158. **Clitocybe geotropa** (Bull.).

S.W.—Fixby pastures (Hud. Bot. Soc.). A fine specimen was found with pileus 6 in. diam. Cullingworth.

N.E.—Scarborough.

MID W.—Slaidburn; Barwick-in-Elmet; Gateforth; Baildon (Lees' Fl.). Langstrothdale.

N.W.—Masham.

159. **Clitocybe gilva** (Pers.).

S.W.—Halifax. The Dict. Icon. Champ. refers Bolton's, Tab. 22, to this species. It is doubtful. This Tab. is not referred to by either Fries or Saccardo.

N.E.—Scarborough.

160. **Clitocybe inversa** (Scop.).

N.E.—Castle Howard (F.F., 1892).

161. **Clitocybe flaccida** (Sow.).

N.E.—Scarborough (exhibited at Leeds F.F., 1881).

162. **Clitocybe tuba** Fr.

MID W.—Selby (F.F., 1884).

N.E.—Scarborough.

S.W.—Fixby, Hx.

On dead leaves in woods.

163. **Clitocybe ericetorum** (Bull.).

MID W.—Selby.

S.W.—Shipley Glen ; Bingley Woods (Lees' Fl.). Heptonstall, Hebden Bridge.

N.W.—Masham.

164. **Clitocybe cyathiformis** Fr.

S.W.—Halifax, 1790 (Bolton's Hist. Fung., Tab. 145). Elland Park Wood ; Luddenden Dean ; North Wood, Lightcliffe, Hx. N.E.—Scarborough.

MID W.—Meanwood ; Brayton ; Bishop's Wood (Lees' Fl.). Langstrothdale. Grassington (Exc. 1900).

S.E.—Escrick (Selby F.F., 1896).

165. **Clitocybe brumalis** Fr.

S.W.—Huddersfield (Hud. Bot. Soc.). Steeton (Lees' Fl.). Liversedge. Several woods about Hebden Bridge. Goitstock. Woods at Luddenden Dean ; Northdean ; Elland Park ; Ovenden ; Skircoat ; Cragg Vale ; Fixby, etc., Hx. Woods near Sheffield.

MID W.—Bramham and Harewood (F.F., 1888).

N.E.—Cloughton, Scarborough (H.T.S., 'Nat.', Jan. 1892). Arncliffe Woods (Whitby F.F., 1894). Mulgrave (F.F., 1900).

N.W.—Masham.

Common in woods among dead grass and leaves.

166. **Clitocybe metachroa** Fr.

MID W.—Harrogate (F.F., 1881). Selby (F.F., 1884).

S.W.—Nab Wood, Saltaire (Lees' Fl.). Sandal Beat, Doncaster (F.F., 1891). Hebden Bridge.

N.E.—Scarborough. Mulgrave Woods (Whitby F.F., 1900).

167. **Clitocybe ditopoda** Fr.

N.E.—Ganton.

S.W.—Hebden Bridge. Northdean Wood, Hx. (U. Bairstow).

168. **Clitocybe fragrans** (Sow.).

Common in woods and poor, mossy pastures ; distribution general. At the Cadeby F.F. it was plentiful in Potridings wood, but every sporophore was attacked by the parasitic

mould *Sporodinia aspergillus*. In poor pastures in rings, Luddenden Dean, Hx. (H.T.S.).

169. **Clitocybe angustissima** (Lasch.).

Brought to the Leeds F.F., 1881 (Tr. Y.N.U., ix.).

[**Clitocybe Sadleri** (Berk.).

N.E.—Scarborough. On tree stump. This is now generally admitted to be nothing more than an abnormal form of *Hypholoma fasciculare*, in which the gills remain sterile, and hence pale in colour. It was founded on specimens growing on an oak tub in a conservatory, Edinburgh].

GENUS LACCARIA B. & Br., 1883.

170. **Laccaria bella** (Pers.).

N.E.—Scarborough ('Nat.', 1880-1). Two specimens of this very rare fungus were found in Raincliffe Wood. Castle Howard (F.F., 1892).

MID W.—Shipley Glen (Lees' Fl.).

S.W.—Hebden Bridge. Northdean Wood, Hx.

N.W.—Masham.

171. **Laccaria laccata** (Scop.). (Bolton, Tab. 64).

Extremely common and widely distributed; grows, more or less, in almost every damp wood. Most variable in form and colour.

Var. **amethystina** Bolt.

S.W.—Halifax, 1788 (Bolton's Hist. Fung., Tab. 63). Also an unpublished figure, deep blue, in the British Museum (Nat. Hist.) collection, n. 224, which Bolton named *Ag. indigoferus*. Hebden Bridge. Luddenden Dean, Hx. Anston, near Sheffield. Storthes Hall Woods, etc., Huddersfield.

N.E.—Castle Howard (F.F., 1892). Arncliffe Woods (F.F., 1894). Mulgrave Woods (F.F., 1900).

Var. **tortila** Bolt.

S.W.—'Grows in rich garden-mould, about the roots of such plants and shrubs as afford much shade.' Halifax (Bolton's Hist. Fung., Tab. 41, f.a.). Much smaller than type.

MID W.—Grassington (Exc. 1900).

GENUS COLLYBIA Fr., 1821.

172. *Collybia radicata* (Bull.).

About old stumps in shaded places, penetrating deeply by a tough, gradually tapering, tail-like root. Common; has been met with at all the forays, and is recorded from all the county divisions.

173. *Collybia longipes* (Bull.).

S.W.—On old stumps. Not common. Apperley; Bingley (Lees' Fl.).

174. *Collybia platyphylla* Fr.

MID W.—Selby (F.F., 1885). Stainor and Bishop's Woods (F.F., 1896).

S.W.—Sandal Beat (Doncaster F.F., 1891). Huddersfield (F.F., 1895). Hebden Bridge. Northdean Wood; Callis Wood, Erringden; Elland Park Wood; North Wood, near Lightcliffe; Luddenden Dean, Hx. Blackwood (Selby F.F., 1896). Hugsett, Stainborough and Notton (Barnsley F.F., 1897). Ravensthorpe (H. Parkinson). Bingley (Lees' Fl.).

N.E.—Scarborough. Castle Howard (F.F., 1892). Mulgrave Woods (F.F., 1900).

S.E.—Everingham (Pocklington F.F., 1893).

Frequent in woods among decaying leaves. Springs from an extensively creeping, anastomosing, white, rooting, cord-like mycelium which spreads in the humus beneath the last fall of leaves.

175. *Collybia fusipes* (Bull.).

MID W.—Hambleton (Bot. Report, 1878). Beckwithshaw (F.F., 1881; Tr. Y.N.U.). Harewood (F.F., 1898). Shipley Glen (Lees' Fl.).

S.W.—Nab Wood, Bingley (H.T.S., 'Nat.', 1880-1). Birstall; Roche Abbey Valley (Lees' Fl.). Coxley Valley. Huddersfield (F.F., 1895). Ovenden; Northdean Wood, Hx.

N.E.—Scarborough. Castle Howard (F.F., 1892).

S.E.—Escrick Woods (Selby F.F., 1896).

On or near stumps, fallen trunks, etc. Edible.

Var. *œdematopa* (Schæff.).

S.W.—Rough Hey Wood, Norland, Hx.

176. *Collybia maculata* (A. & S.).

Frequent in moist mixed woods and generally distributed; has been met with at all the forays. Very common in the woods about Halifax, Huddersfield, etc.

177. *Collybia fodiens* (Kalchb.).

S.W.—Sutton (F.F., 1899).

178. *Collybia distorta* Fr.

MID W.—Bramham (F.F., 1888). Esholt (H.T.S.).

N.E.—Castle Howard (F.F., 1892).

S.W.—High Greenwood, near Hebden Bridge. Bingley Woods (Fl. Skipt.).

179. *Collybia butyracea* (Bull.).

N.E.—Scarborough (Bot. Report, 1879). Cloughton, Scarborough (H.T.S., 'Nat.', Jan. 1892). Mulgrave Woods (F.F., 1894 and 1900).

MID W.—Beckwithshaw; Meanwood (F.F., 1881). Selby (F.F., 1884). Carlton (Lees' Fl.). Bramham (Harewood F.F., 1888). Stainor and Bishop's Woods (Selby F.F., 1896).

S.W.—ShIPLEY Glen (Lees' Fl.). Ovenden, Hx. (G. L. Lister, 1891). Hebden Bridge. Northdean Wood; Ludden Dean; Lightcliffe, Hx. Several woods about Huddersfield. Edlington Woods (Doncaster F.F., 1891). Melton and Potridings Woods (F.F., 1901). Goitstock. Woods near Sheffield.

S.E.—Escrick and Blackwood (Selby F.F., 1896).

N.W.—Masham.

Frequent among grass and dead leaves in woods.

180. *Collybia velutipes* (Curt.).

S.W.—Halifax, Feb. 1st, 1789 (Bolton's Hist. Fung., Tab. 135).

Common on stumps, and on living trees, everywhere; sometimes forming immense bundles. Has been noted at all the forays, and recorded for all the divisions. Remarkable for its power of withstanding strong frost. May be met with all the

year round. A tuft was found growing on an old clothes-dolly in an out-kitchen, Hx., 1899.

181. *Collybia vertirugis* (Cke.).

N.E.—Scarborough.

MID W.—Pool, 1887 (Lees' Fl., p. 812).

182. *Collybia stipitaria* Fr.

S.W.—Near Keighley; Roche Abbey Valley (Lees' Fl.).

183. *Collybia confluens* (Pers.).

MID W.—Selby (F.F., 1884). Adel; Hawkesworth; Bishop's Wood (Lees' Fl.). Harewood (F.F., 1888). Grassington (Exc. 1900).

S.W.—Thackley (Lees' Fl.). Sandal Beat (Doncaster F.F., 1891). Campsall (Sutton F.F., 1899). Potridings Wood (Cadeby F.F., 1900).

N.E.—Scarborough. Castle Howard (F.F., 1892). Mulgrave Woods (F.F., 1894 and 1900).

S.E.—Everingham (F.F., 1893). Escrick (Selby F.F., 1896). Frequent on soil in woods among dead leaves.

184. *Collybia ingrata* (Schum.).

N.E.—Scarborough.

185. *Collybia conigena* (Pers.).

N.E.—Scarborough.

S.W.—Sutton (F.F., 1899).

N.W.—Masham.

In pine woods, growing on cones and among pine leaves.

186. *Collybia cirrhata* (Schum.).

N.E.—Scarborough (G.M., 'Nat.' 1880-1). Mulgrave (F.F., 1894).

MID W.—Meanwood (F.F., 1881).

S.W.—Edlington (Doncaster F.F., 1881). Sutton (F.F., 1899).

187. *Collybia tuberosa* (Bull.).

Common in moist woods on the débris of species of dead *Russula* and other *Agarics*. Has been met with at nearly all the forays, and is recorded for each county division.

188. **Collybia racemosa** (Pers.).

S.W.—Goitstock (T. Hebden in Fl. Skipt.).

189. **Collybia thelephora** (Cke. & Mass.).

N.E.—Scarborough. In partly dried up Sphagnum bogs.

The species was founded on specimens growing in the bog near the race course (Cooke's Illustr., pl. 1167).

190. **Collybia leucomyosotis** (Cke. & Sm.).

S.W.—On Sphagnum in bogs, Goitstock (T. Hebden in Fl. Skipt.).

191. **Collybia xanthopoda** Fr.

N.E.—Scarborough. In pine woods, etc.

S.W.—Huddersfield (F.F., 1895).

192. **Collybia nitellina** Fr.

N.E.—Among grass near paths in pine woods, Scarborough.

S.E.—Allerthorpe (Pocklington F.F., 1893).

193. **Collybia succinea** Fr.

N.E.—Scarborough. Among grass under trees in mixed woods.

194. **Collybia nummularia** (Bull.).

N.E.—Scarborough.

S.W.—Sutton (F.F., 1899). Luddenden Dean, Hx. Melton; Potridings Wood (Cadeby F.F., 1901).

N.W.—Masham. Sedbergh (*1902). Among decaying grass and leaves.

195. **Collybia esculenta** (Wulf).

N.E.—Scarborough.

N.W.—Bramham (F.F., 1888).

In pastures, open woods, etc.

196.—**Collybia tenacella** (Pers.).

N.E.—Scarborough. In pine woods among the decaying leaves.

197. **Collybia acervata** Fr.

N.E.—Scarborough. Mulgrave Woods (F.F., 1900).

S.W.—Melton (Cadeby F.F., 1901).

N.W.—Masham.

At the base of pine trunks, on fallen pine logs, etc.

198. **Collybia dryophila** (Bull.).

Common in woods among dead leaves. Distribution general.

Has been met with at every foray and recorded for all the county divisions.

There are several forms.

199. **Collybia aquosa** (Bull.).

N.E.—Arncliffe Woods (Whitby F.F., 1894).

200. **Collybia clavus** (L.).

[S.W.—Most likely Bolton's Tab. 39, f. B. *Agaricus clavus* L. (not of Bulliard, as intimated in Lees' Fl., p. 671) represents *Mycena acicula*. We cannot say definitely that it does, though several authorities who have dealt with the matter place it there].

Pecket Wood, Hebden Bridge, 1894.

N.W.—Masham.

201. **Collybia ocellata** Fr.

N.E.—Scarborough. Mulgrave Woods (F.F., 1900).

202. **Collybia muscigena** (Schum.).

S.W.—Norland, Hx., 1891. On mossy ground in a wood (exhibited at the Doncaster F.F., 1891).

203. **Collybia rancida** Fr.

N.E.—Scarborough. Mulgrave Woods (F.F., 1900).

On the ground, about fallen tree trunks and stumps. Very strong smelling.

204. **Collybia plexipes** Fr.

S.W.—Ramsden Wood, Ovenden; Rough-Hey Wood, Norland, Hx. On tree stumps.

205. **Collybia atrata** Fr.

N.E.—Scarborough, on the ground in open places.

206. **Collybia ambusta** Fr.

N.E.—Scarborough. S.E.—Blackwood (Selby F.F., 1896).

S.W.—Goitstock, near Bingley (Fl. Skipt.). Luddenden Dean, Hx. Cadeby (F.F., 1901).

N.W.—Masham.

Generally on scorched ground among the charred remains of branches, etc.; occasionally among decaying bracken.

207. **Collybia clusilis** Fr.

S.W.—Among Sphagnum on the Wadsworth and Saltonstall Moors, Hx., June 1901. Always in the company of crowds of *Pholiota mycenoides*.

MYCENA Pers., 1797.

208. **Mycena pelianthina** Fr.

S.W.—Northowram, Halifax, 1787 (Bolton's Hist. Fung., Tab. 4, f. 1.).

N.E.—Scarborough. Castle Howard (F.F., 1892).

209. **Mycena balanina** (Berk.).

N.E.—Scarborough. Arncliffe and Mulgrave Woods (F.F., 1894).

210. **Mycena elegans** Pers.

N.E.—Castle Howard (F.F., 1892). Owston (Sutton F.F., 1899).

211. **Mycena olivaceo-marginata** Masee.

S.W.—Huddersfield (F.F., 1895). Among short grass, Savile Park, Hx. (H.T.S., 1898).

The original specimens were found on lawns at Kew.

212. **Mycena rosella** Fr.

MID W.—Beckwithshaw (F.F., 1881).

N.E.—Scarborough, among moss and leaves in pine woods.

S.E.—Boynton (W.W.S.).

213. **Mycena strobilina** Fr.

Var. **coccinea** Sow.

N.E.—Staithes (* 'Nat.', April, 1898).

214. **Mycena pura** Pers.

S.W.—Halifax, 1786. Bolton's Tab. 36 is considered to be a red form of this sp. Shelley (Hud. Bot. Soc., 1883). Allerton (Lees' Fl.). Sutton (F.F., 1899). Potridings Wood (Cadeby F.F., 1901).

MID W.—Studley Royal (F.F., 1881). Selby (F.F., 1884).
Bramham (F.F., 1888). Shipley Glen (Lees' Fl.).

S.E.—Grindale (W.W.S. 'Nat.', June 1889). Escrick (Selby
F.F., 1896).

N.E.—Scarborough. Mulgrave Woods (Whitby F.F., 1894
and 1900). Staithes (* 'Nat.', April 1898). Egton Bridge
(F.F., 1902).

Frequent in woodside meadows and grassy woods. Variable
in colour. Tastes and smells like radish.

215. **Mycena pseudopura** (Cke.).

N.E.—Scarborough. Mulgrave Woods (Whitby F.F., 1894).

S.W.—Goitstock.

216. **Mycena zephira** Fr.

S.W.—Among dead leaves, Goitstock Wood.

217. **Mycena adonis** (Bull.).

MID W.—Pasture on Baildon Moor (H.T.S., 'Nat.', Sep.
1891).

218. **Mycena luteo-alba** (Bolton).

S.W.—Halifax (Bolton's Hist. Fung. Tab., 38, f. 1). Common
in the woods about Hx. in Bolton's time. Huddersfield (F.F.,
1895). Cottingley and Goitstock (H.T.S., 'Nat.', Sep. 1891).
Norland, Hx. (H.T.S., 1898).

S.E.—Kirkham Abbey (* 'Nat.', Nov. 1889).

N.E.—Scarborough.

N.W.—Masham.

219. **Mycena flavo-alba** Fr.

MID W.—Studley Royal (F.F., 1881).

N.E.—Scarborough.

S.W.—On mossy tree-trunks, Nab Wood, Saltaire (Lees' Fl.).

220. **Mycena lactea** Pers.

MID W.—Studley Royal (F.F., 1881). Selby (F.F., 1884).
Barlow (Lees' Fl.).

S.W.—Edlington (Doncaster F.F., 1891). Crimsworth Dean,
High Greenwood, etc.; near Hebden Bridge. Luddenden
Dean, Hx.

N.E.—Scarborough. Cloughton Scar, Scarborough (H.T.S., 'Nat.,' Jan. 1892). Mulgrave Woods (F.F., 1900).

N.W.—Masham.

In woods, chiefly among pine leaves. Frequent.

221. **Mycena gypsea** Fr.

N.E. — Scarborough, first British record (Cooke's Illustr., pl. 952A). Castle Howard (F.F., 1892). Egton Bridge (F.F., 1902).

MID W.—Bramham and Harewood (F.F., 1888).

S.W.—Sutton (F.F., 1899).

N.W.—Masham.

In tufts on the ground among dead leaves.

222. **Mycena Berkeleyi** Mass. (= *M. excisa* Berk.).

S.W.—Potridings Wood (Cadeby F.F., 1901). On rotting branches. Of this fine, well-marked species, noted for the greatly extended sinus in the gills, only two sporophores were found.

223. **Mycena rugosa** Fr.

S.W.—Nab Wood, Saltaire (Lees' Fl.). Edlington Wood (Doncaster F.F., 1891). Several woods about Hebden Bridge. Binn-royd Clough, Norland; Elland Park Wood; Luddenden Dean, Hx. Huddersfield (F.F., 1895). Goitstock. Hugsett, Stainborough (Barnsley F.F., 1897). Sutton (F.F., 1899). Potridings Wood (Cadeby F.F., 1901). Wyming Brook, Ecclesall, and other places near Sheffield. Thongsbridge (C. H. Broadhead).

S.E.—Everingham (Pocklington F.F., 1893).

N.E.—Scarborough. Arncliffe Woods (Whitby F.F., 1894). Mulgrave (F.F., 1900). Egton Bridge (F.F., 1902).

N.W.—Masham. Frequent on and about dead stumps.

224. **Mycena sudora** Fr.

MID W.—Denton, near Ilkley (Lees' Fl.).

S.E.—Boynton (W.W.S.).

225. **Mycena galericulata** (Scop.).

Common everywhere, from July to November, in fascicles, or

occasionally solitary, on and near old dead stumps. Has been met with at all the forays.

Var. **calopoda** Fr.

S.W.—Pecket Wood, and High Greenwood, near Hebden Bridge. Northdean Wood; Luddenden Dean Woods, Hx. Potridings Wood (Cadeby F.F., 1901).

226. **Mycena polygramma** (Bull.).

MID W.—Studley Royal (F.F., 1881). Harewood (F.F., 1888).

S.W.—ShIPLEY Glen (Lees' Fl.). Edlington Woods (Doncaster F.F., 1891). Coxley Valley; Hunsworth. On rotting beam, Heath, Hx. Birks Wood, Southowram; Northdean Wood, Hx. Hebden Bridge. Hugsett; Stainborough (Barnsley F.F., 1897). Melton (Cadeby F.F., 1901). Goitstock. Anston, Sheffield.

S.E.—Pocklington (F.F., 1893). Escrick (Selby F.F., 1896).

N.E.—Scarborough. Mulgrave Woods (F.F., 1900). Egton Bridge (F.F., 1902).

N.W.—Masham. Sedbergh (*1902).

227. **Mycena parabolica** (A. & S.).

S.E.—Grindale (W.W.S., 'Nat.', June 1889).

228. **Mycena tintinnabulum** Fr.

N.E.—Scarborough. On fallen, decaying branches.

N.W.—Masham.

229. **Mycena flavipes** (Quel.).

N.E.—Whitby, on stump (G.M.), first British record (Cooke's Illustr., pl. 951B).

230. **Mycena atro-alba** (Bolton).

S.W.—“Grows amongst moss about the roots of trees in woods about Halifax, but rarely” (Bolton's 'Hist. Fung.', 1789, tab. 137). Cullingworth; Battye Ford (Lees' Fl.).

231. **Mycena pullata** (Berk. & Cke.).

S.W.—North Wood, near Lightcliffe; Elland Park Wood, Hx. Hebden Bridge. Goitstock.

On the ground among leaves in woods.

232. *Mycena dissiliens* Fr.

S.W.—“On decaying stumps of fallen trees, Halifax” (Bolton's ‘Hist. Fung.,’ 1790, tab. 154). Warley; North Wood, near Lightcliffe, Hx. Callis Wood; High Greenwood; near Hebden Bridge.

N.E.—Scarborough. Mulgrave Woods (F.F., 1900).

Strong scented.

233. *Mycena plicosa* Fr.

N.E.—Scarborough.

S.W.—On lawn, Peel Park, Bradford (H.T.S., ‘Nat.,’ Sept. 1891). Hugsett (Barnsley F.F., 1897).

N.W.—Masham.

234. *Mycena atrocyanea* (Batsch).

N.E.—Scarborough. Cloughton, Scarborough (H.T.S., ‘Nat.,’ Jan. 1892). Mulgrave Woods (F.F., 1900).

S.W.—Luddenden Dean, Hx. Northdean Wood, Hx. (H.T.S.). Howden Hole, near Hebden Bridge. Sutton (F.F., 1899).

The Luddenden Dean specimens were met with during a foray held by the Mycological Committee in October 1895, and recorded as *Mycena iris*. They were afterwards found to belong here.

235. *Mycena leptcephala* Pers.

S.W.—Hatfield (*‘Nat.,’ March 1888). Ovenden, Hx. (G. L. Lister). Peel Park, Bradford (Lees’ Fl.). Halifax.

MID W.—Ilkley; Hawkesworth; Baildon (Lees’ Fl.).

N.E.—Scarborough. Mulgrave Woods (F.F., 1900).

236. *Mycena alcalina* Fr.

MID W.—Selby (F.F., 1884). Bramham (F.F., 1888). Ilkley (Fl. Skipt.).

S.W.—Shipley Glen; Bingley (Lees’ Fl.). Ovenden; Northdean Wood, Hx. (J. W. Sutcliffe). High Greenwood, Hebden Bridge. Stainborough (Barnsley F.F., 1897). Sutton (F.F., 1899). Anston and Grenoside, near Sheffield. Thongsbridge (C. H. Broadhead).

N.E.—Scarborough. Mulgrave (F.F., 1900). Egton Bridge (F.F., 1902).

N.W.—Masham.

Frequent on trunks, stumps, etc. Distinguished by its strong alkaline odour.

237. **Mycena ammoniaca** Fr.

Ś.W. — Gomersall ('Nat.,' Sept. 1891). Shipley Glen (H.T.S.). Field, Elland Park Wood; Luddenden Dean; Skircoat, Hx. Crimsworth Dean, Hebden Bridge. Sheffield.

N.E.—Scarborough. Castle Howard (F.F., 1892). Arncliffe Woods (Whitby F.F., 1894). Mulgrave Woods (F.F., 1900).

S.E. — Everingham (Pocklington F.F., 1893). Skipwith (Selby F.F., 1896).

N.W.—Masham.

238. **Mycena cinerea** Mass. & Crossl. ('Nat.,' Jan. 1902, p. 1).

MID W.—Among short grass. First collected at Selby, Yorks., afterwards met with at Louth, Lincs., and at Kew, Surrey.

Apparently not uncommon, and probably passed over as *M. metata* Fr., which differs in the absence of smell, and white gills. Most nearly allied to *M. plumbea* Fr., recently found in this country; the latter, however, differs in the sulcate pileus, white apex of stem, and absence of smell.

239. **Mycena metata** Fr.

N.E.—Scarborough.

N.W.—Masham.

S.W.—Redmires, near Sheffield.

240. **Mycena ætites** Fr.

S.W.—Among moss, Highlee Clough, Norland, Hx., 1900.

241. **Mycena stanea** Fr.

N.E.—Scarborough. Mulgrave Woods (F.F., 1900). Egton Bridge (F.F., 1902).

S.W.—Sutton (F.F., 1899). Hardcastle, Hebden Bridge. Thongsbridge (C. H. Broadhead).

N.W.—Masham. Not common.

242. **Mycena vitrea** Fr.

MID W.—Hawkesworth, 1885 (Lees' Fl.).

243. **Mycena tenuis** (Bolton).

S.W.—“Grows in the deep, moist and shady parts of woods; in a little wood above Lee Bridge; Woodhouse Wood; North Dean; and several other like places near Halifax, 1783” (Bolton's 'Hist. Fung.,' tab. 37).

244. **Mycena filopes** (Bull.).

S.W.—Northdean Wood (*'Nat.,' 1877-8). Hugsett (Barnsley F.F., 1897). Sutton (F.F., 1899). Melton; Potridings (Cadeby F.F., 1901). Wyming Brook, near Sheffield.

MID W.—Church Fenton; Hambleton; Bishops Wood (Lees' Fl.). Bramham (F.F., 1888).

N.E.—Scarborough. Mulgrave Woods (Whitby F.F., 1894 and 1900). Egton Bridge (F.F., 1902).

Frequent in woods among decaying leaves.

245. **Mycena iris** (Berk.).

S.W.—Roche Abbey Valley (Lees' Fl.).

N.E.—Scarborough. Stokesley (*1899).

S.E.—Boynton (W.W.S., 'Nat.,' June 1889).

On decaying fir-wood.

246. **Mycena amicta** Fr.

S.W.—Moor-edge, Rishworth, Hx., 1899, about the roots of *Nardus stricta*.

247. **Mycena debilis** Fr.

N.E.—Staithe (*'Nat.,' Apr. 1898). Mulgrave Woods (F.F., 1900).

N.W.—Masham. Rare.

248. **Mycena vitilis** Fr.

N.E.—Scarborough ('Nat.,' 1880-1). Castle Howard and Welham Park (F.F., 1892).

MID W.—Hawkesworth (Lees' Fl.).

S.W.—Crimsworth Dean, near Hebden Bridge.

249. **Mycena speirea** Fr.

S.W.—On a tree trunk, Thackley, 1886 (Lees' Fl.).

N.W.—Masham.

250. **Mycena acicula** (Schæff.).

MID W.—Selby (F.F., 1884). Esholt (H.T.S., 1891). Harewood and East Keswick (F.F., 1898). Brimham (*1902).

N.E.—Scarborough.

S.E.—Kirkham Abbey (*'Nat.,' Nov. 1889). Escrick (Selby F.F., 1896).

S.W.—High Greenwood and Midge-Hole Wood; Crimsworth Dean, etc., near Hebden Bridge, 1893. Elland Park Wood, Hx. (Bolton's tab. 39B, see under *Collybia clavus*). Melton Wood; Potridings Wood (Cadeby F.F., 1901).

N.W.—Masham.

Frequent among rotten leaves and twigs.

251. **Mycena hæmatopoda** Fr.

MID W.—Selby (F.F., 1884).

N.E.—Scarborough (Cooke's Illustr., pl. 162A). Mulgrave Woods (Whitby F.F., 1894). Egton Bridge (F.F., 1902).

S.W.—Sutton (F.F., 1899). Melton and Potridings Woods (Cadeby F.F., 1901).

On stumps, decaying branches, etc.

252. **Mycena sanguinolenta** (A. & S.).

Very common in almost any damp wood among the dead leaves. Has been recorded for each county division.

253. **Mycena galopoda** Fr.

As common and in similar situations as the preceding species.

254. **Mycena leucogala** Cke.

N.E.—Scarborough. On rotten stumps, etc.

S.W.—Goitstock (Fl. Skipt.).

N.W. Sedbergh (*1902).

255. **Mycena epipterygea** (Scop.).

S.W.—“Under the fir trees in the plantation near Fixby Hall” (Bolton, unpublished tab. in B.M. (Nat. Hist.) collection, n. 350 = *Ag. lubricus*). Heaton Wood, Wibsey (Lees' Fl.). Wharnccliffe. Coxley Valley. Norland; Luddenden Dean; Elland Park Wood; Stainland, etc., Hx. Several places about

Hebden Bridge. Goitstock. Hugsett (Barnsley F.F., 1897).
Wyming Brook, and Ecclesall, near Sheffield.

MID W.—Beckwithshaw (F.F., 1881). Selby (F.F., 1884).
Bramham and Harewood (F.F., 1888). Rombalds' Moor; Bail-
don; Temple Hurst (Lees' Fl.). Bolton Woods (Fl. Supt.).

N.E.—Scarborough. Cloughton, Scarborough (H.T.S., 'Nat.,'
Jan. 1892). Castle Howard (F.F., 1892).

S.E.—Escrick (F.F., 1896).

N.W.—Masham.

Common in fields on the margins of woods, and in woods of
an open, grassy nature.

256. **Mycena clavicularis** Fr.

N.W.—Masham.

257. **Mycena pelliculosa** Fr.

MID W.—Baildon Moor (Lees' Fl.).

N.E.—Scarborough.

S.W.—Crimsworth Dean, Hebden Bridge. Fixby, Hx.
Goitstock.

258. **Mycena vulgaris** Pers.

S.W.—Roche Abbey Valley (Lees' Fl.). Huddersfield (F.F.,
1895). Melton Woods (Cadeby F.F., 1901).

MID W.—Langstrothdale.

N.E.—Scarborough.

Among pine leaves, twigs, etc. Not common.

259. **Mycena citrinella** Pers.

N.E.—Scarborough. In pine woods, rare.

260. **Mycena rorida** Fr.

N.E.—Scarborough. Rare.

261. **Mycena stylobates** Pers.

MID W.—Selby (F.F., 1884). Baildon; Hawkesworth (Lees'
Fl.). Harewood (F.F., 1888). East Keswick (F.F., 1898).

S.W.—Roche Abbey Valley (Lees' Fl.). Edlington Wood
(Doncaster F.F., 1891). Elland Park Wood; Luddenden
Dean; Hx. Hebden Bridge. Sutton (F.F., 1899).

N.E.—Scarborough.

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