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ROYAL ASIATIC SOCIETY.

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APRIL 1923.

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25 JAN 1983

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THE
Malayan Branch
OF THE
Royal Asiatic Society.

Patron.

H. E. SIR LAURENCE GUILLEMARD, K.C.B., Governor of the Straits
Settlements and High Commissioner for the Malay States.

Council for 1923.

THE HON. MR. W. G. MAXWELL, C.M.G. *President.*
DR. R. O. WINSTEDT AND MR. H. *Vice-Presidents for the*
ROBINSON - - - - - *S. S.*
THE HON. MR. E. S. HOSE AND MR. *Vice-Presidents for the*
H. C. ROBINSON - - - - - *F. M. S.*
THE HON. MR. HAYES MARRIOTT AND *Vice-Presidents for the*
THE HON. MR. J. L. HUMPHREYS - *Unfederated States.*
MAJOR J. C. MOULTON, O.B.E. - - - *Hon. Secretary.*
MR. R. E. HOLTUM - - - - - *Hon. Treasurer.*
MR. J. JOHNSTON - - - - - *Hon. Librarian.*
DR. G. H. MACALISTER, MR. J. E.
NATHAN, DR. F. W. FOXWORTHY
AND MR. C. BODEN KLOSS - - - *Council.*

Proceedings

of the

Annual General Meeting

The annual general meeting was held at the Selangor Club, Kuala Lumpur 5 p.m. Saturday 10th February 1923.

Present: The Hon: Mr. W. G. Maxwell C.M.G. (in the Chair) and 34 other members.

1. The Minutes of the Annual General Meeting held 10th February 1922 were confirmed.

2. The Annual Report and Statement of Accounts were adopted.

3. The election of Officers and Members of the Council for the current year resulted as follows:—

President The Hon. Mr. W. G. Maxwell
C.M.G.

Vice-Presidents for the S. S. Dr. R. O. Winstedt and Mr.
H. Robinson.

Vice-Presidents for the F. M. S. Mr. H. C. Robinson and the
Hon. Mr. E. S. Hose.

Vice-Presidents for the U. M. S. The Hon. Mr. Hayes Marriott
. . . . and Mr. J. L. Humphreys.

Hon. Secretary Major J. C. Moulton O.B.E.

Hon. Treasurer Mr. R. E. Holttum.

Hon. Librarian Mr. J. Johnston.

Council Dr. G. H. Macalister, Mr. J.
E. Nathan, Mr. C. Boden
Kloss and F. W. Foxworthy.

4. Votes of thanks to the Hon. Secretary for his work during the past year, and to Mr. See Teong Wah for kindly auditing the accounts were passed.

5. Dr. W. L. Abbott was elected an Honorary Member.

6. After the official business of the meeting the following papers were read, for the most part illustrated by exhibits:—

Stone Implements in Malaya by Mr. I. H. N. Evans.

The height of trees in Malaya by Dr. F. W. Foxworthy.

Anti-malarial methods by C. N. Maxwell.

Some butterflies and other interesting insects, by H. M. Pendlebury.

Meteorological observations on Gunong Tahan, and notes on some interesting mammals and birds of the Peninsula, by H. C. Robinson.

Malay Mystics of the 17th Century by Dr. R. O. Winstedt.

Dr. Malcolm Watson made some valuable comments on Mr. Maxwell's paper.

The President warmly thanked the speakers for their communications which kept the meeting deeply interested for over an hour. It was decided to print them in the Society's Journal.

7. A vote of thanks to the Chair, proposed by Mr. I. H. Burkill, concluded the meeting.

Annual Dinner

By kind permission of the Committee of the Selangor Club the usual annual dinner was held at that Club, Kuala Lumpur, on Saturday 10th February 1923 at 8.30 p.m.

The President, the Hon. Mr. W. G. Maxwell C.M.G., presided. H. E. the Governor and High Commissioner, Patron of the Society, was present as the guest of the evening. Covers were laid for 52.

After the usual loyal toast, the President extended a hearty welcome to the Society, which for the first time in its history, had held its Annual Meeting away from Singapore. It was a step that signified the broader interests of the Society and as such was one to be welcomed. The large number attending the meeting that afternoon—a record one he believed—and the still larger number at the dinner showed that the move was appreciated. There were three points he desired to call attention to: first in regard to the Journal, he hoped more members would contribute short notes. When Sir William Maxwell (the speaker's father) was the Hon. Secretary of the Society in its early days, the "Notes and Queries" published by the Society contained a wide variety of interesting matter. He hoped this feature could be revived in the Journal. He deplored the absence of ladies, whose assistance should be sought to further the interests of the Society. It was gratifying to learn that several influential Malays had joined the Society during the last two or three years and he hoped that more would be done to enlist the interest and support of Asiatics in this country.

H. E. the Governor in a witty and characteristic speech referred to the pleasure it gave him once again to propose the health of the Society. He recalled various episodes in his early days but regretted that a scientific training was not one of them. In spite of a diligent application to classics, however, he was still able to appreciate the broad-minded views of scientists and it therefore gave him much pleasure to couple the names of Mr. H. C. Robinson and Dr. R. O. Winstedt with the toast of the Society. He referred in eulogistic terms to their work in this country and congratulated the Society on co-operating with them. Time prevented

him mentioning other eminent workers in Malaya, but there were many, and by their published works they had made names for themselves.

Mr. Robinson and Dr. R. O. Winstedt replied on behalf of the Society. Mr. C. J. Wilson replied on behalf of the guests and Mr. Boden Kloss in his usual happy vein replied on behalf of the older members, of whom he happened to be the most senior present. His quotation from "Macbeth" with reference to speech-making concluded the evening.



List of Members for 1923.

(as on 1st January, 1923)

* *Life Members.* † *Contributors to the Society's Journal.*

Honorary Members.

Year of Election.

- 1890.1918. †BLAGDEN, C. O., Shirley, 57 Earl's Court Square, London, S. W. 5.
1921. BRANDSTETTER, PROF. DR. R., Luzern, Switzerland.
- 1894.1906. COLLYER, W. R., I.S.O., Hackford Hall, Reepham, Norfolk, England. (Council, 1904: Vice-President, 1897-1900, 1902, 1904-1905).
- 1903.1917. †GALLOWAY, DR. D. J., British Dispensary, Singapore. (Vice-President, 1906-1907: President, 1908-1913).
- 1895.1920. †HANITSCH, DR. R., 99 Woodstock Road, Oxford, England. (Council, 1897-1919: Hon. Treasurer, 1898-1906, 1910-1911, 1914-1919: Hon. Secretary, 1912-1913).
1922. JOHORE, H. H. The Sultan of, G.C.M.G., K.B.E., Johore Bahru, Johore.
1921. PERAK, H. H. The Sultan of, K.C.M.G., The Astana Negara, Bukit Chandan, Kuala Kangsar, Perak.
1878. †PERHAM, VEN. ARCHDEACON J., Chard, Somerset.
- 1890.1912. †RIDLEY, H. N., C.M.G., M.A., F.R.S., 7 Cumberland Road, Kew Gardens, Surrey, England. (Council, 1890-1894, 1896-1911: Hon. Secretary, 1890-1893, 1896-1911).
1916. SARAWAK, H. H. The Rajah of, Kuching, Sarawak.
1885. SATOW, SIR ERNEST M., Beaumont, Ottery St. Mary, Devon, England.
- 1894.1921. †SHELLABEAR, REV. W. G., D.D., c/o Board of Foreign Missions, 150, Fifth Avenue, New York City, U. S. A. (Council, 1896-1901, 1904: Vice-President, 1913: President, 1914-1918).
1921. SNOUCK-HURGRONJE, PROF. DR., Leiden, Holland.
1921. †VAN RONKEL, DR. Professor of Malay, Zoeterwondsche Singel 44, Leiden, Holland.

Corresponding Members.

1920. †ANNANDALE, N., D.Sc., F.A.S.B., Indian Museum, Calcutta.
1920. †LAIDLAW, F. F., M.A., F.Z.S., Hyefield, Uffculme, Devon.
1920. †MERRILL, E. D., Ph. D., Director, Bureau of Science, Manila.
1920. †MOQUETTE, J. P., Kebonsirih 36, Weltevreden, Java.

Ordinary Members.

1903. ABBOTT, W. L., 400 South 15th Street, Philadelphia.
 1918. ABDUL-MAJID BIN HAJI ZAINUDDIN, Education Office, Taiping, Perak.
 1922. ABDULLAH, Dato Sadia Raja, The Undang of Rembau, Negri Sembilan.
 1916. †ABRAHAM, H. C., Bukit Timah, Singapore.
 1920. †ABIDIN, ZAINAL, BIN AHMAD, Malay College, Kuala Kangsar.
 1909. ADAM, FRANK, The Straits Trading Co., Singapore.
 1907. *ADAMS, SIR ARTHUR, K.B.E., Penang.
 1921. ADAMS, C. D., Baram, Sarawak.
 1910. ADAMS, H. A., Kuching, Sarawak.
 1917. ADAMS, J. W., M.R.C.S., L.R.C.P., B.A., M.B., B.C., Medical Health Office, Penang.
 1920. ADAMS, P. M., Kuching, Sarawak.
 1917. ADAMS, R. H., Topham, Jones and Railton, Ltd., Singapore.
 1909. †ADAMS, T. S., Batu Gajah, Perak.
 1919. *ADELBERG, F., Jenderata Estate, Telok Anson, Perak.
 1922. ALEXANDER, C. S., Kuala Lumpur.
 1913. ALLEN, REV. GEORGE DEXTER, M.A., Windermere, St. Thomas Walk, Singapore.
 1914. ALLEN, H. C. W., Boustead and Co., Singapore.
 1921. ALLEN, L. A., c/o Crown Agents, Whitehall, London.
 1917. ALLEN, P. T., B.A., Chinese Protectorate, Singapore.
 1921. ALLEN, DR. R., B.Sc., Sarawak Oilfields, Miri, Sarawak.
 1921. ALLEN, W. H. R., The Straits Trading Co., Penang.
 1914. AMERY, REV. A. J., B.D., Outram Road School, Singapore. (Council, 1921).
 1921. †ANDREINI, CAPT. E. V., Kapit, Sarawak.
 1908. ARTHUR, J. S. W., M.A., Assistant Adviser, Kedah.
 1921. AUSTEN, K. W. H., c/o Police Office, Penang.
 1908. *AYRE, C.F.C., High School, Malacca.
 1921. *AZIZ, UNKU ABDUL, Johore Bahru, Johore.
 1915. BADDELEY, F. M., B.A., Under Secretary, Singapore.
 1921. BADHEKA, MOHAUL O., 21 Malacca Street, Singapore.
 1919. *BAILEY, A. E., Mountmillan, Knowles Hill, Newton Abbott, England.
 1915. BAIN, NORMAN K., B.A., Ipoh, Perak.
 1922. BAKAR, INCHI ABU, BIN HAMAD, Johore Bahru, Johore.
 1912. †BAKER, A. C., M.C., B.A., 7 Upper Beulah Hill, Upper Norwood, London.
 1921. *BALL, H., Inspector of Schools, Malacca.
 1916. BANKS, H. H., Sanitary Board, Seremban.
 1899. *BANKS, J. E., c/o The American Bridge Co., Cambridge, Pa., U. S. A.
 1920. BARBOUR, DR. T., Museum of Comparative Zoology,

- Harvard University, Cambridge, Mass., U. S. A.
1920. BARDHAM, RAI SAHIB, S.N., Medical School, Singapore.
1921. BARNES, J. R., Kuching, Sarawak.
1922. BARRY, D. M., Ipoh, Perak.
1910. BARTLEY, W., M.B.E., B.A., c/o Secretariat, Singapore.
1921. BAUGHAN, G. E., S. S. Police, Singapore.
1914. BAZELL, C., Malay College, Kuala Kangsar, Perak.
(Hon. Librarian, 1916-20; Hon. Treasurer, 1921).
1909. BEAN, A. W., c/o Robinson and Co., Singapore.
1921. BEARD, H., The Asiatic Petroleum Co., Miri, Sarawak.
1921. BELGRAVE, W. N. C., Agric. Dept., Kuala Lumpur.
1913. BELL, V. G., Kuala Lumpur.
1921. BELL, W. C. B., Bell and Co., Singapore.
1921. BENJAMIN, MAJOR E. V., M.C., Asiatic Petroleum Co., Miri, Sarawak.
1910. *BERKELEY, H., F. M. S. Civil Service, Grik, Upper Perak.
1912. BICKNELL, J. W., U. S. Rubber Plantations Inc., Penang.
1885. BICKNELL, W. A., 3 Alexandra Terrace, Exmouth, Devon.
1922. BIGGS, L. A. C., Municipal Office, Penang.
1908. *BISHOP, MAJOR C. F., R.A.
1922. BISHOP, D. A., Principal, Raffles Institution, Singapore.
1921. BLACK, MAJOR K., Tan Tock Seng Hospital, Singapore.
1884. †BLAND, R. N., C.M.G., c/o Messrs. H. S. King and Co., 9 Pall Mall, London, S. W., England.
(Council, 1898-1900; Vice-President, 1907-1909).
1921. BLASDELL, REV. R., Anglo-Chinese School, Ipoh.
1910. BOULT, F. F., Limbang, Sarawak.
1919. *BOURNE, G. F., D. P. P.'s Office, Singapore.
1921. BOYD, R., Labour Office, Penang.
1918. *BOYD, W. R., c/o Crown Agents, London.
1915. BOYD-WALKER, J. W., Penang.
1913. †BRADDELL R. ST. J., Braddell Bros., Singapore.
1918. BRADNEY, G. P., Auditor General, F. M. S., Kuala Lumpur.
1921. BRATTON, A. G., Messrs. Guthrie and Co., Singapore.
(Council 1921; Hon. Treasurer 1922).
1897. BROCKMAN, SIR EDWARD L., K.C.M.G., 88 Cannon Street, London, E. C. 4.
1909. †BROOKS, C. J., Lebong Tandai, Post Ketaun, Benkoelen, Sumatra.
1909. BROWN, MR. JUSTICE A. V., Johore Bahru, Johore.
1915. BROWN, C. C., D. O. Raub, Pahang.

1910. BROWN, D. A. M., *c/o* Messrs. Brown, Phillips and
and Stewart, Penang.
1921. BROWNE, T. W., Kuala Pilah Estate, Negri Sembilan.
1913. *BRYAN, J. M., *c/o* Messrs. The Borneo Co., Ltd.,
Fenchurch Street, London, E. C.
1887. BRYANT, A. T., Messrs. Bryant and Ryde, Bush Lane
Chamber, Bush Lane, London, E. C. 4. (Council,
1907, 1910: Vice-President, 1912, 1914-1916).
1912. †BURKILL, I. H., M.A., Director, Botanic Gardens,
Singapore. (Council, 1913-17, 1921— : Hon.
Secretary, 1914-1917).
1921. BUTTERFIELD, H. M., Alor Star, Kedah.
1913. *†CALDECOTT, ANDREW, B.A., *c/o* Crown Agents, White-
hall, London.
1921. CAMPBELL, F. M., Wardieburn Estate, K. Lumpur.
1916. †CAMPBELL, PROFESSOR J. ARGYLL, M.D., D.S.C., *c/o*
Messrs. W. and F. Haldane, 4 North Charlotte St.,
Edinburgh, Scotland. (Council, 1917, 1919).
1918. CARPMAEL, H., Municipality, Singapore.
1921. *CAVENDISH, A., Taiping, Perak.
1906. CHAPMAN, W. T., Chinese Protectorate, K. Lumpur.
1921. †CHASEN, F. N., M.B.O.U., Raffles Museum, Singapore.
1921. CHEERS, E., S. S. Police, Trengganu.
1913. *CHOO KIA PENG, THE HON. MR., Kuala Lumpur.
1913. CHULAN, RAJA, di Ilir, Perak, Kuala Kangsar, Perak.
1921. CLARK, H. T., Inspector of Schools, Singapore.
1921. CLARK, DR. W. E. LE GROS, P. M. O., Kuching,
Sarawak.
1922. CLARKSON, H. T., Raffles Hotel, Singapore.
1921. CLAYTON, G. E., Cadets' Bungalow, Penang.
1911. *CLAYTON, T. W., B.A., Adviser, Perlis.
1917. CLIFFORD, G. F. W., *c/o* J. A. Russell & Co., Kuala
Lumpur.
1922. COCHRANE, C. W. H., Federal Secretariat, Kuala
Lumpur.
1922. COCKER, T. B., Deputy Registrar, Singapore.
1922. COE, CAPT. T. P., M.C., Malayan Civil Service, Kuala
Lumpur.
1920. *†COLLENETTE, C. L., Gottire Lodge, Woodford Green,
Essex.
1897. *CONLAY, W. L., Kuala Lumpur.
1921. CONNELL, MRS. J. J., *c/o* Connell Bros., Singapore.
1899. COOK, REV. J. A. B., Gilstead, Singapore.
1910. COOK, W. WALLACE, *c/o* The Straits Trading Co.,
Singapore.
1921. COONEY, A. C., Govt. English School, Alor Star,
Kedah.
1920. COTTERILL, WALTER S., Miri, Sarawak.
1921. COULSON, N., Alor Star, Kedah.
1921. COWAP, J. C., Govt. Analyst's Office, Penang.

1921. CRANDELL, Miss, Anglo-Chinese Girls School, Penang.
1921. CRANNA, GORDON, Y. M. C. A., Singapore.
1917. CRICHTON, R., Malayan Civil Service, Kuala Kangsar.
1921. CROCKER, H. B., Kuching, Sarawak.
1922. CROSS, A. B., Seremban.
1917. CROSS, REV. W., M.A., Cavanagh Road, Singapore.
1910. CROUCHER, F. B., M.B., C.M., c/o Crown Agents, London.
1917. †CUBITT, G. E. S., Conservator of Forests, S. S. and F. M. S., Kuala Lumpur.
1921. CULLEN, W. G., c/o Barker and Co., Singapore.
1922. DALTON, H. G., Mersing, Johore.
1910. *DALY, M. D., Alor Star, Kedah.
1918. *DAVID, P. A. F., B.A., Singapore.
1921. DAVIDSON, A. W., c/o Huttenbach Bros., Singapore.
1922. DENNY, A., Sungei Pelek Estate, Sepang, Selangor.
1921. DENNYS, S. E., Alor Star, Kedah.
1907. DENT, F., M.Sc., Ph.D., F.I.C., Government Analyst, Singapore.
1921. DESHMUKH, G. B., Botanic Gardens, Singapore.
1903. *DESHON, H. F., F.R.G.S., Southfield, Combe Down, Bath, England.
1921. DICKINSON, A. H., c/o Crown, Agents, Whitehall.
1897. DICKSON, E. A., District Officer, Kinta, Batu Gajah.
1921. *DICKSON, P. L., Western House, The Nash, Nottingham.
1920. DODDS, H. B., M.D., General Hospital Singapore.
1921. †DOUGLAS, F. W., D. O., Klang.
1905. †DOUGLAS, R. S., F.R.G.S., c/o Sarawak Agency, 2 Millbank, Westminster, London.
1922. DRURY, CAPT. F., O.B.E., Free School, Penang.
1921. DRYBURGH, A. M., Jelebu, Negri Sembilan.
1910. DUNMAN, W., Grove Estate, Grove Road, Singapore.
1915. *DUSSEK, O. T., Malay College, Tanjong Malim.
1921. EATON, B. J., O.B.E., Agric. Dept., Kuala Lumpur.
1922. EBDEN, W. S., Pekan, Pahang.
1922. ECKHARDT, H. C., Telok Anson, Perak.
1922. EDGAR, A. T., Suffolk Estate, Sitiawan, F. M. S.
1921. EDWARDS, S. J., A.R., L.B.A., c/o Messrs. Booty and Co., Singapore.
1885. EGERTON, SIR WALTER, K.C.M.G., Fir Toll, Mayfield, England.
1921. ELDER, DR. E. A., 4 Battery Road, Singapore.
1918. ELLIOT, F. M., O.B.E., Treskelly, Maruhull, Dorset.
1922. ELLES, B. W., Kuala Lumpur.
1913. ERMEN, C., Kuching, Sarawak.
1918. †EVANS, I. H. N., M.A., The Museum, Taiping, Perak.

1919. FAHS, C. H., Secretary, Missionary Research Library,
25 Madison Avenue, New York City, U.S. A.
1910. FALSHAW, P. S., M.R.C.V.S., Government Veterinary
Department, Singapore.
1909. FARRER, R. J., Municipal Offices, Singapore.
1922. FEARON, L. L. F., c/o Fearon & Co., K. Lumpur.
1911. *FERGUSON-DAVIE, RT. REV. DR. C. J., Bishop of
Singapore. (Council, 1912-1913).
1909. FERRIER, J. C., c/o The Borneo Co., Soerabaya. Java.
1917. FINLAYSON, G. A., M.A., M.B., General Hospital,
Singapore.
1919. *FINNIE, W., Mintlaw Station, Aberdeen.
1910. FIRMSTONE, H. W., Sentosa, Ripple, Dover. (Coun-
cil, 1918-9; Vice-President, 1920).
1897. *FLOWER, MAJOR S. S., O.B.E., Zoological Gardens,
Ghizeh, Egypt.
1921. FORRER, H. A., Civil Service, Kuala Lumpur.
1921. FOULGER, R. G., S. S. Police, Singapore.
1918. †FOXWORTHY, DR. F. W., Kuala Lumpur. (Council
1923—).
1921. *FRASER, HON. MR. F. W., C.B.E., Government Secre-
tary, Jesselton, British North Borneo.
1922. FRASER, H. J., Messrs. Fraser & Co., Kuala Lumpur.
1908. FREEMAN, D., c/o Messrs. Freeman and Madge,
Kuala Lumpur.
1910. *FROST, MEADOWS, B.A., Taiping, Perak.
1922. FULLER, J. C., Kuala Kubu, Selangor.
1912. GALLAGHER, W. J., M.A., U. S. Rubber Plantations,
Inc., Medan, Sumatra.
1917. GARNIER, REV. KEPPEL, Penang.
1920. GEALE, DR. W. J., Ulu Kelantan.
1921. GIBSON, L. B., Cadet, Penang.
1903. GIBSON, W. S., B.A., Legal Adviser, Kuala Lumpur.
1922. GILMAN, E. W. F., Kuala Lumpur.
1902. *†GIMLETTE, DR. J. D., 18 Pulteney Mansions Bath.
1922. *GLASS, DR. G. S., Municipal Health Officer, Penang.
1916. GLENNIE, DR. J. A. R., Municipal Offices, Singapore.
1918. GLOYNE, G. B., Samarang, Java.
1918. GOLDIE, R. M., United Engineers, Penang.
1916. GOODMAN, A. M., B.A., Chinese Secretariat, Kuala
Lumpur.
1922. GOODWIN, R. N., Pinang Gazette's Office, Penang.
1922. GORDON, T. I. M., Asst. Postmaster-General, Singa-
pore.
1920. GORDON-HALL, CAPT. W. A., Kuala Lipis, Pahang.
1909. GOULDING, R. R., Survey Dept., Kuala Lumpur.
1919. GOW, G. AUBREY, Lebong Tandai, Benkoelen, Suma-
tra.
1918. GRAHAM, MAJOR A. MCD., c/o Crown Agents,
London.
1921. GRAHAM, W., Sarawak Oilfields, Miri, Sarawak.

LIST OF MEMBERS.

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1921. GRIFFITHS, C. S., Kuching, Sarawak.
 1911. GRIFFITHS, J., Survey Office, Singapore.
 1918. GRIFFIN, N. A. M., c/o Crown Agents, London.
 1919. GRIST, D. H., Dept. of Agriculture, Kuala Lumpur.
 1922. GUBBINS, W. H. W., Seremban.
 1916. GUPTA, SHIVA PRASAD, Naudansahu Street, Benares
 City, United Provinces, India.
 1921. HAINES, W. A. C., A. C. of Police, Alor Star, Keiah.
 1922. HALL, A. C., Singapore.
 1907. HALL, G. A., c/o Crown Agents, Whitehall. (Vice-
 President, 1921).
 1914. HALL, J. D., B.A., Government House, Singapore.
 1918. HALLAWAY, J. P., Gas Engineer, Singapore.
 1911. *HALLIFAX, F. J., c/o Crown Agents, London.
 1921. HAM, G. L., Colonial Secretary's Office, Singapore.
 (Council, 1922).
 1915. †HAMILTON, A. W., Malacca. (Vice-President, 1922).
 1918. HAMPSHIRE, A. K. E., Kuala Lumpur.
 1922. HAMPSHIRE, D. H., c/o Boustead & Co., Kuala
 Lumpur.
 1921. HANDOVER, W. P., Sungei Nipah Estate, Port Dickson.
 1922. HANITSCH, P. H. V., Johore Bahru, Johore.
 1921. HARDIE, J. A. H., Kuching, Sarawak.
 1909. HARRINGTON, A. G., Municipal Offices, Singapore.
 1922. HARRISON, C. W., Taiping, Perak.
 1922. HARROWER, G., M.B., Medical School, Singapore.
 1921. HART, DR. H. H., B.A., 3363, Washington Street, San
 Francisco, California.
 1921. HARVEY, R. N., S. S. Police, Singapore.
 1921. HASHIM, CAPT., N. M., Parit Buntar, Perak.
 1921. HAWKINS, G., D. O., Balik Pulau, Penang.
 1919. HAY, M. C., B.A., Asst. Adviser, Batu Pahat, Johore.
 1921. HAYES, L. J., c/o Messrs. Fraser and Co., Singapore.
 1904. *HAYNES, A. S., Kuala Lumpur. (Council, 1920).
 1922. HAZLITT, P. K., Kulim, Kedah.
 1922. HELLINGS, G. S., M.C.S., Kuala Lumpur.
 1921. HENDERSON, M. R., Perak Museum, Taiping.
 1909. HENNING, W. G., c/o Mansfield and Co., Singapore.
 1917. HEREFORD, G. A., M.A., Johore Bahru.
 1878. HILL, E. C., 26 Highfield Hill, Upper Norwood,
 London, S. E.
 1922. HILL, W. C., Singapore Oil Mills, Havelock Road,
 Singapore.
 1922. HINDE, C. T., Mersing, Johore.
 1921. HOLGATE, M. R., Malay College, Malacca.
 1921. HOLLEMAN, W., Sawah Loento, Sumatra.
 1922. HOLTUM, R. E., Assistant Director of Gardens,
 Singapore. (Hon. Treasurer 1923—).
 1921. †HOOPS, DR. A. L., P. C. M. O., Singapore.
 1917. *HOSE, DR. CHARLES, F.R.G.S., Redleaf, Riddledown
 Road, Purley, Surrey.

1897. HOSE, THE HON. MR. E. S., The Residency, Seremban.
 1922. HOWLETT, CAPT. J. H., M.C., B.A., Agric. Dept.,
 Kuala Lumpur.
1891. †HOYNCK, VAN PAPENDRECHT, P. C., Le Tanglin,
 Avenue Trespoey, Pau, Basses, Pyrenees, France.
1909. HUBBACK, T. R., Kuala Lipis, Pahang.
 1922. HUGGINS, CAPT. J., M.C., Kajang. F. M. S.
 1909. HUGHES, J. W. W., Police Magistrate, Penang.
 1907. †HUMPHREYS, THE HON. MR. J. L., Trengganu.
 (Vice-President, 1922—).
1922. HUNT, CAPT. H. NORTH, Batu Pahat, Johore.
 1921. HUNTER, DR. P. S., Municipal Offices, Singapore.
 1922. IRVINE, CAPT. R., M.C., Rembau.
 1921. IRVING, THE HON. MR. G. C., The Residency, Jessel-
 ton, B. N. Borneo.
1921. ISMAIL BIN BACHOK, DATO, D.P.M.J., Johore Bahru,
 Johore.
1921. IVENS, F. B., Bannion and Bailey, Kuala Lumpur.
 1921. *IVERY, F. E., Kedah.
 1921. JACQUES, DR. F. V., Medical Officer, Seremban.
 1921. JAFFAR, INCHE ONN BIN, Johore Bahru, Johore.
 1922. JAGO, E., Dept. of Agriculture, Kuala Lumpur.
 1921. JALALUDIN, AHMED, Malay College, Kuala Kangsar.
 1918. *JAMES, D., Goebilt, Sarawak.
 1916. JAMES, THE HON. SIR F. S. JAMES, K.B.E., C.M.G.,
 Colonial Secretary, Singapore.
1910. JAMIESON, DR. T. HILL, 4 Bishop Street, Penang.
 1907. JANION, E. M., 5 Gracechurch St., London, E. C. 3.
 1918. JANSEN, P., T., Pzn., Lebong Tandai, Post Ketaun,
 Benkoelen, Sumatra.
1918. JEAVONS, F. C., Sione Estate, Batu Caves, Selangor.
 1921. *JERMYN, L. A. S., Education Dept., Taiping.
 1911. JELF, A. S., Civil Service, Singapore.
 1910. JOHNSON, B. G. H., Telok Anson, Perak.
 1911. JOHNSON, H. S. B., c/o The Borneo Co., Ltd., 28
 Fenchurch Street, London, E. C.
1920. JOHNSTON, J., Librarian, Raffles Library, Singapore.
 (Hon. Librarian, 1921—).
1918. *JONES, E. P., Fleet Paymaster, 20 Waterbell Street,
 Rye, Sussex, England.
1910. JONES, H. W., Kuala Kubu, Selangor.
 1913. JONES, S. W., District Officer, Kuala Lipis, Pahang.
 1919. *JORDAN, A. B., Chinese Protectorate, Seremban.
 1921. JOY, M. M., Asiatic Petroleum Co., Miri, Sarawak.
 1916. KAMARALZAMAN, RAJA, BIN RAJA MANSUR, Tapah,
 Perak.
1921. KASSIM, TUNKU, BIN SULTAN ABDUL HAMID HALIM-
 SHAH, Supdt., of Monopolies and Customs, Alor
 Star, Kedah.

1916. KELLAGHER, G. B., 50 Greenvale Road, Eltham, London, S. E. 9.
1921. *KELLIE, J., Johore Bahru, Johore.
1909. KEMP, HON. MR. W. LOWTHER, c/o Messrs. F. W. Barker and Co., Singapore.
1913. KEMPE, J. E., c/o Crown Agents, London.
1922. *KER, W. P. W., Paterson, Simons & Co., Singapore.
1920. *KERR, DR. A. F. G., Govt. Botanist, Bangkok, Siam.
1921. KINDER, C. S., S. S. Police, Singapore.
1920. KING, E. M., Kong Lee (Perak) Plantations Ltd., Bagan Serai.
1916. KINSEY, W. E., Forest House, Seremban.
1921. KITCHING, T., District Surveyor, Kuala Kangsar.
1900. †KLOSS, C. BODEN, F.Z.S. The Museum, Kuala Lumpur. (Council, 1904-08, 1923: Vice-President, 1920-21).
1915. KNIGHT, VALENTINE, Fairgoxen Cottage, Glemsford, Suffolk, England. (Hon. Treasurer, 1920).
1920. KOEK, E. R., 29 Malacca Street, Singapore.
1920. KORTRIGHT, F. H., Bau, Sarawak.
1922. LACOMBLE, J. A., Controleur B. B. Talock, Indragiri, Sumatra.
1914. LAMBOURNE, J., Castleton Estate, Telok Anson, Perak.
1920. LAW, CAPT. H. R. S., c/o The Asiatic Petroleum Co., Ltd., Singapore.
1906. †LAWRENCE, A. E., Mukah, Sarawak.
1921. LEE, J. ROMANIS-, St. John's Hall, Hongkong.
1921. *LEE, L. G., Labu Estate, British North Borneo.
1922. LEECH, R. F. V., Raub, Pahang.
1922. *LEGGATE, J., Prai, Province Wellesley.
1913. LEICESTER, DR. W. S., Kuantan, Pahang.
1917. LEMBERGER, V. V., c/o The United Engineers, Ltd., Singapore.
1894. *LEMON, A. H. C.M.G., c/o Crown Agents, London. (Vice-President, 1916-18).
1920. LENDRICK, J., Norregate 34, Aarhus, Denmark.
1890. LEWIS, J. E. A. B.A., Harada Mura, Kobe, Japan.
1922. LEYNE, E. G., Kajang, F. M. S.
1897. LIM BOON KENG, DR., O.B.E., M.D., c/o The Dispensary, Singapore. (Council, 1921).
1915. LIM CHENG LAW, Millview, Penang.
1921. LINDON, N. L., S. S. Police, Singapore.
1918. LOH KONG IMM, Sepang-Tanah Merah Estate, Sepang, Selangor.
1914. LORNIE, J., Land Office, Singapore.
1921. LOWE, CAPT. C. P., Kuching, Sarawak.
1922. LOWINGER, V. A., Surveyor General, Kuala Lumpur.
1918. LUCY, G. H. R., M.R.C.S., c/o Crown Agents, London.
1921. LYNCH, J. R., c/o F. M. S. Railways, Singapore.

1907. *LYONS, REV. E. S., c/o Methodist Publishing House, Manila, P. I.
1918. MACALISTER, G. H., M.A., B.Ch., M.D., D.P.H., M.R.C.S., Medical School, Singapore. (Council, 1922—).
1920. MACBRYAN, G. T. M., Kapit, Sarawak.
1910. *†MACFADYEN, ERIC, c/o Sports Club, London.
1920. MACKIE, VIVIAN, Kuala Lumpur.
1922. MACKNESS, L. R., Kuala Lumpur.
1910. MACLEAN, L., Singapore.
1921. MACMILLAN, I. C., A. S. P., Penang.
1921. MADGE, E. E., Juasseh Estate, Kuala Pilah.
1918. MADGE, RAYMOND, Kuala Lumpur.
1920. MAHMUD, RAJA, BIN RAJA ALI, Agriculture Dept., Kuala Lumpur.
1904. MAHOMED, HON. DATO, BIN MAHBOB, Johore Bahru.
1903. MAKEPEACE, W., c/o Singapore Free Press, Singapore. (Council, 1914, 1916, 1920: Hon. Librarian. 1909-1912: Vice-President, 1917: Hon. Secretary. 1918-1919).
1921. MALET, A. H., Singapore.
1921. MANCHESTER, H. L., Municipality, Singapore.
1922. MANN, G. E., M.C., B.A., Kuala Lumpur.
1916. MANN, W. E., Chinese English School, Samarang, Java..
1922. MANSFIELD, J. T., Cable Depot, Keppel Harbour, Singapore.
1922. MANSUR, TENGGU, BIN SULTAN ABDULLAH HAMID HALIMSHAH, District Officer, Kulim.
1907. *MARRINER, J. T., Kuantan, Pahang.
1902. †MARRIOTT, THE HON. MR. H., B.A., General Adviser, Johore. (Council 1907-1908, 1910-1913, 1915-1918: Vice-President, 1919).
1909. MARSH, F. E., Municipal Offices, Singapore.
1920. MARSH, W., Municipality, Singapore.
1909. MARSHALL, HAROLD B., 8 Medina Villas, Hove, Sussex.
1918. MARTIN, T. A., North Lansdale, B. C., Canada.
1921. MARUZON AND Co., LTD., Tokyo, Japan.
1921. MATHER, N. F. H., The Fort, Klang.
1921. †MAXWELL, C. N., Kuala Lumpur.
1903. †MAXWELL, HON. MR. W. G., C.M.G., Chief Secretary Kuala Lumpur. (Council, 1905, 1915: Vice-President, 1911-1912, 1916, 1918, 1920: President, 1919, 1922—).
1922. MAY, P. W., Poste Restante, Singapore.
1909. McARTHUR, M. S. H., c/o Crown Agents, Whitehall.
1920. McCABE, DR. J. B., M.C., M.B., Ch.B., Kapoewas Estate, Pontianak, West Borneo.
1897. McCAUSLAND, C. F., Kuala Lumpur.
1922. McCLELLAND, HON. MR. F. A. S., Kuala Lumpur.

1920. McIVER, MISS AGNES, Kuala Lumpur.
 1921. McLEOD, D., King Edward's School, Taiping, Perak.
 1914. †MEAD, J. P., Forest Dept., Kuching, Sarawak.
 1920. MILLAR, J. W. R., Port Dickson.
 1921. *MILLER, J. I., Kuala Kangsar.
 1910. MILLER, T. C. B., Fairlie, Nassim Road, Singapore.
 1921. MILLS, COMMANDER, J. F., R.N., I.S.O., c/o Crown Agents, London.
 1922. MJOBERG, DR., E., Curator, Sarawak Museum, Kuching.
 1921. MOFFAT, R. M., Asiatic Petroleum Co., Miri, Sarawak.
 1922. MOHAMAD, TENGKU. BIN SULTAN ABDUL HAMID HALIMSHAH, Mersing, Johore.
 1922. MOHAMAD, ISMAIL MERICAN, BIN VAFOO MERICAN NOORDIN, Alor Star, Kedah.
 1921. MOHAMMED. SYED, BIN SYED ALI IDID, Chief Magistrate, Alor Star, Kedah.
 1921. MORGAN, S., Wilde and Co., Ltd., 12 Market, St., Kuala Lumpur.
 1920. *MORKILL, A. G., c/o Crown Agents, London.
 1922. MORSE, G. S., 27 Grange Road, Singapore.
 1921. *MOUAT, DR. J. R. KAY, King Edward VII Medical College, Singapore.
 1909 *†MOULTON, MAJOR J. C., O.B.E., M.A., B.Sc., Director, Raffles Museum and Library, Singapore. (Council, 1916—: Hon. Secretary, 1920—).
 1920. MOWBRAY, G. A., de Chede, Asst. District Officer, Kuala Kangsar.
 1915. *MUNDELL, H. D., c/o Sisson and Delay, Singapore.
 1920. MURISON, HON. SIR J. W., Singapore. (President, 1920-21: Vice-President 1922).
 1913. MURRAY, REV. W., M.A., Gilstead Road, Singapore.
 1921. NAGALINGAM, C. K., Anglo-Chinese School, Port Swettenham.
 1917. NAGLE, REV. J. S., M.A., Singapore.
 1922. NASH, G. H. Johore Bahru.
 1909. †NATHAN, J. E., BA., Singapore. (Council 1922—).
 1921. NATHAN, S. J., Sarawak Oilfields, Miri, Sarawak.
 1921. NELSON, MAJOR J. B., M.C., Education Dept., Alor Star, Kedah.
 1920. NEUBRONNER, A. W., 1 Killiney Road, Singapore.
 1920. NEUBRONNER, C. A., 47-48 Orchard Road, Singapore.
 1910. NIWEN, W. G., 11 Derby Crescent, Kelvinside, Glasgow. Great Britain.
 1900. NORMAN, HENRY, Alor Star, Kedah.
 1920. NORRIS F. DE LA MARE, B. SC., F.E.S., Kuala Lumpur.
 1906. NUNN, B., Butterworth, Province Wellesley.
 1920. NUTT, W., O.B.E., Singapore.

1922. O'CONNELL, LT. B. M., R.N., Kepong, Selangor.
 1911. O'MAY, J., c/o Messrs. Barker and Co., Kuala Lumpur.
1916. ONG BOON TAT, 37 Robinson Road, Singapore.
 1921. ONG THYE GHEE, 39-2 Dickson Road, Singapore.
 1921. ORCHARD, H. A. L., St. Andrew's School, Singapore.
 1921. OSBORNE, R. B., M.V.O., M.C., c/o Crown Agents, Whitehall.
1920. O'SULLIVAN, T. A., Kuala Lipis, Pahang.
 1922. O'SULLIVAN, W. B., B.A., Ipoh, Perak.
 1920. OTHMAN, MEGAT, Secretary to Majlis Ugama Islam, Kota Bharu, Kelantan.
1913. †OVERBECK, H., c/o Behn Meyer and Co., Mij. Soerabaja, Java.
1922. OWEN, G. N., Jesselton, B. N. Borneo.
 1922. PAGE-TURNER, F. W., S'ranggang, Sarawak.
 1919. PARK, MUNGO, Pontian, Pekan, Pahang.
 1921. PARNELL, E., Kuching, Sarawak.
1908. *†PARR, THE HON. MAJOR C. W. C., O.B.E., British Resident, Perak.
1922. PASQUAL, J. C., Penang.
 1921. *PATERSON, MAJOR H. S., Civil Service, Trengganu.
 1921. PEACH, REV. 4 Mount Sophia, Singapore.
 1921. PEEDLOW, J., Penang.
 1922. PEEL, HON. MR. W., British Adviser, Kedah.
 1921. *PENDLEBURY, H. M., The Museum, Kuala Lumpur.
 1914. †PEPYS, W. E., Secretariat, Kuala Lumpur.
 1920. PERKINS, C. J., Survey Dept., Kuala Lumpur.
 1917. PERKINS, D. Y., Messrs. Drew and Napier, Singapore.
1920. PESKETT, A. D., 74 Maxwell Road, Penang.
 1920. PETERS, E. V., Kuala Kemaman, Trengganu.
 1921. *PFUMMER, W. P., Messrs. Derrick & Co., Singapore.
 1921. PONNAMMALAM, P. N., Johore Bahru, Johore.
 1910. PRATT, CAPT. E., Malacca.
 1921. PRICE, C. W. H., S. S. Police, Singapore.
 1906. PYKETT, REV. G. F., M. E. Mission, Penang.
 1921. RAFFLES, MAJOR STAMFORD, O.B.E., Deputy Commissioner of Trade, and Customs, Kuala Lumpur.
1915. RAGGI, J. G., Phlab Phla Jai Road, Bangkok, Siam.
 1917. RATTRAY, DR. M., Europe Hotel, Singapore.
 1916. RAYMAN, L., c/o Fed. Secretariat, Kuala Lumpur.
 1910. *REID, DR. ALFRED, Kuala Lumpur.
1921. REIS, H. C., Asiatic Petroleum Co., Miri, Sarawak.
 1921. REX, MARCUS, Kuala Lumpur.
 1915. RICHARDS, A. F., c/o Secretariat, Singapore.
 1921. RICHARDS, MAJOR F. W., D.S.O., M.C., Sarawak Oilfields, Miri, Sarawak.
1911. RICHARDS, R. M., The Caledonia Estate, Province Wellesley.

1918. RITCHIE, C., The Sagga Rubber Estates, Siliu, F.M.S.
 1912. ROBERTSON, J., Lyall and Evatt, Singapore.
 1911. ROBINSON, H., c/o Messrs. Swan and Maclaren,
 Singapore. (Council, 1916-1920: Vice-President,
 1922—).
 1904. †ROBINSON, H. C., The Museum, Kuala Lumpur.
 (Vice-President, 1909, 1913, 1922— : Council,
 1920).
 1916. ROGBS, A., H.M.I.C.E., Penang.
 1921. ROSS, E. A., Labour Office, Penang.
 1896. ROSTADOS, E., Padang Malau Estate, Perlis. (Coun-
 cil, 1901).
 1922. RUSSELL, D. J. A., Kuala Lumpur.
 1921. RUSTON, J. A. V., McNeill and Co., Samarang, Java.
 1921. RUTTER, MAJOR E. O., Wattisfield Croft, Suffolk,
 England.
 1922. SAID, CAPT. HAJI MOHAMAD, Bukit Timbalan,
 Johore.
 1921. SALLEH, INCHE MOHAMED BIN ALI, S.M.J., Post-
 master-General, Johore Bahru, Johore.
 1921. SANGUINETTI, MAJOR W. R., O.B.E., M.A., State En-
 gineer, Alor Star, Kedah.
 1919. SANTRY, DENIS, c/o Swan and Maclaren, Singapore.
 1920. SATHASIVAM, M., Public Works Dept., Johore
 Bahru.
 1921. SAUCHELLI, V., Kent Estate, Batu Caves, Selangor.
 1896. *SAUNDERS, THE HON. MR. C. J., B.A., Official As-
 signee, Singapore. (Vice-President, 1910-1911,
 1914-1915: President, 1916-1918).
 1920. SCHARFF, DR. J. W., Health Office, Singapore.
 1921. SCHIDER, DR. R., Asiatic Petroleum Co., Miri, Sara-
 wak.
 1920. *SCOTT, DR. G. WAUGH, Sungei Siput, Perak.
 1910. SCOTT, R., B.A., Penang.
 1906. †SCRIVENOR, J. B., Govt. Geologist, Batu Gajah,
 Perak. (Vice-President, 1922).
 1888. SEAH LIANG SEAH, c/o Chop Chin Hin, Singapore.
 1921. SEAR, DUNCOMBE, Barker & Co., Kuala Lumpur.
 1915. *SEE TIONG WAH, c/o Hongkong and Shanghai Bank,
 Singapore.
 1922. SEHESTED, S., 7 Battery Road, Singapore.
 1918. SENNETT, C. W. A., B.A., Temerloh, Pahang.
 1922. SHAW, G. E., Land Office, Kulim, Kedah.
 1922. SHELLEY, M. B., Kuala Lumpur.
 1922. SHELLEY-THOMPSON, A. J., Singapore.
 1921. SHERIFF, MOHAMED, BIN OSMAN, Under Secretary,
 Alor Star, Kedah.
 1921. SIMPSON, P., Presgrave and Mathews, Penang.
 1909. *SIMS, W. A., c/o Commercial Union Assurance Co.,
 Singapore.

LIST OF MEMBERS.

1921. SIRCOM, H. S., Kuala Lumpur.
 1921. SKRINE, W. F. DE V., Kuching, Sarawak.
 1922. SMALL, A. S., Education Office, Kuala Lumpur.
 1922. SMART, DR. A. G. H., Kedah.
 1921. SMART, W., Sarawak Oilfields, Miri, Sarawak.
 1912. SMITH, HARRISON W., Papeete, Tahiti.
 1921. SMITH, DR. G. T. FOSTER, Asiatic Petroleum Co.,
 Miri, Sarawak.
 1921. SMITH, CAPT. S. R., O.B.E., P. W. D., Kuala Lipis.
 1920. SOH YIEW JIN, 119 Devonshire Road, Singapore.
 1910. SONG ONG SIANG, HON. MR., M.A., LL.M., c/o Messrs.
 Aitken and Ong Siang, Singapore.
 1921. SOUTH, F. W., Dept. of Agriculture, Kuala Lumpur.
 1918. STANTON, DR. A. T., Kuala Lumpur.
 1910. STEEDMAN, R. S., Rahman Hydraulic Tin, Intan,
 Perak.
 1920. STEVENS, F. G., Rodyk and Davidson, Singapore.
 1910. *STILL, A. W., c/o Straits Times, Singapore. (Coun-
 cil, 1914-1915).
 1917. *†STIRLING, W. G., Singapore.
 1922. STONOR, HON. MR. O. F., British Resident, Selangor.
 1921. STOOKE, G. BERESFORD, Kuching, Sarawak.
 1921. STOWELL, DE LA M., Malay College, Kuala Kangsar.
 1911. STUART, E. A. G., Alor Star, Kedah.
 1921. STUBINGTON, W. H., Bentong, Pahang.
 1910. †STURROCK, A. J. Ipoh.
 1922. SUMMERHAYES, R., B.Sc., Swan and Maclaren, Singa-
 pore.
 1917. SUMNER, H. L., c/o Crown Agents, London.
 1921. SUTCLIFFE, H., R. G. A. Research Laboratory, Pata-
 ling, Selangor.
 1912. SWAYNE, J. C., Bintulu, Sarawak.
 1918. *SYKES, G. R., M.A., Chinese Protectorate, Singapore.
 1908. TAN CHENG LOCK, 59 Heeren Street, Malacca.
 1913. TAYLOR, LT. CLARENCE J., Telok Manggis Estate,
 Sepang, Selangor.
 1921. TAYLOR, E. R., Estates Dept., Singapore Harbour
 Board, Singapore.
 1917. TENNENT, M. B., Chiengmai, Siam.
 1921. TERRELL, A. K. A. BECKETT, Presgrave and Mathews,
 Penang.
 1921. *THOMAS, L. A., Asst. Supt. of Police, Singapore.
 1920. THOMPSON, THE HON. MR. H., B.A., British Resi-
 dent, Pahang.
 1922. THOMPSON, S. L., Boustead & Co., Penang.
 1921. TREWIN, H. P., Govt. Printing Office, Singapore.
 1921. TYTE, LT. COL. J. H., Inspector of Prisons, Singa-
 pore.
 1918. UDA, RAJA, Kuala Pilah, Negri Sembilan.
 1918. VALPY, G. C., B.A., Income Tax Office, Singapore.

1887. †VAN BEUNINGEN VAN HELSDINGEN, DR. R., 74 River Valley Road, Singapore. (Hon. Librarian, 1914-1915, 1920).
1922. VEARS, LINDSAY, Kuala Lumpur.
1921. VISSERS, W. D., Netherland Consular Service, Singapore.
1921. WADE, F. W., Architect, P. W. D., Alor Star, Kedah.
1921. WALTON, B. S., Govt. Monopolies, Penang.
1922. WALKER, E. G., United Engineers, Singapore.
1909. WARD, A. B., Kuching, Sarawak.
1922. WARD, D. J., 40-5 Grange Road, Singapore.
1920. WARNER, CAPT. W. H. LEE, Singapore.
1917. WATSON, J., Education Office, Kuala Lumpur.
1916. WATSON, J. G., Forest Dept., Johore Bahru, Johore.
1916. WATSON, DR. MALCOLM, Klang, Selangor.
1921. WEBB, MAJOR G. R. H., O.B.E., E. E. Telegraph Co., Singapore.
1920. WEISBERG, H., District Officer, Jelebu, Negri Sembilan.
1910. WHITEHEAD, C. B., Police Office, Butterworth, Province Wellesley.
1920. *†WILKINSON, R. J., C.M.G., Poste Restante, Mitylene, Greece.
1921. †WILLEOURNE, E. S., Assistant Geologist, Batu Gajah, Perak.
1922. WILLIAMS, E. B., Seremban, Negri Sembilan.
1921. WILLIAMS, E. T., c/o Secretariat, Singapore.
1922. *WILLIAMS, F. L., Chinese Protectorate, Ipoh.
1921. WILLIAMS, R. M., Paterson, Simons & Co., Singapore.
1910. WILLIAMS, S. G., Municipal Offices, Singapore.
1919. WILSON, F. K., Segamat, Johore.
1921. WILSON, DR. W. B., M.C., 4 Battery Road, Singapore.
1910. *WINKELMANN, H., Singapore.
1904. †WINSTEDT, R. O., M.A., D.LITT., Singapore. (Vice-President, 1914-15, 1920-21, 1923—).
1918. WOLDE, B., Layng Tujoh Estate, Padang Serai, via Penang.
1902. WOLFF, THE HON. MR. E. C. H., B.A., Director of Education, Singapore.
1908. *WOOD, E. G., c/o Messrs. Henry S. King & Co., London.
1913. WOOD, W. L., The Cedars, Balsham, Cambridge.
1922. WOODGATE, L. C. H., St. Andrews' School House, Singapore.
1922. WOODWARD, THE HON. SIR L. M., Chief Judicial Commissioner, Kuala Lumpur.
1920. †WOOLLEY, G. C., Sandakan, British North Borneo.
1922. WOOLLEY, H. W., Forest Dept., Kuala Lumpur.
1922. WORLEY, N. A., Kuala Lumpur.
1911. WORSLEY-TAYLOR, F. E., Singapore.

1905. *WORTHINGTON, THE HON. MR. A. F., British Adviser, Kelantan.
1921. WURTZBURG, C. E., M.C., c/o Messrs. Mansfield & Co., Singapore.
1914. WYLEY, A. J., Lebong Tandai, Benkoelen, Sumatra.
1922. YAHYA, TENGKU WAN, BIN TUAN MOHAMAD TAIB, Secretary to Government, Alor Star, Kedah.
1917. *YATES, MAJOR W. G., West Kent Regiment, Cox and Co., 16 Charing Cross, London.
1920. *YEWDALL, CAPT. J. C., Sitiawan, Lower Perak.
1916. YOUNG, E. STUART, 85 Wilbraham Road, Chorlton-cum-Hardy, Manchester, England.
1904. *YOUNG, H. S., Rosemount, Tain, Rosshire, Scotland.



RULES
of
The Malayan Branch
of the
Royal Asiatic Society.

I. Name and Objects.

1. The name of the Society shall be 'The Malayan Branch of the Royal Asiatic Society.'
2. The objects of the Society shall be:—
 - (a) The increase and diffusion of knowledge concerning British Malaya and the neighbouring countries.
 - (b) the publication of a Journal and of works and maps.
 - (c) the formation of a library of books and maps.

II. Membership.

3. Members shall be of three kinds—Ordinary, Corresponding and Honorary.
4. Candidates for ordinary membership shall be proposed and seconded by members and elected by a majority of the Council.
5. Ordinary members shall pay an annual subscription of \$5 payable in advance on the first of January in each year. Members shall be allowed to compound for life membership by a payment of \$50. Societies and Institutions are also eligible for ordinary membership.
6. On or about the 30th of June in each year the Honorary Treasurer shall prepare and submit to the Council a list of those members whose subscriptions for the current year remain unpaid. Such members shall be deemed to be suspended from membership until their subscriptions have been paid, and in default of payment within two years shall be deemed to have resigned their membership.

No member shall receive a copy of the Journal or other publications of the Society until his subscription for the current year has been paid.*

*Bye-Law, 1922. "Under Rule 6 Members who have failed to pay their subscription by the 30th June are suspended from membership until their subscriptions are paid. The issue of Journals published during that period of suspension cannot be guaranteed to members who have been so suspended."

7. Distinguished persons, and persons who have rendered notable service to the Society may on the recommendation of the Council be elected Honorary Members by a majority at a General meeting. Corresponding Members may, on the recommendation of two members of the Council, be elected by a majority of the Council, in recognition of services rendered to any scientific institution in British Malaya. They shall pay no subscription: they shall enjoy the privileges of members (except a vote at meetings and eligibility for office) and free receipt of the Society's publications.

III. Officers.

8. The Officers of the Society shall be:—

A President.

Vice-Presidents not exceeding six, ordinarily two each from (i) the Straits Settlements, (ii) the Federated Malay States and (iii) the Unfederated or other Protected States, although this allocation shall in no way be binding on the electors.

An Honorary Treasurer.

An Honorary Librarian.

An Honorary Secretary.

Four Councillors.

These officers shall be elected for one year at the Annual General Meeting, and shall hold office until their successors are appointed.

9. Vacancies in the above offices occurring during any year shall be filled by a vote of the majority of the remaining officers.

IV. Council.

10. The Council of the Society shall be composed of the officers for the current year, and its duties and powers shall be:—

(a) to administer the affairs, property and trusts of the Society.

(b) to elect Ordinary and Corresponding Members and to recommend candidates for election as Honorary Members of the Society.

(c) to obtain and select material for publication in the Journal and to supervise the printing and distribution of the Journal.

(d) to authorise the publication of works and maps at the expense of the Society otherwise than in the Journal.

(e) to select and purchase books and maps for the Library.

(f) to accept or decline donations on behalf of the Society.

(g) to present to the Annual General Meeting at the expiration of their term of office a report of the proceedings and condition of the Society.

(h) to make and enforce bye-laws and regulations for the proper conduct of the affairs of the Society. Every such bye-law or regulation shall be published in the Journal.

11. The Council shall meet for the transaction of business once a month and oftener if necessary. Three officers shall form a quorum of the Council.

V. General Meetings.

12. One week's notice of all meetings shall be given and of the subjects to be discussed or dealt with.

13. At all meetings the Chairman shall in the case of an equality of votes be entitled to a casting vote in addition to his own.

14. The Annual General Meeting shall be held in February in each year. Eleven members shall form a quorum.

15. (i) At the Annual General Meeting the Council shall present a Report for the preceding year and the Treasurer shall render an account of the financial condition of the Society. Copies of such Report and account shall be circulated to members with the notice calling the meeting.

(ii) Officers for the current year shall also be chosen.

16. The Council may summon a General Meeting at any time, and shall so summon one upon receipt by the Secretary of a written requisition signed by five ordinary members desiring to submit any specified resolution to such meeting. Seven members shall form a quorum at any such meeting.

17. Visitors may be admitted to any meeting at the discretion of the Chairman but shall not be allowed to address the meeting except by invitation of the Chairman.

VI. Publications.

18. The Journal shall be published at least twice in each year, and oftener if material is available. It shall contain material approved by the Council. In the first number in each year shall be published the Report of the Council, the account of the financial position of the Society, a list of members, the Rules, and a list of the publications received by the Society during the preceding year.

19. Every member shall be entitled to one copy of the Journal, which shall be sent free by post. Copies may be presented by the Council to other Societies or to distinguished individuals, and the remaining copies shall be sold at such prices as the Council shall from time to time direct.

20. Twenty-five copies of each paper published in the Journal shall be placed at the disposal of the author.

VII. Amendments to Rules.

21. Amendments to these Rules must be proposed in writing to the Council, who shall submit them to a General Meeting duly summoned to consider them. If passed at such General Meeting they shall come into force upon confirmation at a subsequent General Meeting or at an Annual General Meeting.

Affiliation Privileges of Members.

Royal Asiatic Society. The Royal Asiatic Society has its headquarters at 74 Grosvenor Street, London, W., where it has a large library and collection of MSS. relating to oriental subjects, and holds monthly meetings from November to June (inclusive) at which papers on such subjects are read.

2. By Rule 105 of this Society all the Members of Branch Societies are entitled when on furlough or otherwise temporarily resident within Great Britain and Ireland, to the use of the Library as Non-Resident Members and to attend the ordinary monthly meetings of the Society. This Society accordingly invites Members of Branch Societies temporarily resident in Great Britain or Ireland to avail themselves of these facilities and to make their home addresses known to the Society so that notice of the meetings may be sent to them.

3. Under Rule 84, the Council of the Society is able to accept contributions to its Journal from Members of Branch Societies, and other persons interested in Oriental Research, of original articles, short notes, etc., on matters connected with the languages, archaeology, history, beliefs and customs of any part of Asia.

4. By virtue of the afore-mentioned Rule 105 all Members of Branch Societies are entitled to apply for election to the Society without the formality of nomination. They should apply in writing to the Secretary, stating their names and addresses, and mentioning the Branch Society to which they belong. Election is by the Society upon the recommendation of the Council.

5. The subscription for Non-Resident Members of the Society is 30/- per annum. They receive the quarterly journal post free.

Asiatic Society of Bengal. Members of the Malayan Branch of the Royal Asiatic Society, by a letter received in 1903, are accorded the privilege of admission to the monthly meetings of the Asiatic Society of Bengal, which are held usually at the Society's house, 1 Park Street, Calcutta.



Exchange List and Donations, 1922.

The following is a list of the Scientific Institutions and Societies on our Exchange List, together with the Publications received from them during the year 1922.

A list of Donations to the Society's Library is also appended.

AMERICA.

Canada.

TORONTO. Royal Canadian Institute, *Transactions*, Vol. 13, Pt. 2, 1921, Vol. 14, Pt. 1, 1922.

United States of America.

BALTIMORE. John Hopkins University.

BERKELEY. University of California, *Publications in Zoology*, Vol. 20, Nos. 8-13, 1922, Vol. 21, Nos. 7-8, 1922.

CAMBRIDGE. Museum of Comparative Zoology, Harvard, *Bulletin*,
(i) *Bulletin*, Vol. 65, Nos. 3-4, 1921.
(ii) *Annual Report*, 1920-21

CHICAGO. Field Museum of Natural History.

CHICAGO. University of Michigan.

CHICAGO. John Crerar Library, *Annual Report*, 1920, 1921.

LINCOLN. University of Nebraska, *Circulars* 14-15, 1922, from the *Agricultural Experiment Station*.

NEW YORK. American Museum of Natural History.

NEW YORK. New York Zoological Society, *Zoologicae*, Vol. 3, Nos. 3-13, 1921.

NEW YORK. American Geographical Society, "*Geographical Review*," Vol. 12, Pts. 1-4, 1922.

OBERLIN. Oberlin College—Wilson Ornithological Club, Laboratory, *Bulletin*, Nos. 23-25, 1922.

PHILADELPHIA. Academy of Natural Sciences,

(i) *Proceedings*, Vol. 73, Pts. 1-3, 1921.

(ii) *Annual Report*, 1920.

PITTSBURGH. Carnegie Museum,

(i) *Annual Report*, 1921.

(ii) *Memoirs*, Vol. 8, Nos. 1-3, 1921.

ST. LOUIS. Missouri Botanical Garden, *Annals*, Vol. 7, No. 4, 1920, and *Index*, Vol. 8, Nos. 1-2, 1921.

WASHINGTON. Academy of Sciences, *Proceedings*, Vols. 3-13, 1901-11.

- WASHINGTON. Smithsonian Institution, U. S. National Museum,
 (i) *Herbarium Contributions*, Vol. 20, Pts. 2, 10, 12, 1921-22, Vol. 22, Pt. 6, 1922, Vol. 24, Pts. 1, 2, and 4, 1922.
 (ii) *Proceedings*. Vols. 57-58, 1921, Vol. 59, 1922.
 (iii) *Bulletins*, 82, 100, 113, 114, 1921, 117, 119, 1922.
 (iv) *Report on the Progress and Condition of the U. S. National Museum, 1921*
 (v) *Annual Report of the Board of Regents of the Smithsonian Institution, 1919.*
- WASHINGTON. United States, Department of Agriculture, *Journal of Agricultural Research*, Vols. 19, 21, Vol. 22, Pts. 4-9, 1921.
- HAWAIIAN ISLANDS. (HONOLULU). Bernice Pauahii Bishop Museum,
 (i) *Occasional Papers*, Vol. 7, 1921, Nos. 12-14, Vol. 8, 1922, Nos. 2-5.
 (ii) *Memoirs*, Vol. 8, Nos. 3-4, 1922.

ASIA.

Ceylon.

- ANURADHAPURA. Archaeological Survey of Ceylon. *Annual Report*, 1920-21.
- COLOMBO. Ceylon Branch of the Royal Asiatic Society.
- COLOMBO. Colombo Museum,
 (i) "*The Snakes of Ceylon*," by F. Wall, 1921.
 (ii) "*Spoila Zeylanica*," *Index*, Vol. 11, 1921, Vol. 12, Pt. 45, 1922.

India.

- BOMBAY. Bombay Branch of the Royal Asiatic Society, *Journal*, No. 73, 1920-21.
- BOMBAY. Bombay Natural History Society, *Journal*, Vol. 27, No. 5, Vol. 28, Nos. 1-3, 1921-22.
- CALCUTTA. Asiatic Society of Bengal,
 (i) *Journal and Proceedings*, Vols. 3-15, 1907-1920, and Vol. 17, Nos. 2-3, 1921.
 (ii) *Memoirs*, Vols. 1-7, 1905-1922.
- CALCUTTA. Indian Museum,
 (i) *Memoirs*, Vol. 5, Nos. 9-10, 1922.
 (ii) *Records*, Vol. 21, Pt. 1, Vol. 22, Pts. 2-5, 1921, Vol. 8, Pt. 13, Vol. 23, Pt. 1, Vol. 24, Pts. 1-3, 1922.

CALCUTTA. University of Calcutta, *Journal of the Department of Letters*, Vol. 8, 1922.

LAHORE. Panjab Historical Society, *Journal*, Vol. 8, No. 2, 1921.

PUSA. Agricultural Research Institute, *Report of the Fourth Entomological Meeting*, 1921.

SIMLA. Archaeological Survey of India,

(i) *Memoirs*, Nos. 6, 10, 11, 1922.

(ii) *Reports of Northern, Eastern, Western, and Central Circles, 1920-21, and the Report of the Director General of Archaeology, in India, 1920-21.*

(iii) *Catalogue of the Museum of Archaeology, Sanchi, Bhopal.*

(iv) *Epigraphica Indica*, Vol. 16, Pts. 1-2, 1921, Vol. 16, Pt. 5, 1922.

Burma.

RANGOON. Archaeological Survey of Burma, *Annual Report*, 1922.

RANGOON. Burmah Research Society, *Journal*, Vol. 11, Pts. 1-3, 1921, Vol. 12, Pt. 1 1922, Vol. 12, Pt. 1, 1922.

Malaya.

BORNEO, (SARAWAK). Sarawak Museum.

MALAY PENINSULA (KUALA LUMPUR). Department of Agriculture, F. M. S.,

(i) *Agricultural Bulletin*, Vol. 9, Pts. 2, 3, 4, 1921.

(ii) *Malayan Agricultural Journal*, Vol. 10, Pts. 1-6, 1922.

MALAY PENINSULA (KUALA LUMPUR). F. M. S. Museums, *Journal*, Vol. 10, Dec. 1919—Dec. 1922.

SINGAPORE. Botanic Gardens.

SINGAPORE. Raffles Museum and Library,

(i) *Annual Report*, 1921.

(ii) *Guide to the Mammals of Malaysia*, Pt. 1, *Malaysian Ungulates*, 1922.

Dutch East Indies.

JAVA (BATAVIA). Bataviaasch Genootschap van Kunsten en Wetenschappen,

(i) *Notulen van de Algemeene en Directievergaderingen*, Deel, 59, 1921.

(ii) *Tijdschrift voor Indische Taal-, Land- en Volkenkunde*, Deel, 60, Pts. 5-6, Deel, 61, Pts. 2-3.

- (iii) *Oudheidkundig Verslag, Derde Kwartaal, 1921, Vierde Kwartaal, 1922.*
 - (iv) *Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen, Deel, 63, Pts. 2-3, 1921.*
 - (v) *Naturukundig Tijdschrift voor Nederlandsch-Indie Deel, 82 tweede aflevering, 1922.*
- JAVA (BATAVIA). Commissie voor de Volkslectuur.
- JAVA (BATAVIA). *Het Algemeen Proefstation der A. V. R. O. S., Mededeelingen, Rubberserie, Pt. 36, 1921.*
- JAVA (BATAVIA). Topografische Dienst, *Jaarverslag, 1920.*
- JAVA (BUITENZORG). Departement van Landbouw, Nijverheid en Handel in Nederlandsch Indie.
- JAVA (BUITENZORG). Jardin Botanique de Buitenzorg, *Bulletin, Ser. 3, Vol. 4, Pt. 1, Vol. 5, Pt. 1, 1922.*
- JAVA (BUITENZORG). Zoologisch Museum en Laboratorium, *Treubia, Vol. 2, livr. 1, 1921.*

Siam.

- BANGKOK. Natural History Society of Siam, *Journal, Vol. 4, Pt. 4, 1922.*
- BANGKOK. Siam Society.
- BANGKOK. Vajiranana National Library, 111 Siamese Publications.

Indo-China.

- HANOI. L'Ecole Francaise de l'Extreme Orient, *Bulletin, Tome 20, Pt. 4, Tome 21, Pt. 1, 1920.*
- SAIGON. La Société des Etudes Indo-Chinoises.

Philippine Islands.

- MANILA. Bureau of Science,
- (i) *Philippine Journal of Science, Vol. 19, Pts. 4, 5, 6, 1921, Vol. 20, Vol. 21, Pts. 1-5, 1922.*
 - (ii) *Annual Report, 1922.*
 - (iii) *Mineral Resources of the Philippine Islands, 1919-20.*

China.

- SHANGHAI. North China Branch of the Royal Asiatic Society. *Journal, Vol. 53, 1922.*

Japan.

- TOKYO. Asiatic Society of Japan, *Transactions, Vols. 28, 32, 39, 47, 48, and 24 parts of volumes.*

Australia.

- ADELAIDE. Royal Society of South Australia.
- SYDNEY. Royal Society of New South Wales.

EUROPE.**Belgium.**

BRUXELLES. Société Belge d'Études Coloniales.

Finland.

HELSINGFORS. Finska Vetenskaps-Societeten,

(i) *Bidrag till Kannedom, H. 80, Pt. 3, 1921.*

(ii) *Ofversigt, 62c, 63c, 64, a, b, c.*

(iii) *Acta Societatis Scientiarum Fennicae, Tome 49, Pts. 3-4, Tome 50, Pt. 3.*

France.

HAVRE. Société de Géographie Commerciale du Havre, *Bulletin 38, 1921.*

MARSEILLES. Société de Géographie et d'Études Coloniales.

PARIS. Commission Archéologique de l'Indo-Chine.

PARIS. L'École des Langues Orientales.

PARIS. Société Asiatique de Paris, *Journal Asiatique, 11 Serie, Toms 4-8, 11, 18 and 13 parts.*

PARIS. Société de Géographie, "*La Géographie.*" *Tome 36, Pts. 4-5, 1921, Tome 37, Tome 38, Pts. 1-3, 1922.*

PARIS. Société de Géographie Commerciale de Paris, "*Revue Economique Française,*" *Tome 43, Pt. 6, 1921, Tome 44, Pts. 1, 2, 4, 1922.*

PARIS. Société de l'Histoire des Colonies Françaises.

PARIS. Société de Linguistique de Paris,

(i) *Memoirs, Tome 22, fasc 5-6, 1922.*

(ii) *Bulletin, Tome 22, fasc 2, Tome 23, fasc 70, 71.*

Germany.

BERLIN. Deutsches Institut d'Entomologie, *Entomologische Mitteilungen, Bd. 1-10, 1912-21, Bd. 11, Pts. 1-5, 1921-22.*

Great Britain.

LONDON. British Museum (Natural History).

LONDON. Royal Anthropological Institute, *Journal, Vols. 51-52, 1921-22.*

LONDON. Royal Asiatic Society of Great Britain and Ireland, *Journal 1922.*

LONDON. Royal Botanic Gardens, Kew, *Bulletin, 1921.*

LONDON. Royal Colonial Institute, "*United Empire,*" *Vol. 13, Nos. 1-10, 1921-22.*

LONDON. School of Oriental Studies, London Institution, *Bulletin, Vol. 2, Pts. 2-3, 1922.*

LONDON. Zoological Society of London,

(i) *Proceedings, Pt. 4, 1921, Pts. 1-3, 1922, and Index.*

(ii) *A List of Fellows, Members and Medallists, 1922.*

Holland.

AMSTERDAM. Koloniaal Instituut.

AMSTERDAM. Koninklijk Nederlandsch Aardrijkskundig Genootschap, *Tijdschrift, Deel 39, Pts. 1-6, 1922.*

HAGUE. Koninklijk Instituut voor de Taal-, Land, en Volkenkunde van Nederlandsch Indië, *Bijdragen, Deel 77, Pts. 3-4, 1921, and Index. Deel 78, Pts. 1-3, 1922.*

LEIDEN. Ethnographisches Reichsmuseum, *Verslag van den Directeur 1920 and 1921.*

LEIDEN. Universiteits Bibliotheek.

Sweden.

STOCKHOLM. K. Svenska Vetenskapsakademien,

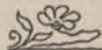
(i) *Arkiv for Zoologie, Band 14, Pts. 3-4, 1921, Band 15, Pt. 1, 1922.*

(ii) *Arkiv for Botanik, Band 17, 1922, Band 18, Pt. 1, 1922.*

UPSALA. Royal University Library, *Zoologiska Bidrag, Suppl.-Bd. 1, 1920, Bd. 7, 1921.*

Switzerland.

ZURICH. Naturforschende Gesellschaft, *Vierteljahrschrift, Bd. 66, Pts. 3-4, 1921, Bd. 67, Pts. 1-2, 1922.*



Donations.

AMERICA (NORTH).

Canada.

- OTTAWA. Canadian Department of Mines.
- (i) *Bulletin, Nos. 33, 34, 36.*
 - (ii) *Memoirs, 125-128, 131.*
 - (iii) *Summary Report, 1920, Pt. D, 1921, Pts. A. C. D.*
 - (iv) *Annual Report, 1921.*
 - (v) *Report of the Canadian Arctic Expedition, 1913-18, Vol. 12, 1922.*
 - (vi) *Biological Series, Nos. 4, 8.*
- HALIFAX. Nova Scotia Institute of Science, *Proceedings and Transactions, Vol. 15, Pt. 1, 1921.*

United States of America.

- BOSTON. Museum of Fine Arts, *Bulletin, Nos. 118, 120, 1922.*
- WASHINGTON. Library of Congress, *Annual Report, 1921.*
- ITHACA, (NEW YORK). Cornell University Agricultural Experiment Station,
- (i) *Memoirs, 38-39, 1920-21.*
 - (ii) *Bulletin, 404, 1921.*
- HAWAIIAN ISLANDS (HONOLULU). Pan Pacific Union, *Bulletin, 33-36, 1922.*

AMERICA (South).

Mexico.

- MEXICO. Institute Geologico di Mexico, *Boletin, Nos. 37, 1920.*

ASIA.

India.

- MADRAS. Madras Government Museum, *The Coins of Haidar Ali and Tipu Sultan, by J. R. Henderson.*
- CALCUTTA. Indian Museum, *Records, Vol. 24, Pt. 3, The Indian Planorbidae, by N. Annandale.*
- CALCUTTA. *Report on the diseases of Silk Worms in India, by A. Pringle Jameson, D. Sc.*
- NOVA GOA. Comissao Arquelogia da India, "*O Oriente Portugues,*" *Vol. 17, Nos. 5-6, 1920.*

Malaya.

- KUALA LUMPUR. Committee for Malay Studies, *Papers on Malay Subjects, 2nd Ser. Perak Malay*, by C. C. Brown, 1921.
- SINGAPORE. Natural History Society, *the Singapore Naturalist, Vol. 1, No. 1, 1922.*
- SINGAPORE. *Tours in the State of Pahang*, by J. W. Boyd Walker, 1922.

Dutch East Indies.

- JAVA (BATAVIA). Mijnwezen in Nederlandsch Oost-Indie,
(i) *Jaarboek, 1919.*
(ii) *Atlas Behoorende bij het Jaarboek 1918.*
- JAVA (BATAVIA). Pratélan Kawontenaning Bokoe-Bokoe, Javansche Bibliographie, *Dijlid 1-2, 1920, door Dr. D. A. Riukes.*
- JAVA (WELTVREDEN). Balai Poestaka,
(i) *Sri Poestaka, tahoen, 1-12, 1922.*
(ii) *Seventeen publ. translated into Javanese.*
- JAVA (WELTVREDEN). Koninklijke Natuurkundige Vereeniging in Nedrlandsch Indie, *Natuurkundig Tijdschrift Deel 81, 1921 and Index Deel 82, Pt. 1, 1922.*

Japan.

- TOKYO. Ornithological Society of Japan, *Bulletin, Vol. 3, Nos. 11-13, 1921-22.*
- TOKYO. Kaiserliche Universität zu Tokyo, *Deutsche Gesellschaft für Natur- und Volkenkunde Ostasiens, Bd. 17, 1922, Bd. 15, Heft D., 1917.*

EUROPE.**Great Britain.**

- LONDON. Report on the Victoria and Albert Museum, 1918.

Germany.

- GIELEEN. Bericht der Oberhessischen Gesellschaft für Natur- und Heilkunde zu Giessen, *Band 8, 1920-22.*

Holland.

- LEIDEN. Kleinere Schriften des ibn Al-Arabi, *von H. S. Nyberg, 1919.*
- LEIDEN. *De Pandji-Roman by W. H. Rassers.*
- LEIDEN. *De Zeeën van Nederlandsch Oost-Indie Uitgegeven door het Koninklijk Nederlandsch Aardrijkskundig Genootschap, 1922.*
- LEIDEN *Encyclopaedie van Nederlandsche-Indie, Afl. 1, Mei 1922.*

Italy.

- ROME. Reale Societa Geografica Italiana, *Bolletino. Serie 5, Vol. 10, Nos. 10-12, 1921, Vol. 11, Nos. 1-6, 1922.*
- ROME. Monthly Bulletin of Agricultural Intelligence and Plant Diseases, *Vol. 12, No. 10, 1921.*

Sweden.

- STOCKHOLM. *Die Person Muhammeds Vorgelegt von Tor Andrae, 1917.*
- STOCKHOLM. *Etudes sur la Phonologie Chinoise, par Bernhard Karlgren, 1915.*
- UPSALA. *Die Supernasage von Earl Charpentier, 1920.*
- UPSALA. *Traditions de Tsazzege et Hazzega Annales et Documents, par Johannes Kolmodin 1914.*

Switzerland.

- LUZERNE. Brandstetter (R.) *Wir Menschen der Indonesischen, Erde 2, 1922.*



ANNUAL REPORT

of the

Malayan Branch, Royal Asiatic Society

For 1922.

The membership of the Society at the close of the year stands at 543, as compared with a total of 463 at the end of 1921. There are 15 Honorary Members, 4 Corresponding Members, and 524 Ordinary Members.

During the year 86 new Members were elected by the Council. This shows a decrease over 1921, when the record number of 153 new Members joined the Society. The total however is the second highest in the history of the Society and compares very favourably with a pre-war average of 22 new Members per annum. Rather more than half the present membership roll have joined the Society since January 1920.

The names of the new Members elected during the year are:—

Honorary Member.

H. H. the Sultan of Johore, G.C.M.G., K.B.E.

Ordinary Members.

Mr. C. S. Alexander	Mr. G. S. Glass
Inchi Abu Bakar bin Hamad	Mr. R. N. Goodwin
Mr. D. M. Barry	Mr. T. I. M. Gordon
Mr. L. A. C. Biggs	Mr. W. H. W. Gubbins
Mr. D. A. Bishop	Mr. A. C. Hall
Mr. C. W. H. Cochrane	Hon. Mr. D. H. Hampshire
Mr. T. B. Cocker	Mr. P. H. V. Hanitsch
Mr. H. T. Clarkson	Mr. C. W. Harrison
Capt. T. P. Coe, M.C.	Mr. G. Harrower, M.B.
Mr. A. B. Cross	Mr. P. K. Hazlitt
Mr. H. G. Dalton	Mr. G. S. Hellings, M.C.S.
Mr. A. Denny	Mr. W. C. Hill
Capt. F. Drury, O.B.E.	Mr. C. T. Hinde
Mr. W. S. Ebdon	Mr. R. E. Holtum
Mr. H. C. Eckhardt	Capt. J. H. Howlett, M.C., B.A.
Mr. A. T. Edgar	Capt. J. Huggins, M.C.
Mr. B. W. Ellis	Capt. H. North Hunt
Mr. L. L. F. Fearon	Capt. R. Irvine, M.C.
Mr. H. J. Fraser	Mr. E. Jago
Mr. J. C. Fuller	Mr. W. P. W. Ker
Mr. E. W. F. Gilman	Mr. J. A. Lacomblé

Mr. R. F. V. Leech	Hon. Mr. W. Peel
Mr. J. Leggate	Dato Sadia Raja Abdullah
Mr. E. G. Leyne	Mr. J. A. Russell
Mr. V. A. Lowinger	Mr. S. Schested
Mr. L. R. Mackness	Mr. G. E. Shaw
Mr. G. E. Mann, M.C., B.A.	Mr. M. B. Shelley
Mr. J. T. Mansfield	Mr. A. J. Shelley-Thompson
Tengku Mansur bin Sultan Abdul Hamid Halimshah	Mr. A. S. Small
Hon. Mr. F. A. S. McClelland	Dr. A. G. H. Smart
Mr. P. W. May	Mr. D. G. Stead
Dr. E. Mjoberg	Hon. Mr. O. F. Stonor
Tengku Mohamad bin Sultan Abdul Hamid Halimshah	Mr. R. Summerhayes, B.Sc.
Mohammad Ismail Merican bin Vafoo Merican Noordin	Mr. S. L. Thompson
Capt. Haji Mohamad Said	Mr. Lindsay Vears
Mr. G. S. Morse	Mr. E. G. Walker
Mr. G. H. Nash	Tengku Wan Yahya bin Tuan Mohamad Taib
Lt. B. M. O'Connell, R.N.	Mr. D. J. Ward
Mr. W. B. O'Sullivan, B.A.	Mr. E. B. Williams
Mr. G. N. Owen	Mr. F. L. Williams, M.C.S.
Mr. F. W. Page-Turner	Mr. L. C. H. Woodgate
Mr. J. C. Pasqual	Sir L. M. Woodward
	Mr. H. W. Woolley
	Mr. N. A. Worley

The Council record with deep regret the death during the year of Bishop Hose, one of the founders of the Society and for many years its President. For 30 years he took an active part in the work of the Society and after his retirement in 1908 he maintained his interest.

The "Father of the Society" is now the Ven. Archdeacon Perham, who was elected in May, 1878.

The Society also lost by deaths Mr. L. Lewton Brain and Mr. A. J. Weller, the former for several years Director of Agriculture, S.S. and F.M.S.

Four resigned their membership during the year.

Messrs. C. L. Collenette and B. Nunn left the Council during the year; Mr. G. L. Ham and Dr. G. H. Macalister were **Council** co-opted in their places. Mr. C. Bazell, Hon. Treasurer, on his departure to Kuala Kangsar, handed over his duties to Mr. A. G. Bratton. As Hon. Librarian from 1916-1920 and Hon. Treasurer from 1921 Mr. Bazell has afforded much valuable assistance to the Society.

The Annual General Meeting was held on the 10th February, followed by a dinner at the Singapore Club
General Meeting at which H. E. Sir Laurence Guillemard, Patron of the Society, was present, together with 35 Members and their friends.

The change in the Society's name was approved by the meeting with effect from 1st January 1923.

An alteration was passed in Rule 8, whereby provision is now made for the election of two Vice-Presidents for the Unfederated States, in addition to Vice-Presidents for the Straits Settlements and Federated Malay States.

Two Journals were issued during the year: No. 85 appeared in March and No. 86 in November. Together they covered 440 pages. There was a good response to the appeal for papers from those who had not yet contributed to the Journal. Twenty-one contributed articles or short notes against thirteen in 1921. Exclusive of short notes, altogether 34 papers were published against 21 in 1921. Malayan folk-lore provided material for many papers, chiefly by Dr. Winstedt; important Vocabularies were contributed by T. S. Adams (Pangan) A. W. Hamilton (Penang Malay), the late N. B. Baboneau (Murut). Malay Pantuns were discussed in a novel manner by Mr. Overbeck. Five short papers and five notes dealt with Zoological subjects. Botany was represented by an important memoir on the flora of Borneo by Dr. E. D. Merrill, and by shorter papers from Mr. H. N. Ridley, Dr. F. W. Foxworthy and Mr. I. H. Burkill. Mr. E. S. Willbourn contributed an important paper on the Geology of the Malay Peninsula—a subject which is rarely treated in our Journal. The Psychology of "Latah" by a former President, Dr. D. J. Galloway, a paper by Sir John Bucknill on Coins, Notes and Tokens issued in Malaya during and after the Great War, and accounts of jungle journeys by F. W. Douglas and A. W. Hamilton, maintained the variety of subjects dealt with in the Journal.

The authorship asterisk is now placed against 53 names in the membership list. It is still felt that a great many Members resident in Malaya must have unique opportunities for observation and research, and that in consequence they should be in a position to communicate papers or notes of considerable interest and value. Short articles in particular will always be welcomed by the Society's Council.

The Hon. Treasurer's Statement of accounts shows credit balances carried forward to the total of \$2,378.84 against \$1,632.96 at the end of 1921.

Our investment of \$2,200 in S. S. War Loan was added to the "Life Members' Reserve" which now stands at \$4,700 nominal value (= \$4,762 actual value as on 31st December 1922). 26 Members compounded for Life membership, making the total of Life Members now 76. To these must be added 19 Honorary and Corresponding Members who pay no subscriptions.

Sales of Journals showed an increase of \$675.83 over 1921. Sales of maps a decrease of \$345.60.

Bye-Law Under Rule 10 (h) the Council passed the following bye-law:—

"Under Rule 6 Members who have failed to pay their subscription by the 30th June are suspended from membership until

their subscriptions are paid. The issue of Journals published during that period of suspension cannot be guaranteed to Members who have been so suspended."

The Society's Exchange list now numbers 81 Institutions and Societies. From these and other sources 352 publications were received during the year, an increase of 104 over the number received in 1921. \$150.50 was spent on book-binding during the year against \$73 in 1921.

As a result of the steady increase in the number of publications sent to the Society during the past few years the shelf room in the Library has been taxed very greatly. To prevent overcrowding, a number of books were withdrawn. A re-arrangement of the book cases and furniture also took place and sufficient shelf room has been secured to last for a number of years.

Singapore,

6th January, 1923

J. C. MOULTON,

Hon. Secretary.

Receipts and Payments Account for the year ended 31st December, 1922,

	RECEIPTS.	PAYMENTS.
To Cash		
Mercantile Bank of India, Ltd.		
Current account	\$1,616.63	By Printing Journal No. 85
Petty Cash in hand	16.33	Journal No. 86
	\$1,632.96	Circulars
Subscriptions		Photographs No. 85
Annual 1920-21	250.00	Photographs No. 86
" 1922	1,650.46	
" 1923-26	490.00	Stationery
Life Members	1,296.31	Salaries
	3,686.77	Postage
Interest		
Investments	245.00	Book-binding
Bank	57.59	Printing circulars etc.
	302.59	" Sundries
Sales		" Annual Dinner
Journals	1,185.53	Cash
Maps	93.60	Mercantile Bank of India, Ltd.
	1,279.13	Current Account
Sundries .. ..	.93	Petty Cash in hand
Annual Dinner	350.00	
	\$7,252.38	
		\$3,647.84
		624.52
		249.55
		306.46
		2,404.01
		\$7,252.38

A. G. BRATTON,
Hon. Treasurer.

Examined and found correct
SEE TEONG WAH,
Hon. Auditor.

28th January 1923.

On a Collection of Reptiles from Sarawak.

BY DR. EMMETT R. DUNN.

The following notes are based upon a collection of Reptiles made in the region of the upper waters of the Baram River, north-western Sarawak, Borneo, by J. C. Moulton and Harrison W. Smith, September to November 1920.

The collection contains three new snakes and a few other rarities, as noted below. The remainder represent common species and can be dismissed in a few words.

Lacertilia.

The collection of lizards comprises 57 specimens representing 13 species—or one-seventh of the total number of species recorded from Borneo.

The Geckos are represented by two species: the Common Eastern house Gecko, *G. monarchus* (D. and B.), and the very rare *Gehyra beebei* described by Annandale in 1913 from a single female captured by Mr. Beebe's collector in 1910 at Kapit, up the Rejang River, in Sarawak.

On this occasion three were taken at Long¹ Akar (two in the Government Fort) and one further up the Baram River at Long Sap. Annandale notes that it is distinguished from other Malaysian species "by having all but the terminal subdigital lamellae completely divided, as well as by other characters."

The length of head and body (measured from the spirit specimens) is 43—52 mm., tail 50 mm. The ♂ has 28—31 femoral pores, 6 rows enlarged scales on the tail.

The AGAMIDAE are represented by four species of *Draco* (*D. cornutus* Gunther, *D. cristatellus* Gunther, *D. maximus* Boulenger and *D. formosus* Boulenger), two species of *Gonyocephalus* (*G. liogaster* (Gunther) and *G. grandis* (Gray)), and the very common *Calotes cristatellus* (Kuhl).

Two of these are rarities: *Draco cristatellus* only known from Borneo—represented in this collection by one from Baram—and *D. formosus* which is chiefly found in the highlands of the Malay Peninsula, Borneo and Sumatra. This collection contains two from Baram.

The big family of Skinks, of which there are many species in Borneo, are represented by the four common species *Mabuia multifasciata* (Kuhl), *Lygosoma (Hinulia) variegatum* Peters, *Lygosoma (Kineuxia) vittatum* (Edeling) and *Tropidophorus brookei* (Gray).

¹ "Long" means "Mouth of a river": thus Long Akar = mouth of the River Akar, a branch of the great Baram river. J.C.M.

Ophidia.

The snakes proved of more interest. The collection contains 53 specimens representing 24 species, of which 3 are new. They all belong to the Family COLUBRIDAE, 23 species to the harmless subfamilies *Colubrinae* (18) and *Dipsadomorphinae* (5). The remaining species is represented by one specimen, the only poisonous snake of the whole collection viz. *Doliophis bivirgatus*. No vipers or water snakes were collected.

[A fine Hamadrayad measuring 9 ft. 2 ins.—not sent to Dr. Dunn for identification—was taken at Lio Matu. The capture of only 2 poisonous snakes out of a total of 54 is interesting evidence of the general harmlessness of snakes—at any rate in Borneo.] J. C. M.

The following common or well-known Colubrine snakes call for no comment: *Sibyonophis*¹ *geminatus* (Boie), *Dendrophis pictus* (Gmelin), *Dendrelaphis caudolineatus* (Gray), *Natrix conspiciolata* (Gunther), *Natrix chrysarga* (Schlegel), *Natrix maculata* (Edeling), *Xenelaphis hexagonotus* (Cantor), *Elaphe flavolineata*² (Schlegel), *Gonyosoma oxycephalum* (Boie), *Holarchus octolineatus* (Schneider), *Holarchus purpurascens* (Schlegel), *Gongylosoma baliodeirus* (Boie), and *Calamaria borneensis* Bleeker.

Two rare Colubrine species were taken:

(i) *Natrix flavifrons* (Boulenger), a rare mountain species hitherto only known from Mount Kinabalu in British North Borneo and Mt. Penrissen in Sarawak, and represented in this collection by one from Lio Matu, a mountainous region in the upper waters of the Baram River, and another from Mt. Murud, alt. 2,000 ft.

(ii) *Calamaria lowi* Boulenger, which appears to be confined to this part of Sarawak. The collection contains 7 from Long Mujan and one from Long Sap.

[When alive the lateral spots in the anterior portion are bright yellow, and there are one or two yellow spots on the tail. The general colouring is brownish-purple above, bright yellow beneath. Six of these, 14 *Calamaria borneensis* and the two new *Calamaria* species—*C. smithi* and *C. moultoni*—were caught at Long Mujan on October 4th and 5th on flooded trees or swimming near the river bank where a heavy fresh had flooded the surrounding country.] J. C. M.

The three following Colubrine snakes appear to be new. In each case they are only represented by single specimens which, at the request of the Director of the Raffles Museum, Singapore, have been sent to the British Museum.

¹ The following generic names are usually employed by European writers in place of those given in this paper:—*Polyodontophis* for *Sibyonophis*, *Tropidonotus* for *Natrix*, *Coluber* for *Elaphe* and *Gonyosoma*, *Simotes* for *Holarchus*, and *Ablabes* for *Gongylosoma*. I mention these at the request of Major Moulton for the convenience of European readers of this Journal. E.R.D.

² Long known as *E. melanurus*.

***Natrix frenata* sp. n.**

Field No. 119, from Mt. Murud, 2,000 ft.

Last three maxillary teeth abruptly enlarged, eye large. Scales 17, all keeled, ventrals 166, anal divided, subcaudals 112, rostral visible from above, internasals longer than prefrontals, broadly truncate in front, frontal longer than its distance from tip of snout, shorter than the parietals, once and three-fourths as long as broad, loreal deeper than long, oculars 1-3, temporals 2-3, eight upper labials, third to fifth entering eye. Brown above, small, square black spots alternating on each side of middorsal line, below these on each side a series of narrow upright white bars with broader dark borders, belly checkered black and white, a white line from lower hind corner of eye traverses upper labials and runs backwards and upwards to meet its fellow on back of neck. This line is bordered with black above and below. Remainder of upper labials and lower labials white with black sutures. Total length 260 mm., tail 75 mm.

This snake seems to be close to *N. sarawacensis* (Gunther) and to *Natrix maculatus* (Edeling). The colouration is most like *N. maculatus torquatus* (Moquard) from Mt. Kinabalu. But the present form has more ventrals and subcaudals than *sarawacensis*; more ventrals, fewer scale rows and one less labial than *maculatus*; and the colouration is not exactly that of any of the other forms.

***Calamaria moultoni* sp. n.**

Field No. 40, from Long Mujan.

Diameter of the eye longer than its distance from the mouth, rostral broader than deep, frontal longer than broad, shorter than the parietals, not twice as wide as the greatest width of the supra-ocular, one pre- and one postocular, six upper labials, third and fourth entering eye, mental in contact with the anterior chin shields. Ventrals 122, anal entire subcaudals 23. Tail ending in a point. Brown above, each scale with white marbling. Striped as follows, a dark stripe on ends of ventrals and part of scale row 1, a white stripe on rest of scale row 1, anteriorly a dark stripe on adjacent halves of scale rows second, third, fourth and fifth, a dark stripe on the median row and the adjacent halves of the two rows at each side. These stripes disappear on posterior two-thirds of body. Anterior ventrals with a median black spot, middle ventrals with black anterior border, posterior ventrals with median black spot, a black median line under the tail, most of upper labials white, chin and throat white. Total length 270 mm., tail 25 mm.

Apparently allied to *C. indragirica* Schenkel, from Sumatra. But *C. moultoni* has some twenty-three more ventrals and the colouration, while on the same general plan, differs in detail.

***Calamaria smithi* sp. n.**

Field No. 74, from Long Mujan.

Diameter of the eye a little longer than its distance from the mouth, rostral about as broad as deep, frontal longer than broad,

more than twice as broad as supraocular, much shorter than parietals, one pre- and one postocular, five upper labials, third and fourth entering eye, first lower labial in contact with its fellow behind the mental.

Ventrals 142, anal entire, subcaudals 21. Tail ending in a blunt point. Yellowish brown, many scales with a darker border, lower half of scale row 1 white, middle of scale row 2 white, forming a light lateral stripe. A light line starting at nostril traverses prefrontal, supraocular, postocular and parietal, lower two-thirds of upper labials white, belly white, a dark line on subcaudals. A dark half collar on neck; a dark half band at anus, one in middle of tail, and one near tip. Total length 103 mm., tail 20 mm.

Very close to *C. brookei* Boulenger, also from Borneo, but differing in not having the five black stripes attributed to that species and in having the portion of the rostral visible from above one-fourth instead of one half its distance from the frontal.

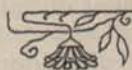
The Dipsadomorphine snakes are *Boiga*¹ *dendrophila* (Boie), *Boiga cynodon* (Boie), *Passerita fasciolata* (Fischer), *Dryophiops rubescens* (Gray) and *Chrysopelea peleas* (Linn.)—for the most part common and well-known Malaysian species.

D. fasciolatus is rather a rarity, confined to Sumatra, Borneo and the Natunas. One was collected at Long Selaan in the upper Baram River.

D. rubescens, represented by one from Long Kalimau, is another uncommon species, which is however known from Siam, the Malay Peninsula, Sumatra and Java.

The others call for no comment.

¹European writers have long used *Dipsadomorphus* for *Boiga*, *Dryophis* for *Passerita* and *C. chrysochlora* for *C. pelias*.



Early Days In Penang.

BY THE REV. KEPPEL GARNIER.

On the morning of July 15th 1786 Pulo Pinang—Pulo Ka Satu—lay sleeping in the sun, as quiet and untrodden by human feet as any other of the many jungle-covered islands in these Eastern seas. At midday three ships dropped anchor off Pulo Tikus, boats were lowered and soundings taken. The same thing happened the following day, and no doubt the fifty odd original inhabitants came from their Kampong under the hill, by narrow jungle path down to the sea shore to find out what these strange ships were doing. On July 17th Lieutenant Gray and a party of marines were landed at "Point Penaggar"; their duty was to prepare for the arrival of Captain Francis Light and a few other Europeans who, on the morning of July 18th set foot on the sandy scrub-covered beach where today stands Fort Cornwallis. The intended occupation of the Island by the British was well known by those who dwelt on the Kedah coast, and soon after Captain Light had landed, the Datu of "Qualla Moodoo" arrived and obtained permission to build himself a house. He was shortly followed by the Captain China and some Indian Christians who had come from Kedah in a prahu. Perhaps, in the same boat came the French Padre, who, Light tells us, landed among the first arrivals and planted his Cross on the soil of Penang. With him, or soon afterwards, came a hundred Christians, also from the coast of Kedah. This constant coming and going was too much for the Malays—they now approached Light and through their Headman, Nakodah Kechil, asked what it all meant. Light seems to have been in entire sympathy with Malays. He frequently dressed as one himself and they were always his devoted friends. On this occasion, these Penang Malays departed well satisfied with a present which Light had ready for them. For the rest of the month everyone was busy, in clearing the ground, building a Fort, erecting a small Bazar, and generally getting things shipshape.

On August 7th the "*Eliza*" returned from "Queda" with provisions. Several more Christian families took the opportunity to travel by her, and on August 10th two H. C. ships, the "*Vansittart*" and the "*Valentine*" arrived, and so Light decided to invite their Commander to be present on the following day when he hoisted the Flag and took possession of the Island in the name of His Britannic Majesty and the Honourable East India Company. At noon, therefore, on August 11th, Captains Light, Glass, Wall and Lewin, besides "Local Servants of Government" carried out the simple ceremony at a spot where now is the Esplanade, and Prince of Wales Island came into being, and was admitted into the great family of the British Empire. Although presumably proud of its new name, it has never been able

to persuade the world in general to adopt it and, except officially, Pulo Pinang it remains, modified into "Penang" by the clumsy British tongue.

From this time on, things began to move rapidly. We are not told much in detail, but we learn that ships called at the new Settlement in quick succession and that every Captain was desirous of obtaining possession of land and "employed people everyday to clear the woods." Among the first to arrive was Captain James Scott, a Navigating Merchant belonging to Calcutta and a friend of Captain Light. He was also a first cousin once removed of Sir Walter Scott. Very soon one hears that he has cleared the land at Glugor—Assam Glugor is a tree with orange acid fruits used in flavouring curries—and Glugor we may say is the oldest estate on the island, and is still today the most important. One Bacon went further inland and cleared Ayer Itam. Before long a Chinese gentlemen built his flour mills there. They were burnt to the ground early in the nineteenth century, but the foundations of Amee's Mill can still be seen. A year after the inauguration of the Settlement there were 60 Chinese families who kept the shops in the Bazar, "already pretty extensive," and a few Malabars. There were also a certain number of Malays, who come and go between the island and the mainland. Captain Glass who had now been appointed to the command of the troops, was not fond of these Malays and complained that they taught his men to gamble. He tried to find more work for his soldiers so as to keep them from these naughty natives.

In 1792 Light wrote, with pardonable pride, that the Island which six years ago had been one entire wood, now had a population of 10,000; this total he divided up into 7,000 "inhabitants"; Company's servants with their followers 1,000; Malays 1,500; and strangers who come and go in ships and "prows" anything from 1,500 to 2,000. Two years later, on October 21st, Light died, but he had lived long enough to feel the gratification of success and something of anxiety in regard to the future of his Settlement.

Light himself was a Suffolk man, but he seems to have depended on Scotsmen to carry on his work. With the exception of Captain Glass, who was an Irishman, he was surrounded by men from North of the Tweed. Lieutenant Norman Macalister, who in 1807 became the second Governor of Penang, and Lieutenant Robin Duff were Members of his Council, while Edward Hay was the Secretary to Government. Another Scotsman by the way, was the first baker in Penang, for we are told that the Honourable J. Cochrane owned the first bakehouse, valued, with his godown, at 4,000 Spanish dollars. But nothing more is known about him than that.

Light was most anxious that those who succeeded him should be in sympathy with the Malays and the Asiatic immigrants, but he evidently had fears on the subject. The sequel showed that his fears were unfounded, for the year following his death the population had again increased, and there were at that date 25,000

inhabitants, showing that the Asiatics of all races had entire confidence in the Government. Such trouble as arose was caused, not by the Government being out of sympathy with the Asiatics, but by the European merchants and planters being opposed to any Government at all—at any rate of the character provided by the E. I. Company. So unruly did they become that an attempt was made by the Superintendent, Major J. R. Macdonald, to come to some agreement with them, for which purpose he invited them to meet him, to discuss their grievances. He seems to have shown very little tact and the influential planters probably felt themselves strong enough to be able to oppose him, and were by no means conciliatory in their attitude. Major Macdonald retaliated by instituting inquiries in regard to the titles by which they held their property. We have the names of some of these merchants and the replies given in certain cases. Messrs. McIntyre, Scott, Lindsay, Hutton, Roebuck, Young, Brown, Sparran, Mackrell and Nason were the men who attended the conference. Mr. Scott,—the Captain James Scott mentioned earlier—seems to have been the outstanding personality of those early days. Major Macdonald reported of him that “of every spot which Mr. Scott’s sagacity pointed out as at a future hour likely to become valuable, he has by assumption or purchase made himself a part owner.” He added, “Mr. Layton is likewise an industrious and prospering farmer, as was Mr. Brown, previous to his junction with Mr. Young.” Mr. Young’s influence does not seem to have done much harm in the long run!

The answers made by some of these gentlemen on the subject of the titles to their properties were as follows: Mr. Lindsay said he arrived in 1788 under the protection of Mr. Light and was a partner in Mr. Scott’s house, with whom Mr. Light was also associated in commercial affairs. Mr. Scott wrote that he belonged to Calcutta, “to which place I return as soon as I can settle my affairs.” However he died in Penang on September 20th 1808. Mr. Nason says he arrived in the Island on September 10th 1786 and declared that he was the man who cut the first tree and raised the first plant. There was the making of a very pretty quarrel between Government and the independent planters. We can understand it better when we remember that Government Officials were themselves merchants. They began as “Writers” and after their sixth year of residence they become “Factors.” From the 9th to the 11th year they were called “Junior Merchants.” From and after the 12th year of arrival they were designated “Senior Merchants.” But Light had from the first encouraged independent merchants to settle and take up land, and these men had become very wealthy and were owners of practically all the land in the island worth cultivating. The Superintendent regarded them as a turbulent and unruly crowd of interlopers, and a constant warfare was kept up for many years. They seemed to have shown a close resemblance to their brothers and cousins who were living similar cheery lives on the plantations in the West Indies. Young bloods they

were beyond doubt, and, also beyond doubt, rather a thorn in a side of Government.

Major Macdonald died in 1799 and in 1800 a new regime began. Sir George Leith was sent out as Governor and Mr. W. E. Phillips accompanied him as Private Secretary. Mr. G. Caunter was the first assistant under Mr. Phillips and Mr. Dickens, an uncle of Charles Dickens, was appointed Judge and Magistrate.

Mr. Caunter's name is frequently met with, and he occupied many important posts from time to time, including that of Superintendent. One of the most curious is that of Acting Chaplain. As Chaplain he baptized, married and buried members of the Anglican Community in Penang; and this he did up to the time of the arrival of the first Padre, the Reverend Atwell Lake in 1805, and repeatedly, after that date, when the Chaplain was on leave. In 1801 we find him marrying Thomas Burston Peirce, Commander of H. C. S. "*Taunton Castle*," to Anna Maria Fearon, Spinster, of Prince of Wales Island; J. P. Fearon and the Governor, Sir George Leith, were the witnesses. In 1803 he married Charles Sealy and Elizabeth Palmer Mannington, daughter of Phillip Mannington, who succeeded Light as Superintendent in 1794 and who died in 1795. Elizabeth was thus the sister of Philip Mannington who was 2nd Assistant to Major Macdonald and Magistrate, who died in 1806. There was another brother, Robert, who stood as Godfather to Charles Sealy's son in 1804. In 1804 Mr. Caunter married Patrick Chiene, merchant, to Elizabeth Brymer; D. Brown was one of the witnesses.

James Scott, senior, died on September 20th, 1808, his son James having died on July 23rd. These were the founders of "James Town" which they hoped would prove a successful rival to George Town, the seat of Government, where Sir Edward Stanley, the newly appointed Recorder and Judge, was making things rather unpleasant for independent and high spirited planters. James Scott had another son William, who survived him and died at the ripe age of 83.

W. E. Phillips who came to Penang as Private Secretary to Sir George Leith was, from the day of his arrival to the day of his departure from the island, continually in the public eye. He acted as Lieut. Governor between 1800 and 1805. After 1805 he acted as Governor and in 1820 he was finally appointed Governor, which office he held until his departure in 1824. He lived for 30 years at home after his retirement. In his time St. George's Church was built and consecrated, and in his time too, and mainly owing to his endeavours, slavery was finally abolished in the Island. He also, like Mr. Caunter, was intimately associated with the social life of the Settlement. He married (and incidentally was married himself), he baptized and he buried. In 1809 he was called upon to baptize the youngest son of Quinton Dick Thompson and Marianne Raffles, his wife. The boy was christened William O'Bryen Drury, and his godparents were Rear Admiral William O'Bryen Drury, Thomas Raffles and Olivia Marianne Raffles. A

month later Mr. Phillips was called upon to bury the father. Marianne the mother was married again two years later to Captain Flint in Malacca. Mr. Phillips baptized at the same time as the little Dick Thompson was brought to the font, the daughter of Thomas and Catherine Church; and Marianne Thompson and her brother Stamford Raffles and his wife Olivia stood as Godparents. The following year his services were again required in connection with the Raffles family. This time he married Leonora, a younger sister of Stamford Raffles, to Billington Loftie, surgeon, and Thomas Raffles again signed the Register. This seems to have been a popular wedding, for Mr. Clubley, Mr. John Macalister, Mr. W. Ibbetson and Mr. J. L. Phipps also signed.

Mr. Clubley married in 1817 Margaret Carnegy, the sister of James and Patrick Carnegy. He was the first owner of the "Crag" which was then known as "Clubley's Hill." He died in 1826 aged 36 years, being at the time of his death Senior Member of the Council. Mr. John Macalister was also Senior Member of Council when he died in 1824, aged 39.

Mr. Phipps was one of the "Senior Merchants" and married in 1817 Marianne Bailey. Mr. Ibbetson was afterwards Governor; he married in 1817 Harriet Georgina Hutchings Bennett, the widow of W. Bennett whom she had married in 1811. She was a sister of Mr. G. and Mr. R. Caunter. The Ibbetsons had a son, Samuel Kerr, who was at Winchester College in 1837. In 1817, which was a great year for marriages, a sister of Mrs. Ibbetson, Sarah Sparke Caunter, was married to Captain Thomas Larkins of H. C. S. "*Marquis of Campden*." The following year another sister of James and Patrick Carnegy, Mary Alison, was married to John Anderson of H. C. Civil Service, and Messrs. Carnegy, Clubley, Phipps, Erskine, Ibbetson, etc., rolled up to make sure that almost the last bachelor of their small circle was safely tied up. But a month later, June 30th, a double wedding took place (no doubt in the newly built Church of St. George the Martyr) which must have been the social event of the year. Mr. Phillips married Janet Bannerman. At the same time and in the same place Mr. Henry Burney, a Lieutenant in the Bengal Army, also married Janet Bannerman, and the Reverend Joseph Rawlings Hutchings A. M., who performed the ceremony, did not think fit to give any explanation or specify more clearly who these ladies were. But from private sources it has been possible to clear up the difficulty. Mr. Phillips married Janet, daughter of Colonel Bannerman, the Governor, and Henry Burney married Janet, the daughter of the Rev. James Patrick Bannerman and the niece of the Governor. The Governor and his wife, Mr. A. J. Kerr, the Registrar, and Mr. James Low signed both registers. Mr. Phillips' name was added for Mr. Burney's wedding and Mr. Burney's for Mr. Phillips'.

The Phillips in the course of time had a son, Charles Palmer, and Charles Palmer Phillips had three sons, all at Winchester College, the second one, by name Charles Bannerman Phillips, was

for long a well-known and much respected housemaster there and is still alive today.

Mr. Burney was a brother of Fanny Burney (Madame d'Arblay) and was the author of the famous treaty with Bangkok in 1826. Later he was British Resident at Ava from 1829 to 1838. He also had two sons at Winchester, the second of whom bore the name of Alexander d'Arblay. After the wedding, no doubt they all repaired to Suffolk to cut the cakes and make appropriate speeches.

The social life must have been very pleasant at that time in Penang. It was one big family party. One finds that many of one's preconceived ideas of life in the East in those days have to be revised. Life was not the exile that one sometimes imagined it to have been. Brothers came out together and then sent for their sisters. Stamford Raffles not only had his wife with him, but three sisters as well. The Carnegys were a party of two brothers and two sisters. The Caunters were the same.

The Bannermans were a large party including a niece of the Governor. There were also the Cousens. George Alexander married Martha, one of the sisters, while Jemima stayed on with her brother and died unmarried. And there seem to have been children in every household. John Hall, Deputy Collector of Customs, and Rosemary Ann his wife had six children in ten years. James Cousens, by the way, married a sister of John Hall. The Scotts, Browns, Carnegys, Chienes and Dickens all had growing families and there must have been more European children in Penang in 1822 than there are today. There were many nice homes with boys and girls growing up together. Then again, there was much coming and going. People went away to Calcutta, Madras, Malacca, Bencoolen and further afield to the Cape and to China on business or for health—not perhaps for pleasure! Two out of the three Members of Council appointed in 1805 were drowned. Alexander Gray went down in the "*Blenheim*" off Mauritius and his wife was with him. Colonel Norman Macalister and his wife were drowned in a typhoon off the coast of China.

In 1811 the first real globe trotter visited the Island, Mr. James Wathen. On his voyage out he had read Johnson's *Oriental Voyages*, and he expected much of Penang, for Johnson declared that "the island, from the salubrity of its air was justly esteemed the Montpellier of India, and from the dawn of day until the sun has emerged above the high mountains of Queda, and even for some time after this period, Penang rivals anything that has been fabled of the Elysian Fields." Wathen at the end of his two months' visit agreed with all that Johnson had said in its praise. On his arrival at Penang his first duty was to report immediately at the office of the Town Major—Major J. M. Coombs 25th M. N. I. This gentleman who was also a Magistrate, was once challenged to fight a duel by John Macalister, a fellow Magistrate. There was a considerable disturbance over the matter and Macalister was

severely reprimanded by the authorities at home. Having performed this necessary duty Wathen was free to come and go and enjoy the hospitality of all the friendly folk in Penang, many of whose names have been mentioned already. He dined at Suffolk with Mr. Phillips, who at the time of his visit was Acting Governor, and was delighted with the house. "A splendid mansion" he exclaimed. The entertainment provided thoroughly met with his approval. Mr. Phillips was still a bachelor but he knew how to do things well. Ten years later when Crawford visited him and his wife, he says that Suffolk was the most beautiful place in all India, with the one exception of Barrackpore. Wathen met at dinner Sir Edward Stanley and his lady, Dr. and Mrs. McKinnon—the Doctor was the Senior Surgeon at the Residency—Mr. John Hall and his wife Rosemary Ann—the mother of Charles, Rose, Emma, Ellen; Edward William Phillips and Morris James; Mr. Hali-burton the Sheriff, and many others, all the best people in fact, which seems to have gratified our globe-trotter very much. Dr. McKinnon lived at Treelough, his country place near the Burman village, and thither Wathen repaired and from there made expeditions to the corn mills of Mr. Amee at Ayer Itam, and also, with Mr. Phillips' permission, he ascended to "the top of Penang mountains" and visited "Convalescent." On his way he passed a handsome dwelling which he was informed was once the residence of Colonel Macalister, formerly Governor of Penang, who with his lady and children and near 200 persons were lost in a typhoon off the coast of China. "These anecdotes," the timid little man exclaims "leave an unpleasant impression on the mind, particularly at a time when one is engaged in the prosecution of a long and dangerous voyage!" However, he recovered his spirits and spent a happy month walking about the lanes near Mount Olivia and the Burman village: or in being carried in the Doctor's palanquin to George Town, where he walked with much interest, about the streets. It must have been very different then to now, for then we find many trades were in the hands of Europeans. There were Europeans working as Printers, Tavern Keepers, Fiddler, Hair Dresser, Coachmaker, Watchmaker, Cooper and Shipwright. The Governor's coachman and valet were also English. Among his little jaunts we can well imagine that he visited the Post Office and perhaps he was somewhat tickled by finding the following notice:

"No letter will be received at the Post Office without the postage being sent with it, nor will any letter be delivered unless the postage is paid to the Peon, or the Person signs a receipt for it. For the accommodation of the Residents on the Island however a Register will be permitted to be kept for this Postage account on the understood condition that all postage claims are regularly settled every month."

On October 17th Wathen attended a christening at Treelough of an infant daughter of Dr. and Mrs. McKinnon. The Register, now in St. George's Church, shows that there were two daughters

of the Doctor baptized that day—Maria Sophia and Sophia Jane—but Wathen seemed to have been more struck by the appearance of the Ayah than by anything else, and may have overlooked Maria Sophia or Sophia Jane, or been confused by the repetition of the name. According to him “The most remarkable object at this ceremony was an antient Hindoo nurse who had lived many years in the family. She was dressed in a style so youthful and gay, and so bedizened with mock jewels, in her ears, nose, hair, etc. and was so full of consequence upon this grand occasion that the Doctor, in making me observe her airs, thought it proper to say that though this vanity of finery was ridiculous in so old a duenna, yet it was a comical fault and pardonable, as she was an excellent servant, careful and faithful, affectionate to the children and devoted to her mistress.”

She seems to have been rather a jewel of a servant and somewhat of an exception to the usual run of domestics for, as a contrast to her, it is interesting to read the following notice which was issued about the time of Wathen’s visit to the Island:—

“Almost daily complaints having been made to the Magistrate respecting servants leaving the employ of their masters without giving intimation of their intention of so doing and thereby putting such employers or their families to great inconvenience. It is hereby ordered that all persons serving in the capacity of servants on this island, are to give their employers warning of their intention of quitting their service one month at least previous to their so doing. And any servant who shall be found guilty of acting contrary of this order, will be taken up and brought before the Sitting Magistrate where he will be fined a sum not exceeding 10 Spanish dollars and be liable to be committed to the House of Conviction for a period not exceeding one month.”

Registration of Servants was not necessary in those days. They managed quite well without it, or at least found other methods of dealing with the domestic problem. A few days after the McKinnon Baptisms, Wathen attended a funeral in the old cemetery and there was much impressed by “two ancient sons of Neptune” who remained, after the funeral, one at each grave (for there were two British seamen buried at the time) leaning on their sticks in deep contemplation. “Meagre was their look and pale” —“some baleful disease had seized their vitals”—whose vitals he referred to is not quite clear.

However, on the whole he thoroughly enjoyed himself and his last remarks on Penang were these: “It is with regret I quit this delightful spot, emulating in beauty and produce the seat of Paradise itself. I shall ever cherish the remembrance of the kindness I received from those families in it, with whom I had the honour of being acquainted, and I request that they will accept my thanks, esteem and gratitude.”

And here too we must take leave of Penang and those early days of its existence.

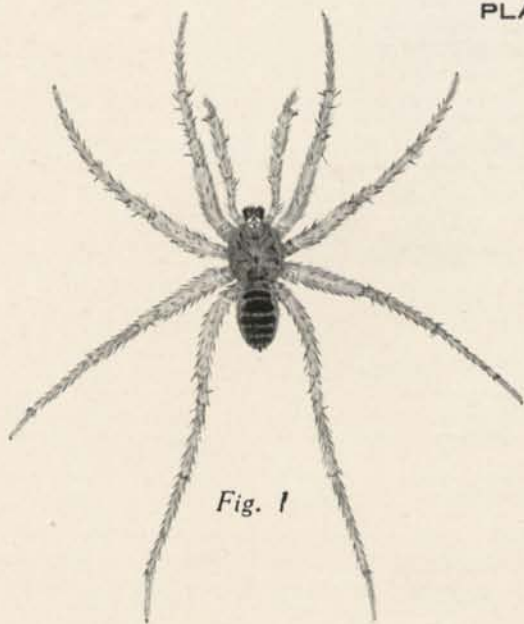


Fig. 1



Fig. 4

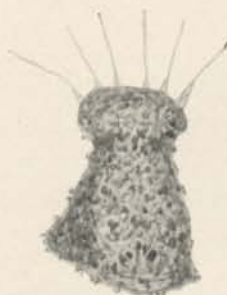


Fig. 2



Fig. 5



Fig. 7

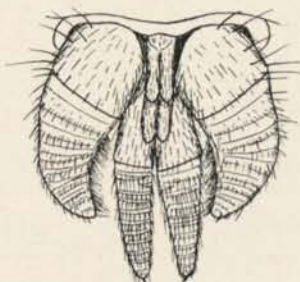


Fig. 3

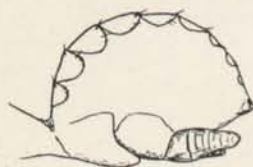


Fig. 8



Fig. 6

(b),— from outside.



(a),— from above.

Fig. 9

A New Spider of the Genus *Liphistius*.

BY H. C. ABRAHAM.

The series of spiders from which the following descriptions were made was collected, with the exception of one female, by myself in the dark caves at Batu Caves, Selangor, F. M. S., during December 1921 and January 1922. This cave is situated in one of those isolated, precipitous, limestone hills which form such a characteristic feature of many parts of this country; the particular hill in question being some seven miles north of Kuala Lumpur, with the mouth of the cave about 300 feet above sea-level. The female above referred to was collected by Capt. H. M. Pendlebury, Systematic Entomologist, F. M. S. Museums, whilst on an expedition to the summit of Gunong Tahan, the highest point of the Malay Peninsula, during November 1921.

Since writing these notes, I have been extremely interested to see, amongst the Nature Study Photographs exhibited at the Malaya-Borneo Exhibition (April 1922), a picture taken on Gunong Angsi, Negri Sembilan, about 2,500 feet above the sea, by Mr. F. de la Mare Norris of the F. M. S. Agricultural Department, of a large species of *Liphistius* at the mouth of its retreat. The latter is a more or less vertical tube (apparently about 18 inches long) sunk into the soil with its mouth held open by anchoring lines similar, but used in a different manner, to those described under *L. batuensis* (*infra* p. 19); the trap-door seems from the photo to be similar to that described in this paper. From the rough description of the spider given to me by Mr. Norris I am inclined to believe that it is *L. birmanicus* Thorell, but hope shortly to be able to publish a detailed description of both spider and nest, as Mr. Norris has very kindly promised to secure for me specimens and photos of both on the next occasion on which he visits Gunong Angsi.

The point of immediate interest brought out by this photograph is that the Gunong Angsi species appears to build its retreat in the form of a tube *in the ground*, whilst the spiders found by me in Batu Caves made theirs *not* in the guano on the cave floor (where I discovered other small Mygalomorph spiders had sunk their tubes) but on the walls of the cave at, apparently, any height above the ground, sometimes, but by no means always, using a small hollow in the face of the rock for the bottom of the nest to rest in. This appears to indicate that these spiders have been cave-dwellers for a sufficiently long period of time to have modified considerably the original form of nest (assuming, as seems natural, that the open-air form is the original one), this modification probably having taken place on account of the fact that their prey appears to frequent mostly the walls of the cave, so that their nests being there also gives the spiders a retreat close at hand, if they are alarmed whilst hunting.

Up to the present time five descriptions have been published of specimens of the genus, viz:—

- (1) *L. desultor* Schiödte, in Kroyer, *Naturh. Tijdsk.* 2, II, p. 621, (1849).
- (2) *L. mamillanus* O. P. Cambridge, *Ann. Mag. Nat. Hist.*, (4), XV, p. 249, (1875).
- (3) *L. desultor* van Hasselt, *Vers. Med. K. Akad. Wetensch. A. Naturk.*, 2 Reeks, XV, p. 186, (1879).
- (4) *L. sumatranus* Thorell, *St. Rag. Mal. e Pap.* IV, p. 27, (1890).
- (5) *L. birmanicus* Thorell, *Ann. Mus. Civ. Genoa*, XXXVII, p. 162, (1897).

It appears, however, that a comparison of these specimens has never yet been made, but, from a discussion of the various descriptions, carried out by Thorell in *St. Rag. Mal. e Pap.*, IV, pp. 26-31, (1890), and by Simon in *Hist. Nat. des Ar.*, I. p. 63, (1892) and II, p. 875, (1903), one is led to the conclusion that (1) and (2) are identical i.e. *L. desultor* Schiödte, and that (3) is a synonym of (4) *L. sumatranus* Thorell, (3) having been described by van Hasselt under the impression that he was dealing with a specimen of (1). So that the genus *Liphistius* has consisted, up to the present, of three species, viz:—

L. desultor Schiödte (= *mamillanus* Cambr.).

L. sumatranus Thorell (= *desultor* van Hasselt).

L. birmanicus Thorell.

A short description of the last-named is given by Pocock in *Fauna Brit. India, Arachnida*, p. 156, (1900), and a description of the male of the same species by Simon in *Bull. Sci. Fr. Belg.*, 42, p. 70, (1908).

In a recent paper (*Ann. Mag. Nat. Hist.*, (9), X, p. 444, 1922) Mr. T. H. Savory points out the extreme interest attaching to spiders of the Family LIPHISTIDAE as approaching more nearly than any others, in external structure, to the fossil spider (*Protolycosa*) of the Carboniferous strata of the Palaeozoic epoch. He regrets the fact that the internal anatomy of *Liphistius* has never yet been studied. The cause for this regret will, I hope, soon be removed as I am corresponding with Mr. B. H. Buxton with a view to supplying him with material for such investigation.¹

The members of the Family LIPHISTIDAE, which consists of the two genera *Liphistius* Schiödte, and *Anadiastothele* Simon, are distinguished from all other spiders by the facts, (i) that the dorsal surface of the abdomen is furnished with distinct terga,

¹ I see Mr. Savory states also that the male palpus of *Liphistius* has never yet been described. He has evidently overlooked the description of *L. birmanicus* by Simon, quoted in the preceding paragraph. The description and figure of the palpus of my new species *L. batuensis* now given in this paper I hope will also prove of interest.

giving an appearance of segmentation, and (ii) that they possess eight spinnerets which are situated in a group near the middle of the ventral surface of the abdomen, far removed from the anal tubercle.

FAM. LIPHISTIIDAE.

Genus LIPHISTIUS Schiödte.

Liphistius Schiödte, in *Kroyer Naturh. Tijdsk.*, 2, II, p. 621, (1849). E. Simon, *Hist. Nat. Ar.*, I, p. 64, (1892); *op. cit.*, II, p. 875, (1903).

***Liphistius batuensis*, sp. nov.**

Plate I, figs. 1 to 9.

FEMALE:

Colour: Varies in a rather a remarkable degree (see note p. 21) but is generally as follows:—Cephalothorax and mandibles, greyish-yellow to warm grey-brown; fangs, red-brown; lip, dull yellow; coxae of palpi, brownish; sternum and coxae of legs, dull yellow; legs and palpi, pale greyish-yellow with the distal extremities of the segments brownish; abdomen, upper surface dark dull yellow-grey to dull warm grey-brown, the terga being dark grey to warm grey-brown, under surface, dull yellowish-grey becoming darker posteriorly, opercula of stigmata dull yellow, region around epigyne pinkish; sides and under surface of abdomen thinly clad with coarse down-lying dark hair.

Cephalothorax: Three or four coarse up-standing black bristles in a median longitudinal row are placed just behind the ocular tubercle and 6 more pointing forward along the front margin; of this latter series the 2 innermost bristles are slightly longer and stouter, and the 2 outermost shorter and more slender; than the intervening ones.

Eyes: Eight in number, and grouped closely together on a circular tubercle on the front margin of the cephalothorax. The laterals of the front row are largest, their front margins occupying the whole of the lower half of the tubercle. The medians of the same row are minute and, a short distance apart, are situated above the inner margins of the lateral pair. The rear row is recurved, the laterals, rather smaller than the front pair, which their lower edges touch, are ovate, broadest anteriorly, and occupy the posterior-lateral margins of the tubercle. The rear medians, slightly smaller still, ovate with the smaller end pointing backwards, lie above and between the side eyes. The small front median eyes are black and like day eyes, the remainder colourless and probably nocturnal. There are 3 or 4 upstanding curved black bristles disposed along the median line of the ocular tubercle. The eyes in both sexes are alike and are shown in Fig. 7.

Mandibles (Fig. 4): Stout and about $\frac{2}{5}$ as long as the cephalothorax. The Falx is flat on the inside and convex exteriorly; it is slightly hollowed at the base and thence arched anteriorly. The apical and inside front margins are furnished with stout up-standing black bristles. The external and anterior surfaces are clothed with scattered black bristles whilst the inner surface has scattered short down-lying hairs. On the inner margin of the falx-sheath are 9 (rarely 10) teeth, the arrangement of which as regards relative size is somewhat variable but is in general much as is shown in Fig. 4. Both margins of the falx-sheath are furnished with a fringe of long reddish bristles; on the inner margin is also a shorter and finer similar fringe. The Fang is long and stout, slightly curved.

Lip: Wider than the front of the sternum and about twice as broad as long, and rounded in front where it is furnished with a number of slender bristles.

Sternum: More than twice as long as it is wide in the middle, truncate anteriorly and rather sharply attenuated posteriorly, separating the coxae of the 4th pair of legs; it is furnished with numerous long black slightly curved bristles.

Legs: Clothed with black bristles arranged more or less in longitudinal series. The coxae are about $2\frac{1}{4}$ times as long as wide, those of the 4th pair being separated by the extension of the sternum. The femora are furnished, in addition to the numerous bristles mentioned above, with 4 longitudinal series of spines, one along the middle of the upper side, one along the front upper edge, and one along each edge of the under side; the spines of the last two rows are particularly long and numerous. There is also a pair of curved spines on the upper surface near the distal end. The patellae have two long curved bristles on the upper side, one near the base and the other near the apex, there are also 4 or 5 long curved bristles in a bunch at the distal end. On the tibiae are numerous spines and bristles in more or less longitudinal series. Those of the 1st and 2nd pairs have, in addition, a series of 4 very stout long outstanding spines down each edge of the underside. The metatarsi of the 1st and 2nd pairs have a series of 5 stout long outstanding spines down each edge of the underside; those of the 3rd and 4th pairs have a bunch of curved spines at the distal end. The tarsi are clothed with numerous bristly hairs. Those of the 1st, 2nd and 3rd pairs have also a series of 5 spines along each edge of the underside, the spines on the 3rd pair being much finer than those on the 1st and 2nd; on the 4th pair these series are represented by 3 pairs of slender spines on the apical half of the under surface. The tarsal claws (Fig. 5) are 3 in number, long and powerful; the superior pair are about twice the size of the inferior claw and are armed with 2 to 4 sharp teeth of which those nearest the base are the smallest, the others increasing in size successively; the spacing and relative size of these teeth varies slightly, in some cases, on the two superior claws of the same leg. The inferior claw has 2 or 3 minute teeth on the basal half.

Palpi: extremely leg-like in appearance and similarly furnished with black bristles. The coxae are also provided with a thick fringe of long reddish curved hairs along the inner margin. The femora are bowed so that when out-stretched their distal ends are immediately in front of the mandibles. They have a long dark spine near the base, and another near the apex; and also a series of about 9 long black spines along each margin of the under side. The patellae are furnished with a long spine on the upper side near the base and another near the apex, as well as several long curved spines on the inner surface. The tibiae are armed with 9 long, stout, out-standing, dark spines in 3 longitudinal series of 3; one row down each edge of the under surface, and the third series down the inner surface. The tarsi are thickly clad with longish bristles, and have a row of 7 stout out-standing spines along each edge of the lower side. The claw is slightly curved, and has near the base, 3 small contiguous teeth.

Abdomen: oval, about $\frac{7}{8}$ as wide as long. It is divided into 9 transverse dorsal terga from the base to the rear end; of these the 3rd and 4th are the largest, and the 9th, much the smallest, is a little distance above the anal tubercle. Each of these terga has 4 black bristles directed backwards along its posterior margin, the median pair longer than the lateral; these are easily broken off. There are also short, down-lying, bristly hairs irregularly scattered on each.

The inferior lateral spinnerets consist of two joints, the basal one being stout, semicircular in outline, and plentifully furnished with long, dark, out-standing, bristly hairs; the second joint, $1\frac{1}{2}$ times as long as the basal, is bluntly conical, incurved, and is divided into 10 to 12 false articulations by chitinous rings each of which is fringed along the distal margin with long, coarse hairs in addition to a number of shorter ones scattered over the surface. The inner margin of the distal joint, from the basal to the apical annulation, has a thick fringe of long, reddish, curved hairs. They are separated at their bases by a distance not quite equal to half the diameter of their basal segments. The superior laterals are contiguous and likewise two-jointed, the basal segments nearly parallel (slightly broader at the apex than at the base), about equal in length to the 1st joint of the inferior laterals, and of a diameter at the apex of nearly $\frac{1}{2}$ their length; they are clothed with long, coarse, scattered hairs. The 2nd joint is conical, about three times as long as its diameter at the base and bluntly rounded at the apex where it tapers to about $\frac{1}{3}$ the width of its base; it is divided by 12 chitinous rings into false articulations, and there is an incomplete annulation between the 1st and 2nd of these; each of these rings is fringed along the distal margin with long coarse hair; there is also a single, slightly curved bristle near the apex of the joint on the under side. The 4 median spinnerets are about equal in size, and are one-jointed. They are arranged in pairs, the members of each pair being close together, the inferior pair lies between the inferior laterals, with

the superiors a little behind them. They are cylindrical in form, about $\frac{1}{4}$ as broad as long, with their distal ends blunt. They are clad with long, coarse, dark, scattered hairs. The spinnerets, which are alike in both sexes, are shown in Fig. 3.

The anal tubercle, not quite at the end of the ventral surface, is conical and clothed with scattered, longish, coarse hairs.

MALE:

Colour: the single specimen obtained is coloured thus:—Cephalothorax and mandibles, dull greenish-brown; fangs, red-brown; lip, pale dull yellow-brown; coxae of palpi, reddish; sternum and coxae of legs, pale dull yellow-brown; legs and palpi, the same with distal extremities of all joints brownish; abdomen, upper surface and sides dull greyish-brown, dorsal terga dark dull olive-brown with their posterior margins yellowish, ventral surface pale dull yellow-brown, the opercula of the stigmata being warm yellow with the edges of the epigastric fold pinkish, and the anal tubercle yellow. The sides and under surface of the abdomen are clad with long, slender, black bristles.

Cephalothorax: similar to that of the female except that the median row of bristles behind the ocular tubercle appears to be lacking.

Mandibles: similar in form to those of the female but not quite so large in proportion.

Legs: considerably longer than those of the female and the coxae somewhat stouter. The femora, patellae and metatarsi are armed in a manner similar to the corresponding joints of the female, but the bristles and spines are distinctly more slender. The tibiae lack the long outstanding spines which are found on those of the 1st and 2nd pairs in the female. The tarsi are furnished with numerous bristly hairs and have also a series of very fine spines along each edge of the under-side; the series on the 1st, 2nd, and 3rd pairs each consisting of 5, and those on the 4th of 6 spines. There is a light scopula of very fine pale hair on the distal half of all the tarsi.

Palpi: furnished on the upper surfaces of femora, patellae and tibiae with black bristles in longitudinal rows. The coxae, femora and patellae are similar to those of the female. The tibiae are slightly dilated basally and have a blunt apophysis on the outer side at the distal end with 4 long, stout, forwardly-pointing spines (Fig. 9).

The distal joint is clad with long spinous bristles and has on the outer side of the base a circular cushion covered with a number of short, stout, pointed spines; from this the palpal organ projects in a stout, blunt point alongside a crutch-shaped projection of the bulb. The exact forms and relative positions of the various parts are shown in Figs. 6 and 9.

Abdomen: longer in proportion to its width than that of the female, being $\frac{2}{3}$ as wide as long.

Measurements (mm.):—

FEMALE.

					Length.	Breadth.
Cephalothorax	..	..	..	..	5.5	4.9
Abdomen	..	..	..	..	5.4	4.9
Falx	..	..	..	..	3.0	—

Lengths of		Coxae	Tr: & Fem:	Pat: & Tib:	Metat:&Tar:	Total.
Legs	I	2.75	4.8	5.1	3.9	16.55
	II	2.5	5.0	5.1	4.5	17.1
	III	2.5	5.0	5.1	5.0	17.6
	IV	2.2	6.2	6.8	8.1	23.3
Palpi		2.0	4.3	4.7	2.9	13.9

MALE.

					Length.	Breadth.
Cephalothorax	..	..	..	..	5.4	5.1
Abdomen	..	..	..	..	5.0	3.8
Felx	..	..	..	..	2.1	—

Lengths of		Coxae	Tr: & Fem:	Pat: & Tib:	Metat:&Tar:	Total.
Legs	I	2.4	5.8	6.6	6.8	21.6
	II	2.7	6.3	7.0	7.6	23.6
	III	2.7	6.3	7.3	9.3	25.6
	IV	2.9	7.9	8.9	13.0	32.7
Palpi		1.9	3.8	5.8	1.9	13.4

Nest: consists of a sac-shaped tube, 35 to 40 mm. in length, forming a retreat below which is a cavity in which the egg-sacs are deposited, curtained off from the retreat and from each other by a fine sheet web. A trap door of simple wafer type closes the tube and appears to be fastened down by the spider when the latter is within (see below p. 20). The nest is built, with its entrance upwards, upon the more or less vertical side-walls of the cave and is anchored in position by a number, generally about six,

of long lines of twisted silk which are attached to the lower lip of the opening of the retreat at approximately equal intervals, their distal ends being fixed to the cave-wall. The entire structure, including the anchoring lines, is thickly covered with particles of sand, etc., giving it a very close resemblance to an excrescence of rock on the cave-wall (Fig. 2). The eggs are ivory-white in colour, about 1 mm. in diameter, and are deposited in the chambers of the nest as a spherical egg-mass about 6 mm. in diameter. The young, when sufficiently grown, apparently escape from the egg-chamber by burrowing through its walls. The retreat of the male is exactly similar to that of the female except that it lacks the egg-chambers.

Habits: When captured all the specimens were within their retreats with the legs and palpi doubled up and closely pressed to the body; the lid of the nest was in each case not quite closed, thus seeming to indicate that the spiders had retired there in alarm on the approach of our lights. On approaching the finger towards the opening of the nest, the lid was at once snapped down and held tightly closed; which seems to show that the spider itself holds the trap-door shut whenever it has been driven, by the proximity of danger, to take refuge within its retreat.

From remains found in some of the nests and the fact that they occur plentifully in the same part of the cave, it appears to be extremely probable that the principal food of the spider is the grasshopper *Paradiestrammena gravelyi* Chop., which it would obtain by hunting along the cave-walls, and which it apparently takes to its nest to devour. An interesting find in one of the nests was the larval form of an earwig (probably *Chelisoches morio* (Fabr.)); these earwigs normally remain much nearer the mouth of the cave, separated from the chamber where the *Liphistius* are found by a flooded portion of the cave floor, so that probably the specimen found in the spider's nest was one which had been accidentally transported to that part of the cave.

The foregoing notes upon the structure of the nests, and the habits of the spider are written from observations made of the specimens obtained in Batu Caves and so may not apply to the single specimen collected in Pahang, of which we have no information on these points.

Locality: The dark cave, Batu Caves, Selangor, 300 feet above sea-level; December 1921 and January 1922. The specimens were all obtained in a side-chamber some distance from the entrance of the cave; their nests were not uncommon in this situation.

One specimen, a female, was collected by Capt. H. M. Pendlebury between Kuala Teku and Wray's Camp (Gunong Tahan), Pahang; virgin jungle, 500'-3,500'; November 1921. The exact locality is not recorded more nearly than this.

Note on Colour: Three of the females exhibited rather striking differences in colour from that generally prevailing. Of these a small one collected in Batu Caves has the cephalothorax of a dull reddish-purple and the abdomen dark bluish-purple, with the dorsal terga black; whilst the legs are pinkish-purple with the metatarsi and tarsi yellowish.

Another, from the same place, and of about the same size as the female of which the measurements are given above, has the cephalothorax dark greyish-green, the abdomen dull pinkish-brown, and the dorsal terga dark grey-green with lateral and posterior margins yellowish.

The specimen collected in Pahang has the cephalothorax dark warm grey-brown, the abdomen pale cold grey, the dorsal terga very dark grey (practically black), and the legs dull olive-brown with very faint brown markings.

Specimens examined: 11 adult females; 1 adult male; 4 immature. I have sent the Types to the British Museum, and copies of the female to Mr. H. R. Hogg; to Raffles Museum, Singapore; and to the F. M. S. Museum, Kuala Lumpur.

To Mr. Hogg I must express my gratitude for kindly advising me in the preparation of this paper, for checking my description and comparing the specimens with other *Liphistius* species including Types in the British Museum. A worker in the East is necessarily at a disadvantage; the ready assistance of a specialist at home is therefore doubly appreciated.

PLATE I.

Liphistius batuensis, sp. nov.

- Fig. 1. Male $\times 1\frac{1}{2}$ (about).
 " 2. Nest $\times \frac{3}{4}$ (about); the anchoring lines have been cut off short in the figure.
 3. Spinnerets.
 4. Mandible of ♀ from inside.
 5. a. Superior tarsal claw of 1st pair.
 b. Inferior " " "
 c. Superior tarsal claw of 3rd pair.
 d. Inferior " " "
 e. Inner superior tarsal claw of 4th pair.
 f. Inferior tarsal claw of 4th pair.
 6. Palp of ♂,—palpal organ, tarsus, and apex of tibia from outer side.
 7. Eyes.
 8. Profile of abdomen $\times 4$ (about).
 9. Palp of ♂ as in Fig 6, but seen from above.

New or Noteworthy Bornean Plants.

PART III.

BY ELMER D. MERRILL

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[Concluded from Journal No. 86, page 342]

ERICACEAE.

Vaccinium Loureiro.

Vaccinium moultonii sp. nov.

Frutex vel arbor parva, racemis leviter pubescentibus exceptis glaber; ramulis 2 mm. diametro; foliis breviter petiolatis, ovatis vel oblongo-ovatis, subcoriaceis, 10—15 cm. longis, integris, perspicue caudato-acuminatis, basi rotundatis vel acutis, nervis utrinque 3 vel 4, curvato-adscedentibus; racemis solitariis vel binis, axillaribus, 3—4 cm. longis, paucifloris; floribus ellipsoideis, 5 mm. longis, bracteis bracteolisque parvis, lanceolatis, 1—2 mm. longis; calyce pubescente, lobis ovato-lanceolatis, acuminatis, 1.8 mm. longis; corolla ellipsoidea, lobis brevibus; filamentis pubescentibus, antheris 1.5 mm. longis.

A shrub or small tree entirely glabrous except the sparingly pubescent racemes; ultimate branches terete, about 2 mm. in diameter, brown, smooth or with few conspicuous, scattered lenticels. Leaves ovate to somewhat oblong-ovate, subcoriaceous, olivaceous, 10 to 15 cm. long, 4 to 6.5 cm. wide, entire, the base rounded to acute, the apex very conspicuously caudate-acuminate; lateral nerves, including the basal pair, 3 or 4 on each side of the midrib, curved-ascending, rather obscurely anastomosing, the reticulations distinct on both surfaces; petioles 2 to 3 mm. long. Racemes solitary or in pairs, axillary, slender, 3 to 4 cm. long, few-flowered, sparingly pubescent, the pedicels 2 to 3 mm. long, the subtending bracts lanceolate, acuminate, 2 mm. long, slightly pubescent, the bracteoles 2, lanceolate, acuminate, 1 mm. in length. Flowers about 5 mm. long, ellipsoid. Calyx tube subovoid, somewhat pubescent, the lobes ovate-lanceolate, acuminate, 1.8 mm. long. Corolla glabrous, subterete, about 4.5 mm. long, contracted at the throat, the lobes ovate, obtuse, 0.5 mm. long. Stamens 10, equal, the filaments pubescent, 2 mm. long; anthers 1.5 mm. long, the apical tips 0.8 mm. in length, the dorsal spurs slender, 0.6 mm. long. Style 3.5 mm. long, included.

Sarawak, Upper Baram, Gunong Temabo, *Major J. C. Moulton* 6676, November 5, 1920. Altitude about 1200 m. A species well characterized by its ovate, conspicuously caudate-acuminate leaves, the acumen attaining a length of 3 cm. as well as by its

solitary or paired, few-flowered racemes, and by its scattered lateral nerves, the uppermost nerves frequently leaving the midrib near the middle of the leaf. It is probably as closely allied to *Vaccinium bigibbum* J. J. Sm. as any other described form, differing among other characters in its flowers being more than twice as large as in Smith's species.

MYRSINACEAE.

Ardisia Swartz.

Ardisia sublepidota sp. nov. § *Acrardisia*.

Frutex erectus, ramulis inflorescentiisque junioribus adpresse furfuraceo-lepidotis exceptis glaber; foliis chartaceis, oblongis, 20—35 cm. longis, acutis vel obtusis, basi acutis vel subrotundatis, subolivaceis, nitidis, utrinque perspicue sed pauce elevato-punctatis, nervis utrinque circiter 25, perspicuis; petiolo 1—1.5 cm. longo, distincte alato; inflorescentiis terminalibus, pedunculatis, tripinnatim paniculatis, 20—30 cm. longis, ramis primariis paucis, usque ad 15 cm. longis, floribus umbellatim dispositis; floribus breviter pedicellatis, 5-meris; sepalis elliptico-oblongis, obtusis, 2.5 mm. longis, perspicue glandulosis, margine minutissime ciliatis, patulis; petalis ovatis, subacutis, 5 mm. longis, eglandulosis; ovario glabro; stylis 4 mm. longis, glanduloso-punctatis, connectivo eglanduloso.

An erect shrub about 3 m. high, the young branchlets and inflorescences minutely appressed-furfuraceous-lepidote, in age entirely glabrous, the ultimate branchlets about 3 mm. in diameter. Leaves alternate, chartaceous, oblong, subolivaceous, shining, 20 to 35 cm. long, 7 to 10 cm. wide, acute or obtuse, the base acute to somewhat rounded, both surfaces with conspicuous, widely scattered, somewhat elevated glands; lateral nerves about 25 on each side of the midrib, spreading, prominent on the lower surface, curved and obscurely anastomosing close to the margin, the reticulations lax, not prominent; petioles 1 to 1.5 cm. long, distinctly undulate-winged. Panicles terminal, peduncled, 20 to 30 cm. long, the primary branches few, up to 15 cm. long, the flowers umbellately disposed on the ultimate branchlets, 5 to 12 in an umbel, the subtending bracteoles oblong, 2 mm. long, with few large glands, deciduous, the pedicels in flower about 6 mm. long, in fruit about 1 cm. long, sparingly glandular. Sepals 5, elliptic-oblong, obtuse, 2.5 mm. long, conspicuously glandular, the margins minutely ciliate. Petals pink, ovate, subacute, about 5 mm. long, eglandular. Anthers 4 mm. long, subsessile, the connectives eglandular. Ovary ovoid, eglandular, glabrous; style glandular-punctate, 4 mm. long, not exerted in bud. Mature fruits red when fresh, reddish-brown when dry, ovoid, 5 to 6 mm. long, eglandular, minutely and broadly apiculate.

British North Borneo, Sibuguey, near Sandakan, *Ramos 1645* (type); Labuk District, *Domingo 1109*, the former number with flowers in November, the latter with mature fruits in April. On

forested slopes at low altitudes. A species manifestly in the alliance with *Ardisia polyactis* Mez, but readily distinguished, among numerous other characters, by its much larger leaves, its distinctly winged petioles, and its distant nerves.

***Ardisia diversilimba* sp. nov. § *Acrardisia*.**

Frutex vel arbor parva, inflorescentiis leviter pubescentibus exceptis glaber; foliis alternis, coriaceis vel subcoriaceis, sessilibus, integris, ellipticis vel oblongo-obovatis, basi amplexicaulibus, cordatis vel auriculatis, majoribus 11—18 cm. longis, acutis vel breviter acuminatis, nervis utrinque circiter 15, minoribus 1.5—2.5 cm. longis; paniculis terminalibus, 10 cm. longis, bipinnatim paniculatis, ramis primariis paucis, floribus umbellatim dispositis; sepalis circiter 1 mm. longis, margine leviter ciliatis; petalis lanceolatis, imbricatis, 4—4.5 mm. longis, glandulis paucis instructis.

A shrub or tree, glabrous except the sparingly pubescent inflorescences. Leaves alternate, coriaceous or subcoriaceous, very dissimilar in size, the upper ones all amplexicaule, the larger ones elliptic to narrowly oblong-obovate, 11 to 18 cm. long, 5 to 7 cm. wide, acute or shortly acuminate, entire, the base rather deeply cordate and clasping the stem, or the bases of the lower ones slightly auricled, all sessile, the upper surface olivaceous, the lower brownish and with numerous conspicuous glands especially near the margin; lateral nerves about 15 on each side of the midrib, mostly spreading, distinct, anastomosing, the primary reticulations rather lax and distinct on both surfaces: smaller leaves ovate to oblong-ovate, 1.5 to 2.5 cm. long, amplexicaul. Panicles terminal, rather few-flowered, about 10 cm. long, the primary branches few, spreading, the flowers umbellately disposed at the tips of the secondary branches, their pedicels about 8 mm. long. Sepals about 1 mm. long, oblong-elliptic, obtuse, spreading, not at all imbricate, each with 1 or 2 glands or frequently eglandular, their margins slightly ciliate. Petals lanceolate, acuminate, imbricate, 4 to 4.5 mm. long, with few conspicuous glands. Anthers lanceolate, acuminate, 3 mm. long, their connectives glandular. Ovary glabrous, glandular-punctate; style 3 mm. long.

Sarawak, Upper Baram, Gunong Temabo, Major J. C. Moulton 6750, November 2, 1920. Altitude about 2100 m. A very distinct species belonging in the group with *Ardisia caudifera* Mez and *A. amplexicaulis* Bedd., strongly differentiated by its very diverse leaves which are all sessile, the upper ones being very prominently cordate at their bases and amplexicaul.

Rapanea Aublet.

***Rapanea multibracteata* sp. nov.**

Frutex glaber, circiter 2 m. altus, ramis incrassatis, ramulis 2.5—3 mm. diametro; foliis coriaceis, oblongo-obovatis, symmetricis, 4—7 cm. longis, apice rotundatis retusisque, basi cuneatis,

utrinque punctatis, nervis tenuibus subobsoletis; inflorescentiis ♂ numerosis, axillaribus et in axillis defoliatis, solitariis, incrassatis, oblongo-obovoideis, 5—7 mm. longis, 3—4 mm. diametro, bracteis numerosis orbiculari-ovatis rotundatis subcoriaceis margine ciliatis imbricatis; floribus ♂ brevissime pedicellatis, 5-meris; sepalis oblongo-ovatis, acutis, 1 mm. longis, haud ciliatis, glandulis paucis instructis; petalis elliptico-ovatis, oblongo-ovatis, 1.5 mm. longis, glandulis paucis perspicuis instructis.

An entirely glabrous shrub about 2 m. high, the branches and branchlets thickened, rather smooth, reddish-brown, the ultimate branchlets 2.5 to 3 mm. in diameter. Leaves coriaceous, oblong-obovate, symmetrical, 4 to 7 cm. long, 1.5 to 2.5 cm. wide, the upper surface subolivaceous, shining, the lower surface paler, both surfaces rather conspicuously punctate-glandular, the apex rather broadly rounded and retuse, base cuneate; lateral nerves slender, very obscure or obsolete, the midrib impressed on the upper surface, prominent on the lower surface; petioles 5 to 7 mm. long. Staminate inflorescences axillary and in the axils of fallen leaves, solitary, many-flowered, 5 to 7 mm. long, 3 to 4 mm. in diameter, oblong-obovoid, supplied with very numerous, persistent, orbicular-ovate, rounded, subcoriaceous bracts about 1.5 mm. in diameter, the bracts brown when dry, their margins ciliate. Staminate flowers numerous, 5-merous, white, entirely glabrous, their pedicels 1 mm. long or less, the flowers slightly projecting beyond the bracts. Sepals membranaceous, oblong-ovate, acute, 1 mm. long, with few scattered glands or sometimes eglandular. Petals elliptic-ovate, obtuse, membranaceous, somewhat spreading, 1.5 mm. long, with few but conspicuous glands. Anthers 0.7 mm. long, somewhat glandular toward their apices.

British North Borneo, Sandakan, *Ramos 1345*, October, 1920. Along the inner border of mangrove swamps. A species belonging in the group with *Rapanea densiflora* Mez and *R. crassifolia* Mez of New Guinea and Norfolk Island, but differing from both of these in very numerous details.

EBENACEAE.

Diospyros Linnaeus.

Diospyros juppilii sp. nov. § *Embryopteris*.

Arbor glabra, ramulis teretibus, 3—4 mm. diametro; foliis oblongis, alternis, subcoriaceis, nitidis, circiter 26 cm. longis, 7—8 cm. latis, basi rotundatis, apice breviter acuminatis, nervis utrinque circiter 15, cum reticulis utrinque distinctis; inflorescentiis caulinis, fasciculatis, floribus pedicellatis, 5-meris, glabris vel subglabris; calyci cupulato, lobis coriaceis, reniformibus, erectis, rotundatis, 3—3.5 mm. latis; corollae tubo 8—10 mm. longo, crasso, sursum angustato, lobis patulis vel recurvatis, reniformibus, 6 mm. latis; staminoideis circiter 15, linearibus, 1-seriatis, glabris, 5—6 mm.

longis; ovario glabro, elongato, circiter 12-locellato; fructibus oblongis vel oblongo-ovoideis, circiter 10 cm. longis, glabris, nitidis, seminibus compressis, 3 cm. longis, albumine aequabile.

A nearly glabrous tree, the branchlets terete, somewhat brownish when dry, slightly rugose, 3 to 4 mm. in diameter. Leaves subcoriaceous, oblong, alternate, shining, about 26 cm. long, 7 to 8 cm. wide, the base rounded, the apex shortly acuminate, the upper surface grayish-olivaceous when dry, the lower surface somewhat brownish; lateral nerves about 15 on each side of the midrib, slender but rather distinct on both surfaces as are the reticulations; petioles rather stout, about 1 cm. long. Flowers in small fascicles on the trunk, their pedicels somewhat pubescent, up to 8 mm. long, each subtended by 1 or 2 bracts which are broadly ovate and about 1.2 mm. long. Flowers 5-merous, the pistillate ones nearly glabrous. Calyx somewhat cup-shaped, 5 to 6 mm. long, the lobes erect, reniform, coriaceous, 2 to 2.5 mm. long, 3 to 3.5 mm. wide. Corolla tube stout, about 8 mm. long, narrowed upward and 4 mm. in diameter at the throat, the lobes reniform, spreading or recurved, coriaceous, about 6 mm. wide, 4 mm. long. Staminodes about 15, 1-seriate, united below and with the staminal tube, linear, glabrous, 5 to 6 mm. long. Ovary glabrous, elongated, narrowed upward, about 12-celled, the stigmas oblong, about 4 or 5, about 1 mm. in length. Fruits fleshy, oblong or oblong-ovoid, smooth, shining and brownish when dry, about 10 cm. long, 5.5 cm. in diameter, the pulp acid, edible. Seeds compressed, 3 cm. long, 1.4 cm. wide, the albumen smooth.

British North Borneo, Bettotan River Valley, Jupp 727, September, 1919. Mr. W. O. Jupp who collected this species states that during a period of some twenty years that he has resided in British North Borneo, many of which were spent in the country outside of Sandakan, he had seen only three specimens of this tree. His attention was attracted to it by the fact that the large conspicuous fruits are borne on the trunks and further that the acid fruits are used by the natives as a relish with fish. In vegetative characters this species closely approximates the Philippine *Diospyros copelandii* Merr. and is manifestly allied to it, differing in numerous details in floral structure.

OLEACEAE.

Jasminum Linnaeus.

Jasminum crassifolium Blume Bijdr. (1825) 679.

British North Borneo, Sebuga and Batu Lima, near Sandakan, Ramos 1432, 1787, 1843. In forests at low altitudes. Luzon, Palawan, Java.

LOGANIACEAE.

Strychnos Linnaeus.

Strychnos ignatii Berg, Mat. Med. 1 (1878) 146; A. W. Hill, in Kew Bull. (1911) 290, plate.

British North Borneo, Batu Lima near Sandakan, *Ramos* 1295, in fruit, October, 1920. In damp forests at low altitudes. Previously known only from the Philippines, where it occurs in Samar, Leyte, and Mindanao.

APOCYNACEAE.

Epigynum Wight.*Epigynum borneense* sp. nov.

Frutex scandens, ramulis junioribus inflorescentisque exceptis glaber, ramis rubro-brunneis, glabris, ramulis leviter adpresse hirsutis; foliis membranaceis, oblongis, 6—10 cm. longis, nitidis, glaberrimis, breviter acute acuminatis, basi obtusis; cymis brevibus, paucifloris, ferrugineo-pubescentibus, bracteolis lanceolatis, circiter 2 mm. longis; corollae tubo 3 cm. longo, extus pubescente, intus villosa, lobis patulis, 1.4 cm. longis; folliculis 25—35 cm. longis, cylindraceis, 5 mm. diametro, acuminatis, obscurissime torulosis, leviter adpresse hirsutis, glabrescentibus.

A scandent shrub nearly glabrous except the very young branchlets and the inflorescences. Branches terete, slender, glabrous, reddish-brown, the ultimate branchlets about 2 mm. in diameter, sparingly appressed-hirsute, the indumentum ferruginous. Leaves opposite, membranaceous, entirely glabrous, pale-olivaceous, somewhat shining, oblong, 6 to 10 cm. long, 2 to 3.5 cm. wide, the apex shortly acute-acuminate, base usually obtuse; lateral nerves about 10 on each side of the midrib, slender, rather distinct, curved and arched-anastomosing near the margin, the reticulations lax, not prominent, with no intermediate secondary nerves from the midrib; petioles 5 to 8 mm. long, sparingly hirsute when young, ultimately glabrous. Cymes terminal and in the uppermost axils, sessile or shortly peduncled, few-flowered, rather densely fulvous-pubescent, often subtended by a few linear-lanceolate, foliaceous bracts 1 to 1.5 cm. long, the bracteoles lanceolate, about 2 mm. long. Flowers white, 5 to 10 in each cyme, their pedicels about 5 mm. long. Calyx lobes lanceolate, acuminate, pubescent, 2 to 3 mm. long, eglandular. Corolla tube about 3 cm. long, cylindric, pubescent, slightly inflated in the lower quarter opposite the insertion of the anthers, inside conspicuously villous, the lobes inequilateral, about 14 mm. long, 6 to 7 mm. wide, twisted to the left, crenulate on the upper margin, glabrous except the dorsal parts that are exposed in bud. Stamens inserted near the base of the tube, the filaments glabrous, 1 to 2 mm. long; anthers narrowly lanceolate, acuminate, 5 mm. long, the basal spurs 2 mm. in length.

Disk somewhat fleshy, glabrous, cylindric, crenately 5-lobed, nearly 1 mm. high. Carpels sparingly pubescent, about 1 mm. long. Follicles cylindric, slightly torulose, 25 to 35 cm. long, about 5 mm. in diameter, sparingly pubescent, ultimately glabrous or nearly so, longitudinally striate, the apex narrow, distinctly acuminate. Seeds numerous, 1.3 to 1.5 cm. long, narrowed below, the apex obliquely truncate, the coma silky, 2 to 2.5 cm. in length.

British North Borneo, Sandakan, *Ramos 1117*, September, 1920. In thickets and forests at low altitudes. This seems to be most closely allied to *Epigynum forbesii* King and Gamble of Sumatra, which is possibly represented by *Haviland 3048* from Sarawak. Among other characters the present species differs in its sparingly hirsute, not puberulent branchlets, longer flowers, and smaller, thinner leaves. *Epigynum beccarii* K. Schum. in Engl. and Prantl, Nat. Pflanzenfam. 4, part 2 (1895) 178 is merely a *nomen nudum*, based on a Bornean specimen collected by Beccari.

Willughbeia Roxburgh.

Willughbeia (Urnularia) borneensis sp. nov.

Frutex scandens ramulis inflorescentisque dense puberulis exceptis glaber; foliis chartaceis, oblongis vel oblongo-ellipticis, 11—14 cm. longis, nitidissimis, tenuiter acuminatis, basi acutis vel subrotundatis, nervis utrinque 8—10, subtus perspicuis, reticulis obsolete; cymis axillaribus, longe-pedunculatis, paucifloris, 6—10 cm. longis, partibus junioribus dense olivaceo-puberulis; floribus 4-meris, corollae tubo glabro, 9 mm. longo, lobis obovatis, 2 mm. longis, patulis vel reflexis, margine revolutis; fructibus junioribus ovoideis, acutis, 2.5 cm. longis.

A scandent shrub, glabrous except the densely puberulent branchlets and inflorescences. Branches terete, somewhat rugose when dry and glabrous, rather densely and conspicuously lenticillate, the branchlets minutely and densely puberulent, the indumentum dark-brown. Leaves chartaceous, oblong to oblong-elliptic, 11 to 14 cm. long, 4 to 5.5 cm. wide, slenderly acuminate, the acumen 1 to 1.5 cm. long, blunt, the base acute to somewhat rounded, the upper surface brownish-olivaceous, smooth, strongly shining, the lower surface pale and with rather numerous, widely scattered, small glands; lateral nerves 8 to 10 on each side of the midrib, distant, straight, anastomosing directly with the arched and equally distinct marginal veins, the reticulations obsolete; petioles about 2 cm. long, when young puberulent, ultimately glabrous or nearly so. Cymes axillary, solitary, long-peduncled, few-flowered, 6 to 10 cm. long, the younger parts densely olivaceous-puberulent, the primary branches few, spreading, the lower ones up to 4 cm. long, the bracts and bracteoles coriaceous, ovate, acute or obtuse, the pedicels densely puberulent, 5 to 6 mm. long. Flowers yellow, 4-merous. Sepals oblong-ovate, obtuse, 2 mm. long, their basal portions and margins slightly pubescent. Corolla tube cylindric, glabrous, 9 mm. long, 1.5 mm. in diameter, the throat not appendaged,

the lobes orbicular-obovate, rounded, slightly pubescent, 2 mm. long, recurved, their margins revolute. Stamens inserted slightly above the middle of the tube, the filaments 1.5 mm. long; anthers lanceolate, 2.5 mm. long, obtuse. Disk 0. Ovary ovoid, glabrous, 1-celled; style 3 mm. long, the stigma 1 mm. in length, narrowed from a slightly thickened base. Immature fruits ovoid, acute, 2.5 cm. long, glabrous, dark-brown and wrinkled when dry.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1442. In damp forests at low altitudes. Among other characters this species is distinguished by its 4-merous flowers. It clearly belongs in the group for which Stapf proposed the generic name *Urularia*, but which he later found to be not distinct from *Willughbeia*; see King and Gamble in Journ. Asiatic Soc. Bengal 47, part 2, (1907) 398, in note following *Willughbeia flavescens* Dyer. The species of *Urularia* proposed by Stapf will have to be transferred to *Willughbeia*, *U. beccariana* Stapf becoming *W. beccariana* O. Ktze., the other two considered below:

***Willughbeia ovatifolia* (Stapf) comb. nov.**

Urularia ovatifolia Stapf in Hook. Ic. IV 8 (1901) sub-t. 2711; Merr. Bibl. Enum. Born. Pl. (1921) 497.

***Willughbeia stapfii* nom. nov.**

Urularia oblongifolia Stapf, l. c.; Merr. l. c., non *Willughbeia oblongifolia* O. Ktze.

CONVOLVULACEAE.

***Erycibe* Roxburgh.**

Erycibe angulata Prain in Journ. As. Soc. Bengal 63, part 3, (1894) 84, 74, part 2, (1905) 291.

Erycibe paniculata Miq. Fl. Ind. Bat. Suppl. (1861) 248, non Roxb.

British North Borneo, Bettotan River, *Agama* 705, May, 1919. In forests at low altitudes. Malay Peninsula and Sumatra, with a closely allied form, *E. macrophylla* Hall. f., in Java.

BORAGINACEAE.

***Tournefortia* Linnaeus.**

Tournefortia tetrandra Blume Bijdr. (1826) 845.

Tetrandra zollingeri Miq. Fl. Ind. Bot. 2 (1859) 928.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1322. In thickets on slopes at low altitudes. After examining Javan, Sumatran, and Malay Peninsula material and the descriptions I fail to see how *Tournefortia wallichii* DC. (*Tetranthera*

wallichii Miq.) can be distinguished from Blume's species. Malay Peninsula, Sumatra, and Java, with a variety in the Moluccas fide Blume.

VERBENACEAE.

Petraeovitex Oliver.

Petraeovitex membranacea sp. nov.

Frutex scandens, inflorescentiis parce puberulis exceptis glaber, ramis teretibus vel obscure angulatis; foliis 3-foliolatis, foliolis oblongo-ovatis vel elliptico-ovatis, integris, 6—7 mm. longis, membranaceis, breviter acuminatis, basi rotundatis, rariter subacutis, nervis utrinque 4 vel 5; paniculis axillaribus, pedunculatis, 11—25 cm. longis, cymis laxissimis, paucifloris, bracteis inferioribus plerumque lanceolatis, circiter 1 cm. longis; floribus 7—8 mm. longis, tenuiter pedicellatis, calycis tubo cuneato, 3 mm. longo, glabro, lobis obscure puberulis; fructibus striatis, glabris, lobis accrescentibus, 1 cm. longis, 2 mm. latis.

A slender glabrous vine, or the inflorescences obscurely puberulent. Branches pale, terete or obscurely 4-angled, 2 to 4 mm. in diameter. Leaves opposite, 3-foliolate, their petioles 5 to 6 cm. long; leaflets membranaceous, oblong-ovate to elliptic-ovate, entire, 6 to 11 cm. long, 3 to 6 cm. wide, pale-olivaceous, somewhat shining, the base rounded, rarely subacute, the apex shortly acuminate; lateral nerves 4 or 5 on each side of the midrib, distinct as are the primary reticulations; petiolules of the lateral leaflets 5 to 7 mm. long, that of the terminal one 1 to 1.8 cm. in length. Inflorescences axillary, peduncled, paniculate, very lax, 11 to 25 cm. long, glabrous or very obscurely puberulent, the primary branches few, spreading, the lower ones up to 8 cm. long and usually subtended by lanceolate leaf-like bracts about 1 cm. in length; the upper branches without bracts, the bracteoles linear, 1 mm. long or less; cymes very lax, few-flowered, the pedicels of the individual flowers slender, up to 1 cm. in length. Flowers 8 to 9 mm. in diameter, 7 to 8 mm. long. Calyx-tube cuneate, 3 to 3.5 mm. long, glabrous, the lobes 5, oblong, acute, about 3 mm. long, 1 mm. wide, obscurely 3-nerved, very slightly puberulent. Corolla glabrous, white, the tube about 3.5 mm. long, the limb very obscurely 2-lipped, the 5 lobes subequal, ovate to elliptic-ovate, obtuse, about 3.5 mm. long, 2 to 2.5 mm. wide, their margins minutely ciliate. Filaments glabrous; anthers ellipsoid, 1.7 mm. long. Young fruits cuneate, glabrous, longitudinally striate, the accrescent lobes up to 1 cm. in length, about 2 mm. wide, 3-nerved.

British North Borneo, Batu Lima near Sandakan, *Ramos* 1372 (type). 1679, October and November, 1920. In damp forests along small streams and on damp ridges at low altitudes. This species is strongly characterized, among the five hitherto known representatives of this genus, by its very lax, few-flowered cymes and long-pedicelled flowers. It differs from *P. trifoliata* Merr.

(*P. ternata* Hall. f.) of Borneo, Palawan, and Mindanao not only in its very lax cymes and slenderly pedicelled flowers but also in being nearly glabrous, and in its thinner leaves. From *P. bambusetorum* King and Gamble, it differs not only in its inflorescence characters mentioned above, but also in its few-nerved leaflets and in its distinctly ribbed fruits.

Callicarpa Linnaeus.

Callicarpa involucrata sp. nov.

Frutex 3 m. altus, subglaber, partibus junioribus minute puberulis; foliis oppositis, glabris, chartaceis, oblongo-ellipticis, 20—35 cm. longis, basi acutis, apice breviter acuminatis, margine distanter undulato-dentatis, utrinque glandulis paucis disciformibus instructis, nervis utrinque 10—12, perspicuis; inflorescentiis caulinis, fasciculatis vel depauperato-cymosis, densis 2—3.5 cm. diametro, bracteis suborbicularibus vel obovatis 8—9 mm. longis deciduis instructis; floribus 4-meris, 7—9 mm. longis, pedicellatis, calyce brevissime 4-dentato, extus glandulis paucis disciformibus instructo.

A nearly glabrous shrub about 3 m. high, the younger branchlets sometimes minutely puberulent, the inflorescences sparingly pubescent. Branchlets obscurely 4-angled, the ultimate ones about 3 mm. in diameter. Leaves opposite, glabrous, chartaceous, subolivaceous, shining, the lower surface paler than the upper, oblong-elliptic, 20 to 35 cm. long, 8 to 14 cm. wide, subequally narrowed to the acute base and the shortly but sharply acuminate apex, the margins distantly undulate-dentate or quite entire in the lower part of the leaf, both surfaces conspicuously pitted-glandular, the lower surface with few, widely scattered, disk-like, sessile glands, 0.5 mm. in diameter or less, the upper surface with numerous similar, crowded glands at the very base; petioles about 1.5 to 2 cm. long. Inflorescences cauline, the flowers densely crowded, fascicled or depauperate-cymose, the inflorescences, in anthesis, sessile, 2 to 3.5 cm. in diameter, subtended by several suborbicular to obovate, 8 to 9 mm. long, subcoriaceous, deciduous bracts, the bracts rounded, externally supplied with numerous sessile discoid glands. Flowers white, 4-merous, their pedicels slightly pubescent, about 5 mm. long. Calyx 4 mm. long, cup-shaped, obscurely pubescent, the base subacute, the margins with 4 triangular obtuse teeth, about 0.5 mm. long and usually with few distant discoid glands near the rim. Corolla-tube 5 mm. long, glabrous, the lobes orbicular-ovate, rounded or obtuse, subequal, about 3 mm. in diameter. Stamens 4; anthers oblong, 3 mm. long, slightly exerted, obscurely waxy-glandular. Fruits ovoid, glabrous, 5 mm. in diameter, from two thirds to three quarters included in the cup-shaped, membranaceous, glabrous calyx, their pedicels up to 7 mm. long. The infructescences are distinctly and stoutly peduncled, the peduncle attaining a length of 2.5 cm.

British North Borneo, Batu Lima near Sandakan, *Ramos 1395* (type), 1523, 1927. On forested slopes at low altitudes. A remarkable species remote from all hitherto described forms, but somewhat resembling *Callicarpa cauliflora* Merr. It is strongly characterized by its cauline, fascicled or depauperate-cymose, crowded flowers, the uniformly pitted upper and lower surfaces of its leaves, and the peculiar disciform glands widely scattered on the lower surface, crowded on the upper surface at the base of the leaf, and similar ones on the bracts (many) and on the calyces (few). The bracts are deciduous, but form a distinct involucre subtending the younger inflorescences.

Callicarpa erioclona Schauer in DC. Prodr. 11 (1847) 643; H. Lam, Verb. Malay. Archipel. (1919) 76.

British North Borneo, Kudat, *Agama 1049*, on dry slopes at low altitudes. Philippines (Luzon, Mindoro, Leyte, Negros, Mindanao), Java, Celebes, New Guinea, New Britain, and New Ireland.

SOLANACEAE.

Solanum Linnaeus.

Solanum epiphyticum Merr. in Philip. Journ. Sci. 7 (1912) Bot. 350.

British North Borneo, Sandakan, *Ramos 1463*, October, 1921. Epiphytic. This differs from the typical form which occurs throughout the Philippines in its slightly pubescent leaves.

GESNERIACEAE.

Didymocarpus Wallich.

Didymocarpus multinervia sp. nov. § *Kompsoboaea*.

Species *D. kompsoboecae* affinis, differt foliis anguste oblongis, nervis utrinque 35—40, pedunculis paucifloris (haud 1-floris), floribus multo minoribus, circiter 1.7 cm. longis.

Stems woody, simple, erect or ascending, up to 13 cm. high, about 5 mm. in diameter, the upper parts densely rugose with petiolar scars. Leaves crowded, narrowly oblong to oblong-lanceolate, chartaceous, mostly 15 to 25 cm. long, 2.5 to 3.5 cm. wide, acuminate, the base distinctly inequilateral, obtuse to acute, the upper surface dark brownish-olivaceous, smooth or slightly bullate, sparingly ciliate with long rather weak hairs, conspicuously so on the midrib, the lower surface brown, ciliate on the midrib and lateral nerves, the margins conspicuously and rather coarsely crenate-dentate; lateral nerves 35 to 40 on each side of the midrib, spreading, the reticulations lax, indistinct; petioles about 1 cm. long, more or less ciliate. Inflorescences nearly as long as the

leaves, the flowers rather few, cymosely arranged, white, about 1.7 cm. long, the bracts and bracteoles linear, 2.5 to 4 cm. long. Sepals free nearly to the base, narrowly lanceolate, 2 mm. long, slightly pubescent, the corolla about 1.7 cm. long, very slightly pubescent externally, the mouth somewhat oblique, the smaller lip 3-lobed, the larger one 2-lobed. Anthers 2 mm. long, their filaments glabrous, 5.5 mm. long, the staminodes 3 mm. in length, glabrous. Ovary and style very slightly pubescent. Capsules linear, glabrous, about 4 cm. long, 1 mm. in diameter. Peduncles and branches of the inflorescence sparingly ciliate with elongated hairs and pubescent with more numerous and much shorter ones.

British North Borneo, Sandakan, *Ramos 1145* (type), September, 1920, *Mrs. Clemens 9445*, October, 1915. On cliffs and large boulders in forests at low altitudes. A species allied to *Didymocarpus kompsoboena* C. B. Clarke, differing radically in the characters mentioned in the diagnosis. From *D. crenata* Baker, it differs in its evident stems; its much larger, longer and broader leaves; its smaller calyx with narrowly lanceolate, not ovate, lobes; and its distinctly smaller corolla.

Cyrtandra Forster.

Cyrtandra didissandriformis sp. nov. § *Whitia*.

Frutex erectus, haud ramosus, 40—65 cm. altus, pubescens caule 3—5 mm. diametro, dense ferrugineo- vel fulvo-villoso; foliis oppositis, paribus aequalibus, membranaceis, oblongis vel oblongo-ellipticis vel oblongo-oblancoelatis, 12—25 cm. longis, acutis vel subobtusis basi longe angustatis, cuneatis, margine crenato-dentatis, supra olivaceis, subasperis, plus minusve furfuraceo-hispidis, ad costam nervosque perspicue ciliato-villosis, subtus pallidioribus, villosis, nervis utrinque circiter 15 distinctis; floribus plerisque in axillis defoliatis, fasciculatis, 4 cm. longis, tenuiter pedicellatis, bracteolis obscuris vel 0; calyci parvo, profunde lobato; corollae tubo deorsum anguste cylindrico, supra ampliato, extus parvissime pubescente; fructibus cylindricis, usque ad 4.5 cm. longis, 3—4 mm. diametro, longe acuminatis, glabris, rugosis.

An erect, unbranched, ferruginous-pubescent shrub, 40 to 65 cm. high, the stems terete, 3 to 4.5 cm. in diameter, rather densely appressed ferruginous-villous, the internodes 1.5 to 6 cm. long. Leaves opposite, those of each pair equal in size and similar in shape, membranaceous, oblong to oblong-elliptic or oblong-oblancoelate, narrowed upward to the acute or subobtuse apex, and below to the cuneate base, 12 to 15 cm. long, 3.5 to 6.5 cm. wide, the margins crenate-dentate, the midrib and nerves conspicuously ciliate-villous, the upper surface somewhat hispid with short subappressed hairs from thickened bases, the lower surface conspicuously ciliate-villous on the midrib, nerves, and reticulations, brownish; lateral nerves about 15 on each side of the midrib, prominent on the lower surface; petioles 1 cm. long or less, densely ferruginous-

villous. Inflorescences chiefly in the axils of fallen leaves on the lower part of the stem, the flowers solitary, in pairs, or fascicled, white, about 4 cm. long, their pedicels appressed-hirsute, slender, 1 to 2 cm. long, ebracteolate. Calyx hirsute, the lobes linear-lanceolate, acuminate, about 5 mm. long, free nearly or quite to the base. Corolla-tube slightly pubescent, the lower 1.5 to 2 cm. slender, cylindrical, then expanded, the lobes orbicular-ovate, about 6 mm. long. Stamens 2, the anthers ovoid, 1.2 mm. long, connate, the filaments glabrous, ultimately much twisted and contorted; staminodes two, 4 mm. long, glabrous. Ovary and style somewhat pubescent. Fruits cylindrical, elongated, glabrous, up to 4.5 cm. long, 3 to 4 mm. in diameter, slenderly acuminate, somewhat rugose when dry, the seeds minute, subellipsoid, 0.3 mm. in length.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1458 (type), 1263, 1833. October, 1920. In damp forests at low altitudes. A species well characterized by its somewhat hispid leaves, those of each pair being equal in size and similar in shape, but more especially by its slenderly pedicelled, solitary to fascicled flowers which are for the most part confined to the leafless nodes on the lower part of the stem, as well as by its slender, cylindrical, elongated fruits. It seems to be remote from all other known species of the section, but clearly belongs in the section *Whitia*.

***Cyrtandra longicarpa* sp. nov. § *Whitia*.**

Suffruticosa, erecta, haud ramosa, circiter 40 cm. alta; caulibus brevibus, rugosis, circiter 5 mm. diametro, leviter hirsutis; foliis confertis, membranaceis, olivaceis, nitidis, oblongo-obovatis, breviter acuminatis, deorsum angustatis, cuneatis vel decurrentibus, margine serratis, 20—27 cm. longis, utrinque glabris vel subtus ad costam hirsutis, nervis utrinque 12—14, distantibus, reticulis tenuibus, laxis; floribus axillaribus et in axillis defoliatis fasciculatis, tenuiter pedicellatis, circiter 2.5 cm. longis, bracteis submembranaceis ovatis subcaudato-acuminatis 1.8 cm. longis instructis, calycis profunde 5-fidis, lobis lanceolatis, glabris, 5—6 mm. longis; corollae tubo deorsum tenuiter cylindrico, supra ampliato, extus leviter pubescente; fructibus cylindraceutis, elongatis, glabris, tenuiter acuminatis, 5—7 cm. longis, 2—3 mm. diametro.

An erect, unbranched shrub about 40 cm. high, the stems short, about 5 mm. in diameter, rugose when dry, the younger parts more or less hirsute. Leaves crowded at the apices of the stems, apparently alternate, the normal ones membranaceous, olivaceous, shining, oblong-obovate, shortly acuminate, narrowed below to the cuneate or long-decurrent base, the margins more or less serrate, 20 to 27 cm. long, 6 to 10 cm. wide, glabrous on both surfaces or the midrib beneath sparingly hirsute; lateral nerves 12 to 14 on each side of the midrib, prominent on the lower surface, the reticulations lax; petioles 2 to 4 cm. long, somewhat hirsute; intermingled with the normal leaves are found greatly reduced, apparently alternate, usually lanceolate, sessile ones, 1.5 to 3 cm. in

length. Flowers 2.5 cm. long, fascicled, chiefly in the lower axils, their pedicels slender, glabrous or nearly so, up to 2 cm. in length, subtended by submembranaceous, ovate, subcaudate-acuminate, nearly glabrous bracts up to 1.8 cm. in length. Calyces divided nearly or quite to the base, the lobes lanceolate, glabrous, 5 to 6 mm. long. Corolla sparingly pubescent externally, the tube narrow and cylindric for the lower 10 mm. then expanded, the lobes subequal, orbicular-ovate, 6 mm. long. The filaments erect, 8 mm. long; anthers oblong-ovate, 3 mm. long, slightly cohering by the acuminate tips; staminodes 5 mm. long, glabrous. Disk cylindric, truncate, glabrous, 2.5 mm. long. Ovary and style obscurely pubescent, the stigma 2-lobed, the lobes elliptic, 1 mm. in length. Fruits narrow, cylindric, elongated, 5 to 7 cm. long, 2 to 3 mm. in diameter, glabrous, rugose, slenderly acuminate, usually more or less curved.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1359 (type), 1265, October, 1920. In damp forests along small streets at low altitudes. A species strongly characterized by its erect, unbranched habit; its short stems; its crowded, apparently alternate and very dissimilar leaves; as well as by its slenderly pedicelled, fascicled flowers which occur both in the axils of leaves and in the axils of fallen leaves; and furthermore by its slender, elongated, usually curved, glabrous, slenderly acuminate fruits which attain a length of from 5 to 7 cm. Like *C. didissandriiformis*, it strongly resembles certain species of *Didissandra*, but is clearly a *Cyrtandra* and by definition falls in the section *Whitia*. It apparently is not closely allied to any previously described species of this section and differs radically from the species mentioned above in its densely crowded, apparently alternate and dissimilar leaves, which are furthermore glabrous or nearly so.

Cyrtandra simplex sp. nov. § *Campanulaceae*.

Frutex erectus, 40—50 cm. altus, haud ramosus, partibus junioribus dense ferrugineo-villosis; caulibus teretibus, circiter 3 mm. diametro, vetustioribus glabris; foliis in paribus, aequalibus vel subaequalibus, membranaceis, oblongis vel oblongo-ellipticis, 8—14 cm. longis, supra olivaceis, glabris, subtus pallidis, ad costam nervosque plus minusve pubescentibus, apice breviter acuminatis, basi acutis, margine distanter crenatis vel undulato-crenatis, nervis utrinque circiter 6, tenuibus, reticulis laxis obscuris; floribus 5 cm. longis, in axillis inferioribus defoliatis, pedunculis solitariis vel fasciculatis, plerumque bifloris; calyci circiter 1.5 cm. longo, cylindraco, sulcato, persistente, lobis ovato-lanceolatis, acuminatis, 4 mm. longis; corollae tubo extus villosa, deorsum tenuiter cylindraco, sursum ampliata.

An erect, unbranched shrub 40 to 50 cm. high, the younger parts of the stems densely ferruginous-villous. Stems terete, smooth, about 3 mm. in diameter, grayish or brownish, the older parts glabrous or nearly so, the internodes 1.5 to 7 cm. long. Leaves opposite, in equal or subequal pairs, membranaceous, oblong

to oblong-elliptic, 8 to 14 cm. long, 3.5 to 6 cm. wide, the apex rather shortly and stoutly acuminate, the base acute, margins distantly crenate to undulate-crenate, the upper surface glabrous, olivaceous, the lower surface pale and rather conspicuously pubescent on the midrib and lateral nerves; nerves about 6 on each side of the midrib, slender, curved-ascending, the reticulations lax, indistinct; petioles slender, more or less pubescent, 1 to 2.5 cm. long. Inflorescences from the axils of fallen leaves and confined to the basal part of the stems, chiefly 2- or 3-flowered, the peduncles solitary or in pairs, in anthesis about 5 mm. long, the lower ones in fruit up to 2 cm. in length. Flowers white, 5 cm. long, subsessile or shortly pedicelled in flower, the pedicels in fruit attaining a length of 1.5 cm., somewhat pubescent, the bracts subtending the flowers elliptic-ovate to narrowly lanceolate, up to 12 mm. long. Calyx about 1.5 cm. long, cylindrical, somewhat pubescent, more or less angled, equally 5-lobed, the lobes ovate-lanceolate, acuminate, 4 mm. long. Corolla silky-villous outside, the tube in the lower 1.5 to 2 cm. slender, cylindrical, then rather abruptly enlarged, the enlarged portion equalling the slender portion in length. Disk cylindrical, glabrous, crenate 2 mm. long. Ovary and style glabrous, style 2.5 cm. long; stigma 3 mm. wide, 1.5 mm. long, entire. Fruits oblong, glabrous, about 12 mm. in length, included in the persistent but not accrescent calyx.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1234 (type), 1577, October and November, 1920. In damp forests at low altitudes. A species in many respects resembling *Cyrtandra basiflora* C. B. Clarke of the section *Dissimiles*, but at once distinguished, among other characters, by its strictly opposite leaves, those of each pair being equal or subequal in size and similar in shape. It belongs in the subgenus *Macrocyathus*, and on account of its persistent calyces can scarcely be placed in any other defined section of the genus than the *Campanulaceae*. A somewhat similar form is represented by *Ramos* 1676, 1708, from the same locality. Of these only fruiting specimens are known. Among other characters, these specimens differ from the species described above in their thicker, sharply toothed, shortly petioled or subsessile leaves, and much shorter infructescences, the fruits being sessile or subsessile in groups of from 2 to 4 at the apices of the short peduncles, the infructescences being chiefly confined to the base of the erect, short, simple trunks, as in *C. basiflora* C. B. Clarke.

ACANTHACEAE.

Hygrophila R. Brown.

Hygrophila obovata Nees in Wall. Pl. As. Rar. 3 (1832) 81; DC. Prodr. 11 (1857) 91.

British North Borneo, Sandakan, *Ramos* 1215. In damp open places at low altitudes. India to Malaya.

Pseuderanthemum Radlkofer.***Pseuderanthemum album*** (Roxb.) comb. nov.*Justicia alba* Roxb. Fl. Ind. 1 (1820) 117.*Eranthemum album* Nees in DC. Prodr. 11 (1847) 455; C. B. Clarke in Journ. As. Soc. Bengal 74, part 2, (1907) 677 (Mat. Fl. Malay. Penin. 4: 887).British North Borneo, Sapagaya River valley and Batu Lima, near Sandakan, *Wood* 445, apparently typical, *Ramos* 1240 with thicker leaves than the typical form. Chittagong, Pegu, Malay Peninsula, Nicobar Islands, Andaman Islands and Java.*Justicia* Linnaeus.***Justicia henicophylla*** C. B. Clarke in Journ. As. Soc. Bengal 74, part 2, (1907) 685 (Mat. Fl. Malay. Penin. 4: 895).British North Borneo, Batu Lima, near Sandakan, *Ramos* 1243. In forests at low altitudes. Malay Peninsula.*Staurogyne* Wallich.***Staurogyne subglabra*** C. B. Clarke in Journ. As. Soc. Bengal 74, part 2, (1907) 640 (Mat. Fl. Malay. Penin. 4: 850).British North Borneo, Kiau, Mount Kinabalu, and Mount Kalawat, *Mrs. Clemens* 10106, 11149, November and December, 1915. This species was previously known only from the Malay Peninsula, the Bornean specimens agreeing entirely with the original description and with Perak material.***Staurogyne arcuata*** C. B. Clarke l. c.British North Borneo, Batu Lima and Sibuga, near Sandakan, *Ramos* 1358, 1862, October and December, 1920. In damp forests at low altitudes, agreeing with the original description and with Perak material in all essentials. Malay Peninsula.

RUBIACEAE.

Neonauclea Merrill.***Neonauclea longipedunculata*** sp. nov.

Arbor glabra, circiter 8 m. alta, ramulis incrassatis, pallide brunneis; foliis magnis, subcoriaceis, oblongis vel ellipticis, 30—40 cm. longis, 11—20 cm. latis, nitidis, brevissime acuminatis, basi rotundatis, nervis utrinque circiter 15; stipulis oblongis, obtusis, coriaceis, 2 cm. longis, circiter 1 cm. latis; pedunculis ternatis vel solitariis, 10—13 cm. longis, sub apice bibracteatis, capitulis subfructu 3—4 cm. diametro; calyci 5-lobat, loborum partibus deciduis 3—4 mm. longis, lineari-filiformibus haud clavatis, apice nigris; capsulis circiter 1 cm. longis.

A glabrous tree about 8 m. high, the branchlets thickened, pale brownish, the internodes 4 to 12 cm. long, often swollen and inhabited by colonies of ants. Leaves large, 30 to 40 cm. long, 11 to 20 cm. wide, oblong to elliptic, subcoriaceous, the upper surface greenish-olivaceous, shining, the lower somewhat paler, apex shortly and bluntly acuminate, base rounded; lateral nerves about 15 on each side of the midrib, prominent, the reticulations distinct; petioles 2 to 3 cm. long; stipules oblong, obtuse, coriaceous, brown, about 2 cm. long and 1 cm. wide. Heads solitary and ternate, in fruit globose, 3 to 4 cm. in diameter, the peduncles 10 to 13 cm. long, somewhat thickened upward and sharply 4-angled, 2-bracteate near the apex, the bracts deciduous. Capsules very numerous about 1 cm. long, narrowed and globose below, the apical part appressed-pubescent. Calyx-lobes 5, the deciduous parts linear-filiform, black, not clavate, 3 to 4 mm. long, the persistent basal parts thickened, ovate, pale, hard, shining, about 1 mm. long. Seeds numerous, linear, 4 to 5 mm. long, including the wings.

British North Borneo, Batu Lima, near Sandakan, *Agama* 1034, November 2, 1920. On steep, damp forested slopes, altitude about 70 m. A species well characterized by its very large leaves and its unusually long peduncles. It is probably most closely allied to *Neonauclea cyrtopoda* Merr. and *N. peduncularis* Merr.

Hedyotis Linnaeus.

Hedyotis fissistipula sp. nov.

Suffruticosa, erecta, usque ad 60 cm. alta, haud ramosa, caulibus obscure 4-angulatis, sulcatis; foliis oblongo-ovatis vel oblongo-lanceolatis, tenuiter acuminatis, basi acutis, 9—13 cm. longis, supra glabris, laevibus, subtus asperis, ad costam nervosque breviter hirsutis, nervis utrinque circiter 7, perspicuis, ascendentibus; stipulis circiter 10 mm. longis latisque, leviter hirsutis, pectinatis, segmentis numerosis (circiter 35), 3—4 mm. longis; inflorescentiis axillaribus, sessilibus, capitato-glomeratis, circiter 1 cm. diametro, multifloris, bracteis brevis foliaceis sublanceolatis circiter 1.4 cm. longis bracteolisque numerosis minoribus instructis; floribus confertis, 4-meris, 5 mm. longis, calycis segmentis lanceolatis, 2 mm. longis, haud accrescentibus; capsulis subellipsoideis, glabris, 2 mm. longis, 2-locellatis.

An erect, suffrutescent, unbranched shrub up to 60 cm. high, the stems about 4 mm. in diameter, obscurely 4-angled, the younger parts distinctly sulcate, more or less hispid-hirsute. Leaves oblong-ovate to oblong-lanceolate, chartaceous to subcoriaceous, brittle when dry, greenish or greenish-olivaceous, somewhat shining, 9 to 13 cm. long, 3 to 4.5 cm. wide, the upper surface glabrous, nearly smooth or the midrib more or less hispid-hirsute, the lower surface hispid-hirsute on the midrib and lateral nerves, the indumentum short and stiff, the apex slenderly and sharply acuminate, the base acute to somewhat decurrent and rather distinctly 3-nerved; lateral

nerves, including the basal pair, about 7, sharply ascending, slightly curved or nearly straight, anastomosing close to the margin, prominent on the lower surface; petioles 1.5 to 2 cm. long, more or less hispid; stipules about 10 mm. long and wide, somewhat pubescent, pectinate, the segments usually about 35, linear, 3 to 4 mm. long, the ultimate ones narrower and usually gland-tipped. Inflorescences axillary, sessile, capitate-glomerate, about 1 cm. in diameter, many-flowered, subtended by usually 2 foliaceous lanceolate acuminate bracts about 1.4 cm. long and 5 mm. wide, and supplied with numerous shorter bracteoles, the ultimate ones linear, acuminate, 3 to 4 mm. long. Flowers white, crowded, shortly pedicelled, 4-merous. Calyx-lobes lanceolate, acuminate 2 mm. long, slightly pubescent. Corolla-tube 2.5 mm. long, the lobes oblong-ovate 1.2 mm. long; slightly hirsute at their tips. Capsules subellipsoid, 2 mm. long, glabrous, 2-celled, crowned by the non-accrecent calyx-lobes.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1551 (type), 1154, September and November, 1920. In damp forests and along streams in rather dry forests at low altitudes. A species belonging in the group with *Hedyotis macrophylla* Wall., and in general resembling the Philippine *H. scaberrima* Merr., differing from both of these and from other allied forms in its very numerous lacinate stipules.

***Hedyotis platyphylla* sp. nov.**

Suffrutex erectus, ramulis sulcatis et leviter angulatis; foliis chartaceis, oblongis vel oblongo-ovatis, usque ad 20 cm. longis, basi acutis vel decurrento-acuminatis, apice perspicue acuminatis, nervis utrinque 7, subtus valde perspicuis, adscendentibus; stipulis laciniatis, circiter 1 cm. longis; inflorescentiis dense fasciculatis, axillaribus, fasciculis circiter 1 cm. diametro; floribus parvis, circiter 4.5 mm. longis, 4-meris, calycis lobis lanceolatis, acuminatis, 1.5 mm. longis; capsulis ellipsoideis, circiter 2 mm. longis.

An erect, glabrous, suffrutescent plant about 70 cm. high, the branches sulcate and somewhat angled. Leaves chartaceous, oblong to oblong-ovate, 14 to 20 cm. long, 6 to 8 cm. wide, the base acute or decurrent-acuminate, the apex distinctly acuminate, when dry olivaceous slightly shining; lateral nerves about 7 on each side of the midrib, very prominent on the lower surface, ascending; petioles 2 to 3.5 cm. long; stipules about 1 cm. long, divided into 7 to 9, narrow, linear lobes. Flowers white, in dense, axillary, subglobose fascicles about 1 cm. in diameter, the pedicels up to 2 mm. in length. Calyx-tube 1 to 1.2 mm. long, the lobes 4, lanceolate, acuminate, 1.5 mm. long. Corolla 3.5 mm. long, the lobes oblong, obtuse, 1.2 mm. long, the tube villous inside; subtending bracteoles numerous, linear-lanceolate up to 3 mm. in length. Capsules ellipsoid, about 2 mm. long, crowned by the erect calyx teeth.

British North Borneo, Bettotan watershed, *D. D. Wood 692* (type), June 7, 1919, in level forested country, altitude about 20 metres; Batu Lima, near Sandakan, *Ramos 1332, 1678*, October, 1920. A species belonging in the group with *Hedyotis congesta* R. Br. but well characterized by its unusually large leaves.

Urophyllum Wallich

Urophyllum borneense sp. nov.

Frutex circiter 5 m. altus, ramulis et subtus foliis ad costam nervosque adpresse pubescentibus; foliis oblongo-ellipticis vel oblongo-lanceolatis, chartaceis, usque ad 20 cm. longis, utrinque angustatis, apice tenuiter acuminatis, basi acutis, nervis utrinque circiter 15, perspicuis; stipulis lanceolatis, 10—12 mm. longis; fructibus numerosis, fasciculatis, subglobosis, glabris, circiter 4 mm. diametro, pedicellis tenuibus circiter 1 cm. longis.

A shrub about 5 m. high, the branchlets and the lower surface of the leaves on the midrib, nerves, and reticulations appressed-pubescent with short hairs. Branches slender, terete, glabrous, pale brownish, the branchlets somewhat compressed or sulcate. Leaves chartaceous, oblong-elliptic to oblong-lanceolate, 13 to 20 cm. long, 4 to 6 cm. wide, pale when dry, subequally narrowed to the acute base and to the slenderly acuminate apex; lateral nerves about 15 on each side of the midrib, rather prominent as are the primary reticulations; stipules lanceolate, 10 to 12 mm. long; petioles 1.5 to 2 cm. long, slightly pubescent. Fruits numerous, black when dry, fascicled at the nodes, up to 50 at each node, in the uppermost fascicles sometimes as few as 6, dark brown or black when dry, subglobose, about 4 mm. in diameter, glabrous except for the slightly pubescent, short, persistent calyx-teeth; pedicels slender, slightly pubescent, about 1 cm. long.

British North Borneo, Batu Lima, near Sandakan, *Wood 948*, October 14, 1920. In forests at low altitudes. A species strongly characterized by its very numerous, slenderly pedicelled fruits which are crowded at the nodes in fascicles 2.5 to 3 cm. in diameter.

Urophyllum suberosum sp. nov.

Frutex circiter 3 m. altus; ramulis et subtus foliis plus minusve pubescentibus; foliis chartaceis, oblongo-lanceolatis, tenuiter acuminatis, basi acutis vel obtusis, usque ad 35 cm. longis, nervis utrinque 20—25 subtus perspicuis; floribus caulinis, 5- vel 6-meris, fasciculatis, sessilibus, magnis, bracteatis, bracteis ovatis 8—10 mm. longis, ovario 11-loculare; styli ramis patulis, carnosis, 9—11 mm. longis; fructibus turbinatis, circiter 2 cm. diametro.

A shrub about 3 m. high, the trunk about 3 cm. in diameter, covered with a pale-gray, thick, corky, deeply ridged bark, the flowers unusually large for the genus, borne in sessile fascicles on the trunk. Branches and branchlets terete or subterete, these, the

petioles, and the leaves with a dirty-brown pubescence. Leaves oblong-lanceolate, chartaceous, subolivaceous, 27 to 35 cm. long, 7 to 8 cm. wide, slenderly acuminate, base acute to obtuse or even somewhat rounded, the upper surface glabrous except the midrib, the lower surface pubescent; lateral nerves 20 to 25 on each side of the midrib, prominent, curved-anastomosing; petioles pubescent, about 2 cm. long; stipules lanceolate, pubescent, about as long as the petioles. Flowers white, sessile, large, 5- or 6-merous, fascicled on the trunk, the subtending bracts ovate, slightly pubescent externally, densely appressed-villous within, 8 to 10 mm. long, acute. Corolla-tube cylindric, 10 to 12 mm. long, 8 to 10 mm. in diameter, externally appressed-pubescent, inside glabrous except at the densely ciliate-bearded throat, the lobes oblong-lanceolate, acuminate, about 9 mm. long, glabrous inside. Calyx somewhat campanulate, about 10 mm. long and 12 mm. in diameter, the lobes broadly ovate, about 6 mm. long, inside densely appressed-villous. Ovary 11-celled; style sparingly hirsute, 5 mm. long, the arms fleshy, spreading, 9 to 11 mm. long, as many as the ovary-cells. Fruit turbinate, 2 cm. in diameter, apex depressed, glabrous, rugose, the persistent calyx pubescent, the lobes spreading.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1472 (type), October, 1920; Labuk and Sugut Districts, Sumawang river, *Agama* 663, September 24, 1918, in flat country at low altitudes. This species is remarkable for its thick, corky, deeply ridged, pale bark, and its cauline, sessile, unusually large flowers, and its turbinate fruits, the spreading persistent calyx 2 cm. in diameter, the fruit somewhat projecting and depressed at the apex.

Borreria G. F. W. Meyer.

Borreria hispida (Linn.) K. Schum. in Engl. and Prantl, Nat. Pflanzenfam. 4, part 4, (1891) 44.

Spermacoce hispida Linn. Sp. Pl. (1753) 102.

British North Borneo, Sandakan, *Ramos* 1786, 1760, 1767. In open waste places at low altitudes. India to China and Malaya.

Borreria ocymoides (Burm. f.) DC. Prodr. 4 (1830) 544.

Spermacoce ocymoides Burm. f. Fl. Ind. (1768) 34, t. 13. f. 1.

British North Borneo, Sandakan, *Ramos* 1768. Along roads at low altitudes. Tropical Africa, Asia, and Malaya.

Psychotria Linnaeus.

Psychotria woodii sp. nov.

Frutex erectus, circiter 2 m. altus, glaber; foliis chartaceis, oblongis vel oblongo-oblanco-latis, usque ad 30 cm. longis, acute acuminatis, basi cuneatis, in siccitate fragilibus, nitidis, supra castaneis, subtus brunneis, nervis utrinque circiter 18 perspicuis;

infructescentiis paniculatis, 6—12 cm. longis, fructibus ellipsoideis circiter 1 cm. longis longitudinaliter sulcatis, seminibus plano-convexis dorso perspicue 5-sulcato, albumine laeve.

A glabrous shrub about 2 m. high, the branchlets nearly black when dry. Leaves oblong to oblong-oblongeolate, chartaceous, 15 to 30 cm. long, 4.5 to 10 cm. wide, usually narrowed upward to the slenderly and sharply acuminate apex, the base gradually narrowed, cuneate, when dry usually castaneous and prominently shining on both surfaces, the lower surface somewhat paler than the upper; lateral nerves about 18 on each side of the midrib, prominent, anastomosing directly with the slightly arched marginal nerves; petioles 2 to 4 cm. long; stipules lanceolate, acuminate, deciduous, about 8 mm. long. Infructescences paniculate, 6 to 12 cm. long, shortly peduncled, sometimes branched from the base, the primary branches few, the lower ones spreading. Fruits ellipsoid, red when fresh, black or dark-brown when dry, glabrous, longitudinally sulcate, about 1 cm. long; seeds plano-convex, the back conspicuously 5-sulcate, the albumen uniform, not at all ruminant.

British North Borneo, Batu Lima and Sandakan, *Ramos 1429* (type) 1198, *Wood 1101*. All collected in October, 1920, from damp forests at low altitudes. The same species is also represented by *Mrs. Clemens 11180* from Mt. Kalawat, December, 1915. A species well characterized by its being entirely glabrous throughout, as well as by its elongated, usually slenderly acuminate leaves which are typically castaneous when dry.

***Psychotria grandistipula* sp. nov.**

Frutex erectus, usque ad 1 m. altus, ramulis et inflorescentiis et foliis utrinque ad costam nervosque perspicue rubiginoso-villosis; foliis chartaceis, ellipticis vel oblongo-ovatis vel oblongo-obovatis, 13—27 cm. longis, acuminatis, basi acutis, in siccitate plerumque rubiginosis, nervis utrinque circiter 12, perspicuis; stipulis ovatis, 1.5—2 cm. longis, 1—1.5 cm. latis, obtusis, deciduis; inflorescentiis paniculatis, brevissime pedunculatis, circiter 5 cm. longis, 7—9 cm. latis; fructibus glabris, ellipsoideis vel oblongo-ellipsoideis, 9 mm. longis, longitudinaliter sulcatis; seminibus plano-convexis, dorso perspicue 3- vel 4-sulcato, albumine aequabile.

An erect shrub up to 1 m. high, the branchlets, petioles, inflorescences, and leaves conspicuously rubiginous-villous. Leaves chartaceous, elliptic to oblong-ovate or oblong-obovate, 13 to 27 cm. long, 8 to 13 cm. wide, the apex distinctly acuminate, base acute, when dry usually rubiginous or the upper surface olivaceous, somewhat shining on both surfaces and conspicuously ciliate with more or less crisped hairs on the midribs, nerves, and reticulations on both surfaces, and with scattered similar hairs on the parenchyma, the upper surface ultimately nearly glabrous; lateral nerves about 12 on each side of the midrib, prominent on the lower surface, arched-anastomosing close to the margin, the reticulations lax, distinct; petioles rubiginous-villous, 2 to 3 cm. long; stipules broadly ovate, chartaceous, villous, deciduous, 1.5 to 2 cm. long,

1 to 1.5 cm. wide, obtuse, narrowed below. Infructescences terminal, shortly peduncled, about 5 cm. long, 7 to 9 cm. wide, usually with 3 primary branches, rather lax. Mature fruits red when fresh, dark-brown when dry, glabrous, ellipsoid to oblong-ellipsoid, 9 mm. long, longitudinally sulcate; seeds plano-convex, the back conspicuously 3- or 4-sulcate, the albumin uniform, not at all ruminate.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1194 (type), 1365, 1370, 1426, 1576. On forested slopes at low altitudes. A species in general appearance resembling *Psychotria stipulosa* Wall., but differing totally in its indumentum. The unusually large stipules are characteristic.

Xanthophytum Blume.

Xanthophytum longipedunculatum sp. nov.

Frutex usque ad 60 cm. altus, plus minusve ferrugineo-pubescentis; foliis membranaceis, oblongis vel oblongo-oblancheolatis, 13—25 cm. longis, acuminatis, basi acutis vel attenuatis, supra olivaceis, glabris vel ad costam leviter hirsutis, subtus subferrugineis, adpresse-ferrugineo-ciliatis, nervis utrinque circiter 20, perspicuis; paniculis 3—5 cm. longis, longe tenuiterque pedunculatis, pedunculo 5—15 cm. longo; floribus 4—4.5 mm. longis, fructibus glabris, 2—3 mm. diametro.

An erect shrub less than 1 m. high, the branchlets, inflorescences, and the lower surface of the leaves more or less ferruginous-pubescent with appressed hairs, the indumentum on very young leaves often cupreous and shining. Leaves membranaceous, oblong to oblong-oblancheolate, 13 to 25 cm. long, 4 to 6 cm. wide, narrowed upward to the acuminate apex and below to the attenuate base, the upper surface olivaceous, ultimately glabrous, when young with scattered ciliate hairs along the midrib and nerves, the lower surface paler than the upper, the midrib and nerves rather densely appressed-pubescent and with numerous similar hairs on the surface; lateral nerves about 20 on each side of the midrib, prominent on the lower surface, curved, anastomosing close to the margin, the reticulations obscure; petioles about 2 cm. long; stipules lanceolate, caudate-acuminate, pubescent, about 1.5 cm. long. Inflorescences axillary, paniculate, long- and slenderly peduncled, the panicles 3 to 5 cm. long, the branches spreading, the lower ones up to 2 cm. long, the peduncles 5 to 15 cm. long. Flowers white, 4 to 4.5 mm. long, 5-merous, the calyx cup-shaped, 1.5 to 2 mm. long, very slightly pubescent, the lobes broadly ovate, 0.5 mm. in length. Corolla 3 mm. long, the lobes oblong-ovate, acute, 1 mm. in length, the throat villous inside. Fruits glabrous about 15 mm. long, 2.5 mm. wide, their pedicels up to 3 mm. in length, the bracts subtending the branches narrowly lanceolate, about 2 mm. long.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1926 (type), 1271, November, 1920. In damp forests along small streams at low altitudes; Kiau, *Mrs. Clemens* 10189, November, 1915. The alliance of this species is manifestly with *Xanthophytum fructiculosum* Blume, from which it is at once distinguished by its long and slenderly peduncled inflorescences.

CUCURBITACEAE.

Melothria Linnaeus.

Melothria diversifolia sp. nov. § *Eumelothria*.

Herba scandens, monoica; foliis valde diversiformibus, majoribus ovatis vel oblongo-ovatis, usque ad 20 cm. longis, ad 11 cm. latis, minoribus oblongis vel lanceolatis, 5—10 cm. longis, 1.5—3 cm. latis, omnibus chartaceis vel subcoriaceis, acute acuminatis, basi truncato-hastatis, angulis plerumque acutis, margine distanter dentatis, supra olivaceis, asperrimis, subtus glabris, sublaevibus; floribus ♀ solitariis, tenuiter pedunculatis, 1 cm. longis; ♂ plerumque in ramulis junioribus laxissime corymbosis; fructibus globosis, glabris, 1 cm. diametro; seminibus compressis, subellipsoideis, 6 mm. longis, leviter rugosis, vix marginatis.

A herbaceous, monoecious vine, the stems terete, 3 to 3.5 mm. in diameter, the younger branchlets slender, 1 mm. in diameter or less. Leaves chartaceous to subcoriaceous, mostly dark-green when dry, the upper surface very scabrous, the lower glabrous and nearly smooth, diverse in shape and in size, the larger ones ovate to oblong-ovate, 13 to 20 cm. long, 7 to 11 cm. wide, the smaller ones oblong to lanceolate, 7 to 9 cm. long, 2 to 4 cm. wide, all slenderly and sharply acuminate, their bases truncate-hastate, the angles chiefly acute, the margins distantly dentate; lateral nerves, including the basal ones, about 6 on each side of the midrib, prominent on the lower surface, the reticulations lax; petioles 1 to 2.5 cm. long; tendrils simple, glabrous, up to 15 cm. in length, slender. Flowers yellow, the pistillate ones solitary, slenderly peduncled, about 1 cm. long, the peduncles up to 2.5 cm. in length; ovary ovoid, 3 mm. long, the perianth tube short, broad; calyx segments lanceolate, acuminate, 1.5 mm. long; petals elliptic-ovate, acuminate, 5 mm. long; staminodes 1.2 mm. in length; stigma 3-lobed, the lobes deeply cleft, 2 mm. long. Staminate flowers similar to the pistillate ones, for the most part laxly corymbose on the younger branchlets, the inflorescences up to 10 cm. in length; stamens free, their anthers 1.5 mm. long. Fruits globose, red when fresh, glabrous, smooth, about 1 cm. in diameter, the seeds compressed, subellipsoid, about 6 mm. long, slightly rugose, scarcely marginate.

British North Borneo, Batu Lima and Sebuga, near Sandakan, *Ramos* 1896 (type), 1175, 1210, October and December, 1920. In thickets at low altitudes. A species well characterized by its ample,

elongated, very diverse leaves which are truncate-hastate at the base, the basal angles being chiefly acute, as well as by its lax, corymbose, staminate inflorescences.

Momordica Linnaeus.

Momordica acuminata sp. nov.

Herba scandens, dioica, inflorescentiis exceptis glabra; foliis chartaceis, oblongo-ovatis, brunneo-olivaceis, utrinque nitidis, integris, 9—11 cm. longis, tenuiter acute acuminatis, basi cordatis, subtus perspicue reticulatis, petiolo glanduloso; floribus ♂ solitariis, magnis, bractea magna ovata, acuta, basi cordata, intus scaberula.

A nearly glabrous, herbaceous, dioecious vine, the ultimate branchlets 2 mm. in diameter or less, sulcate, pale-brownish. Leaves chartaceous, shining on both surfaces, brownish-olivaceous, oblong-ovate, entire, 9 to 11 cm. long, 4.5 to 6 cm. wide, the apex slenderly and sharply acuminate, the base cordate, the sinus rather broad, the basal lobes rounded, the basal margins usually with 1 or 2 prominent glands; lateral nerves including the basal pair 4 to 6 on each side of the midrib, prominent, arched-anastomosing, the primary reticulations lax, distinct; petioles about 2 cm. long, distinct, glandular in the upper part, the glands sessile, up to 1 mm. in diameter; tendrils slender, up to 6 cm. long. Staminate flowers axillary, solitary or in pairs, the pedicels up to 3.5 cm. long, the subtending bracts inclosing the buds broadly ovate when spread, acute or obtuse, the base prominently cordate, up to 3.5 cm. long, scabrid on both surfaces. Calyx-tube broad, nearly flat, 10 to 12 mm. in diameter, the lobes oblong-ovate, sharply acuminate, scaberulous, about 1.5 cm. long, 8.5 mm. wide. Corolla-lobes ovate, the larger ones up to 5.5 cm. long, acute or somewhat acuminate, reticulate, sparingly pubescent outside, especially in the lower part. Stamens 3, 6 to 8 mm. long, one entire, two 2-lobed, the connectives more or less papillose, each stamen or lobe with a conspicuous, ascending, lateral, papillate-villous, lanceolate appendage, about 4 mm. long, from a broad base.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1503, October, 1920. In forests at low altitudes. The petals are described as white, the central portion nearly black. The species is allied to *Momordica denticulata* Miq., from which it is distinguished by its thinner, smaller, entire leaves, its glandular petioles, its acuminate sepals, and its larger flowers. A very similar species is represented by *Native Collector* 2812 (Bur. Sci.), *Moulton* 64, from Selungo, Upper Baram, Sarawak, collected on November 22, 1914, but which differs in its truncately rounded, not cordate leaves, and apparently smaller flowers and bracts. The specimens are imperfect.

A Botanical Excursion to Northern Sumatra.

By H. N. RIDLEY, C.M.G., F.R.S.

The flora of Sumatra is at present still very little known, so that the account of even a short excursion especially in the quite unexplored northern part of the island is a contribution to the history of its flora. In my paper on Messrs. Robinson's and Kloss' collections on Korinchi Peak (*Journ. Fed. Malay States Museums*, Vol. viii, p. 9), I gave a resumé of the collections which had been made in Sumatra and which were chiefly in the southern half of the island. As the only part of Sumatra I had myself collected in was the Siak district in the south, I was anxious to visit other parts of Sumatra before my Eastern travels came to an end, and meeting Mr. Gallagher who was Manager of the United Malay Association Rubber Company, in Singapore, he very kindly made arrangements for me to get to Berastagi and to reside for some days in the bungalow belonging to the Company. I left Penang therefore on February 4th, 1921, by steamer and arrived at Belawan, the port for Medan the next day. I had an excellent boy, Rau, procured for me by Mr. Kloss, and a plant collector, Kiah, supplied by Mr. Burkill. Arrived at Belawan at sunrise I had to interview the Customs Officials, two very young men who knew properly neither English nor Malay, about my collecting presses and paper which I believe should have come into the country free, as they did when I travelled in Java; but after a little dispute I had to pay nine guilders duties for them.

The train from Belawan to Medan was very slow and late in arriving. We passed through low-lying cultivated ground with little of the original vegetation left, except in the tidal swamps. The mangrove and tidal swamp flora appeared to resemble closely that of the west coast of the Malay Peninsula. I noted *Oroxylum indicum* and *Excoecaria agallocha*, besides the usual species of *Rhizophora* and *Bruguiera*, and I saw a young plant of *Corypha elata* Roxb., which occurs in the Peninsula as far South as Alor Star only.

Medan is a small but picturesque, well laid out little town with far the best and cheapest Hotels in the East. The officials of the company were exceedingly kind and helpful: Mr. Henderson arranged for a motor car belonging to the Company to convey me with the boys and baggage to Berastagi and we started at about 3 o'clock in the afternoon. The first part of the journey lay for a long time through low, flat cultivated ground. The road was fringed on both sides for a considerable distance with a belt of young teak trees planted very close together to supply poles and posts. Eventually we came to the mountain ranges clad with forest. As the road was bad and required widening in many parts

of the hilly districts, the car had to stop at intervals and we took advantage of this to jump out and collect what we could on the roadside. The pretty pink balsam *Impatiens platyptala* was abundant all the way up wherever it was damp enough for it.

The forest on the mountains here is by no means as dense nor are the trees as lofty as in the mountains of the Malay Peninsula, but this is perhaps due to extensive cutting of timber to supply the lowland districts. Eventually we arrived on the great Karu plateau and at the bungalow, where we were kindly received by the other occupants, at half past five.

The plateau of very large extent does not at first appear a good botanical ground, as it is mainly covered with lalang and bracken, the original forests with which it was probably formerly covered having doubtless been cleared for cultivation by the Battaks, who inhabit this region; but patches of forest occur near their villages and in the valleys, and the further hills, many within an easy walk, are clad with a dense forest vegetation at the summits. Among the lalang even grew some plants of interest: *Arundina speciosa*, *Rhynchospora glauca*, *Callicarpa eriophylla* n. sp., *Shuteria vestita*, the pretty little purple and yellow *Liparis pratensis* n. sp. and many others. Where the lalang could not grow or had been extirpated, the turf was yellow with *Smithia javanica*; and *Viola serpens* and *Patrinii*, *Habenaria lacertifera*, *Knoxia lineata* and many other small plants were to be found, and in the streams were *Ranunculus diffusus*, *Juncus lamprocarpus*, *Equisetum* and many sedges and grasses.

Some of the hill forests especially those in the neighbourhood of the Volcano Sibayak were rich in many interesting plants. We explored these hills as far as we could go in a morning, and made an expedition one day to the Volcano. Starting at 7 a.m., we crossed the plain to the first range of hills which we ascended by a very wet track. Then came a steep descent of about 1,000 feet, to a valley full of ricefields which was very wet, and contained many marsh plants. We then made our way to a house where lived a native who acted as a guide to the track to the top of the Volcano. We crossed the rest of the paddy land and came to a sulphurous stream issuing from the Volcano; near by was a hot sulphurous spring about which grew *Cyperus polystachyus* and *Juncus*, and in the stream was a new species of *Eugenia*, many trees of which had been killed by the sulphur. Crossing this we entered the woods of the base of Sibayak, chiefly characterised by abundance of *Polygonum chinense*. The track is quite clear from this point, but is a stiff climb, the black greasy volcanic mud making the walk very arduous. The upper part of the wood proved very rich in fine and showy plants:—*Medinilla vulcanica* n. sp., *Rhododendron multicolor*, *Pratia montana*, *Clethra pulcherrima* n. sp., and a large species of *Pandanus*.

Above the wood on the actual volcano slope is a low scrub of *Medinilla vulcanica* with *Heptapleurum triste*, *Embelia pergamacea*, *Gualtheria leucocarpa* with large clumps of *Rhuacophila javanica*.

The path ascends steeply through this scrub until the last sign of vegetation disappears, and the rest of the way to the crater is a mass of bare, broken stones. The highest plant to ascend was *Litobrochia incisa*. This fern made a brake of plants not more than a foot tall on the highest part which bore any vegetation.

We reached the crater at 10.30. The crater is of considerable size and contains a small lake and some very large fumaroles encrusted with sulphur and some steam-jets which make a hissing and whistling noise which can be heard from a great distance. The views from the top are very fine extending over a great area: but thick clouds and sulphur-smoke only allowed us to catch glimpses of the views. The return was as arduous as the ascent, the last range before we descended into the plains being especially steep. Indeed, an old Battak man and his wife I met returning to the ricefields declared it was enough to kill anyone. We got back to the house at 3 o'clock. A number of Chinese were coming up to the volcano as we left, including a woman who seemed in a state of collapse, about half way up the final ascent. They must have come a long way, but such visitors come (we were told by the guide) in great numbers.

After a few more days collecting, Mr. Knapp came up to Berastagi and I returned in his car to Medan on February 16th and left in the car for Belawan next day, arriving at Penang on the 18th.

The weather was fine, at least most of the day: but it rained heavily in the afternoons and evenings nearly always. The temperature was cool and pleasant, and at that altitude the Battaks were able to cultivate potatoes, cabbages and carrots, as good as in Europe. The Tree-tomato *Cyphomandra betacea* grew and fruited readily and indeed has run wild in the forests.

THE FLORA.

The flora of this mountain region closely resembles that of Java, as might be expected, but is strikingly dissimilar from that of the Malay Peninsula as represented by the Taiping hills on the West and the Tahan mountains on the East. Indeed there are scarcely any species common to the mountains of both countries. It should be remarked however, that they differ also in soil and climate. The high mountains of Perak are covered with a thick wet forest, and their soil is granitic in origin: the Tahan range is open and rocky, the prevailing rock being a sandstone. The mountains of Java and Sumatra except where cleared are covered with forest in most parts, rather thinner than that of the Malay Peninsula and the soil consists of volcanic debris, ash and volcanic mud.

At these high altitudes in Sumatra and Java we find a series of palaeartic genera which occur also in the mountains of Northern India, but which are strikingly absent from the Malay Peninsula, only a few occurring in one spot.

Such are *Ranunculus*, *Anemone*, *Viola*, *Mahonia*, *Sanicula*, *Neillia*, *Sambucus*, *Lonicera*, *Carlemannia*, *Hydrangea*, *Astilbe*, *Melissa*, *Disporum*, *Juncus*, *Potamogeton*, *Equisetum*. In one spot only in the Malay Peninsula have we met with any of this type of flora, and that is in a valley in Telom, on the borders of Perak and Pahang, where occur *Viola serpens*, *Sanicula europaea*, *Desmodium scalpe*, *Disporum multiflorum* and *Pouzolzia Bennetiana*. All these plants occur together at Berastagi in light open woods or open country. They do not occur at all in dense shady forests.

At the time I wrote an account of the flora of Telom (*Journ. F. M. S. Mus.* Vol. iv, p. 1) practically nothing was known of the mountain flora of Sumatra, and as most of these plants occurred in Java as well as the Himalayas, I was very puzzled to account for their occurrence in Telom. There can be no doubt they were derived from Sumatra, as Telom is nearly opposite Berastagi and further that they form evidence of a land connection between the Malay Peninsula and Sumatra. There can be no doubt that the extension of this Himalayo-Sumatran flora was formerly much wider and has been driven out by the dark wet rain-forests which at a later date over-shadowed the Himalayo-Sumatran flora. The little valley of Telom was in parts covered with a lighter woodland, though surrounded for miles by the dense forest, and it was here that this little patch of plants had persisted. It was interesting to note also that the only *Didymocarpus* in the Berastagi woods was *D. albina*, also a Telom plant.

There are still some botanists who seem to be puzzled by the occurrence of patches of a flora occurring at a considerable distance from other spots where it is found and often isolated by deep chasms or wide spaces of another kind of forest. Their natural idea is to attribute this distribution to the action of birds or wind bringing the seeds from long distances. Mr. F. Lewis in an account of a visit to the Kunadiyaparawita mountain in Ceylon (*Journ. Linn. Soc.* xiv, p. 143), while he examines this possibility rejects it on the grounds of the seeds of the plants common to this mountain and Adam's Peak having no particular development for such special means of dispersion and the absence of birds or monkeys on the mountain he is dealing with. Now it is clear that if a bird can carry the seed of any given plant from one mountain to another it can equally well carry it to all the mountains in the neighbourhood, and as a matter of fact we do not find plants carried by birds from one distant locality to another single, little isolated spot only. (An exception must be made in the case of oceanic islands where the only plants which can be conveyed from the mainland, except a few dust-seed plants, ferns and orchids, and sea-borne plants, are the only ones that can naturally get there, and where the island is naturally attractive to birds fighting oversea).

The patch of Sumatran plants at Telom, and the Adam's Peak plants on Kunadiyaparawita mountain are in most cases plants

with no special means of dispersal, they belong to a variety of Orders and it is not one species but a number which are common to the two spots. There is no possible explanation of the distribution except that the two localities were connected by a land area which bore originally one continuous flora which has been by change of climate or denudation of mountains, swept out of existence between the two localities in which it still persists.

Though the floras of Sumatra and the Malay Peninsula possess a considerable similarity especially in the lowland parts, there are some very marked differences in particular groups. The genus *Saurauja* is represented by about 40 species in the Sumatra-Java area, and by about 30 species in Borneo, while the Malay Peninsula only contains 5 species, 2 of which are also Javanese: *Cyrtandra* is represented by over 50 Sumatran and Javanese species, 40 Borneo species and 7 Malayan ones. On the other hand *Didymocarpus* is represented by 55 species in the Malay Peninsula, and by only 7 species in Sumatra. The paucity of *Didymocarpi* in Sumatra is very striking as they are conspicuous plants and not easily over-looked. *Didymocarpus albina* in Berastagi woods was remarkably abundant, and I never saw elsewhere any species of this genus growing in such great masses together. Another striking fact was the scarcity of palms, only one *Pinanga* and one *Calamus* were to be seen in the woods, besides a *Caryota* possibly introduced as it chiefly occurred in and about cultivation. However, even in the Malay Peninsula, palms certainly become scarcer at 5,000 feet elevation.

While writing this paper I received a collection made in August, 1921 by Mohamed Nur, a collector sent by Mr. Burkill from the Botanic Gardens, Singapore, both at Sibolangit, lower down in this region, the Sibayak Volcano and at Berastagi and I have had also in my hands a collection of specimens made in December 1921 about Berastagi by Mrs. Burkill. I have added to this account the names of such species as are additional to my own gatherings, so as to complete as much as we know of this area.

RANUNCULACEAE.

Clematis sumatrana Ridl. n. sp.

Slender climber; stems hairy. Leaves trifoliate; petiole 2.25 in. long, hairy; leaflets ovate acute, base round, edge shortly and sparsely toothed in the upper part, above glabrous, beneath hairy on nerves and nervules; nerves 5 prominent, 4 inches long, 3.75 inches wide or less. Panicles 6 to 7 inches long, white, tomentose-hairy, branches 2 pairs, 3 in. long in flower, with small leafy bracts at base of branches. Flowers 3 or 4 in terminal cymes on the branch ends; pedicels tomentose, .5 in. long. Sepals lanceolate acuminate, base broad tomentose, white .75 in. long. Stamens hairy .5 in. long. Achenes fusiform narrowed at both ends; plume slender 1 inch long with long silky hairs.

Edges of woods, climbing on trees, Berastagi. A very beautiful species. Allied closely to *C. Leschenaultiana* DC. of Java, but the leaves are broader, less serrate, and much less hairy, the sepals narrower and more acuminate.

Ranunculus diffusus DC. var. **glabratus**.

A tall plant over 12 inches, nearly glabrous, with only a few short hairs on the stem and leaves; flowers small, only .4 in. across. Banks of streams on the Plateau, Berastagi. Very much more glabrous than the Java form, and with rather smaller flowers.

MAGNOLIACEAE.

Talauma pumila Bl. Fl. Jav. 38, pl. 12, C.

A spreading shrub about 10 feet tall, glabrous except the inflorescence. Leaves stiffly coriaceous, elliptic-lanceolate, subacute narrowed at base; nerves about 12 pairs sunk above, elevate strongly beneath; nervules elevate on both surfaces, 6 to 9 in. long, 2 to 3.5 in. wide; petioles .5 in. long, pubescent when young. Flowers solitary axillary, small, white; pedicels .5 in. long, appressed hairy. Buds globose ovoid .5 in. long. Stipules suborbicular shortly appressed hairy. Sepals ovate blunt pustular, outside glabrous, pustulate when dry, .5 in. long, .25 in. wide. Petals 6, as long, narrower linear oblong blunt. Stamens about 12; anthers linear with a small round crest. Carpels small, 5 or 6, glabrous, connate.

In a wooded ravine at Berastagi. *Distrib.* Java. This has been rather poorly described and Blume himself added to his descriptions figures of plants in the Botanical Magazine and Andrew's Botanic Respository which are not the species he had in Java.

Schizandra pyrifolia Bl.

A climber with whitish flowers. Berastagi Woods. Blume gives as a character the rounded bases of the leaves, as contrasted with the acuminate bases of the leaves in *S. axillare* Bl. In my specimens the leaves are often slightly narrowed at the base, but some are quite rounded and there is no trace of the serration of *S. axillare*. Native of Java also, and Beccari got it at Mount Singalan, in South Sumatra.

ANONACEAE.

Melodorum breviflorum Ridl. n. sp.

Strong climber. Leaves thin, coriaceous elliptic narrowed shortly at base, glabrous above except the lower part of the midrib, pale, thinly tomentose beneath; nerves 16 pairs, prominent beneath nervules transverse, very numerous, 5 in. long, 2 in. wide; petiole .25 in. long tomentose. Flowers fascicled or in short panicles axillary and terminal; peduncles thick, yellowish tomentose, .25 in.

long. Sepals 3, short, ovate blunt. Buds conic ovoid quite blunt .3 in. long. Petals, outer thick, broad lanceolate blunt, ochreous tomentose outside, glabrous purple within, .25 in. long, inner ones shorter, narrower, finely pubescent outside. Stamens glabrous; anthers linear with a short, narrow acuminate point. Carpels 7 or 8, densely reddish tomentose. Ripe carpels subglobose, a little broader than long, .75 in. through, thinly pubescent on stalks rather slender, 1 inch long.

Climbing on trees in thickets behind the bungalow, Berastagi.

This is certainly closely allied to *M. parviflorum* Scheffer, of Rhio, Banca and Borneo, but differs in its shorter ochreous, not red, tomentum and the very much shorter and blunter buds, the petals being nearly ovate lanceolate, and the stamens having a short narrow acute appendage instead of a broad rounded one.

Polyalthia sp.

Shrub with brown velvety fruits. Allied to *P. bullata*, King, but the indumentum brown-tomentose and the leaves not bullate. Berastagi forests.

Popowia foetida Maing.

Sibolangit (Mohamed Nur). *Distrib.* Malay Peninsula.

MENISPERMACEAE.

Stephania discolor Spreng.

In the ravine of a stream, Berastagi plateau. *Distrib.* Java.

BERBERIDACEAE.

Mahonia nepaulensis DC.

In woods on the plateau at Berastagi. Not very common. Apparently a new record for Sumatra. A bush 5 feet tall with orange flowers. *Distrib.* India, Java.

CRUCIFERAE.

Nasturtium indicum Linn.

Cultivated ground. Flowers yellow. *Distrib.* Tropical Asia.

Cardamine Regeliana Miq.

In streams on Berastagi plateau. Flowers white.

Cardamine africana Linn.

Woods, Berastagi. Flowers white.

Distrib. Singalan (Beccari), Java.

VIOLACEAE.

Viola serpens Wall.

Common all over the open grassy spots, where there was no lalang *e.g.* the golf links. Flowers pale violet with dark streaks on the lower lip in the mouth.

Distrib. India, Malaya, Malay Peninsula about Telom.

Viola Patrinii DC.

Tufted violet with hastate leaves. Common on the plateau but less so than *V. serpens*; not seen in flower.

Distrib. India and North Asia.

FLACOURTIACEAE.**Bennettia leprosipes** Koorders.

Berastagi, also Mount Singalan (Beccari 51 and 324). I have only seen the description of this species of which only fruiting specimens are known.

POLYGALACEAE.**Polygala pulchra** Hassk.

Woods. Flowers greenish. *Distrib.* Java, Malay Peninsula.

Polygala paniculata Linn.

Abundant on road sides and open places all over this district: from a few inches to 12 inches tall; flowers white. I found a dwarf form with pinkish flowers and thicker leaves also. Native of S. America and the West Indies, now naturalized here and in Java.

Polygala persicariaefolia DC.

Not very abundant, open places near the Battak village and elsewhere on the plateau. A specimen from Lake Toba was brought by Mrs. Burkill. Flowers greenish white with a mauve tip to the keel. *Distrib.* Africa, tropical Asia and Australia.

Polygala telephioides Willd.

Hardly 2 in. tall; flowers white, a garden weed, Berastagi. *Distrib.* Indo-Malaya.

Salomonina cantoniensis Lour.

On banks near the village.

Distrib. A common weed in Tropical Asia.

CARYOPHYLLACEAE.**Drymaria cordata** Willd.

In open spaces by cultivation, Berastagi. *Distrib.* East Asia.

HYPERICACEAE.**Hypericum mutilum** Linn.

Common in the cleared ground all over the plateau. Flowers yellow; sometimes as a low tufted plant about 4 in. tall, and in longer grass a slender, hardly branched plant over a foot tall.

TERNSTROEMIIACEAE.**Saurauja vulcanica** Korth.

The commonest and most conspicuous tree on the plateau, the leaves appearing white from their undersides blown by the wind.

The tree is stout about 30 feet tall; flowers white.

Distrib. Sumatra only, Singalan.

Saurauja roseata Ridl. n. sp.

Tree about 30 feet tall. Leaves coriaceous elliptic-oblong, blunt, base broad truncate, above smooth glabrous, beneath covered with red brown tomentum; nerves elevete beneath, horizontal, parallel, over 60 pairs, midrib stout, sunk above, elevete beneath, 8 in. long, 5 in. wide; petioles 2 in. long, stout, deciduously tomentose. Panicles terminal axillary, 6 in. long, 3 in. wide, on a peduncle 4 in. long. Bracts at base of branches linear, .4 in. long. Bracteoles ovate, smaller. Flowers numerous very shortly pedicelled, tomentose. Sepals 5, oblong-ovate, round at tip, outer pair largest, tomentose outside, inner three glabrous, smaller, all ciliate, rose pink, enlarged and quite glabrous in fruit, .1 in. long. Petals rosy pink hardly longer, thin, oblong. Stamens 10; filaments short; anthers small, rounded. Style 1 with 3 stigmas recurved. Fruit oblong ovoid, crowned with the style.

Open country at Berastagi. Only one or two trees seen; foliage like that of *S. sapotacea* Ridl. of Korinchi, but flowers quite different.

Saurauja cuspidella Miq.

Small tree with greenish flowers, Berastagi woods.

Saurauja ferox Korth.

Sibolangit (Mohamed Nur). *Distrib.* Borneo.

Saurauja Reinwardtiana Miq.

Sibolangit (Mohamed Nur). *Distrib.* Java.

MALVACEAE.

Sida carpiniifolia Linn.

Toba Lake (Mrs. Burkill). *Distrib.* Tropics.

STERCULIACEAE.

Sterculia sumatrensis Ridl. n. sp.

A treelet. Leaves entire elliptic, shortly cuspidate, base shortly cuneate, glabrous chartaceous; nerves 8 pairs elevete beneath, secondary nerves few transverse, reticulations wide, all elevete beneath, the main nerves inarching within the margin 8 in. long, 4 in. wide; petioles 1 in. long. Panicles very slender and lax with few distant short branches 8 in. long; branches 1 in. with few—4 or 5-flowers on each, all sprinkled with stellate hair tufts. Flowers pale green on short pedicels, campanulate: lobes 5, split more than half way down, narrow lanceolate acuminate with scattered and stellate hair-tufts outside, the edges fringed with long white hairs. Staminal column as short as the campanulate tube; anthers 6 in a globose head.

Forests of Berastagi. West Sumatra, Padang at Ayer Mancior (Beccari 710). Lampongs (Teysmann).

I have not seen ripe fruit or female flowers of this plant, Miquel in *Fl. Ind. Bat. Supp.*, referred this plant as represented by Teysmann's leaf specimens to *S. nobilis* Sm. = *Sterculia Balanghas* Roxb., from which it is entirely different.

Melochia velutina Bedd.

Sibolangit (Mohamed Nur). *Distrib.* Indo-Malaya.

TILIACEAE.

Grewia acuminata Miq.

A plant with the climbing habit of *G. umbellata* of the Malay Peninsula, but while that is glabrous, this is mealy pubescent on the inflorescence and hairy on the midrib and nerves of the leaf. It occurred in the lane by the Battak village at Berastagi and in the woods. It has also been collected in Sumatra in the Padang district by Beccari at Ayer Mancior, 739, and occurs in Java; the Javanese form appears to me to be less hairy than the Sumatran one.

Triumfetta pseudo-cana Sprague.

In a ravine in cultivated ground by the edge of a stream. Flowers yellow. Berastagi plateau. This occurs all over the Malay region.

Triumfetta cana Bl.

In the forests, Berastagi. *Distrib.* Java.

OXALIDACEAE.

Oxalis javanica Bl.

Open country on the plateau, Berastagi, and in the west hill woods.

This is classed under *O. corniculata* Linn. by some authors, but appears very different from that species, as originally described and also from the variety *tomentosa* which occurs in the Malay Peninsula and India. The ordinary form here is creeping with distant branches about 6 in. tall; the leaves .75 in. wide; the leaflets deeply retuse with pilose edges, the inflorescence and stems usually are pilose and the fruit hairy. Another form was erect with slender stems, hairy all over, and woody at the base. Leaves smaller. *O. javanica* is also a native of Java.

Dapania scandens Stapf.

Sibolangit, Dato Pulo Siam valley (Mohamed Nur).

Climber; flowers pink. This form, common in Borneo and Sumatra, has narrower leaves with more ascending nerves than the type from Gopeng in Perak.

BALSAMINACEAE.

Impatiens platypetala Lindl.

Very common all over this region from the low country to the Berastagi plateau in damp spots. *Distrib.* Java.

Impatiens pyrrhotricha Miq.

Common all through the woods, about 6 to 8 in. tall with large canary yellow and orange flowers. The form here is less hairy, and the leaves less crenate than usual. *Distrib.* Sumatra.

Impatiens Korthalsii Miq. Ill. Flor. Arch. p. 100.

Very local in thick herbage in a stream in the forest edge, only a few plants. A herb 2 feet tall with yellow flowers.

Distrib. Sumatra.

RUTACEAE.

Evodia latifolia DC.

A large tree, Berastagi woods.

Distrib. Malay Peninsula and islands.

Zanthoxylum acanthopodium DC.

A spiny shrub about 6 feet tall in an open grassy spot at Berastagi, the small-leaved form. *Distrib.* China, India.

Glycosmis sumatrana Ridl. n. sp.

Shrub; young parts deep red scurfy. Leaves under 12 in. long, with 3 to 4 pairs of leaflets; leaflets elliptic blunt, shortly cuneate at base, chartaceous, glabrous, 7 to 8 pairs of nerves ascending, elevate beneath, closely gland-dotted, 4 in. long, 2 in. wide; petiole .1 in. long. Inflorescence red-scurfy paniced 1.5 in. long with few branches .3 in. long. Bracts linear acute, red scurfy .05 in. long. Flowers very small (but not fully developed). Sepals orbicular, edges ciliate. Petals ovate-oblong. Stamens, filaments broad narrowed upwards. Pistil glabrous.

Woods, Berastagi. This is allied to *G. puberula*, Lindl. of Penang, but the leaves are thinner with more leaflets and ascending nerves, and the pistil is not glandular.

ILICACEAE.

Ilex triflora Bl. var. **Griffithii**.

Bandar Bharu, Gunong Sibayak (Mohamed Nur). Quite like the Taiping Hills form.

CELASTRACEAE.

Celastrus axillaris Ridl. n. sp.

Adult leaves thinly coriaceous, ovate, base round, shortly acuminate, edge obscurely serrate; nerves 7 pairs, elevate beneath, 4 in. long, 2.5 in. wide; petioles .25 in. long; leaves on floral shoots thinner lanceolate, 2.5 in. long, .75 in. wide. Flowers small, white in axillary cymes of 5 or more with a terminal panicle of cymes, 1 in. long; pedicels slender .1 in. long. Calyx of 5 rounded fimbriate lobes. Petals oblong, white, much longer, blunt. Stamens within a thin annular disc, 5.

Berastagi woods. This differs from *C. paniculatus* in its short axillary cymes.

Perrottetia alpestris Loesen.

Very common at Berastagi in the woods, a small tree.

Distrib. Malay Peninsula and islands.

RHAMNACEAE.**Rhamnus sumatrensis** Ridl. n. sp.

Tree. Leaves alternate, chartaceous oblong acuminate, base round, edge obscurely serrate crenulate, when young pubescent beneath, when adult glabrous; nerves 6 pairs with midrib sunk above, elevate beneath, 4.5 in. long, 1.5 in. wide; petioles 1 in. long. Racemes axillary pubescent. Flowers in fascicles in lower part, green; pedicels .05 in. long. Calyx campanulate, lobes 5, triangular acute, all hairy. Petals minute, oblong adnate to stamens. Stamens short, from edge of disc, shorter than sepals. Disc lining the calyx-tube. Ovary grooved, free; style grooved; stigma capitate bilobed. Berastagi Woods.

Allied to *Rhamnus nepalensis*, but the sepals are not acuminate as in that species and the stigmas much smaller.

AMPELIDACEAE.**Vitis trifolia** Linn. (*Cissus carnos*a Roxb.)

Berastagi, edges of woods. Flowers white; fruits green.

Distrib. Indo-Malaya.

Vitis geniculata (*Cissus geniculata*, Bl.)

Berastagi, at 5,000 ft. alt. Fruits dirty white.

Distrib. Java.

Vitis (§ **Tetrastigma**) **Scortechinii** Ridl. (*V. semicordata* var. *Scortechinii* King). Berastagi Woods.

Distrib. Java, Malay Peninsula.

Vitis rumicisperma Laws.

Berastagi (Mrs. Burkill). *Distrib.* Malay islands.

Leea sundaica Miq.

Big shrub. Flowers green, fruits purplish. Berastagi.

Distrib. Java.

Leea aequata L.

Sibolangit (Mohamed Nur). *Distrib.* Malay islands.

SAPINDACEAE.**Lepisanthes montana** Bl.

Small tree 15 feet tall. Flowers white on the stem. Berastagi Woods. *Distrib.* Java, Malay Peninsula.

Lepisanthes sp.

Slender tree. Leaves glabrous oblanceolate, grey when dry; nerves 8 pairs elevate beneath, 14 in. long, 5.5 in. wide. Fruiting spikes 8 together, 8 in. long, with cymes of 2 to 3 pedicels. Fruit sub-triquetrous, pink, covered with short fur, .75 in. long.

Berastagi Woods. Small tree.

STAPHYLEACEAE.

Turpinia sphaerocarpa Hassk.

Big tree with pinkish fruits. Berastagi Woods.
Distrib. Java.

OLACACEAE.

Phytocrene bracteata Wall.

Sibolangit, Bukit Kluang (Mohamed Nur).
Distrib. Malay Peninsula.

LEGUMINOSAE.

Crotalaria ferruginea Grah.

In lalang at Berastagi.
Distrib. Malay Peninsula and islands.

Crotalaria sessiliflora Linn.

In lalang, Berastagi. Flowers pale yellow.
Distrib. India, China, Malaya.

Crotalaria lanceolata E. Meyer.

Berastagi (Mrs. Burkill).
Distrib. East Africa. A handsome yellow *Crotalaria* in gardens here whence it has escaped to the roadside.

Desmodium scalpe DC.

Very abundant in the Berastagi Woods. Conspicuous from its orange-scarlet flowers.

Distrib. India, Malay Peninsula (Telom) and islands and Africa.

Desmodium sinuatum Bl.

A common bush about 3 feet tall with mauve flowers, in the open plateau in lalang, Berastagi. *Distrib.* Java.

Desmodium parvifolium DC.

Open plateau, Berastagi. Flowers white.
Distrib. India, Malaya, China.

Shuteria vestita Walk. and Arn.

Abundant among lalang. Flowers reddish. Berastagi plateau. Rather a hairier form than most.

Distrib. India, Malay islands.

Smithia javanica Bl.

Creeping in short grass; golf links, etc. on the plateau. Flowers large, bright yellow. *Distrib.* Java.

Caesalpinia sepiaria Roxb.

A climber with lemon yellow flowers with red stamens. In the forest, and in thickets, Berastagi. *Distrib.* India, Malaya.

Mezoneuron Kunstleri King.

Sibolangit (Mohamed Nur). Apparently this species, but only in young bud. *Distrib.* Perak.

Cassia mimosoides Linn.

Open country. Flowers yellow, Berastagi.
Distrib. India, Malay Peninsula and islands.

Cassia siamea Sibolangit, Bukit Kluang (Mohamed Nur 7422).

ROSACEAE.

Rubus rosaefolius Smith.

Common, forming thick impenetrable bushes; fruit orange. Berastagi Woods. *Distrib.* Indo-Malaya.

Rubus pyrifolius Smith.

Var. *sumatrana*. Leaves ovate-lanceolate acuminate, bluntly serrate crenulate, larger than in the Javanese form, 5 in. long, 2.5 in. wide. The Javanese form has elliptic leaves 3.5 in. long, 2 in. wide, with acute serrations.

Rubus rugosus Sm.

Berastagi Woods. Flowers small, white. *Distrib.* Java.

Rubus glomeratus Bl.

Berastagi. Fruit red. *Distrib.* Malay Peninsula & islands.

Rubus battakensis Ridl. n. sp.

Branches slender, hairy at the top, below glabrous with numerous hooked prickles. Leaves deltoid-ovate obscurely trilobed, subcordate, finely dentate above, glabrous except the hairy midrib and nerves beneath, pale thickly hairy tomentose; nerves 6' pairs, long hairy as are reticulations, 3 in. long, 2 in. wide; petioles slender, 1 in. long; prickles small numerous recurved. Stipules broad with numerous processes, thickly silky hairy. Flowers few, one or two in the uppermost axils, with a short raceme of 4 or 5 at the top; pedicels .5 in. long, densely tomentose hairy. Bracts ovate-lanceolate hairy .1 in. long. Sepals ovate acuminate densely appressed hairy, .25 in. long. Petals short, white. Stamens shorter than sepals.

Berastagi Woods. This resembles *R. elongatus* in many points, but is very much more hairy, the leaves beneath and the base of the sepals being quite long hairy.

Pyrus granulosa Bertol.

Lane near the village, Berastagi; fruits white.
Distrib. Malaya, India.

SAXIFRAGACEAE.

Dichroa febrifuga Lour.

Shrub. Flowers white; anthers light blue. Woods, Berastagi.
Distrib. India, Malay Peninsula and islands.

HALORAGIDACEAE.

Gunnera macrophylla Bl.

Damp ravines, Berastagi. *Distrib.* Philippines.

MYRTACEAE.

Eugenia sulphurata Ridl. n. sp.

Bushy tree about 30 feet tall; branches 4-angled with low undulate wings in the uppermost twigs. Leaves stiffly coriaceous,

ovate lanceolate acutely long acuminate; midrib prominent beneath; nerves 7 pairs prominent beneath, joining an intramarginal nerve, 1.8 in. long, .8 in. wide; petioles thick .15 in. long. Panicles lax in upper axils and terminal; branches 4-angled and winged. Flowers small, 3 to 5 sessile on the end of each branch, white. Bracts brown papery, oblong-lanceolate blunt shorter than the calyx. Calyx obconic, ribbed rugose, .18 in. long, lobes round persistent. Petals orbicular calyptrate. Stamens fairly numerous in a thick series round the mouth of calyx-tube, .18 in. long. Style as long. Fruit subglobose, pulpy pithy, white, as big as a pea.

In the sulphurous stream at the foot of the Sibayak volcano. There were a good many trees here but a large proportion were dead from the sulphur fumes. Allied most nearly to *E. grata*, but the leaves strongly nerved beneath.

Eugenia sp.

A big tree in the forests. Common but hardly any flowers.

MELASTOMATACEAE.

Melastoma normale Don.

Berastagi on the open plateau. Large bush. Flowers mauve.
Distrib. Java.

Melastoma vulcanicum Ridl. n. sp.

Bush; branches covered with brown acuminate toothed scales. Leaves coriaceous lanceolate acuminate narrowed to base, 5-nerved, above covered with scattered short appressed acuminate scales, beneath covered with soft short acuminate scales, the nerves with lanceolate acuminate scales. Flowers 4 or 5 in the terminal cyme. Calyx covered with dense soft lanceolate acuminate pale scales, tube .4 in. long, lobes as long, lanceolate acuminate. Petals white or tinted rose. Stamens 10; anthers lanceolate blunt subequal, the slightly longer ones with long connective produced bilobed at tip.

Abundant at Sibayak volcano in the forest near the top, Berastagi.

Melastoma molle Wall.

Sibolangit, Bukit Kramat Kuda (Mohamed Nur).
Distrib. Malay Peninsula, Philippines.

Dissochaeta inappendiculata Triana.

Climber. Flowers pink, Berastagi Woods. *Distrib.* Java.

Sonerila tuberculifera Cogn.

Flowers pink, Berastagi Woods; also collected by Baccari on Mount Singalan.

Oxyspora racemosa Ridl. n. sp.

A spreading shrub, with slender branches, quite glabrous. Leaves chartaceous ovate to ovate-lanceolate, long caudate entire, base shortly narrowed, 5-nerved, three only running into the cauda; nervules parallel, transverse, 4.25 to 5 in. long, (cauda 1.25 in. long) 1.6 in. wide; petioles .25 in. long. Flowers white, in lax

racemes terminal, 4.5 in. long. Calyx goblet-shaped, .12 in. long, ribbed with 4 short rounded lobes forming a cup. Petals 4, short ovate acute, white. Stamens longer 8, four larger than the others; anthers linear, connective slightly thickened at back; style slender subulate. Ovary small ellipsoid, free or nearly so at base of calyx-tube.

Woods on the ridge towards the Sibayak volcano. Abundant, a conspicuous bush with its slender racemes of white flowers .4 in. long.

Phyllagathis rotundifolia Bl.

Bandar Bahru, Gunong Sibayak (Mohamed Nur 7373).

Distrib. Malay Peninsula and islands.

Medinilla septuplinervia Cogn.

Sibayak volcano woods. Epiphytic and terrestrial; bush; flowers rose-pink. Also occurs on Mount Singalan.

Medinilla vulcanica Ridl. n. sp.

A terrestrial shrub 2 feet tall, forming thickets. Stems .25 in. through, 4-angled above with large pustules, nodes enlarged. Leaves stiffly coriaceous, obovate, blunt or rounded at the top; nerves one pair from the base, and one from the broad thick midrib, .75 in. from the base, 3.25 in. long, 2.25 in. wide; petiole thick, .25 in. long. Panicle axillary below the leaves; peduncle 2.5 in. long; branches 4 or 5, slender, 1.5 in. or less long; flowers solitary at the ends of the branchlets. Calyx urceolate papillose when dry. Petals white, ovate 5, acute. Stamens 5, filaments slender; anthers acuminate slender, with two upcurved processes at base. Fruit globose, as big as a large pea, white.

On the slopes of the Sibayak volcano, forming a dense scrub up to the knees.

Medinilla micrantha Ridl. n. sp.

Epiphyte with slender branches, pale, warted in the lower part. Leaves coriaceous elliptic, shortly acuminate blunt, sessile; nerves inconspicuous, one pair, base rounded subcordate, 3 in. long, 1.5 in. wide. Flowers very small, white, in a small umbellate cyme .6 in. across on a slender peduncle .75 in. long. Bracts 2, small at base of flower. Calyx campanulate, truncate. Petals oblong blunt, .1 in. long. Stamens short, 8, equal, pink. Fruit small, campanulate.

Allied to *M. cuspidata* Bl. of Borneo of which however, the flowers are not known, but this has not long acuminate leaves.

Medinilla Clarkei King.

Bandar Bharu, Gunong Sibayak (Mohamed Nur).

Distrib. Malay Peninsula.

Pachycentria scandens Ridl. n. sp.

Scandent shrubby plant with smooth brown bark. Leaves thin, coriaceous, elliptic acuminate at both ends, 3-nerved, 3.5 in. long, 1.5 in. wide; petioles .4 in. long. Flowers in a terminal cyme of 3 branches each with 3 flowers, whole cyme 1.5 in. long,

scurfy. Bracts at base of branches 2, lanceolate acuminate, .1 in. long or less. Pedicels .1 to .15 in. long. Calyx funnel-shaped, narrowed slightly below the limb; lobes tooth-like, 4. Corolla in bud acuminate. Petals lanceolate acuminate, 4, white or pink .5 in. long. Stamens 8, 4 smaller than the others with shorter filaments and blunter points, larger ones acuminate with small blunt processes at the base, dorsal process minute. Style as long as stamens. Fruit globose, red, .25 in. through, crowned by the persistent calyx-tube.

Berastagi; forests; flowers white; fruit red; climbing on trees.

ONAGRACEAE.

Jussiaea villosa Lam.

Damp swampy spots. Flowers one inch across, yellow. Berastagi. *Distrib.* India, Malaya.

CUCURBITACEAE.

Melothria punctata Cogn.

In a lane by a Battak village, Berastagi.

Distrib. Africa, Java, Celebes.

Melothria mucronata Miq.

Berastagi; flower white (Mrs. Burkill). *Distrib.* Java.

Gynostemma laxa Cogn.

Berastagi Woods. Flowers green.

Distrib. India and Ceylon; also collected in Sumatra by Beccar.

Hodgsonia capniocarpa Ridl.

Sibolangit, Bukit Samaik (Mohamed Nur 7450).

Distrib. Malay Peninsula.

BEGONIACEAE.

Begonia Beccariana Ridl. n. sp.

A rather tall, hairy plant, stem and petioles covered with long red hairs. Leaves ovate acuminate, base unequally bilobed or acutely lobed, deep blackish green above, red beneath, pustular above, dotted with short hairs beneath, edge dentate with a hair on each tooth; nerves about 6, dense hairy, 5 in. long, 4 in. wide; petiole 4 in. long. Peduncle hairy 4 in. long, with about 6 white flowers. Males 1.5 in. across. Sepals oblong, roughly hairy on the back. Petals shorter and narrower, blunt subovate. Stamens very numerous; anthers linear-oblong blunt; filaments free. Female flower smaller, glabrous except the hairy ovary. Fruit hairy, 3-winged, two wings .5 in. long, .25 in. wide, larger one triangular .5 in. long and .5 in. wide at the base.

Hill Woods at Berastagi. Also collected by Beccari on Mount Singalan (no. 126). His specimens are more deeply cut in the leaves than mine and the leaves are larger, 6 in. long and wide.

This is near *B. Lowiana* King and *B. robusta* of Java, the flowers are larger than in the first named and the leaves more deeply cut, and it is a smaller plant altogether than the Javanese one.

***Begonia turbinata* Ridl.**

Flowers white; fruit green fleshy. Occurs on Korinchi. The leaves are more distinctly toothed than in the type plant.

***Begonia trigonocarpa* Ridl.**

Sibayak Volcano Woods. Flowers white, tipped with pink. Also occurs on Korinchi.

***Begonia flexula* Ridl. n. sp.**

Slender erect plant; stems flexuous, rough with small papillae about 8 in. tall possibly more, internodes 1 in. long, nodes slightly swollen. Leaves thin, membranous lanceolate long acuminate, base narrowed, blunt, obscurely inaequilateral, edge crenate-undulate; nerves 3 pairs ascending alternate, all glabrous except the nerves shortly scabrid-hairy beneath, 4 in. long, 1.5 in. wide; petiole .2 in. long or less. Stipules linear acuminate, caudate .1 in. long. Flowers, male 3 or 4 on a slender filiform peduncle .2 in. long; pedicels .1 in. long. Perianth-lobes 2, oblong blunt, white, .1 in. long. Stamens 15. Anthers oblong on filament free to base, blunt, club-shaped, not apiculate. Female flowers with 4 equal or sub-equal lobes. Capsule oblong-orbicular, base round; wings 3, rounded equal, 3.3 in. long by .4 in. wide crowned by the persistent sepals. Sibulangit, Bukit Kluang (Mohamed Nur 7444).

This is allied to *B. isoptera* Dry., but is the smallest form of this section I know, the slender rough flexuous stem and the very small flowers and fruit are characteristic.

UMBELLIFERAE.

***Hydrocotyle asiatica* Linn.**

Common in cultivated ground. A form with woolly petioles and underside of leaves occurred also. *Distrib.* Warm countries.

***Hydrocotyle hirsuta* DC.**

Common on the plains at Berastagi. *Distrib.* Malay islands.

***Hydrocotyle javanica* Thumb.**

Woods of Berastagi. *Distrib.* India, Malay Peninsula and islands.

***Sanicula europaea* Linn.**

Abundant in woods, Berastagi.

Distrib. Europe Asia, Malay Peninsula (Telom), Africa.

***Oenanthe laciniata* Miq.**

In streams, open plain. Flowers white.

Distrib. Malay Peninsula and islands.

***Torilis anthriscus* Gmel.**

Cultivated ground near Berastagi. Flowers white.

Distrib. Europe, North Asia.

ARALIACEAE.

Aralia Beccarii Ridl. n. sp.

Tree about 20 feet tall, spiny with spines stout, conic, some slightly flattened with an acute point, base hairy, all light brown .25 in. long. Leaves large, compound, rachis covered with scattered thorns, scurfy, branches hairy and spiny; leaflets ovate or elliptic-ovate, shortly cuspidate, base rounded, edge serrulate, above tesellate and sprinkled with short hairs, beneath densely hairy on the nerves (about 8 pairs) and reticulations, 4 to 4.5 in. long, 2 to 2.5 in. wide; petiolules .1 in. long above, .4 in. long in lower leaflets. Panicles 18 in. long; branches distant below, 6 in. long, 4-umbelled at the top, covered with short, appressed hairs and sprinkled with short thorns. Bracts at base of branches lanceolate acuminate cuspidate, .4 in. long. Umbels very many .25 in. through. Flowers small, sessile with short lanceolate bracts. Calyx obconic, pustular with hair bases; lobes 5, short triangular acute. Petals small, 5, oblong. Stamens 5, inflexed; anther ellipsoid. Styles 5, eventually reflexed, quite free to base. Fruit small, ellipsoid, strongly 5-ribbed when dry. Common in the Berastagi Woods, but I only found one tree showing inflorescence on the Western Hills. Also collected by Beccari at Kayu Tanam, Padang, south west Sumatra No. 871.

Brassaiopsis floribunda Seem. (*Macropanax glomeratum* Miq.)

A treelet 15 feet tall, spiny; flowers yellowish. Berastagi woods.

Distrib. Java.

Heptapleurum triste King.

In the low scrub on the foot of the Sibayak volcano.

Distrib. Perak Hills.

Heptapleurum heterophyllum Seem.

Bandar Bahru, Gunong Sibayak (Mohamed Nur).

Distrib. Malay Peninsula and islands.

Heptapleurum polybotryum Seem.

Berastagi (Mrs. Burkill). Fruit deep claret. *Distrib.* Java.

CAPRIFOLIACEAE.

Viburnum coriaceum Bl.

Fruit red. Flowers white. Stamens dark violet. Small tree or shrub, Berastagi woods. *Distrib.* Java.

Lonicera pulcherrima Ridl. n. sp.

Tall climbing plant; branches velvety. Leaves coriaceous, ovate blunt or subacute, base shortly narrowed, above glabrous shining, nerves and nervules depressed beneath, white tomentose; nerves 3 pairs and reticulations elevate, 3 in. long, 2.25 in. wide; petioles .25 in. long, velvety. Flowers in terminal cymes of 15 or

more. Bracts small, lanceolate. Calyx .08 in. long, tube ellipsoid, subglabrous, lobes lanceolate as long as tube velvety. Corolla pale yellow, tube slender 1 in. long, velvety; lobes linear-oblong .25 in. long. Stamens filaments linear, sparsely hairy; anthers curved linear. Styles sparsely hairy .5 in. longer than corollatube. Stigma capitate.

Berastagi, climbing on trees on the hill above the bungalow.

This beautiful honeysuckle is allied to *L. macrantha* DC. of India and Burma, differing in the stiffer leaves, not rounded at the base and white velvety beneath, the stem is not hairy but softly thickly velvety, and the calyx-lobes not linear acuminate, shorter and broader.

Sambucus javanica Bl.

Common in the Berastagi woods. *Distrib.* India, China, Malay islands. Absent*from Malay Peninsula.

RUBIACEAE.

Hedyotis pinifolia Wall.

Berastagi plains. A slender erect form on banks in short grass. *Distrib.* Indo-Malaya.

Hedyotis hispida Retz.

Plains, Berastagi. *Distrib.* Indo-Malaya.

Hedyotis stipulata Wall.

Berastagi. Flowers white. *Distrib.* India, Malay Peninsula.

Ophiorrhiza bracteata Korth.

Slightly woody at the base, not or sparingly branched, scurfy hairy and viscid above. Leaves hairy on the nerves beneath and dotted with bulbous based hairs above. The flowers large for an *Ophiorrhiza* nearly .5 in. long, pure white with large lanceolate green bracts. The stipules are ovate cuspidate. In the hill woods at Berastagi high up. *Distrib.* Java.

Ophiorrhiza deflexa Ridl. n. sp.

Tall fleshy herb sparsely scurfy. Leaves lanceolate-elliptic and oblanceolate, very variable, acuminate sparsely hairy and pale beneath, nerves 13 pairs slender, looping near the edge, 4 to 5.5 in. long, 1.5 to 2.5 in. wide; petiole 1 in. long. Stipules filiform. Cyme pendulous in flower, erect in fruit. Peduncle .5 in. long; branches about 4.25 in. long, all scurfy pubescent. Bracts linear setaceous, small. Pedicels .1 in. or less long. Calyx short, angled. Corolla campanulate, tube broad, lobes recurved .4 in. long, .25 in. wide at the mouth. Stamens at the base of the tube. Fruit cyme erect; peduncle 2 in. long; branches 1.5 in. long, hairy. Capsule transversely oblong, upper edge straight, .3 in. wide, puberulous.

In the Berastagi forest woods. A shrublet with pinkish-white flowers. Remarkable for its wide trumpet-shaped corolla.

Ophiorrhiza exserta Ridl. n. sp.

A widely branched herb, scurfy-pubescent. Leaves thinly membranous, glabrous above except the edge which has small stiff hairs, scurfy on the nerves beneath, oblong or elliptic to ovate, acuminate and decurrent on the petiole for some way; nerves parallel, 11 pairs, 3 to 3.5 in. long, 1.25 to 1.4 wide; petioles .75 in. long, pubescent. Stipules setaceous hairy. Cymes terminal and in the uppermost axils; peduncle .25 in. long, pubescent; branches short. Flowers white about 12 in a cyme. Bracts very small setaceous. Calyx small, campanulate with narrow teeth as long as tube. Corolla urceolate, tube .15 in. long dilate at base, narrowed above; lobes reflexed. Stamens long projecting.

Hill woods, Berastagi. I got no fruits of this pretty species which is allied to *O. tenella* Ridl., but larger and with a different shaped corolla.

Ophiorrhiza subcrenata Ridl. n. sp.

Herbaceous; base of stem slightly woody, creeping. Leaves elliptic-lanceolate, thickly membranous, glabrous except midrib, scurfy beneath and young parts hairy, acuminate at both ends, edge crenate undulate, nerves slender, 10, with nervules and reticulations conspicuously elevate above, 2 in. long, 1 in. wide; petiole slender .4 in. long. Stipules oblong-lanceolate acuminate, glabrous, .1 in. long. Peduncles terminal .5 in. long. Flowers few, very shortly pedicelled. Bracts persistent linear-oblong, blunt glabrous, .1 in., longer than pedicel and ovary. Calyx small, red hairy as is pedicel, lobes small, acute. Corolla cylindric .2 in. long, white; lobes short rounded. Stamens included. Capsule V-shaped, glabrous when adult, very slightly retuse at top, bracts persistent.

Sibayak Volcano (Mohamed Nur 7345).

A very distinct little plant in having the reticulations and nerves elevate above and not beneath, and in its crenate leaves. The bracts also are persistent and for the flowers large.

Carlemannia sumatrana Ridl. n. sp.

Herb about a foot tall, branched puberulous above. Leaves membranous ovate to lanceolate acute narrowed to base, edge coarsely serrate, sparsely white hairy on both sides; midrib beneath and 5 pairs of nerves shortly close hairy, 3 in. long, 1.25 in. to 1.5 in. wide; petioles slender 1 in. long. Stipules a mere ring very obscure. Corymbs terminal; peduncles and branches puberulous, 1 in. long and wide, many flowered, or smaller. Calyx-tube very small, campanulate, lobes 4, linear acute hairy as long as the corolla, green .1 in. long. Corolla hairy at the tip, tube cylindric, lobes 4, hairy outside. Stamens 2, from the corolla base; anthers linear blunt, large for the flower. Style thick cylindric sigmoid. Capsule .1 in. wide, broad at base, narrowed at the top, strongly 4-lobed at the base, each lobe separately dehiscent. Seeds numerous, black, reticulate.

Woods, Berastagi.

The genus *Carlemannia* has not hitherto been recorded from the Malay islands. It is represented by 3 or 4 species in North India, one or more in China and Cochin China. This species is distinguished by the very long sepals and the curiously 4-lobed capsule. I have no record of the colour of the flowers, but the corolla seems to have been pink.

Argostemma boragineum Bl.

Berastagi woods. This differs from the typical Javanese form in having the corolla-lobes more rounded and less acute.

Distrib. Java.

Argostemma stellatum Ridl. n. sp.

Slender herb 8 in. tall; stem glabrous. Leaves equal lanceolate, narrowed at both ends, whitish beneath, edge slightly crenulate, dotted all over with scattered short hairs, midrib hairy above glabrous; nerves 4 pairs, 1.5 to 2.5 in. long, .4 to .9 in. wide; petiole .1 to .2 in. long. Stipules oblong, rounded at tip. Cyme of 3 flowers; peduncle 1 in. long. Bracts at base of cyme 3, oblong .1 in. long; pedicels .6 in. long hairy at the top. Calyx hairy, lobes lanceolate acute. Corolla pure white 1 in. wide or more, lobes lanceolate-acute, .5 in. long, .3 in. wide. Stamen-column shorter, narrowed to the tip.

Berastagi, hill woods. A beautiful species with large white star-like flowers. Allied to *A. montanum* Bl. and to *A. angustifolium* Miq., but that is described as glabrous. The plant is occasionally branched.

Argostemma corymbosum Ridl. n. sp.

Stout ascending hairy herb, 10 in. tall. Leaves equal ovate-elliptic, base rounded or truncate, tip acute, sprinkled with hairs above; midrib hairy; nerves 11 pairs and midrib long-hairy beneath, 4.25 in. long, 2.5 in. wide, petiole densely hairy 1.5 in. long. Stipules oblong-lanceolate acuminate, .75 in. long. Peduncle hairy 2.5 in. long. Flowers umbelled, 17 or more. Pedicels 1 in. long, hairy. Calyx small campanulate, hairy; lobes small broadly ovate. Corolla lobes lanceolate acuminate .3 in. long. Staminal column as long, narrowed to the tip.

In the Berastagi hill woods on the track to Sibayak Volcano.

Argostemma triflorum Ridl. n. sp.

Herb, 6 in. tall, hairy. Leaves unequal, the large one elliptic-lanceolate acuminate, base narrowed blunt, deep green above, white beneath, edge slightly serrate with hairs on the serrations; midrib above and beneath and 5 pairs of nerves hairy, 1.5 to 1.75 in. long, .5 in. wide; petiole .15 in. long; small leaf, ovate sessile hairy on the edge, .25 in. long. Stipules leafy, green resembling the small leaf but smaller. Peduncle .5 in. long, hairy. Cyme 3-flowered. Bracts at base 3, lanceolate acute, hairy on the edge .1

in. long. Pedicels white, hairy .5 in. long. Calyx obovate hairy. Corolla-lobes narrow linear lanceolate, .25 in. long, hairy on the back. Staminal column thick, as long.

Berastagi Hill woods. Near *A. uniflorum* Bl. but it has 3 flowers in the cyme. It might be *A. pulchrum* of Korthals from Sumatra, but I have seen no specimens of this and the description is quite inadequate.

Mussaenda hirsuta Ridl. n. sp.

Scandent; branches densely red-brown-velvety. Leaves elliptic-lanceolate acuminate, long narrowed to the base; nerves 14 pairs, slender raised beneath, densely hairy as is midrib both sides and the surface of the leaf on both sides more sparsely hairy, 4.5 in. long, 1.75 in. wide; petioles densely hairy .5 in. long. Corymb densely hairy all over 1.5 in. long. Calyx-tube funnel-shaped .2 in. long, hairy, lobes much shorter, linear-lanceolate, hairy, top of ovary raised, black (when dry) glabrous. Enlarged sepals ovate narrowed to base, blunt at tip hairy all over, .2 in. long by 1.75 in. wide, claw slender 1 in. long. Corolla orange, tube 1.25 in. long slender cylindrical hairy, lobes short .2 in. long oblong blunt.

Common on wood edges, Berastagi.

I know no species really at all like this. *M. rufinervis* Miq. of Padang in South Sumatra has quite different leaves and sepals as long as the calyx-tube.

Mycetia fasciculata Korth.

Shrub with yellow flowers, Berastagi Woods. *Distrib.* Java.

Mycetia angustifolia Ridl. n. sp.

A tree about 30 feet tall. Leaves narrow lanceolate, long acuminate, long narrowed to both ends, thin chartaceous, glabrous, nerves 13 pairs, 4 to 8 in. long, .5 to 1 in. wide; petioles .3 in. long. Stipules lanceolate acuminate, dilate at base .25 in. long. Cymes axillary 2 in. long, branching from near the base; branches very slender puberulous; bracts linear acuminate; pedicels .5 in. long. Calyx campanulate, lobes linear, half as long as the tube. Corolla yellow .5 in. long, tube cylindrical, lobes short recurved.

Berastagi Woods. This cannot be Miquel's *Adenosacme lanceolata* (*Mycetia lanceolata*) Palambajan, Sumatra, from description: for it is described as a shrub with short stipules puberulous; nerves beneath and calyx-lobes longer than the tube.

Urophyllum glabrum Jack.

Woods on the Sibayak Volcano.

Distrib. Malay Peninsula, Java, Borneo. This is usually a lowland plant; but Korthals got it on Mount Singalan.

Urophyllum grandifolium Ridl. n. sp.

A tall shrub, glabrous except the inflorescence; branches .3 in. through. Leaves stiff, thinly coriaceous elliptic, shortly cuspidate, base narrowed shortly; nerves about 20 pairs elevate beneath 10 in.

long, 5 in. wide; petioles 1 in. long. Stipules lanceolate, long acuminate 1 in. long. Cymes puberulous, lax, spreading peduncle 2 in. long; branches 1.5 in. long, 3 or 4. All covered with appressed whitish hairs. Cymules 2 of 4 or 5 flowers, with a single flower on the central branch. Calyx campanulate with short obscure rounded lobes .1 in. long. Corolla white .2 in. long; lobes coriaceous ovate-lanceolate, acute.

In the woods of Berastagi.

Near *U. corymbosum* Korth; but with much larger elliptic leaves, corymbs and flowers.

Urophyllum macranthum Ridl. n. sp.

A tree; branches glabrous. Leaves elliptic to lanceolate, long acuminate, base round or shortly narrowed, thin coriaceous, glabrous; nerves about 10 pairs, 5 in. to 1.5 in. wide; petioles .2 in. long. Stipules lanceolate acuminate, very narrow, hairy. Cymes .5 in. long, hairy, of 4 or 5 flowers. Bracts lanceolate cuspidate, hairy; pedicels .15 in. long. Calyx large, cup-shaped, hairy, .4 in. long; lobes very obscure rounded, dull grey-green. Corolla-tube little longer; lobes narrow oblong, .25 in. long, white, mouth of tube white hairy. Fruit globose, hairy, narrowed at the top terminated by the calyx-tube.

In the lower woods, Berastagi. Remarkable for the large size of its flowers, the largest in the genus.

Petunga Roxburghii DC.

Hill forest, Berastagi. *Distrib.* Indo-Malaya.

Petunga hirta Ridl. n. sp.

Shrub; stem shortly densely hairy. Leaves lanceolate, cuspidate acuminate, base narrowed, thinly coriaceous; nerves 7 to 8 pairs slender, above glabrous, beneath hairy on the midrib and nerves, 4.5 in. long, 1.75 in. wide; petiole .2 in. long densely hairy. Stipules triangular acuminate, base and keel hairy .2 in. long. Spikes dense .3 in. long; peduncle, bracts and calyx densely yellow hairy. Bracts lanceolate acuminate. Flowers minute sessile. Calyx shortly 5-lobed; petals 5, oblong blunt pubescent, tube very short with long white hairs on lobes inside; filaments short; anthers linear-oblong with a short point; style and stigma covered with long white hairs.

Sibolangit, Bukit Kluang (Mohamed Nur 7405). The only hairy species in the genus known to me.

Spiradiclis acuminata Bl. Sibolangit, Dato Pulo Siam valley (Mohamed Nur). *Distrib.* Java.

Stylocoryne sylvicola Ridl. n. sp.

Small tree; branches appressed hairy. Leaves lanceolate cuspidate, base narrowed, coriaceous, above scabrid, glabrous except the midrib beneath, sparsely hairy; midrib and nerves depressed

above, elevate beneath, 12 pairs hairy, 6.5 in. long, 2.4 in. wide; petioles .5 in. long. Stipules connate tubular with 2 long points hairy, .3 in. long. Corymb 4 in. across; peduncles 3, hairy 1.5 to 2 in. long. Bracts linear acute, spreading, .2 in. long. Flowers numerous, white, very shortly pedicelled. Calyx-tube globose, hairy, .05 in. long; lobes forming a tube below, 5, very short oblong. Corolla .5 in. long; tube cylindric, hairy; lobes oblong blunt about half as long. Style clubbed, glabrous projecting .5 in. long. Fruit globose, pea-shaped, glabrous, .2 in. through. Seeds very numerous brown, angled and ribbed.

Berastagi woods. Near *S. dasphylla* Miq., but more hairy with different shaped leaves.

Psychotria montana Bl.

Berastagi woods. *Distrib.* Malay Peninsula and islands.

Psychotria penduliflora Ridl. n. sp.

Shrub, glabrous. Leaves chartaceous elliptic-lanceolate, narrowed to both ends; nerves 12 pairs, 6 in. long, 2 in. wide; petiole 1.5 in. long. Stipules lanceolate papery acute denticulate. Cymes pendulous from the uppermost axils, 2 in. long (peduncle 1.5 in. long) branches few, short. Bracts blunt lanceolate. Calyx campanulate with short pubescent ovate rounded lobes. Corolla .3 in. long, white; tube thick cylindric, lobes broad ovate blunt more than half as long. Stamens partly exsert. Fruit elliptic narrowed to the base, .4 in. long, 12 ribbed, crowned by the tubular calyx.

Berastagi hill woods. Very distinct in its long pendent deflexed cymes.

Psychotria multinervia Ridl. n. sp.

Shrub; stems thick sparsely hairy. Leaves large elliptic or obovate, cuspidate, base cuneate, beneath dotted with minute hairs; nerves 16 pairs and midrib red-pubescent, 7 in. long, 3.5 in. wide; petioles .5 in. long, thick. Stipules large ovate or oblong cuspidate-acuminate 1.25 in. long, .3 in. wide. Cymes 3, dense capitate on a red pubescent peduncle 1.5 to 2.5 in. (in fruit) long. Cyme-peduncles .5 in. long. Bracts linear deflexed .25 in. long. Heads .5 in. through of many flowers, sessile with persistent lanceolate acuminate bracts. Calyx campanulate, lobes short triangular. Corolla-tube cylindric, .3 in. long, white, mouth white hairy, lobes 5, triangular acute, half as long. Stamens half exsert. Fruit ellipsoid narrowed to the base, 10-ribbed, crowned by the enlarged calyx .4 in. long.

Hill woods, Berastagi.

Chasalia propinqua Ridl. n. sp.

Shrub, glabrous. Leaves thin lanceolate acuminate, base long narrowed; nerves about 8 pairs inarching, 6 in. long, 1.75 in. wide; petiole 1 in. long. Cyme 1.5 in. long and wide; peduncle 1 in. long. Flowers small, white shortly pedicelled. Calyx small,

saucer-shaped with acute triangular points. Corolla .3 in. long; tube cylindric slightly curved at top; lobes short, rounded, crisped on the edge .08 in. long. Fruit .4 in. long, pulpy dark claret colour; pyrenes large with one strong rib on the back.

In the hill woods, Berastagi.

I should have referred this to a form of the common *Chasalia curviflora*, Thw., except that the fruit and pyrenes are very much larger than in that species and the flowers smaller.

Cephaelis pauciflora Ridl. n. sp.

Slender unbranched shrub over 12 in. tall. Leaves membranous, lanceolate, cuspidate, base long narrowed; nerves 7 pairs slender, 4 in. long, 1 in. wide; petiole slender .4 in. long. Stipules oblong, convolute, papery, .25 in. long. Peduncle 2.5 in. long, slender. Capitulum .4 in. across, of very few flowers, about 6. Bracts, outer 2 oblong ovate, thin, .25 in. long, inner bracts papery as long as the corolla-tube. Corolla white, .25 in. long. Fruit .3 in. long, blue.

Berastagi hill forests. A very distinct plant in its thin leaves and very small few-flowered heads.

Lasianthus rhinocerotis Bl.

Shrub. Berastagi woods, shrub 3 feet tall.

Distrib. Malay Peninsula and islands.

Lasianthus stercorarius Bl.

Berastagi woods. A small tree.

Distrib. Malay Peninsula and islands.

Lasianthus (Mephitidia) vulcanicus Ridl. n. sp.

A small tree. Leaves elliptic caudate, base cuneate, quite glabrous; nerves 7, transverse nervules few, conspicuous, 2.5 in. long, .75 in. wide; petioles slender .1 in. long. Stipules small sheathing at base with a tooth-like point. Cymes sessile of 3 or 4 flowers. Flowers white, very small, barely .1 in. long, subsessile. Calyx obconic; teeth very short. Corolla-tube very short, cylindric; lobes ovate as long or longer. Fruit very small .12 in. through, obconic crowned with the enlarged calyx teeth. Pyrenes 4.

Woods of Sibayak volcano. Allied to *L. lucidus* Bl. A very elegant species with its long caudate leaves.

Knoxia corymbosa Willd.

Berastagi plains. *Distrib.* Indo-Malaya.

Knoxia lineata DC.

Small herb with pale lavender coloured flowers. Common in the lalang fields at Berastagi. *Distrib.* Java, Borneo.

Rubia cordifolia L. var. **javana** Miq.

Hedge banks, Battak village, Berastagi. Common.

Distrib. Java.

COMPOSITAE,

Vernonia javanica DC. var. **conferta** DC.

Woods at Berastagi. A form with leaves very softly tomentose at the back as are the panicle branches.

Distrib. Malay Peninsula and islands.

Vernonia cinerea Less.

Common in open country. The leaves are quite linear to linear lanceolate in the form here. *Distrib.* Tropics generally.

Adenostemma viscosum Forst.

In a wooded ravine, on the south of the plain. Berastagi.

Distrib. Tropical Asia.

Erigeron sumatrense Retz.

Common all over the plateau in lalang.

Distrib. Malay Peninsula and islands.

Microglossa volubilis DC.

Woods, Berastagi. Flowers white.

Distrib. Malay Peninsula and islands.

Lagenophora Billiardieri Benth.

This pretty little miniature daisy dotted the grassy open spots of the plateau. Flowers white.

Distrib. Tropical Asia (wanting in Malay Peninsula).

Laggera alata Schultz-Bip.

In lalang grass; not very common in the plateau. Flowers a beautiful rose pink. *Distrib.* Malay islands.

Dichrocephala latifolia DC.

Open country in damp spots. *Distrib.* Tropical Asia.

Blumea hieracifolia DC.

Open plains, Berastagi. *Distrib.* India, Java.

Blumea lacera DC.

Open plains, Berastagi. Flowers yellow. Involucre purple.

Distrib. Indo-Malaya.

Blumea chinensis DC.

Berastagi (Mrs. Burkill). *Distrib.* Eastern tropics.

Blumea aromatica DC.

Six feet tall. Flowers yellow. Woods on the hills, Berastagi.

Distrib. Malay Peninsula and islands.

Blumea scabrifolia Ridl. n. sp.

Tall plant over 3 feet tall. Stem rather slender, thinly arachnoid. Leaves alternate, distant thinly chartaceous, above scabrid with minute pustules, beneath sparsely appressed hairy; midrib and nerves densely appressed hairy, lanceolate acuminate, narrowed

to the base, sessile, edges serrulate, 6 in. long, 1.5 in. wide. Panicle long, lax, 18 in. with a few axillary branches below, silvery woolly; branches 1 to 2 in. distant below, 3 to 5 in. long with a leafy bract at the base of each. Cymes of heads about 2 in. across, lax. Heads .25 in. long; peduncles .3 in. long. Involucral bracts, basal short lanceolate hairy, upper ones linear acute of ten, tipped pink, twice as long. Male flowers .25 in. long. Corolla-tube slender, dilated at tip, lobes ovate. Female flower smaller very slender. Style bifid. Achene linear-oblong ribs about 6, hairy. Pappus .25 in. long, white silky, minutely scabrid.

Berastagi woods.

There are a number of species of *Blumea* described under *Conyza* by Miquel, but I cannot fit this plant to any, though it seems to be nearest to *Conyza Korthalsiana* Miq. of Singalang.

Siegesbeckia orientalis Linn.

In waste ground. Flowers yellow.

Distrib. Weed all over Tropical Asia.

Wedelia asperrima DC.

Woods of Berastagi. *Distrib.* Java.

Bidens pilosa Linn.

Open country in cultivated and waste ground.

Distrib. Tropical Asia.

Spilanthes acmella Linn.

Very common in damp open spots. *Distrib.* Whole tropics.

Enhydra fluctans Lour.

Rice fields at the base of the volcano, Gunong Sibayak.

Distrib. India, Malaya, China.

Artemisia vulgaris Linn.

Damp spots in ravines in open cultivated country. Flowers white. Leaves white beneath, Berastagi.

Distrib. Most parts of the world, introduced into Malaya.

Anaphalis longifolia DC.

Sporadic on the plateau, not common. *Distrib.* Java.

Erechthites valerianaefolia DC.

Open pastures. A native of South America, according to Hasskarl brought by Governor General Rockussen to Java with Coffee seed from Brazil in 1845. It is now spread over Borneo, Java and the Malay Peninsula.

Gynura sarmentosa DC. var. *longipetiolata*.

This plant differs from typical *Gynura sarmentosa* in having the petioles .1 to .75 in. long, the blade of the lower leaves is almost deltoid serrate acute with a broad base of which the centre is shortly decurrent on the petiole.

In a lane by the Battak village.

***Gynura aspera* Ridl. n. sp.**

Herb erect, 2 feet and more tall, not tuberous, shortly rough hairy, stem ribbed. Leaves membranous, narrow lanceolate acute, coarsely toothed, sessile, rough hairy auricled at the base, 3.75 in. long, .4 in. wide. Capitula about 10, crowded at the top. Involucral bracts glabrous lanceolate linear .25 in. long, brownish with pale edges. Flowers yellow. Corolla-tube very slender, dilate towards the tip .3 in. long. Pappus white, silky .5 in. long, not bearded. Achene narrow linear cylindrical with 8 longitudinal ribs with short hairs between.

In long grass on the plateau. There is also a reduced form 5 in. tall with 1 to 3 heads; leaves 1 in. long. This species is allied to *G. malasica* Ridl. and *G. pseudo-China* D.C., but differs in the form of leaves and hairiness.

***Emilia sonchifolia* DC.**

Common in open grassy spots. *Distrib.* Tropical Asia.

***Emilia angustifolia* DC.**

Less common. This has very narrow leaves. Flowers pink. *Distrib.* Philippines.

***Lactuca brevirostris* Champ.**

Common on the open plateau. A handsome plant about 4 feet tall, with pale yellow flowers. *Distrib.* Philippines.

***Crepis japonica* Benth.**

Common on the plateau. *Distrib.* Tropical Asia.

LOBELIACEAE.***Pratia begoniaefolia* Lindl.**

A common weed in the potato fields, often covering the ground. *Distrib.* India, Malay Peninsula and islands.

***Pratia montana* Hassk.**

Upper woods on Sibayak volcano. Flowers dark blue. *Distrib.* Java.

***Lobelia trialata* Ham.**

Open country, Berastagi. Calyx purple. Corolla pale violet and white. *Distrib.* Indo-Malaya.

CAMPANULACEAE.***Campanumoea celebica* Bl.**

Lane by the Battak village. *Distrib.* Malay Peninsula and Java.

ERICACEAE.

Gualtheria leucocarpa Bl.

Woods and scrub of the volcano Gunong Sibayak at 7,000 feet alt. Flowers white. *Distrib.* Malay Peninsula and Java.

Rhododendron multicolor Miq.

I picked up a spray of flowers in the woods on the slope of the volcano Sibayak, apparently belonging to this Sumatran species. The flowers were dark red.

There was another *Rhododendron* there with small lanceolate elliptic very coriaceous leaves 2 inches long and 1.1 in wide opposite. Fruits .5 in. long, on long stalks. It cannot be *multicolor* as the leaves are not whorled, but I saw no flowers.

Rhododendron malayanum Jack.

Gunong Sibayak (Mohamed Nur 7350).

Distrib. Malay Peninsula and islands.

Clethra pulcherrima Ridl. n. sp.

Small tree. Leaves coriaceous, lanceolate acute, base long narrowed, entire; nerves 13 pairs elevate beneath; nervules transverse, rather irregular, glabrous except the young leaves which are pubescent. Racemes in upper axils and terminal, 8 in. long, pubescent. Flowers white, 40 or more in a raceme; pedicels pubescent .5 in. long. Sepals lanceolate acute, reddish, pubescent .3 in. long. Petals slightly longer oblong truncate at top, connate at base, entire. Stamens 10, adnate to corolla at base; filaments shorter than petals narrowed upwards, white hairy; anthers dorsifixed elliptic dehiscing by pores at the top. Style long, elongating after the fall of the corolla to .25 in. long, glabrous; stigma capitate. Ovary hairy, 3-celled.

Woods on the lower slopes of the volcano Sibayak at about 6,000 ft. alt. Allied to *C. sumatrana* J. J. Smith, a native of Toba in the same area, but differing in the entire lanceolate leaves, and larger white (not pink) flowers.

PRIMULACEAE.

Lysimachia japonica Thunb.

In cultivated ground, West Hills, Berastagi. Flowers bright yellow. Plant prostrate, covered with white hairs.

Distrib. Japan, India, Philippines.

MYRSINACEAE.

Maesa pyrifolia Miq.

Berastagi woods. *Distrib.* Java.

Maesa latifolia DC.

Berastagi woods. A small tree. Flowers whitish. A striking plant from its very distinct teeth on the edge of the upper part of the leaf. *Distrib.* Java.

Embelia pergamacea DC.

In the low scrub on the Sibayak volcano at 6,000 feet.

Distrib. Malay Peninsula and Java.

Ardisia fertilis Miq.

Berastagi woods. A tree with white flowers.

Ardisia speciosa Bl.

Berastagi woods. A shrub. Inflorescence dull red.

Distrib. Java.

Ardisia pterocaulis Miq.

A tall shrub. Flowers pink; fruit white. Berastagi hill woods.

Distrib. Malay islands.

Ardisia Ridleyi King.

Shrub 5 to 6 feet tall. Flowers white; fruits claret-colour. Berastagi woods, on the hills. *Distrib.* Malay Peninsula.

Ardisia (§Pimelandra) megalocarpa Ridl. n. sp.

Shrub 10 to 15 feet tall; branches, inflorescences and midrib beneath shortly densely hairy. Leaves oblong-lanceolate, shortly acuminate, base narrowed blunt or subacute; nerves very numerous, fine and close; nervules and reticulations fine and visible on both sides, thinly coriaceous, pustulate on both sides, 8 in. long, 2.25 in. wide; petiole .5 in. long hairy. Cymes extra-axillary from the branches, 3-flowered; peduncle 1 in. long, hairy. Flowers unknown. Fruit ovoid globose, .3 in. long, ribbed; pedicels stout, .4 in. long, hairy. Sepals ovate acute, .1 in. long, closely glandular outside, the glands in numerous vertical lines on the inside, hairy edges long-haired.

Sibolangit (Mohamed Nur 7354).

I know no species of this section which has such large fruits, nor the curiously dotted and hairy sepals.

Labisia ovalifolia Ridl. n. sp.

Stem woody, rooting erect, 9 in. tall. Leaves ovate elliptic acute, base decurrent on petiole, chartaceous; nerves very numerous fine and parallel; reticulations fine and close, edge bluntly denticulate. scurfy beneath on midrib and pustular beneath, 5 in. long, 3 in. wide; petioles .5 in. long. Panicle racemiform, the lower flowers in short 3 to 4-flowered cymes, upper ones solitary, all scurfy. Peduncle 1 in. long; panicle 1.5 in. long. Bracts minute lanceolate acuminate; pedicel .05 in. long. Calyx-lobes 5 triangular acute scurfy. Corolla ovoid blunt in bud; petals ovate sub-acute .1 in. long, glandular; style persistent .1 in. long.

Gunong Sebayak (Mohamed Nur 7395). Flowers white. Near *L. pothoina* but with dentate leaf edges and leaves broadly ovate.

SAPOTACEAE.

Payena vulcanica Ridl. n. sp.

Tree 40 to 50 feet tall. Branches much warted with bases of flower-fascicles. Leaves coriaceous, glabrous oblanceolate blunt, base narrowed; nerves 8 pairs elevate above, .3 in. long, 1 in. wide; petiole grooved above, 1 in. long. Flowers in fascicles below the leaves, 5 together; pedicels .5 in. long. Sepals 4, imbricate, ovate pubescent, .1 in. long. Petals as long ovate shortly silky pubescent. Stamens as short as petals 12; anthers ovate-lanceolate acuminate, base cordate; style thick, .25 in. long.

Gunong Sibayak (Mohamed Nur 7326).

STYRACEAE.

Symplocos xanthophylla Jungh. de Vries.

In woods on the Sibayak volcano. *Distrib.* Java.

Symplocos fasciculata Zoll.

One of the commonest trees in the plateau woods and as a fairly big tree for this species.

Distrib. Malay Peninsula and islands.

OLEACEAE.

Jasminum bifarium Wall.

Road from Medan to Berastagi.

Distrib. Malay Peninsula and islands.

Ligustrum robustum Bl.

Lane by the Battak village, Berastagi. *Distrib.* Java.

APOCYNACEAE.

Alyxia Forbesii King.

Woods on the slope of the Sibayak volcano, 6,000 to 7,000 feet alt. *Distrib.* Malay Peninsula and Sumatra.

ASCLEPIADACEAE.

Hoya rhodostele Ridl. n. sp.

Stems moderately stout. Leaves thick; lanceolate acute, base cuneate; nerves invisible, 3 in. long, 1.5 in. wide; petioles thick .5 in. long. Peduncle axillary 4 in. long. Raceme rachis thick .25 in. long; pedicels slender, 1 in. long. Sepals short, ovate blunt. Corolla .5 in. wide, lobes triangular blunt, velvety inside, cream-colour. Staminal column claret colour, lower lobe broad lanceolate, thick, blunt, upper one very short. Berastagi woods.

Dischidia polyphylla Ridl. n. sp.

Long slender climber. Leaves numerous, crowded orbicular-oblong to ovate, .25 in. long, .2 in. wide, fleshy; nerves invisible; petiole .05 in. long. Peduncle opposite a leaf, .1 in. long; rachis thickened (sometimes 2) half as long; pedicels short. Sepals rather long lanceolate blunt. Corolla urceolate, lobes erect, sub-acute, white tipped pink, .1 in. long. Column blunt at top. Anther appendages oblong blunt. Corona scales attached to base of column, anchor-shaped, lobes narrow, recurved. Fruit narrow-linear acuminate 1.5 in. long. Seeds oblong, but acute at base, dark brown, smooth .06 in. long; plume fine silky .5 in. long.

Climbing on trees, Berastagi forests.

Allied to *D. albida* Griff., but the column is not acute but blunt and short, the stamen appendages being broad and blunt.

LOGANIACEAE.

Buddleia asiatica Linn.

Shrub 6 feet tall. Flowers white. Edge of woods on West Hill, Berastagi. *Distrib.* Indo-Malaya.

Fagraea lanceolata Bl.

Berastagi Hill woods. *Distrib.* Java.

Mitrasacme nudicaulis Reinwdt.

Open ground, Berastagi.

Distrib. Malay Peninsula and islands.

GENTIANACEAE.

Crawfordia Blumei Don.

Upper woods on the base of the volcano Sibayak, at 7,000 feet alt. Flowers white, tube green. *Distrib.* Java.

BORAGINACEAE.

Tournefortia Zollingeri Miq.

Berastagi Woods. *Distrib.* Java.

Cynoglossum javanicum, Miq.

Berastagi plateau, not common but hardly in flower.

Distrib. Java.

Cynoglossum micranthum, Desf.

Berastagi (Mrs. Burkill). *Distrib.* Java.

CONVOLVULACEAE.

Ipomoea obscura Ker.

Toba Lake (Mrs. Burkill). *Distrib.* Malay islands.

SOLANACEAE.

Solanum nigrum Linn.

Berastagi woods. Flowers white. *Distrib.* Cosmopolitan.

Solanum Zollingeri Dunal.

West Hill, Berastagi, scarce. Flowers violet outside, white inside. *Distrib.* Java.

Solanum Blumei Nees.

Shrub, about 3 feet tall. Leaves unequal. Fruit red, out of flower, Berastagi woods.

Solanum torvum Swartz.

Flowers white, open places, Berastagi.
Distrib. Tropical Asia.

Solanum aculeatissimum Jacq.

Near the Battak Village, Berastagi. *Distrib.* Tropical Asia.

SCROPHULARIACEAE.

Bonnaya reptans Spreng.

Base of Sibayak volcano. Flowers pale blue.
Distrib. Tropical Asia.

Buchnera sumatrana Miq.

Common on the plateau, Berastagi. Flowers pale violet.
Distrib. Sumatra only.

Striga lutea Lour.

Open country. Flowers yellow. *Distrib.* Tropical Asia.

Mazus rugosus Lour.

Cultivated ground, Berastagi. Flowers light blue.

GESNERACEAE.

Aeschynanthus fruticosus Ridl. n. sp.

Epiphyte with erect, rather slender angled stems about a foot tall. Leaves fleshy in whorls of 4, ovate lanceolate; nerves invisible, .5 in. long, .25 in. wide; petiole very short or none. Flowers 1 to 4 or 5, terminal; pedicels very slender .25 in. long. Sepals hardly .1 in. long, linear acuminate, free nearly to base. Corolla .75 in. long, deep claret-colour, hairy, tube dilated upwards and curved at the top, lobes short, oblong blunt. Stamens projecting for .2 in. hairy. Capsule .5 in. long, .25 in. wide when split open. Seed minute oblong with a single hair at each end, very fine about .5 in. long.

On trees in the woods near Berastagi. Common and forming large clumps. Allied to *A. tetraquetra* Clarke, of Singaian, but the leaves are much smaller, ovate-lanceolate and entire; pedicels and calyx-lobes longer.

Rhynchoglossum obliquum Bl.

Sibolangit, Bukit Kluang (Mohamed Nur 7437).

Distrib. Java.**Loxonia acuminata** Br. Sibolangit (Mohamed Nur).*Distrib.* Pulau Tiunan off the Pahang coast (Burkill), Java.**Didymocarpus albina** Ridl.

Abundant in the woods on the hills, towards Sibayak. I cannot separate this from the plant of Telom and Semangkok Pass. Some forms took on a pale violet tint but most were white with yellow in the mouth. *Distrib.* Malay Peninsula.

Didymocarpus vulcanica Ridl. n. sp.

Stem woody, tomentose. Leaves crowded, oblong or obovate blunt, base rounded; edge bluntly serrate, above glabrous beneath, midrib elevate, red-villous; nerves 20 pairs elevate, red-villous 5 in. long, 1.75 in. wide; petiole .25 to .6 in. long. Scape 6 in. long, red hairy, with 4 distant pairs of flowers with a pair of lanceolate bracts; pedicels .1 in. long, hairy. Sepals linear hairy .1 in. long; corolla blue .6 in. long, tube gradually dilate from the base; limb .3 in. wide, lobes round, all pubescent. Stamens 2; filaments rather thick, glabrous; anthers linear-oblong, connivent. Ovary lanceolate conic pubescent; style shorter than the stamens; stigma pulvinate.

Bandar Bharu, Gunong Sibayak (Mohamed Nur 7314). Allied to *D. amoena* Clarke and *D. teres* Clarke, of Borneo but distinct from all in the conspicuous pair of bracts at the base of each pair of flowers.

Chirita Blumei C. B. Clarke.

Road to Berastagi from Medan. Flowers white.

Distrib. Java.**Chirita Horsfieldii** R. Br.

In the lane by the Battak village. Flowers deep blue. A very beautiful plant. *Distrib.* Java.

These two species are very different in appearance in life, the white-flowered one being much larger and more shrubby than the smaller deep blue-flowered one, but from book descriptions and herbarium specimens it is not easy to distinguish them.

Rhynchotechum angustifolium Ridl. n. sp.

Low shrub, densely appressed, woolly hairy. Leaves alternate, lanceolate acute, long narrowed to the base, obscurely blunt serrulate at the tip, glabrous above except the midrib puberulous, yellowish, appressed hairy beneath especially on the nerves, over 20 pairs, 7 in. long, 2 in. wide; petioles 1 in. or less. Panicles axillary, densely yellow hairy, at first in dense heads, eventually spreading 4 in. long and wide. Bracts lanceolate, narrow hairy, .25 in. long. Flowers in terminal cymes of 2 branches with 3 flowers on each, and 1 to 3 solitary, longer pedicelled flowers between. Calyx-

lobes lanceolate, golden-hairy, .1 in. long. Corolla as long, white. Capsule ovoid as long as the sepals; style persistent cylindrical; stigma nearly as long, capitate.

Berastagi woods. This has larger fruit and flowers than *R. parviflorum* Bl., and the leaves are quite different.

Cyrtandra pauciflora Ridl. n. sp.

Shrub about 5 feet tall; branchlets and young parts fulvous velvety. Leaves opposite variable, the younger ones lanceolate sub-falcate acuminate slightly inaequilateral at base; edges denticulate with a few distant teeth; nerves 9 pairs sparsely hairy on both sides except the nerves and midrib densely hairy beneath, 6 in. long by 1.5 in. wide; larger leaves oblong, 10 in. long, 3.5 in. wide, very strongly toothed. Cymes axillary, .75 in. long; peduncle and branches golden hairy. Flowers 3 or 4 together, dirty white. Bracts 2, lanceolate, leaf-like, 3-nerved hairy, .25 in. long. Calyx-tube campanulate with 5 linear subulate teeth .12 in. long. All hairy. Corolla .6 in. long, dirty white with brown streaks in the mouth, pubescent, tube thick, cylindrical, limb .4 in. wide, lobes round. Fruit elliptic, narrowed to the top, hairy cuspidate with the style base .5 in. long, .1 in. through.

In a wooded ravine, Berastagi. Allied to *C. rostrata* Bl. of Sumatra, but the calyx-lobes long and very narrow, and the corolla not golden hairy.

Cyrtandra Sandei De Vriese.

I collected fruiting specimens of a plant either this or very near it in the woods. It is a native of Java and Sumatra.

Cyrtandra pandurata Ridl. n. sp.

Shrubby. Leaves obovate decurrent to the base with a broad winged petiole, base rounded, broad, edge serrate, glabrous except the midrib beneath, nearly pubescent; nerves 8 pairs, slender, 8 in. long, 4 in. wide. Flowers clustered; bracts small, lanceolate. Calyx goblet-shaped, glabrous, entire with minute points .4 in. long. Corolla white, 1.25 in. long, tube cylindrical; limb .3 in. wide, hairy, lobes rather broad, rounded.

Berastagi woods. This belongs to the section *Coccineae* with a tubular calyx with very short points. The leaves are peculiar in being fiddle-shaped, the base is broad and rounded, above is an oblong winged petiole 3 in. long, 1 in. wide passing into an obovate lamina.

ACANTHACEAE.

Strobilanthes Maingayi C. B. Clarke.

Berastagi woods. A bush with white flowers. This is not exactly like the type form from Penang; it has more rigid, rather smaller leaves, and stiffer lanceolate bracts, but I am unwilling to separate it specifically.

Distrib. Malay Peninsula.

Strobilanthes hirticalyx Ridl. n. sp.

Shrub, hairy. Leaves membranous, lanceolate, narrowed at both ends, decurrent on petiole, edges crenulate-sinuate; nerves 8 pairs, slender, sparsely white hairy on both sides; nerves and midrib on both sides, rough hairy, 3 in. long, 1 in. wide; petiole slender .75 in. long, white hairy. Peduncles terminal .25 in. long or less. Heads .5 in. across of few flowers, outermost bracts ovate lanceolate, .3 in. long, .12 in. wide, inner ones lanceolate to linear, as long, all white hairy. Sepals linear blunt, hairy, .25 in. long in fruit. Corolla white, gradually dilate upwards .5 in. long, .25 in. across the mouth, lobes round, sparsely hairy. Stamens 2, filaments slender, sparsely hairy at base. Anthers elliptic. Capsule .15 in. long, pale fawn, hairy, valves lanceolate in outline pubescent especially at the tip. Seeds flat, ovate orbicular hairy.

Berastagi Woods.

Very near a plant collected by Zollinger in Java, *Ilex secundum* II, 3801, but this has coriaceous leaves with fewer nerves. Mohamed Nur, who got what appears to be the same plant at Sibolangit (No. 7356), gives the colour of the flowers as blue; they were white at Berastagi.

Strobilanthes multiflora Ridl. n. sp.

Glabrous shrub with slender branches. Leaves lanceolate or elliptic-lanceolate, long acuminate, base cuneate, edge blunt serrulate; nerves 8 pairs ascending to the points, 3.5 in. long, 1.5 in. wide; petiole .5 in. long. Racemes or panicles axillary and terminal, lax with few flowers. Bracts very small less than .1 in. long, linear blunt. Flowers solitary. Sepals linear blunt, one a little longer than the other, .2 in. long in flower, lengthening to .25 in. long in fruit. Corolla white, trumpet-shaped, 1 in. long; limb .5 in. wide, lobes rather short round. Stamens four, included; anthers elliptic, 1 cell slightly below the other in the upper pair. Style moderately stout, narrowed to the tip.

Berastagi woods.

Allied to *S. capillipes* Nees and *S. sumatrana*, Miq.

Strobilanthes anceps Ridl. n. sp.

Glabrous shrub; branches flattened and winged. Leaves stiffly coriaceous, elliptic narrowed at base, shortly acuminate at the tip, edge serrulate; nerves 9 pairs sunk above as are midrib and reticulations, elevate beneath, 6 in. long, 3 in. wide; petiole 2 in. long, channelled above. Spikes axillary, 4 in. or more long. Flowers white in opposite pairs. Bracts caducous, narrow linear, .12 in. long. Sepals linear narrow, blunt .5 in. long. Corolla 1.25 in. long, tube at base cylindrical, then rather suddenly dilate curved; lobes blunt .25 in. long. Stamens 5.

Berastagi Woods.

Allied to *S. collina* Nees, but quite glabrous.

Justicia virescens Ridl. n. sp.

Slightly shrubby herb, glabrous. Leaves ovate or elliptic acuminate, base cuneate, thinly membranous; nerves 6 pairs, slender, 4 to 4.5 in. long, 1.25 to 1.75 in. wide; petioles 1 to 2 in. long. Spike terminal, solitary or 2, pubescent 2 in. long. Bracts short linear acuminate, pubescent. Sepals lanceolate linear acuminate hairy, .05. Corolla greenish-yellow .5 in. long, tube thick, upper lip ovate cuspidate, lower lip oblong, longer, blunt, ribbed on the disc. Stamens shorter than the upper lip; anthers not parallel.

In woods, Berastagi.

Eranthemum sumatrense Ridl. n. sp.

Bush about 5 feet tall. Leaves membranous, elliptic, narrowed at base, acute; nerves about 7 pairs, 7 in. long, 2.5 in. wide; petiole .6 in. long. Raceme dense, 6 in. long on a peduncle 1.5 to 3 in. long. Flowers in fascicles of 6 or more, scattered at the top. Bracts short, narrow linear acuminate. Sepals linear acuminate. Corolla-tube cylindric, puberulous 1.5 in. long; lobes elliptic-oblong, blunt rounded at tip .25 in. long, white; lip wider, oblong top rounded, white, base and centre mauve. Stamens exert curved, black, base subacute.

In wooded ravine, Berastagi.

This suggests *E. Andersoni* at first sight, but the flowers are smaller and the petals plain white, not spotted, and the lip mauve, the petioles are also shorter.

Peristrophe tinctoria Nees.

In the Berastagi woods. *Distrib.* Indo-Malaya.

Hypoestes tenuifolia Ridl. n. sp.

Herb over a foot tall, slender, with rather long, soft hairs. Leaves membranous, ovate-elliptic, shortly blunt acuminate, base cuneate, sparsely hairy above, closely hairy on the midrib, and 4 pairs of nerves beneath, 4 in. long, 2.75 in. wide; petiole 1 in. long, hairy. Inflorescence .5 in. long on a peduncle .5 in. long, terminal and in the upper axils. Bracts membranous, green few leaf-like, upper ones linear-oblong, white hairy. Calyx of 5 free linear acute glabrous sepals. Corolla pale pink, tube cylindric, hairy, .25 in. long, lobes oblong, blunt, rounded equal and similar, .5 in. long. Stamens 2, glabrous, exert from mouth of corolla .1 to .8 in.; anthers 1-celled; style slender as long as stamens.

Berastagi woods. A very soft, weak plant with foliaceous bracts.

VERBENACEAE.

Vitex trifolia Linn. fil.

Common in open country, Berastagi, near the Battak village and in cultivated ground. Probably introduced there.

Distrib. Tropical Asia.

Callicarpa longifolia Lam.

In a lane by a Battak village. Fruit white.

Distrib. Tropical Asia.

Callicarpa eriophylla Ridl. n. sp.

Bush about 4 feet tall, tomentose. Leaves chartaceous oblong-lanceolate, acuminate, base broad, rounded, edge denticulate, thinly closely hairy above, white woolly with stellate hairs beneath; nerves thick, 8 pairs, 3.5 in. long, .6 in. wide; petiole very short, .1 in. long or less, woolly. Cymes in each leaf axil .5 in. wide; pedicels .2 in. long in flower .25 in. long in fruit. Flowers deep mauve violet. Calyx cup-shaped, tomentose. Corolla funnel-shaped, base narrow, dilate upwards, .05 in. long, lobes short. Stamens longer; anthers oblong. Style longer. Fruit globose, pink, .1 in. through.

Abundant in the open country amongalang. A very pretty shrub with its white leaves and bright coloured flowers and fruit.

Distrib. Java, De Vriese in Herb. Kew.

Callicarpa arborea Roxb.

Sibolangit, Bukit Kramat Kuda (Mohamed Nur 7264).

Distrib. Malay Peninsula.

Clerodendron microcalyx Ridl. n. sp.

Tree 15 to 20 feet tall; branches scurfy, velvety, 4-angled. Leaves thin, ovate, subacute, base broad, subtruncate rounded; nerves 6 pairs spreading, scurfy-velvety 6 to 9 in. long, 5 to 8 in. wide; petiole 7 in. long. Corymbs 2 in. wide; peduncle 1.5 to 3 in. long, densely tomentose velvety. Flowers numerous crowded, white sessile. Calyx .1 in. long, tubular-campanulate, velvety with very short acute teeth. Corolla glabrous, tube slender .5 in. long, lobes oblong, blunt, scabrid outside .1 in. long. Stamens filaments glabrous filiform exsert, .2 in. long (twice as long as corolla-lobes). Fruit pyriform to subglobose, glabrous .25 in. through. Calyx short, saucer-shaped .1 in. deep, with 5 minute teeth.

Sibolangit, Bukit Semaik. Tree 15 to 20 feet. Fruit green; flower white (Mohamed Nur 7447). Allied to *C. villosum*, Bl. but with very small calyx lobes and bracts.

Clerodendron bracteatum Wall. var. **sumatranum**.

Bracts much smaller than in the Indian form. A bush. Flowers white. Edges of woods on hills, Berastagi.

Distrib. Indo-Malaya.

LABIATAE.

Moschosma polystachyum Benth.

Open country in damp spots. Flowers white.

Distrib. Africa, India, Malaya, Australia.

Dysophylla auricularia Hassk. var. **montana** Ridl.

Plant 12 in. or less tall, very hairy. Leaves very close-set, .3 in. apart, numerous. Spike 1 to 1.5 in. long. A very short compact form, very different in appearance to the tall lowland one. In damp spots by streams, open country, Berastagi plateau.

Anisomeles ovata R. Br.

Lake Toba, (Mrs. Burkill). *Distrib.* Indo-Malaya.

Leucas zeylanica R. Br.

In thealang fields, not very common, Berastagi.

Distrib. India, Malaya.

Microtaenia cymosa Prain.

Berastagi woods. Upper lip maroon, lower one yellow.

Distrib. India, Java.

Pogostemon battakianum Ridl. n. sp.

Herb over a foot tall, hairy all over. Leaves rhomboid, base long cuneate, subacute with 2 short broad acute side lobes and several broad teeth; nerves 4 pairs, fine with numerous nervules, sparsely hairy on both sides, more densely so on the nerves beneath, 3 in. long, .2 in. wide; petiole 1 in. long, hairy. Flowers in dense heads in upper axillary and terminal spikes, one inch long, hairy. Calyx sessile, elongate campanulate, 5-toothed and 5-ribbed, white hairy, especially at the top, teeth deltoid acute, .1 in. long. Corolla .1 in. long, violet, tube as short as the calyx, very small, lips very small, subequal rounded. Stamens exsert 4. Style slender, as long; stigmas 2, filiform, recurved. Ovary 2-lobed.

In a lane at the Battak village, Berastagi, in thick herbage. This plant is remarkable for its rhomboid leaves resembling those of *P. formosanum* Oliv., of Formosa. The inflorescence is like that of *P. Heyneanum* Benth., but the flowers are much smaller.

Salvia plebeia R. Br.

Weed in cultivated ground. Flowers purplish.

Distrib. Indo-China.

Gomphostemma phlomoides Benth.

About three feet tall. Flowers creamy-white, Berastagi woods.

Distrib. Java.

Gomphostemma sumatrense Ridl. n. sp.

Stem rather slender. Leaves membranous, glabrous except the puberulous nerves beneath and edge, ovate acuminate, base cuneate, edge minutely serrulate hairy; nerves 7 pairs, slender, 7 in. long, 3 in. wide; petiole puberulous, 1.25 in. long, slender. Cymes of about 10 flowers. Bracts minute ovate, puberulous. Calyx goblet-shaped, sessile, glabrous, .25 in. long with very short teeth. Corolla-tube .5 in. long, slightly dilate at base, cylindric, glabrous, upper lip oblong blunt, white hairy, .12 in. long, outside lower lobes shorter, all glabrous within. Nucules glabrous.

Berastagi woods.

Allied to *G. luzonense* Elmer, but the leaves less toothed and calyx-lobes much shorter.

Gomphostemma membranifolium Miq.

Flowers light yellow. In Berastagi woods. *Distrib.* Java.

PLANTAGINACEAE.

Plantago major Linn.

A small form in cultivated ground, Berastagi.

Distrib. Europe and temperate Asia, no doubt introduced, but I have never seen it in the Malay region before.

AMARANTACEAE.

Amaranthus viridis Linn.

Western Hill. Cultivated ground. *Distrib.* All tropics.

Achyranthes bidentata Bl.

In forests, Berastagi. A very hairy form; stem and leaves covered with thick hair. Spikes purple red when young.

Distrib. India, Malaya.

Achyranthes diandra Roxb.

Berastagi woods. *Distrib.* Ceylon.

PHYTOLACCACEAE.

Phytolacca octandra Linn.

Flowers deep pink. Not rare, in the woods near cultivated ground. *Distrib.* South America. No doubt an alien.

POLYGONACEAE.

Polygonum minus Huds.

In ricefields below Sibayak volcano.

Distrib. Europe, Asia, Java, Malay Peninsula, Africa.

Polygonum hydropiper Huds.

Low swampy spots in the plateau, Berastagi.

Distrib. Europe, Asia.

Polygonum perfoliatum Linn.

Scandent thorny. Fruits blue. In thickets, Berastagi plateau.

Distrib. China, India, Java.

Polygonum paniculatum Bl.

Bandar Bharu, Sibayak (Mohamed Nur 7329).

Distrib. Java.

***Polygonum chinense* Linn. var. *latifolium* Miq.**

Common in woods all over the district covering the ground in the wooded slopes of Sibayak volcano.

Distrib. of the var. Sumatra, but of the species all tropical Asia.

BALANOPHORACEAE.***Balanophora* sp.**

I found a *Balanophora* in the west hill woods at Berastagi, but in too young a state for identification.

ARISTOLOCHIACEAE.***Thottea hirsuta* Ridl. n. sp.**

Shrub; stems hairy. Leaves oblong acute, base narrowed, 2 basal nerves running parallel to the edge for some way; nerves from midrib 8 pairs elevate, parallel, above glabrous, beneath thickly rough hairy, 8 in. long, 4 in. wide; petiole thick densely rough hairy on back, more sparsely on inner face. Raceme 1.5 in. long, rufous-hairy. Basal bracts distant oblong-lanceolate, .1 in. long, rufous-hairy, upper ones narrower linear hairy on the back. Flowers about 10, white and back pink; pedicels .25 in. long, hairy. Calyx .5 in. long, campanulate, tube stout, limb obscurely, bluntly 3-lobed hairy outside, scabrid inside. Stamens 12 in 2 rows; filaments short, connective broad. Stigma rays 6, linear.

Sibolangit (Mohamed Nur).

Near *T. tricornis* Maing., but hairy. The flowers when dry densely yellowish red-hairy, and the calyx-lobes not acute.

PIPERACEAE.***Zippelia lappacea* Benn.**

Sibolangit, Bukit Kluang (Mohamed Nur).

Distrib. Malay Peninsula and islands.

***Piper caninum* Blume, var. *janatum*.**

Scandent on trees, spikes greenish white. Berastagi woods.

Distrib. Malay Peninsula and islands.

***Piper (Cubeba) philodendron* Ridl. n. sp.**

Stout plant with large lanceolate sheath to bud. Leaves ovate cordate with a deep sinus, lobes rounded; nerves radiating from sinus 13, all forked half way with a side branch above the fork on one side; nervules at edge terminating in loops, above quite glabrous, beneath thickly dotted over with small hairs; nerves thickly hairy 7 in. long, 9 in. wide, lobes i.e. side of sinus 2.5 in. long; petiole 8 in. long, hairy. Spike thick over 2.5 in. long on a pedicel 1 in. long, glabrous. Bracts oblong ciliate. Ovaries conic sessile with lobed recurved stigmas. Young fruit ellipsoid with a distinct thick stalk.

Berastagi woods. There is a leaf specimen of this from Sumatra collected by Korthals and named *Piper mollissimum* Miq. but this species is quite different from the Java plant in its larger, less woolly leaves and deep and wide sinus.

Piper (Eupiper) melanocarpum Ridl. n. sp.

Slender glabrous plant, scandent. Leaves thin, chartaceous, elliptic acuminate acute, base cuneate inaequilateral; nerves one pair from base and another from .15 in. above the base, decurrent on the midrib; nervules transverse, rather distant, all visible above on both sides when dry, 3.25 in. to 4.25 in. long, 1.5 to 2.10 in. wide; petioles 1 to 2 in. long. Male spikes slender, 1.5 in. long, on a peduncle .3 in. long. Female spikes shorter, lengthening to .5 in. in fruit. Bracts oblong with rounded tip. Ovary immersed with very short cylindrical style and 2 recurved short stigmas. Fruit sessile, globose .1 in. long, black.

Climbing on trees, Berastagi woods.

Piper (Eupiper) salticola Ridl. n. sp.

Climber. Branches .1 in. through, glabrous. Leaves fleshy, light green, ovate subacute, base cuneate unequal; nerves all from the midrib slender, transverse nervules rather distant, 3.5 in. wide; petiole 1 to 1.25 in. long. Spikes opposite the leaves; peduncles .25 to .5 in. long. Male and female spikes both 3 in. long. Males in upper part of branch, females below. Bracts rounded oblong peltate with a short, thick stalk with a few trichomes. Stamen 1; filament broad quadrate; anther cells apical, separate. Stigmas capitate. Ovary conoid. Fruit sessile globose .1 in. through when dry.

Abundant on trees in the forests, Berastagi.

It is possible that this is the *P. quinqueangulatum* Miq., but I have seen no specimens of that Javanese plant and Miquel's description is very incomplete.

Piper nigrescens Bl.

Sibolangit (Mohamed Nur 7254). *Distrib.* Java.

Piper Betle Linn.

On trees near villages. Berastagi.

Distrib. Malay Peninsula and islands usually cultivated.

Piper coactile Ridl. n. sp.

Moderately stout climbing and rooting pepper, brown, felted hairy. Leaves ovate blunt or shortly acute acuminate, base round slightly cordate, glabrous above except midrib and nerves, densely felted tomentose on midrib, nerves, nervules and reticulations beneath and sparsely hairy on whole surface beneath; nerves 3 pairs from base, 1 pair from midrib .5 in. above base, not ascending to tip of leaf, 3 in. long, 2 in. wide; petioles .2 in. long, densely felted tomentose. Stipules narrow linear .5 in. long, hairy. Spikes

male only seen; peduncles hairy slender .6 in. long, spike slender .6 in. long, glabrous. Bracts orbicular, peltate with a thinner edge, very small.

Berastagi forests. I am unable to match this with any species but unfortunately could only get young male spikes. I believe it belongs to the *Eupiper* section. It is remarkable for the woolly felted hairs on the stem and leaves.

***Piper subpeltatum* Willd.**

Sibolangit, Bukit Kluang (Mohamed Nur 7445).

***Peperomia jaevifolia* Miq.**

Epiphytic on trees in the hill woods. Common.

Distrib. Sumatra and Java.

***Peperomia reflexa* Dietr.**

Woods on the slope of the Sibayak volcano.

Distrib. Tropical Asia.

***Peperomia convexa* Bl.**

Epiphyte green flowered, Berastagi woods. *Distrib.* Java.

CHLORANTHACEAE.

***Chloranthus brachystachyus* Bl.**

Berastagi woods and lower woods of Sibayak volcano. Berries red.

Var. ***melanocarpa***. Leaves broader, dentate, not serrate; stipules larger and fruit black. Shrublet 2 feet tall, West Hill, Berastagi. *Distrib.* of type Indo-Malaya.

***Chloranthus officinalis* Bl.**

Bandar Bahru, Gunong Sibayak (Mohamed Nur).

Distrib. Malay Peninsula and islands.

MONIMIACEAE.

***Kibara grandifolia* Merrill.**

Sibolangit (Mohamed Nur 7203). Flowers yellow, fruits black.

Distrib. Philippines.

LAURACEAE.

***Beilschimidia sumatrensis* Ridl. n. sp.**

Tree; branches slender, scurfy. Leaves thin, chartaceous, elliptic-lanceolate, long acuminate blunt, base shortly cuneate, glabrous except midrib beneath scurfy in young leaves; nerves 16 pairs elevate beneath; midrib rather stout; reticulations prominent on both sides, 6 in. long, 2 in. wide; petioles .1 in. long. Panicles axillary scurfy, puberulous 2 to 4 in. long, basal half or more nude; branches few, 1 in. long, with few terminal flowers. Pedicels .15 in.

long. Perianth lobes 6 or 7 oblong rounded at tip, equal, rather fleshy tomentose on both sides, .1 in. long. Stamens in 3 whorls; anthers all introrse, 2-celled, outer row 6 or 7 adnate at base to perianth lobes; filament broad, short oblong tomentose, 2nd row slightly longer; anther-cells dehiscing on the edges, with two short broad glands resembling staminodes at the base. Third row much shorter from mouth of perianth-tube; filaments short, broad, tomentose; anther abortive, ovate, thin at the edges. Pistil conic, sunk in the tube, free, vertically grooved.

In woods, Berastagi.

I cannot match this with any species, the leaves are thin for the genus, even when apparently adult.

Litsea perakensis Gamble.

Tree, Berastagi. Only in young fruit.

Distrib. Malay Peninsula.)

Litsia cuneata Bl.

Big tree, Berastagi in fruit, also Sibolangit, Bukit Klang (Mohamed Nur 7417). *Distrib.* Java.

ELEAGNACEAE.

Eleagnus latifolia var. **ferruginea** Rich.

Berastagi. Edges of woods and open country. Common in Java.

LORANTHACEAE.

Dendrophthoe ignea Scheff.

Sibayak volcano at 6,000 feet alt. Whole plant rusty red.

Distrib. Java.

Loranthus Lydenianus Zoll. (*Phaenicanthemum Lydenianum* Zoll.).

Leaves with red midrib beneath. Flowers red. Berastagi.

Distrib. Java.

Elytranthe avenis Don.

In young fruit only. On trees in the sulphur stream at the foot of Sibayak volcano. *Distrib.* Java, Malay Peninsula.

PROTEACEAE.

Helicia obovata Benn.

Sibolangit, Bukit Kluang (Mohamed Nur 7416).

Distrib. Java.

EUPHORBIACEAE .

Breynia rhamnoides Muell.

Near Battak village, Berastagi.

Distrib. Malay Peninsula and islands.

Breynia microphylla Bl.

Small tree, Berastagi. *Distrib.* Java.

Breynia angustifolia Hook. fil.

Small tree; fruits red, Berastagi. *Distrib.* Malay Peninsula.

Antidesma Bunius Spreng.

Sibolangit, Bukit Kluang. Fruit reddish, cultivated (Mohamed Nur 7414). *Distrib.* Malay islands.

Claoxylon longifolium Muell.

Berastagi woods. Shrub or tree; fruits green.
Distrib. Malay Peninsula and islands.

Claoxylon indicum Hassk.

Sibolangit, Bukit Kluang (Mohamed Nur).
Distrib. Indo-Malaya.

Acalypha brachystachya Horn.

Weed in cultivated ground, Berastagi. *Distrib.* Java.

Macaranga denticulata Muell.

Sibolangit, Datoh Pulo Siam (Mohamed Nur 7204).
Distrib. Indo-Malaya.

Homalanthus populifolius Gray.

Berastagi woods. Common. *Distrib.* Indo-Malaya.

URTICACEAE.

Trema rigida Bl.

Tree, Berastagi woods. *Distrib.* Java.

Trema (Parasponia) rugosa Bl.

Berastagi, open country. A common shrub. Flowers reddish.
Distrib. Java.

Trema (Parasponia) lancifolia Ridl. n. sp.

Tree; branchlets white hairy. Leaves lanceolate acuminate, base narrowed and rounded, edge serrate, membranous, sparsely hairy above, pustulate with longer hairs on midrib and nerves, beneath grey pubescent, areolate; nerves more hairy; nerves 3 from the base, central one (midrib) with 5 pairs of nerves transverse nervules and reticulations numerous, 8 in. long, 2 in. wide; petioles 1 in. long. Stipules lanceolate acuminate caudate, keeled, glabrous. Cymes axillary 2 to 3 in fascicles hairy .5 in. long. Bracts lanceolate acuminate, cuspidate, keeled, glabrous .05 in. long. Flowers crowded in the ends of the cyme; branches sessile. Sepals 4, oblong acute, puberulous. Stamens 4; anthers ellipsoid orbicular, on filaments no longer than themselves. Pistillode of a large obovoid stigma nearly as big as an anther on a very short style. Female flowers and fruit not seen.

Berastagi woods.

Distinct from other species in the long narrow thin leaves and long petioles. The genus *Parasponia* Miq. seems little distinct from *Trema*, and is now generally reduced to it.

Ficus stipata King.

Sibolangit, Dato Puloh Siam valley (Mohamed Nur 7206).

Distrib. Sumatra. I have not seen a specimen of the type.

Ficus subulata Bl.

Berastagi, also Gunong Sibayak (Mohamed Nur 7398). Figs orange, the form of these plants is that of one I collected in Kelantan with few, much arched, prominent nerves.

Distrib. Malay Peninsula and islands.

Ficus urophylla Wall.

Berastagi woods. *Distrib.* Malay Peninsula and islands.

Ficus rostrata Lam.

Sibolangit, Bukit Pasang (Mohamed Nur 7249).

Distrib. Indo-Malaya.

Ficus cuspidata Reinwtd.

Berastagi Woods. *Distrib.* Java.

Ficus singalana King.

Berastagi Hill forests climbing on trees. The figs are probably the largest in the genus being oblong, six inches long and three inches through, green with white spots; the receptacle walls are an inch thick, white inside, and the flowers pink.

Ficus lepicarpa Miq.

Tree; figs, green. Berastagi woods.

Distrib. Java, Malay Peninsula.

Ficus D'Albertisii King.

Sibolangit, Bukit Kluang (Mohamed Nur). *Distrib.* Papua.

Ficus ribes Miq.

Sibolangit, Bukit Semaik (Mohamed Nur 7372).

Distrib. Java.

Ficus Vriesiana Miq.

Berastagi woods. A tree with whitish fruits in clusters and spikes on the trunk. Leaves hairy beneath. I am not quite certain of this as I have seen no other specimens. *Distrib.* Java.

Ficus toxicaria L.

Berastagi. What I take to be the same plant in a younger state of foliage has chestnut red hair all over the shoot and petiole, the blade of the leaf strongly lobed, and the nerves beneath covered thickly with coppery hair, on a white silky ground. The fruit is pink. *Distrib.* Sumatra only.

Ficus diversifolia Bl.

Berastagi, and on the volcano Sibayak.

The plants from the latter spot have obovate leaves and bluntly lanceolate, acuminate ones on the same spray.

Distrib. Malay Peninsula and islands.

Ficus inaequilatera Ridl. n. sp.

Shrub; branches hairy above, glabrescent below. Leaves chartaceous very inaequilateral, oblong, long cuspidate, base unequally cordate, edge coarsely dentate, above scabrid; midrib and nerves hairy, beneath; nerves about 9 pairs, transverse nerves and nervules hairy, 7 in. long, 3 in. wide; petioles .25 in. long, thick, densely hairy. Stipules lanceolate acuminate, caudate, glabrous except the hairy keel .25 in. long. Figs axillary clustered, roughly hairy when young, on short rough pedicels; adults .2 in. through, globose scales of mouth short, broad lanceolate. Male flowers not seen. Females stalked. Sepals 4, very narrow linear. Achene rounded elliptic oval, blunt. Style lateral.

Berastagi. Also at Sibolangit, Datoh Pulau Siam valley (Mohamed Nur 7209). The foliage resembles that of *F. hypogaea*, but the figs are borne on the stem of the plant, not on prostrate shoots.

Conocephalus suaveolens Bl.

Sibolangit, Datoh Puloh Siam (Mohamed Nur 7387).

Distrib. Malay Peninsula and islands.

Conocephalus amoenus King.

Sibolangit (Mohamed Nur 7237).

Distrib. Malay Peninsula and islands.

Conocephalus Scortechinii King.

On Sibayak volcano. Epiphyte. Flowers pink and white.

Distrib. Malay Peninsula and islands.

Laportea stimulans Miq.

Berastagi, also collected by Mohamed Nur in Datoh Puloh Siam valley. Sibolangit, 7201. Fruit blue.

Distrib. Malay Peninsula and islands.

Laportea crenulata Gaud.

Sibolangit, Bukit Kluang (Mohamed Nur). *Distrib.* Malaya.

Girardinia hibiscifolia Miq.

Berastagi, open places. *Distrib.* Java.

Pilea stipulosa Miq.

Berastagi woods. *Distrib.* Java.

Pilea smilacifolia Wedd.

Bandar Bahru, Gunong Sibayak (Mohamed Nur).

Distrib. Indo-Malaya.

Pilea miconiaefolia Miq.Berastagi woods. *Distrib.* Java.**Elatostemma frutescens** Bl.Sibolangit, Dato Puloh Siam Valley. (Mohamed Nur 7295).
Distrib. Java.**Elatostemma macrophylla** Brngn. var. **paludosum**.Berastagi woods. *Distrib.* Java.**Procris peduncularis** Bl.Epiphyte. Berastagi woods. *Distrib.* Java.**Pouzolzia viminea** Wedd.Road from Medan to Berastagi.
Distrib. Java, Malay Peninsula.**Pouzolzia hispida** Benn.Abundant in damp shady spots, Berastagi.
Distrib. Malay Peninsula at Telom, Java.**Pouzolzia pentandra** Benn. var. **alienata**.Lane by Battak village, Berastagi.
Distrib. India, Malay Peninsula and islands.**Leucosyke capitellata** Wedd.Sibolangit, Bukit Kramat Kudah (Mohamed Nur).
Distrib. Java.**Villebrunea integrifolia** Gaud.

Shrub; fruits white; Sibolangit, Bukit Kluang (Mohamed Nur).

Distrib. Indo-Malaya.**Boehmeria malabarica** Wedd.Sibolangit (Mohamed Nur). *Distrib.* Indo-Malaya.**Boehmeria platyphylla** Don.Sibolangit, Bukit Semaik (Mohamed Nur).
Distrib. Indo-Malaya.

CUPULIFERAE.

Quercus turbinata Bl.Sibolangit, Bukit Semaik (Mohamed Nur 7378).
Tree 40 to 50 ft. tall. *Distrib.* Java.

ORCHIDACEAE.

Oberonia elongata Ridl. n. sp.

Stemless. Leaves about 4, the largest 3.5 in. long, .12 in. wide, sword-shaped acuminate. Spike 12 in. long, graceful. Flowers very small, 2 or 3 together, pale green, numerous. Bracts

longer than flower, lanceolate-acute, toothed. Sepals oblong-ovate. Petals similar and nearly as large. Lip boat-shaped obscurely 3-lobed when flattened out with short processes on the tip, yellow. Fruit oblong .1 in. long; pedicel nearly as long.

Berastagi on trees.

Microstylis sumatrensis Ridl. n. sp.

Stem fleshy, 6 in. long, purple. Leaves 4, membranous, ovate acute; narrowed to a petiole; nerves 5, purple beneath, 6 in. long, 2.5 in. wide. Scape 18 in. long, base 10 in., nude. Flowers .12 in. wide, resupinate. Bracts lanceolate acuminate, longer than the flower. Pedicel and ovary short, strongly winged. Sepals, upper one linear oblong fleshy involute, laterals oblong blunt, involute fleshy, purplish tipped green. Petals shorter pale linear. Lip entire, fleshy ovate broad with a large deep foveola, all purple, tip narrower, blunt green oblong. Auricles narrow oblong linear curved behind the column and crossing pale. Column very short with a broad clinandrium with 2 distinct but short stelia. Anther-cup flat orbicular.

Berastagi woods. One plant.

Liparis pratensis Ridl. n. sp.

Terrestrial, base bulbous .25 in. long and through. Leaves about 3, membranous lanceolate acuminate 4 in. long, .2 to .5 in. wide. Scape slender 8 in. tall, floriferous part 3 in. long. Flowers about 20 scattered, .15 in. wide. Bracts narrow lanceolate acuminate, deflexed, .1 in. long. Pedicel and ovary .2 in. long, slender. Sepals upper oblong-lanceolate, broadest at base, lower ones broad, shorter, oblong. Petals linear spatulate, very narrow. All yellow. Lip fleshy, purple, broadly obovate, tip entire, broad, subtruncate with 2 blunt triangular flat calli on the deeply channelled claw. Column arcuate, thickened above.

Berastagi, open country in grassy spots, very local. I only found one patch of about 30 plants.

Eria lorifolia Ridl.

Bandar Bahru, Gunong Sibayak (Mohamed Nur 7343).

Distrib. Malay Peninsula. Kränzlin in the Pflanzenreich reduces this to the totally distinct *E. aeridostachya* Rehb. fil.

Phreatia nana Hook. f.

Berastagi woods on a tree. *Distrib.* Malay Peninsula.

Ceratostylis malaccensis Hook. fil.

Berastagi, and also got on Gunong Sibayak by Mohamed Nur.

Distrib. Malay Peninsula and islands.

Both specimens are of the same stout and tall form, somewhat resembling *C. sima*, but I do not think this form can be separated from the common slender form.

Ceratostylis scariosa Ridl. n. sp.

Plant 12 in. tall; branched and curved, slender, covered with lanceolate acuminate brown sheaths with white and scarious edges. Leaves thinly coriaceous, lanceolate long acuminate, 3.5 in. long, .25 in. wide. Flowers in short racemes just protruding from the lanceolate sheaths; pedicels very short. Whole flower .3 in. long; lip outside. Petals shorter, oblong-linear, blunt, narrow. Lip lanceolate short, base depressed, subacute. Column short, with 2 very large erect oblong round-tipped stelidia. Anther purple, helmet-shaped, base bilobed, the two cells separate.

Berastagi woods.

Spathoglottis plicata Lindl.

Flowers mauve, Berastagi. Quite the same plant as that of the Malay Peninsula and not the one of Java.

Distrib. Malay Peninsula.

Phaius Blumei Lindl.

Edge of a wood, Berastagi.

Distrib. Malay Peninsula and islands.

Platyclinis gracilis Hook. fil.

Berastagi. Flowers pale green with orange nerves edged brown on lip. *Distrib.* Malay Peninsula.

Dendrochilum lepidum Ridl. n. sp.

Elongate slender-branched plant, internodes 1 in. long, rugose, partly covered with lanceolate blunt sheathing bracts; pseudobulbs cylindrical, little dilate at base, 1 in. long, .2 in. wide at base. Leaves oblong-lanceolate, acuminate narrowed at base, 6 in. long, 1.1 in. wide, chartaceous; petioles .3 in. long. Scapes slender filiform 10 in. long, base for 4 in. nude. Flowers subdistant, .15 in. across, greenish white. Bracts oblong mucronate .08 in. long as long as ovary and pedicel. Sepals and petals lanceolate acuminate. Lip with two erect semi-oval lobes at the base; midlobe very narrowed, tongue-shaped, lanceolate acuminate. Calli 2 on the inside of the basal lobes. Column very short, hood large, oblong truncate, arms longer than the column from halfway.

On trees, Berastagi forests.

Dendrochilum brevilabre Ridl. n. sp.

Stem stout, over 12 in. long, covered with sheaths: pseudo-bulbs oblong cylindrical, yellow, 2 in. long. Leaves chartaceous elliptic lanceolate, subacute, base narrowed, 6 in. long, 1.25 in. wide; petiole .75 in. long. Scapes slender 6 in. long, racemose to base. Bracts sepals ovate lanceolate acute, spur short subglobose, all white woolly ovate acute, .05 in. long, much shorter than pedicel and ovary. Sepals lanceolate acuminate; petals similar, .1 in. long. Lip much shorter, broadly obovate, tip broad blunt sub-truncate, 2-keels II at the base running into raised nerves. Column short and thick, arms from the top long, linear acuminate, hood large, broad, lanceolate acute.

Berastagi forests. Allied to *D. album*, Ridl.

Calanthe sp.

A large white-flowered *Calanthe* was not uncommon in the hill forests of Berastagi, but the plants were not in flower. The raceme was velvety and the bracts long and narrow, quite unlike those of *C. veratrifolia* Lindl.

Calanthe unifolia Ridl. n. sp.

Leaf one, broadly elliptic-ovate acute glabrous 12 in. long, 6 in. wide, 7-nerved. Scape 3 feet tall pubescent; petiole 9 in. long. Raceme 5 in. long. Bracts lanceolate acuminate, 5-nerved, deflexed, lowest 1.5 in., upper ones much shorter. Pedicels pubescent .25 in. long. Flowers .4 in. wide. Sepals oblong, 3-nerved, the lower ones nearly ovate. Petals linear oblong, all greenish-white and minutely pubescent. Lip fleshy .4 in. long, yellow, base thick adnate to column; limb 4-lobed, lateral lobes oblong truncate spreading, median lobe short, base oblong, apex bilobed, lobes short broad rounded, spur, pendulous cylindrical blunt .5 in. long.

Berastagi forests. A single plant. This seems to be allied to *C. chrysoglossoides* Lindl. of Java, at least in having only one leaf. The flowers are fleshy and preserve badly.

Arundina speciosa Bl.

Common in the lalang fields.

Distrib. Java, Malay Peninsula.

Galeola Lindleyana Hook. f.

Berastagi, edge of a wood on the western hills. Plant 5 feet tall, erect with yellow flowers.

Distrib. Himalayas. A new record for the Malayan region. The flowers are rather smaller than those of the Himalayas.

Goodyera casta Ridl. n. sp.

Plant about a foot tall, herbaceous glabrous. Leaves broad lanceolate acuminate, narrowed at the base, 3 in. long, 1.25 in. wide; petiole .25 in. long, sheath .75 in. long. Raceme about 3 in. long. Bracts large lanceolate acuminate, bright red. Flowers pure white. Sepals ovate acute, upper one .25 in. long, gibbous at base, laterals broadly ovate acuminate. Petals adnate to the upper sepal. Lip large saccate acute, no papillae inside but a thick fleshy keel runs from the base of the sac to the top where it is papillose. Anther-cap lanceolate acuminate, base dilate. Rostellum bifid deeply, lobes narrow linear.

Very rare, a single plant in the hill forests on the way to Sibayak.

Spiranthes australis Lindl.

A tall form a foot high and very narrow linear acuminate leaves.

Open country, Berastagi. *Distrib.* Java.

Hetaeria grandiflora Ridl. n. sp.

Plant 22 in. tall, with long woolly roots. Stem below leaves 6 in. tall. Leaves elliptic-lanceolate acute, shortly narrowed at the base, distinctly 3-nerved, 3 in. long, .75 in. wide; petiole slender .3 in. long, sheaths ampliate acuminate below, dull red, of leaves shorter. Raceme pubescent, reddish 16 in. long, lower half nude. Flowers about 12, rather distant. Bracts lanceolate acuminate, dull red, .15 in. long. Ovary little longer, hairy. Sepals, upper one oblong-lanceolate blunt, lower ones triangular blunt, all hairy and dull red. Petals glabrous linear, bluntly acuminate, pink. Lip white saccate at base, fleshy narrowed at tip and terminated by two divaricate oblong lobes, .1 in. long, rounded at the tips. Column short; anther dilate ovate acuminate. Pollen white. Rostellum arms very short. Capsule oblong-elliptic, hairy .25 in. long, perianth persistent.

Berastagi hill woods on the way to Sibayak.

Habenaria lacertifera Lindl.

Common and a little variable in habit on the grassy plains, Berastagi.

Distrib. Malay Peninsula and islands. I suppose this to be the plant Dr. J. J. Smith means by his *Peristylus cadidan* of Java.

SCITAMINEAE.

Globba candida Ridl. n. sp.

About 2 feet tall; stem not spotted. Leaves thin membranous, thinly hairy beneath, lanceolate cuspidate narrowed to base, 6 to 9 in. long, 2 to 3 in. wide; sheath glabrous, ligule very small. Panicles over 12 in. long, with numerous distant racemes lengthening to 3 in. long of which 2 in. is bare of flowers. Bracts ovate-lanceolate, mucronate .12 in. long, caducous. Flowers white with a yellow spot on the lip; pedicels .1 in. long, the top dilated into a circular receptacle. Calyx funnel-shaped with three equal acute lobes, .1 in. long. Corolla-tube slender .2 in. long. Upper petal boat-shaped oblong, lower flat oblong. Staminodes linear blunt as long. Lip very short obtusate with rounded lobes, little longer than the corolla-tube. Stamen long, spurs 2, triangular running the whole length of the anther. Capsule .4 in. long, ellipsoid narrowed at base.

Berastagi woods. Allied to *Globba albiflora* Ridl.

Hedychium cylindricum Ridl. n. sp.

About 4 feet tall. Leaves elliptic-lanceolate acuminate, narrowed to base, sparsely hairy especially on the midrib beneath, 13 in. long, 3 in. wide; petiole .1 in. long; sheath sparsely hairy. Spike cylindrical when full grown over 12 in. long, the basal 3 in. covered with ovate brown silky hair, upper floral bracts very numerous, imbricate, hairy especially on the edge, .1 in. long, .5

in. wide. Calyx tubular, hairy all over with oblique mouth, .75 in. long, slender. Corolla-tube slender 1.5 in. long. Petals linear, very narrow 1.25 in. long. Staminodes 1.5 in. long, narrow linear, dilated upwards. Lip with a long narrow claw gradually dilated into an obovate bilobed limb. Stamen nearly 2 in. long. Anther ellipsoid, tip bilobed, base long bifid. Stigma hairy.

Berastagi woods. Also collected at Bandar Bharu near Gunung Sibayak by Mohammed Nur, 7330. Allied to *H. erythrostemon* K. Schum. of Celebes. All the flowers I saw of this were white, Mohamed Nur gives them as yellow.

Hedychium sp. Epiphytic in fruit only.

Berastagi Hill woods.

Zingiber spectabile Griff.

Sibolangit, Bukit Kramat Kudah (Mohamed Nur 7293).

The specimen is poor but it appears to be this plant which is common in the Malay Peninsula and has been found in Sumatra before.

Amomum sumatrense Ridl. n. sp.

A tufted plant with the habit of *Geostachys*. Leaves linear-lanceolate, long cuspidate-acuminate glabrous, base narrowed, 18 in. long, 1.25 in. wide; petiole 1 in. long; sheaths narrow over 6 in. long; ligule oblong truncate .5 in. long. Raceme short, oblong, 3 in. long on a 3 inch peduncle covered with large oblong bracts 1.5 in. long, truncate below, lanceolate acuminate above. Floral bracts enwrapping 2 flowers oblong-lanceolate cuspidate .75 in. long, red. Calyx lanceolate acuminate, red, .75 in. long, longer than the corolla-tube. Corolla 1.5 in. long to end of tip rounded, yellow, spotted red inside the mouth. Anther crest broad, entire, top rounded with a short point in the middle.

Berastagi woods. Allied to *A. spicatum* Ridl. of Bukit Tinggi, Negri Sembilan. Both of these have the habit and colouring of *Geostachys* but the anther is crested.

Amomum sp.

Fruiting specimens only, oblong with short spines from a broad base.

Sibolangit, Bukit Kramat Kudah (Mohamed Nur 7255).

Hornstedtia Beccarii Ridl. n. sp.

Rhizome stout, woody .4 in. through; stems as short; sheaths striate covered when young with small irregular reddish patches, leaving short transverse bars when gone. Leaves oblong cuspidate, base narrowed blunt, young leaves softly hairy on the back; adult glabrous except midrib, 18 in. long, 4.5 in. wide or less petiole hardly any; ligule elliptic-lanceolate, tip round, thickly hairy on edge; sheaths about 9 in. long as described above. Inflorescence obconic, 3 in. long; peduncle covered with sheaths

under .5 in. to 2.5 in. long. Bracts ovate to ovate-lanceolate, finely ribbed. Flowers 2.25 in. long. Calyx tubular with 3 acute points and a rib in the centre, 1.5 in. long. Corolla-lobes lanceolate-oblong, bluntly rounded at tip, 1.75 in. long. Lip fleshy oblong blunt as long as petals, inside densely velvety hairy with 3 hairy points projecting back to mouth tube. Stamen filament very broad at base, narrowed to the anther, densely velvety hairy, crest distinct, rounded with 3 raised veins all hairy; anther-cells hairy narrow; anther bifid at both ends. Style slender, glabrous; stigma cup-shaped.

Sumatra, Mount Singalan (Beccari 267), Sibolangit, Bukit Semaik (Mohamed Nur 7361). Flowers yellow.

The remarkable hairy lip and stamen with its distinct crest is unlike anything I know in this genus.

Hornstedtia triorgyalis Ridl.

Mohamed Nur collected at Sibolangit, on Bukit Kluang No. 7411, specimens of a *Hornstedtia* which seems to differ from *H. triorgyalis* only in the leaves being glabrous. The species is a native of Perak.

Phaeomeria caudiculata Ridl. n. sp.

Leafy stem 6 feet or more. Leaves chartaceous, stiff, glabrous oblong, base blunt, 2 feet long, 4.5 in. wide; midrib prominent; petiole .6 in. long, deeply channelled; ligule stiff, .6 in. long; sheath strongly ribbed and caudate. Scape 3 feet tall, .25 in. through, pubescent with several lanceolate bracts below the head, the lowest 7 in. long, glabrous except at the tips, white hairy. Head 2 inches long, 2.5 in. wide. Bracteoles linear caudate, white-hairy, 1.75 in. long, cherry red. Inner bracteoles enclosing 2 flowers, lanceolate with 2 tails at the tip, 1.5 in. long, .5 in. wide at base. Calyx hairy tubular at base ending in three points tufted with white hairs and bearing glabrous tails, 1.5 in. long. Corolla-lobes lanceolate, narrow glabrous, thin 1.25 in. long, .1 in. wide. All red. Lip oblong-lanceolate acuminate acute, hairy outside, edges incurved yellow, 1.75 in. long. Anther linear-oblong, no crest, pubescent on back at base. Stigma broad, rounded ovate, hairy, deep red.

Berastagi forests, West hill. A very handsome and curious species, the tailed bracts and sepals being very curious. There are two other species of *Phaeomeria* from Sibolangit in Mohamed Nur's collection but no developed flowers. Both appear to be undescribed.

Phrynium densiflorum Bl.

Sibolangit, Bukit Kluang valley (Mohamed Nur 7220).

Distrib. Java.

Musa sumatrana Bcc. Ill. Horticole; xxxvii. 37, t. 375.

In 1877 Beccari sent home from Sumatra live plants of a wild banana of which the leaves had brown spots, it was figured as above

in 1880. The plant was never fully described, nor really sufficiently so to be perfectly certain what species he had. In the Berastagi forests was however, a banana of which the young plants bore the brown spotting of *Musa sumatrana* as well as their general habit. Of this plant I was unable to find a single flowering specimen, and only came across a few nearly rotten fruits. *Musa malaccensis* of the Malay Peninsula often in the young state has brown spotted leaves; but this Sumatran plant was a smaller and more slender banana and the fruits seemed to me also to be different.

Mr. Burkill sends a specimen of a banana collected by Mohamed Nur from Sibolangit which, however, appears to me the same plant and of which I give such information as I can derive from the specimen.—Leaf 25 inches wide, glabrous; inflorescence with narrow linear acuminate bracts 5 in. long, .2 in. wide, the terminal ones lanceolate 3 in. long, .8 in. wide; whorls of flowers very close set about 16 in a row; rachis hairy. Male flowers 1.75 in. long; pedicel .2 in. long, outer sepal linear, boat-shaped, edge scarious, top 3-lobed, acute, inner .6 in. long. Filaments as long; anthers linear .5 in. long. Style glabrous as long. Fruits about 6 in. long, curved cylindric about 12 in one series.

Sibolangit, Bukit Kramat Kuda (Mohamed Nur 7259).

The narrow bracts suggest, at least that it belongs to the *Rhodochlamys* section to which Schumann refers it. I have little doubt that this specimen belongs to *M. sumatrana* Becc., and am sure that the plant I met with at Berastagi was this species.

AMARYLLIDACEAE.

Curculigo recurvata Dry.

Woods, Berastagi. *Distrib.* Malay Peninsula and islands.

Hypoxis aurea Lour.

Berastagi (Mrs. Burkill). *Distrib.* Indo-Malaya.

Crinum moluccanum Roxb.

Sibolangit, Bukit Kluang (Mohamed Nur).

Distrib. Malay islands.

LILIACEAE.

Disporum multiflorum Don.

Berastagi woods.

Distrib. Java, India, Malay Peninsula at Telom.

Rhuacophila javanica Bl.

Sibayak volcano, 7000 feet. Forming large clumps in the scrub on the upper slope. Flowers white.

Distrib. Java, Malay Peninsula.

Smilax javensis DC.

Near the top of the volcano Sibayak at 7000 ft.

Distrib. Java, Philippines.

S. micropoda DC.

Sibayak volcano, upper woods. *Distrib.* Java.

PONTERIACEAE.**Monochoria hastaefolia** Presl.

Form with ovate blunt leaves, in a stream in a ravine in Beratagi plain. A similar form occurs in the Philippines.

Distrib. Tropical Asia.

COMMELINACEAE.**Pollia sorzogonensis** Endl.

Berastagi woods by a stream.

A form with unusually large bracts, oblong blunt .25 in. long, .1 in. wide, occurs in these woods.

Pollia thyrsoflora Endl.

Sibolangit, Bukit Semaik (Mohamed Nur 7366).

Distrib. Malaya.

Commelina clavata C. B. Clarke.

Berastagi woods. Flowers pale blue.

Commelina Hasskarli C. B. Clarke.

Berastagi woods. Flowers pale blue.

Distrib. Malay Peninsula.

Commelina obliqua Ham.

Berastagi woods. Flowers pale blue.

Distrib. Malay Peninsula.

Aneilema protensum Wall.

Berastagi woods. Flowers white.

Distrib. Malay Peninsula, Telom.

Forrestia sumatrensis Ridl. n. sp.

Herb about 3 feet tall, glabrous; stem slender. Leaves lanceolate cuspidate acuminate, narrowed to the base, 6 in. long, 1.5 in. wide; sheath tubular, 1 in. long with pale soft bristles at the mouth and on a line down the sheath. Heads 1 in. through, lower bracts ovate hairy .15 in. long. Sepals linear-oblong .4 in. long. Petals narrowed. Stamens apparently quite glabrous. Capsule oblong, round triquetrous, narrowed at base terminated by the style.

Berastagi woods. Flowers white; fruit pink.

This somewhat resembles *F. gracilis* Ridl., but is smaller and none slender.

Forrestia porrecta Ridl. n. sp.

Stems long, creeping 2 feet or more very slender, glabrous. Leaves lanceolate caudate acuminate with a long point 1 in. long, base narrowed, blunt 4.5 in. long, 1.25 in. wide; petiole .1 in.

long, sheath .75 in. long or more, cylindric with long slender bristles at the mouth and a line of hair down the centre on one side. Heads small, few-flowered about 5 or 6 flowers. Bracts ovate acute. Sepals linear-oblong, boat-shaped hairy on the keel and tip. Petals slightly longer, thin, white, blunt lanceolate as long as the filaments. Filaments long, white, hairy at tip, glabrous below. Anthers ovate. Style longer.

Berastagi hill woods. This curious plant has long creeping stems lying prostrate on the ground or creeping up the trunk of a tree. It has also remarkably small heads of few flowers.

Forrestia mollis Hassk.

Sibolangit (Mohamed Nur). *Distrib.* Malaya.

JUNCACEAE.

Juncus prismatocarpus Ehrh.

Common in sandy streams both on Berastagi plateau and at the base of the volcano Sibayak in the sulphureous stream.

Distrib. Europe, India.

PALMAE.

Pinanga canina Becc.

Bandar Bharu, Gunong Sibayak (Mohamed Nur 7394).

Distrib. Malaya.

Pinanga parvula Ridl. n. sp.

Tree 6 feet tall. Leaves with numerous linear acuminate lobes, 12 in. long, 1 in. wide; usually with 2 to 6 nerves, rachis slender. Spathe oblong bluntly acuminate, 4.5 in. long, 1.1 in. wide. Spadix erect; branches 3. Male flowers ovate triangular acute, point curved up .2 in. long. Stamens 6, very short. Female flowers distichous; sepals broad rounded ovate. Petals hardly as long. Fruit oblong .3 in. long. Seed ellipsoid, not ripe.

Berastagi forests. Near *P. stricta* Becc. of Borneo.

Caryota sp.

A large species occurred in and round villages evidently planted, perhaps *C. furfuracea* Bl. Mohamed Nur sends a specimen from Sibolangit No. 7231 which appears to be *C. furfuracea* Bl.

Arenga saccharifera Labill.

Occurred round villages.

Daemonorops propinqua Becc.

Bandar Bharu, Gunong Sibayak (Mohamed Nur 7308).

Distrib. Malay Peninsula.

Calamus karuensis Ridl. n. sp.

Rather slender and about 22 feet long. Leaf-rachis armed with few, short recurved thorns; leaflets oblong-lanceolate, long acuminate, shortly narrowed at the base; nerves about 6, with short transverse nervules undulate numerous 15 in. long 1.5 in. wide. Spadix, male 3 feet long, sheaths flattened, lowest one 9 in. long, .5 in. wide at top with few scattered short thorns on the edge; limb short .25 in. long, scurfy, triangular acute, upper sheath similar but much smaller and unarmed; secondary spathes tubular 1.5 in. long, mouth oblique, limb short triangular acute ciliate on the edge scurfy. Spadix branches shortly projecting from the sheaths; peduncle hardly or not projecting; branches one or two; branchlets 6 to 10 with flowers scattered; flowers about 1 to 1.5 in. long. Spathels .1 in. long, scurfy. Flowers about 20 on a branchlet. Bracts small, ovate mucronate, Spathelules cup-shaped round, striate or with 3 minute points. Calyx tubular striate with 3 short ovate lobes .11 in. long. Corolla little longer. Petals elliptic. Stamens 4, linear with very short filaments.

Berastagi forests. The only rattan I saw there. Allied to *C. aruensis* Becc., but stouter, and also to *C. siphonacanthus* Becc. of the Philippines but much less robust and thorny and with flattened lower spathes.

ARACEAE.

Arisaema filiforme Bl.

Sporadically in the Berastagi woods.

Distrib. Java, Sumatra, Malay Peninsula.

Homalomena Raapii Engl.

Sibolangit, Bukit Kluang (Mohamed Nur 7410).

There was a very big *Homalomena* common in the Berastagi woods which I take to be this plant, but I could find no trace of flowers or fruits. I have seen no type of this species, but from description and figure take these plants to be Engler's species which is a native of Western Sumatra.

Homalomena paludosa var. ?

Bandar Bharu, Gunong Sibayak (Mohamed Nur 7396). Fruit greenish and stalk brown. I have no spathe on the specimen and there is some difference in the foliage, but it may be a form of *H. paludosa*.

Homalomena Burkilliana Ridl. n. sp.

Stem 1 in. or more tall, not stout. Leaves ovate, base broad slightly retuse, tip shortly acuminate mucronulate; nerves very numerous about 20, more prominent than the others (these consisting of fascicles of smaller nerves which diverge from the central one at different points) 6 in. long, 3.5 in. wide; petiole slen-

der, 9 in. long, sheathing for 2 inches. Spadices about 8 to a plant on long slender peduncles 1.5 in. long. Spathes cylindrical, mucronate 1 in. long. Spadix nearly as long. Male and female portions equally long. Male portions cylindrical acuminate. Female of about 30 pistils; stigmas round.

Sibolangit, Bukit Kluang (Mohamed Nur 7412). Allied to *H. elliptica*.

Homalomena (Chamaecladon) obovata Ridl. n. sp.

Stem 2 in. long or more creeping with long roots. Leaves obovate to oblanceolate, base long narrowed, tip blunt or shortly acuminate, 2 to 4 in. long, .5 to 1.5 in. wide; nerves 6 or 7 pairs slightly thicker than the others which are few, very fine and inconspicuous; petioles 2 to 4 in. long; sheath .5 to 1.75 in. long, very broad, .3 in. wide in large leaves, dilated to base red. Spathes few, curved cylindrical with broad base and mucro at top .5 in. long on a pedicel slender 3 in. long. Spadix .3 in. long cylindrical. Female portion of 8 pistils, much shorter than the acuminate males.

Berastagi, common. Somewhat near *H. Griffithii* but much smaller, more creeping and with unusually broad sheaths to the leaves.

Schismatoglottis longipes Miq.

Berastagi (Mohamed Nur).

Distrib. Malay Peninsula and islands.

Schismatoglottis Wallichii Hook. fil.

Sibolangit (Mohamed Nur).

Distrib. Malay Peninsula and islands.

Colocasia antiquorum Linn.

Sibolangit, Bukit Semaik (Mohamed Nur 7357).

Amydrium humile Engl.

Creeping on the ground in the woods. Berastagi not rare.

Distrib. Penang.

Anadendrum montanum Schott.

Berastagi (Mrs. Burkill).

Distrib. Malay Peninsula and islands.

Anadendrum affine Schott.

Bandar Bharu, Gunong Sibayak (Mohamed Nur 7394).

Distrib. Borneo.

Raphidophora crassifolia Hook. fil.

Sibolangit, Bukit Semaik (Mohamed Nur).

Distrib. Malay Peninsula.

Pothos paucinervius Ridl. n. sp.

Slender climber. Leaves lanceolate oblong acuminate, acute, base hardly narrowed; nerves about 15 pairs with shorter ones

loosely reticulated, 6 in. long, 1.5 in. wide; petiole 3.5 to 4 in. long, slender, sheath very narrow up to the knee which is .5 in. long. Peduncle slender 3.5 in. long. Spathe not seen. Spadix stipitate (stipes .2 in. long) short and thick .5 in. long. Perianth longer than the ovary of 6 oblong lobes free to the base and rounded at the top. Ovary top ellipsoid with a short linear stigma.

Berastagi hill woods, climbing on trees.

This species of which I only obtained one spadix and that somewhat advanced resembles *P. Wallichii* Engl., but the venation of the leaves is utterly unlike that of any other *Pothos* known to me, for they almost all have numerous parallel nerves whereas this has but few prominent nerves and wide distinct reticulations.

LEMNACEAE.

Lemna polyrhiza Linn.

Rice fields at the base of the Sibayak volcano.

Distrib. Whole world.

Lemna paucicostata Hegelm.

With the last. *Distrib.* Tropical Asia.

NAIADACEAE.

Potamogeton oxyphyllus Miq.

Gunong Sibayak. Petain valley from a solfatara in warm water. Also collected by Mr. H. G. Robinson on Korinchi.

Distrib. Japan.

PANDANACEAE.

Pandanus Burkillianus Ridl. n. sp.

Leaves probably long, 2.5 in. wide, thorns on edge, minute black. Peduncle of female inflorescence thick, 2 in. or more long. Bracts lanceolate acuminate 6 in. long, 1 in. wide with minute close set spines on edges and keel. Female spikes in flower cylindrical, 1.5 in. long; stigmas acute curved. Syncarp 4 in. long, 2.25 in. wide cylindrical blunt; fruits .75 in. long, angled cylindrical, tops conic blunt, free .15 in. long; stigma ovate acuminate acute, horizontal on a short, thick style.

Gunong Sibayak (Mohamed Nur 7341).

This belongs to the section *Lophostigma* of which all the other recorded species seem to belong to the Papuan and Polynesian region. It is nearly allied to *P. Beccarii* Solms-Laubach, of the Aru islands on its free tips to the fruits, but the stigma is on a distinct stalk while as far as I understand the description and figure in *Pflanzenreich* the stigma in *P. Beccarii* is sessile.

There was a very large branching long-leaved *Pandanus* on the way up to Gunong Sibayak forming a thicket and about 20 feet tall. I saw no fruit on it; this may have been this species.

ERIOCAULACEAE.

Eriocaulon heterolepis Steud.

In a small marsh, Berastagi plains.

Distrib. Bombay and Java. Our form is the variety *nigricans* of Java.

CYPERACEAE.

Kyllinga brevifolia Rottb.

Berastagi, open country. *Distrib.* Tropics.

Kyllinga cylindrica Nees.

Berastagi open country. *Distrib.* Tropical Asia.

Kyllinga melanosperma Nees.

Marshy ground, Berastagi plains.

Pycreus globosus Reich. var. **nilagiricus**.

Edges of streams and marshy ground. Berastagi plains.

Distrib. Tropical Asia.

Pycreus polystachyus Beauv.

Hot sulphur spring at the foot of Sibayak volcano.

Distrib. Tropics generally.

Cyperus pilosus Vahl.

Swampy ground, Berastagi. *Distrib.* Tropical Asia.

Cyperus difformis Linn.

Rice fields at the base of Sibayak volcano. Marshy ground Berastagi plateau.

Distrib. Europe, Asia, Australia; absent from Malay Peninsula.

Cyperus haspan Linn.

Berastagi. Open country. *Distrib.* Tropics.

Cyperus distans Linn.

Road to Berastagi from Medan. *Distrib.* Tropics.

Mariscus Sieberianus Nees.

Berastagi road sides and open country. *Distrib.* Tropics.

Fimbristylis podocarpa Nees.

Among lalang, Berastagi. *Distrib.* Asia.

Fimbristylis diphylla Vahl.

Berastagi roadsides. *Distrib.* Whole World.

Fimbristylis miliacea Vahl.

Swampy ground, Berastagi. *Distrib.* Tropics.

Bulbostylis capillacea Kunth.

Dry hills, Berastagi. *Distrib.* Indo-Malaya.

Scirpus macronatus Vahl.Swampy marsh, Berastagi. *Distrib.* Tropics.**Rhynchospora glauca** Vahl.

In lalang, Berastagi plains. Common.

Distrib. Tropical Asia.**Gahnia javanica** Moritz.Sibayak volcano. *Distrib.* Malay Peninsula and islands.**Scleria Radula** Hance.

Lower woods of the volcano Sibayak and hill forests nearer Berastagi.

Scleria chinensis Kunth.

A rather fine and dark form among lalang, Berastagi plains.

Distrib. Malay Peninsula, China.**Carex indica** Linn.Berastagi forests. *Distrib.* Tropical Asia.**Carex baccans** Nees.

Berastagi woods. A very handsome species.

Distrib. India, Java, Malay Peninsula (Telom).

GRAMINEAE.

Paspalum orbiculare Forst.

Berastagi, open spots.

Digitaria chinensis Hornem.Berastagi. Waste open ground. *Distrib.* Tropical Asia.**Urochloa javanica** Stapf.Road from Medan to Berastagi. *Distrib.* Malaya.**Sacciolepis indica** Stapf.Berastagi, open plains. *Distrib.* Tropical Asia.**Pseudechinolaena polystachya** Stapf.In the hill woods, Berastagi. The typical form of Java with small unarmed spikelets. *Distrib.* Tropical Asia.**Panicum paludosum** Roxb.Swampy ground, plains, Berastagi. *Distrib.* Tropical Asia.**Echinochloa Crus-Galli**, Beauv.

The awned form. In cultivated ground, Berastagi.

Distrib. Whole world.**Isachne albens** Trin.

Mountain forests, Berastagi.

Distrib. Malay Peninsula and islands.

Oplismenus compositus Beauv.

Berastagi forests and road from Medan. *Distrib.* Tropics.

Setaria glauca Beauv.

Berastagi plains. *Distrib.* Whole World.

Ichnanthus pallens Munro.

Berastagi forests. *Distrib.* Tropical Asia.

Leersia hexandra Sw.

Marsh, Berastagi plains. *Distrib.* Tropics.

Arthraxon nudus Hochst.

Berastagi woods. *Distrib.* India.

Pogonatherum polystachyum R. and S.

On the road between Medan and Berastagi. On rocks. A dwarf form tufted and an elongate one over a foot tall.

Distrib. Tropical Asia.

Coelorhachis glandulosa (Trin.)

Sibolangit, Bukit Semaik (Mohamed Nur).

Distrib. Malay Peninsula and islands.

Themeda gigantea Hack.

Common all over the plains at Berastagi.

Distrib. Tropical Asia.

Ischoemum aristatum Linn.

In the garden at the bungalow, Berastagi. Apparently introduced.

Capillipedium parviflorum Stapf.

Berastagi plains.

Capillipedium scabridum Ridl. n. sp.

Slender branched wiry grass over 12 in. tall. Leaves narrow-linear acuminate, caudate scabrid 3 in. long, .06 in. to .2 in. wide; young leaves hairy, ligule and base of leaf with long white hairs, sheaths slender finely ribbed. Peduncle covered by a sheath to the panicle, blade of sheath usually small, but often developed into a lanceolate leaf. Panicle lax 2.5 in. long and about 1.25 in. wide; branches capillary, rather close set, with a tuft of long white hairs at the base of each. Spikelets 2, one sessile, one pedicelled about .1 in. long, callus bearded with white hairs. Sessile spikelet; glume i. lanceolate purple, hairy; gl. ii. pale narrow-lanceolate with a long slender awn .15 in. long; gl. iii. very short oblong-lanceolate hyaline; style short with a longer broad purple plumed stigma. Pedicelled spikelet glume i. purplish lanceolate, boat-shaped, hairy; gl. ii. larger pale, not awned; gl. iii. larger than in the sessile spikelet. Stamens 3, purple.

Berastagi roadside towards the Battak village.

Imperata cylindrica Beauv.

Very abundant covering the whole plain for many miles.

Erianthus decus-sylvae Ridl. n. sp.

Tufted grass forming a bush about 3 feet tall. Leaves broad lanceolate acuminate to a long point, base broad, glabrous above; midrib hairy beneath 7 in. long, 1.1 in. wide; ligule of a few white bristles, sheaths striate, 3 in. long. Panicle lax, 5 or 6 in. long with numerous capillary branches bearing branchlets with racemes of spikelets .5 in. long. Calli with spreading whorls of pink hairs .1 in. long, making the whole panicle look coppery when alive and purple pink when dry. Spikelets sessile and peduncle similar. Glume i lanceolate acute, pale greenish hairy, ii similar but more acute, iii short oblong-lanceolate hyaline; awn slightly twisted, slender coppery .1 in. long. Stamens 3, black. Stigmas conspicuous, rather thick, black.

In dense thickets, forests of West Hill, Berastagi. A most beautiful and attractive grass with its coppery purple panicles.

Coelachne infirma Buse.

Banks in the plain, Berastagi. *Distrib.* Java.

Poa annua Linn.

On banks by the roadside near the village, Berastagi, no doubt introduced.

Sporobolus diander Beauv.

Plains, Berastagi. *Distrib.* Tropical Asia.,

Eleusine indica Linn.

Common on the plain, on paths and waste ground.
Distrib. Whole world.

Eragrostis amabilis W. and A.

Plains, Berastagi. *Distrib.* Tropical Asia.

Eragrostis elongata Jacq.

Berastagi plains in open country.

GNETACEAE.**Gnetum microcarpum** Miq.

Sibolangit, Dato Puloh Siam (Mohamed Nur 7383).
Distrib. Malay Peninsula and islands.

FILICES.**Gleichenia linearis** Burn.

A dwarf form on Sibayak volcano.

Alsophila squamulata Mett.

Tree fern; stem 3 feet tall. Berastagi woods. *Distrib.* Java.

- Humata parallela** Wall.
Berastagi woods. *Distrib.* Malaya.
- Prosaptea contigua** Sw.
Berastagi woods. *Distrib.* Malaya.
- Davallia bullata** Wall.
Berastagi woods. *Distrib.* Malaya.
- Stenoloma chinensis** Sw.
Berastagi. *Distrib.* Tropical Asia.
- Hymenophyllum javanicum** Spreng.
Berastagi woods. *Distrib.* Malaya.
- Hymenophyllum salakanse** Racib.
Berastagi forests. *Distrib.* Java.
- Lindsaya repens** Thw.
Berastagi woods. *Distrib.* Tropical Asia.
- Pteris aquilina** Linn.
Abundant all over the plateau, Berastagi.
Distrib. Whole world.
- * **Litobrochia incisa** Thunb.
Sibayak volcano. This plant grows at the highest altitude on the rocks of the volcano of any plant forming dense masses of stunted plants.
- Lomaria procera** Spr. var. **vestita**.
Sibayak volcano. *Distrib.* Malaya.
- Lomaria elongata** Bl.
On a rock, Berastagi. *Distrib.* Java.
- Thamnopteris nidus-avis** Linn.
Woods at Berastagi. Common. *Distrib.* Tropical Asia.
- Asplenium normale** Don.
Berastagi woods. *Distrib.* Tropical Asia.
- Asplenium caudatum** Forst.
Berastagi woods. *Distrib.* Tropical Asia.
- Asplenium nitidum** Sw.
Berastagi woods. *Distrib.*
- Diplazium sorzogonense** Presl.
Woods on slope, Sibayak volcano. *Distrib.* Tropical Asia.
- Diplazium polypodioides** Mett.
Sometimes with a short stem like a tree fern. Berastagi woods.
Distrib. India, Malaya, Australia.

Anisogonium cordifolium Mett.Berastagi woods. *Distrib.* Malaya.**Nephrodium aridum** Don.Road between Medan and Berastagi, and on stream banks, Berastagi. *Distrib.* Tropical Asia.**Nephrodium molle** Desv.Berastagi woods by streams. *Distrib.* Tropics.**Nephrodium erythrosorum** Hook.

Sibayak volcano, lower woods.

Distrib. Philippines, Japan, China.**Polystichum aristatum** Presl. var. **coniifolium**.

Lane by the Battak village, Berastagi.

Distrib. Tropical Asia.**Nephrolepis exaltata** Linn.Road from Medan to Berastagi. *Distrib.* Tropical Asia.**Pleopeltis membranacea** Don.Berastagi woods. *Distrib.* Indo-Malaya.**Pleopeltis phymatodes** Linn.

Banks in open places and on old trees, Berastagi.

Distrib. Tropics.**Pleopeltis albidosquamata** Bl.*Distrib.* Malaya.**Pleopeltis linearis** Thunb.Berastagi. *Distrib.* Tropical Africa and Asia.**Polypodium incurvatum** Bl.

Bandar Bharu, Gunong Sibayak (Mohamed Nur 7346).

Distrib. Malaya.**Cyclophorus grandis** Ridl. n. sp.

Rhizome stout, .3 in. through, densely covered with lanceolate acuminate red scales .2 in. long. Sterile fronds, sessile ovate blunt tomentose all over, 1.5 in. long, 1 in. wide. Fertile fronds stiffly coriaceous linear with a lanceolate broadly rounded base, stipes thick, .3 in. long; lamina 18 in. long, 1.25 in. wide at base, narrowing to .75 in. wide above; midrib prominent and broad on both sides, above glabrous with conspicuous ascending parallel veins at the base, beneath densely felted with grey stellate hairs, except the midrib. Sori orbicular, large, in rows of 5 closely set at an angle with the midrib; veins simple or forked near the tip, with faint forked veinlets.

On trees at Berastagi in open places, common. I have failed to find anything resembling this remarkable fern described anywhere. It has some affinities with some South American species.

Hymenolepis spicata Kaulf.

On trees, Berastagi. *Distrib.* Tropical Asia.

Stenochlaena sorbifolia Linn.

Berastagi woods. *Distrib.* Tropical Asia.

Antrophyum plantagineum Kaulf.

Epiphyte. Berastagi woods. *Distrib.* Tropical Asia.

Vittaria elongata Sw.

Berastagi on trees. *Distrib.* Tropics.

SELAGINELLACEAE.

Selaginella atro-viridis Spring.

Berastagi woods. *Distrib.* Malaya.

Selaginella illustris Ridl.

Berastagi woods. *Distrib.* Malay Peninsula.

Selaginella oligostachya Bak. vel aff.

Berastagi woods.

EQUISETACEAE.

Equisetum debile, Roxb.

Sandy marsh ground by a stream, Berastagi plateau.
Distrib. Tropical Asia.

MARSILEACEAE.

Azolla pinnata Br.

Rice fields and watery spots, Berastagi.
Distrib. Asia, Australia, Africa.

**A Record of the Occurrence of Some
Ferns in Northern Sumatra, being Additions
to Mr. Ridley's List.**

ADDED BY I. H. BURKILL.

When I understood that Mr. H. N. Ridley had in preparation a paper upon his collections from Berastagi in Sumatra, I hastily sent to him the material which I had accumulated from the same region, with the exception of the ferns collected for me by my collector Mohamed Nur in the neighbourhood of Sibolangit which had already been submitted to Prince Roland Bonaparte in Paris. The determinations which His Highness the Prince has sent to me add the following to what Mr. Ridley has recorded.

- Alsophila glauca**, J. Sm., var. **setulosa**, Hassk. Sibolangit on Bukit Kluang, No. 7439.
- Hymenophyllum blandum**, Rac. Bandar Bharu on Gunong Sibayak, No. 7325.
- Trichomanes pallidum**, Bl. Bandar Bharu on Gunong Sibayak, No. 7320.
- Trichomanes humile**, Forst. Sibolangit, on Bukit Kluang, No. 7429.
- Trichomanes cupressoides**, Desv. (*T. rigidum* Sw.) Bandar Bharu on Gunong Sibayak, No. 7348.
- Trichomanes bauerianum**, Endl. Bandar Bharu on Gunong Sibayak, No. 7306.
- Dryopteris megaphylla**, C. Christ. Sibolangit, on Bukit Kluang, No. 7440.
- Dryopteris truncata**, O. Ktze. Sibolangit, on Bukit Semaik, No. 7370.
- Lindsaya gracilis**, Bl. Sibolangit, in Dato Pulo Siam Valley, No. 7297.
- Odontosoria retusa**, J. Sm. Sibolangit, on Bukit Pasang, No. 7226, and on Bukit Semaik, No. 7359.
- Diplazium larutense**, Bedd. (ex descript.) Bandar Bharu on Gunong Sibayak, No. 7334.
- Diplazium cordifolium**, Bl. Bandar Bharu on Gunong Sibayak, No. 7397.

Asplenium unilaterale Lam. var. **delicatulum** Bedd. Sibolangit, on Bukit Semaik, No. 7351.

Coniogramme macrophyllum, Hieron. Sibolangit, in Dato Pulo Siam Valley, No. 7202.

Antrophyum semicostatum, Bl. Sibolangit, on Bukit Pasang, No. 7224.

Vittaria angustifolia, Bl. Bandar Bharu on Gunong Sibayak, No. 7319.

No one of these ferns is represented in Mr. Ridley's Berastagi collection, and no one of the 33 which Mr. Ridley collected at or near Berastagi appeared in the Sibolangit collection.

On Malaysian Katydids
(Gryllacridae and Tettigoniidae),
from the Raffles Museum, Singapore.

BY H. H. KARNY, PH.D., M.U.D.

Buitenzorg (Zoological Museum), Dutch East Indies.

While studying the long-horned grasshoppers or katydids from the Malayan and Austro-Malayan region, as represented in the Buitenzorg Zoological Museum (which will be published in the Zoological Journal "Treubia" at Buitenzorg), I also received the material of these groups from the Raffles Museum, Singapore, by the kindness of the Director of that museum. This material has proved of considerable interest and it gives me great pleasure to acknowledge my indebtedness to the Raffles Museum for the opportunity of studying these insects.

The Malayan katydids were hitherto comparatively well known. Especially is this the case in those from Java and to some extent from Sumatra; but less so in those from the Malay Peninsula and Borneo, whence most of the specimens in the Raffles Museum originated. The distribution of the majority of katydid species is usually rather limited, so it is no wonder that there are many new species amongst this material, and, on the other hand, that many species—especially those known from Java or Sumatra only—are not represented in this collection. Connected with this restricted distribution is also the fact that of all the species not yet known from this region two only are already known from other countries; all the others are entirely new to science.

25 species already known from the Malaysian sub-region are here represented from new localities: 4 being new for Borneo, 21 for the Malay Peninsula (which includes the island of Singapore). But there are also some endemic species from these two countries already known from the same localities, but hitherto represented by one or only a few specimens in European collections, whose re-discovery is very interesting. From other species, one sex only was hitherto known, and from the material before me I have now been able to describe the other sex.

LIST OF THE [MALAYSIAN GRYLLACRIDAE AND TETTIGONIIDAE.

1923]

KARNY: *On Malaysian Katyids*

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Subfamilies:	Number of species hitherto known	Represented in the collection of Raffles Museum						Grand Total
		Species hitherto known	New species	New for Malaysia ¹	New for the Malay Peninsula ²	New for Borneo ²	Total	
Gryllacrinae ..	79 ³	9	4	...	4	...	13	83
Phaneropterinae ..	83	21	19	...	10	1	40	102
Mecopodinae ..	7	1	...	...	...	...	1	7
Phyllophorinae ..	1	...	...	...	...	...	1	2
Pseudophyllinae ..	67	12	6	1	5	1	19	74
Listroscelinae .. (Incl. Xiphidiopsis)	14	1	2	...	...	...	3	16
Conocephalinae ..	10	3	...	...	...	...	3	10
Agraeiinae ..	26	3	2	...	1	...	5	28
Copiphorinae ..	33	5	2	...	1	2	7	35
Total ..	320	55	35	2	21	4	92	357

(1) but already known from other countries.

(2) but already known from the Malaysian sub-region.

(3) incl. *Gryllaeris dehaani* a new name for *signatifrons* DE HAAN nec SERVILLE, proposed in the following paper (not represented in the Raffles collection.)

The foregoing summary gives the numbers for the different subfamilies, as known at present from the Malaysian sub-region. The few subspecies and varieties hitherto described and named are included as species. My remarks on the more interesting species are given in the detailed list of species in the succeeding pages.

From this table it will be seen that, of the species represented in the Raffles Museum, 38% are new while the number of all those hitherto known from Malaysia is now increased by 11½% !

FAM. GRYLLACRIDAE.

Subfam. *Rhaphidophorinae*.

Not represented in the material before me.

Subfam. *Gryllacrinae*.

Genus *Gryllacris* Serville.

1831. SERVILLE, Ann. Sci. Nat., XXII, p. 138.
 1838. BURMEISTER, Handb. Ent., II, p. 717.
 1839. SERVILLE, Hist. Nat. Ins. Orth., p. 392.
 1860. GERSTÄCKER, Arch. f. Nat., XXVI, p. 245.
 1869. *Larnaca* WALKER, Cat. Derm. Salt. Brit. Mus., I, p. 190.
 1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 316, 317.
 1892. TEPPER, Trans. R. Soc. S. Australia, XV, p. 142.
 1897. SAUSSURE & PICTET, Biol. Centr.-Amer., Orth., I, p. 285.
 1906. KIRBY, Syn. Cat. Orth., II, p. 139.
 1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 69.
 1909. *Scandalon* ZACHER, Zool. Anz., XXXIV, 11, 12, p. 272.
 1910. KARNY, SCHULTZE, Zool. anthrop. Ergebn. Forsch. Südafr., IV, p. 37, 38.
 1921. KARNY, Treubia, I, 4, p. 174-178.

Gryllacris signatifrons Serville.

1839. SERVILLE, Hist. Nat. Ins. Orth., p. 393.
 1860. GERSTÄCKER, Arch. f. Nat., XXVI, p. 273.
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., I, p. 179.
 1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 340 (*facifer*).
 1891. PICTET & SAUSSURE, Mitt. Schweiz. Ent. Ges., VIII, p. 311 (*latipennis*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 141 (*latipennis*), 142.
 1908. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIII, 581, p. 4.
 1909. GRIFFINI, Mon. Zool. It., XX, 4, p. 111.
 1911. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXVI, 636, p. 5.

1911. GRIFFINI, Atti Soc. It. Sci. Nat., L. p. 208.
 1912. GRIFFINI, Sarawak Mus. Journ., I, 2, p. 3.
 1913. GRIFFINI, Tijdschr. Ent., LVI, p. 188.

Delendae:

1842. DE HAAN, Temminek, Verh., Orth., p. 219.
 1920. KARNY, Zool. Mededeel., V, 4, p. 154, 203.

1 ♀ of the typical form from Penang (1500'-2428'; May 1917). Venation of tegmina according to my type I (*Treubia* l.c., fig. 4).

Hitherto known from Java, Sarawak and Siam.

When I redescribed *Gr. signatifrons* De Haan, I had not material for comparison of the true *signatifrons* Serville. Now I see these two species are not identical; *signatifrons* Serville has an ocelliform yellow spot on forehead, whilst in *signatifrons* De Haan the whole forehead is yellowish, in the shape of a large cross bordered with black. The latter species therefore requires a new name, and I propose *Gryllacris dehaani m.n.n.* for *Gr. signatifrons* De Haan (and Karny), *nec* Serville.

***Gryllacris translucens* Serville.**

1839. SERVILLE, Hist. Nat. Ins. Orth., p. 394.
 1860. GERSTÄCKER, Arch. f. Nat., XXVI, 1, p. 271 (*amplipennis*), 273.
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., I, p. 179 (*amplipennis*), 180.
 1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 336 (*amplipennis*).
 1898. BRUNNER v. W., Abh. Senckenb. Ges., XXIV, p. 199 (*amplipennis*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 141 (*amplipennis*), 142.
 1908. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIII, 587, p. 4.
 1909. GRIFFINI, Atti Soc. It. Sci. Nat., XLVII, p. 178.
 1909. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIV, 610, p. 15.
 1909. GRIFFINI, Rev. Suisse Zool., XVII, 2, p. 386.
 1911. GRIFFINI, Ann. Mus. Zool. Petersb., XVI, p. 68.
 1911. GRIFFINI, Atti Soc. It. Sci. Nat., L, p. 208.
 1911. GRIFFINI, Ann. Mus. Genova, (3), V, p. 88, 126.
 1912. GRIFFINI, Atti Soc. It. Sci. Nat., LI, p. 225.
 1920. KARNY, Zool. Mededeel., V, 4, p. 148, 203.

3 ♂♂ from Pulo Pisang (1.-3. Apr. 1921).

Length of tegmina 31-37 mm. Their venation always according to type I, but somewhat variable. Median vein usually simple, sometimes bifurcate and in this case their posterior branch often united with the first cubital branch.

Distribution: "India," Java, Halmahera.

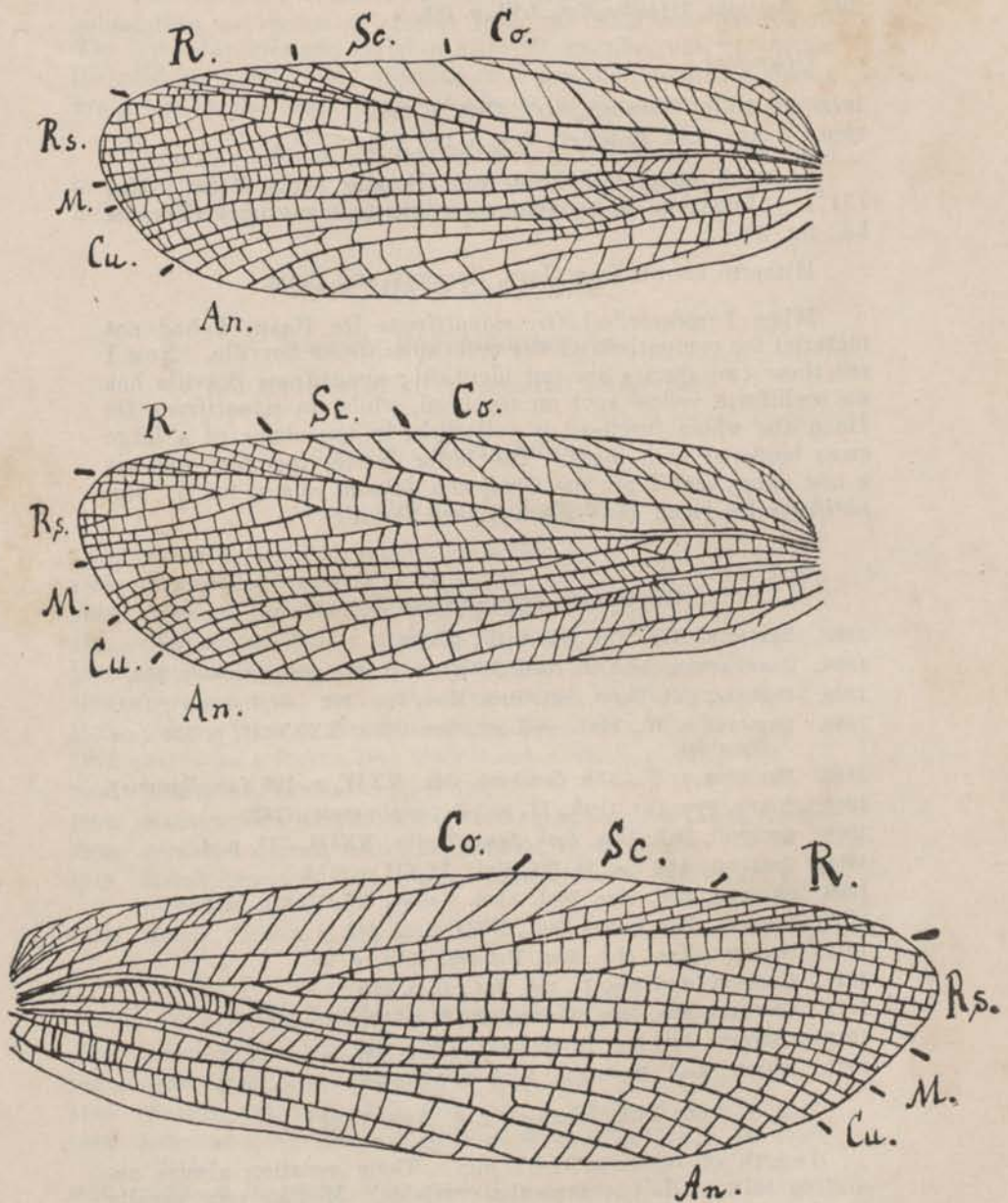


Fig. 1. Fore wings of *Gryllacris translucens* (above and middle) and its var. *secunda* (beneath). All $2\frac{1}{2}$ times enlarged.

***Gryllacris translucens* var. *secunda* Brunner v. W.**

1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 337 (*amplipennis* var. *secunda*).
 1893. BRUNNER v. W., Ann. Mus. Genova, (2), XIII, p. 189 (*amplipennis*).
 1908. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIII, 587, p. 4 (*amplipennis*).
 1909. GRIFFINI, Atti Soc. It. Sci. Nat. XLVII, p. 178 (*translucens* var. *weyersti*).
 1909. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIV, 610, p. 14 (*amplipennis*).
 1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, p. 206 (*amplipennis*).
 1911. GRIFFINI, Ann. Mus. Zool. Petersb., XVI, p. 69 (*amplipennis*).
 1911. GRIFFINI, Ann. Mus. Genova, (3), V, p. 89, 126.

Diverging from the typical form by larger size : length of tegmina 41-47 mm. Venation always according to type I, somewhat variable : median vein as in the typical form.

In one of the specimens before me, the radial vein on the right tegmen has its sector very well developed, but once more united for a very short distance with the radius, after emission of the first branch of radial sector. This first branch therefore, could be mistaken for a medial vein arranged according to type IV, if there were not present a free medial vein behind it, arising from the base of tegmen. Posterior medial and anterior cubital branch united with each other.

Var. *secunda* is represented in the material before me from the following localities : Gunong Angsi, Negri Sembilan (2000-2790' ; April 1918). Gilstead Road, Singapore (July 1917 ; coll. V. Knight). Museum Grounds, Singapore (12 Oct. 1911).

Hitherto recorded from Sumatra, Malacca and Tenasserim.

***Gryllacris singaporae* n. sp.**

♀. Moderately large, stout ; yellowish brown, nearly unicolorous, but the vertex somewhat darker brown.

Head broadly ovate, as seen in front, distinctly wider than pronotum. Occiput and vertex convex ; the latter not quite twice as wide as the first antennal joint, with blunt lateral margins, yellowish bordered on both sides and beneath, but with no distinct ocelliform spots. Forehead depressed, nearly concave beneath, smooth, with a few indistinct dots. Mouth parts as coloured as the body, except the end of mandibles, which is black. Antennae unicolorous.

Pronotum small, subquadrate as seen from above. Fore margin rounded, but hardly produced ; fore furrow very well impressed ; longitudinal sulcus finely marked nearly throughout the whole length of pronotum. The two posterior transverse furrows close to each other, the hindmost at the hind margin ; metazona between them nearly plain. Disc behind the anterior furrow slight-

ly convex on each side. Hind margin prominent, truncate. Lateral lobes nearly twice as long as high, roundly inserted, with rounded fore and hind angle; lower margin straight, nearly horizontal; humeral sinus indistinct. The U-shaped furrow and the posterior one deeply impressed; the space between them arched in the shape of a hump.

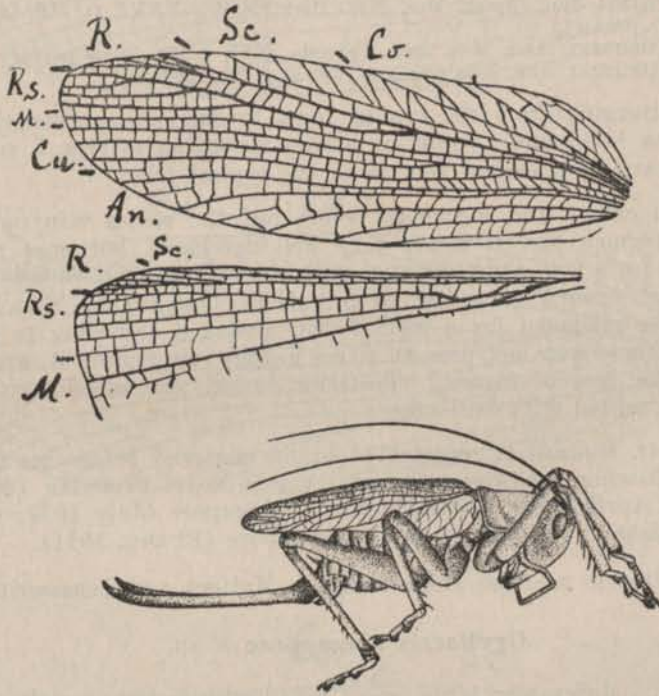


Fig. 2. *Gryllacris singapocrae*. Above: fore wing and fore part of hind wing, $2\frac{1}{2}$ times enlarged.—Beneath: total, lateral view, natural size.

Tegmina a little over-reaching the hind knees and end of abdomen, rounded at apex, very pale whitish-grey, with yellowish brown veins. Venation according to type I. Radial vein with 3 (except the end of vein itself) very oblique, nearly longitudinal branches against the fore margin. Radial sector arising somewhat before the middle, with 3 (except the end of sector itself) hind branches against the apex of tegmen. Medial vein free, arising from base of tegmina, at base closer to radial than to cubital vein, simple throughout its whole length (on both tegmina). Cubital vein divided into 3 branches: bifurcate in the first fourth of tegmen, the fore branch once more bifurcate just before the radial sector arises from radius. Venation quite uniform on both sides.

Wings uniformly pale greyish, with pale brown veins, intermediate in shape between the triangular and the cycloid type. Radial vein and sector branched as in tegmina; but the sector arising close to base, and communicating with the medial vein by an oblique branch.

Legs moderately long, stout, set with long piles, of the same colour as body; tarsi a little darker, especially beneath. Hind femora beneath on each side just before apex with one spine only, which is dark at apex. Fore and middle tibiae with 4 pairs of long, movable spines beneath, which are somewhat darker at extreme apex. Hind tibiae cylindrical in basal half, plain above in distal part, and there with about six short spines, black at apex, on each side.

Ovipositor very long, nearly straight, sharply pointed at apex, of the same colour as body, but somewhat darker at apex. Subgenital plate (♀) rounded, about as long as wide at base, longitudinally excavate in middle; on each side of this excavation with a prominent keel at base, and laterally from this with a short longitudinal furrow; margins somewhat swollen, prominent, parallel in basal part, then gradually rounded.

Length of body 29 mm., of pronotum 5.2 mm., of tegmina 30.5 mm., width of tegmina 9.7 mm., length of hind femora 17 mm., of ovipositor 26.5 mm.

1 ♀ from Singapore.

Seems to come nearest amongst the hitherto known species to the Bornean *venosa* and *xanthusi*, but differing from both by the characters described above. The type of venation in the two Bornean species has not yet been recorded. *Gr. singapora*e belongs to type I, but has the transverse veins of tegmina not blackish, as is usual in this type, and the shape both of tegmina and wings is somewhat intermediate between the usual form of types I and IV, agreeing rather better with the latter. But the relations of radial sector and medial vein are quite as in type I, altogether very different from type IV.

Gryllacris ruficeps Serville.

1831. SERVILLE, Ann. Sci. Nat., XXII, p. 139.
1833. BELANGER, Voy. Ind. Orient., p. 495.
1838. BURMEISTER, Handb. Ent., II, p. 718.
1839. SERVILLE, Hist. Nat. Ins. Orth., p. 294.
1840. BLANCHARD, Hist. Nat. Ins., III, p. 30.
1842. DE HAAN, Temminck, Verh., Orth., p. 220.
1860. GERSTÄCKER, Arch. f. Nat., XXVI, p. 259.
1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 345.
1906. KIRBY, Syn. Cat. Orth., II, p. 143.
1908. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIII, 587, p. 7.
1909. GRIFFINI, Atti Soc. It. Sci. Nat., XLVII, p. 178.

1909. GRIFFINI, Atti Soc. It. Sci. Nat., XLVII, p. 310.
 1910. GRIFFINI, Atti Soc. It. Sci. Nat., XLIX, p. 12.
 1911. GRIFFINI, Ann. Mus. Zool. Petersb., XVI, p. 70.
 1913. GRIFFINI, Tijdschr. Ent., LVI, p. 183.
 1920. KARNY, Zool. Mededeel., V, 4, p. 152, 203.

Gryllacris ruficeps subsp. **malaccensis** Griffini.

1897. GRIFFINI, Misc. Ent. Narbonne, V, p. 142 (*ruficeps*).
 1908. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIII, 587, p. 7.
 1910. GRIFFINI, Atti Soc. It. Sci. Nat., XLIX, p. 12.
 1911. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXVI, 636, p. 10.
 1911. GRIFFINI, Ann. Mus. Genova, (3) V, p. 110.
 1912. GRIFFINI, Sarawak Mus. Journ., I, 2, p. 5.

1 ♀ from Gunong Angsi, Negri Sembilan (2,000'-2,790'; April 1913). Venation of tegmina according to my type IV (Treubia l.c., fig. 7).

This subspecies was hitherto known from Malacca, Pulo Penang, Perak, and from Sarawak.

Gryllacris discoidalis Walker.

1869. WALKER, Cat. Derm. Salt. Brit. Mus., I, p. 174.
 1906. KIBBY, Syn. Cat. Orth., II, p. 144.

Gryllacris discoidalis subspec. **atropicta** Griffini.

1911. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXVI, 636, p. 16.
 1912. GRIFFINI, Sarawak Mus. Journ., I, 2, p. 9.
 1913. GRIFFINI, Atti Soc. It. Sci. Nat., LII, p. 222.
 1914. GRIFFINI, Atti Soc. It. Sci. Nat., LIII, p. 342.

Three ♂ specimens from Penang (1,500'-2,428', May 1917) and Singapore (Changi, Aug. 1911.—7th Mile Stone, Bukit Timah; presented by H. Overbeck; 27 Sept. 1913).

Venation of tegmina in all specimens (on both sides) according to type IV. All tibiae verdigris-green in basal half. The coloration of pronotum is somewhat variable; in the specimen from Penang very dark and well defined; the knees distinctly black, the green colour of tibiae hardly distinguishable.

The specimen from Singapore, 1913, has the coloration of pronotum very indistinct, not well defined, only a little darker brown than the rest; forehead nearly as dark as in the others; knees a little only darker brown at extreme apex; the green colour of tibiae very distinct.

The specimen from Singapore, 1911, represents an intermediate type between the two others.

Hitherto known from Malay Peninsula (Johore, Perak) and from Sarawak (Kuching).

Gryllacris signifera (Stoll).

1813. STOLL, Spectres, Saut., p. 26 (*Gryllus Tettigonia signifera*).
 1831. SERVILLE, Ann. Sci. Nat., XXII, p. 139 (*maculicollis*).
 1839. SERVILLE, Hist. Nat. Ins. Orth., p. 394 (*maculicollis*).
 1840. BLANCHARD, Hist. Nat. Ins., III, p. 30.
 1842. DE HAAN, Temminck, Verh., Orth., p. 220 (*maculicollis*).
 1860. GERSTÄCKER, Arch. f. Nat., XXVI, p. 253 (*maculicollis*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., I, p. 167 (*maculicollis*), 170.

1871. WALKER, Cat. Derm. Salt. Brit. Mus., Suppl., p. 19.
 1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 352 (*maculicollis*).
 1902. KRAUSS, Semon, Zool. Forsch. Austral., V, p. 748 (*maculicollis*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 144.
 1908. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIII, 587, p. 9.
 1909. GRIFFINI, Atti Soc. It. Sci. Nat., XLVII, p. 179.
 1911. GRIFFINI, Riv. Mens. Sci. Nat. Natura, II, p. 19.
 1911. GRIFFINI, Ann. Mus. Zool. Petersb., XVI, p. 71.
 1911. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXVI, 636, p. 15.
 1911. GRIFFINI, Atti Soc. It. Sci. Nat., L, p. 220.
 1911. GRIFFINI, Ann. Mus. Genova, (3) V, p. 119.
 1912. GRIFFINI, Sarawak Mus. Journ., I, 2, p. 13.
 1912. GRIFFINI, Atti Soc. It. Sci. Nat., LI, p. 219.
 1913. GRIFFINI, Tijdschr. Ent., LVI, p. 175, 180, 183.
 1913. GRIFFINI, Atti Soc. It. Sci. Nat., LII, p. 221.
 1914. GRIFFINI, Atti Soc. It. Sci. Nat., LIII, p. 336.
 1914. GRIFFINI, Zool. Jahrb., Abt. Syst., XXXVIII, 3, 4, p. 107.
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 268 (*signifer*).
 1919. DAMMERMAN, Landbouwdierkunde, p. 255.
 1920. KARNY, Zool. Mededeel., V, 4, p. 153, 203.
 1921. KARNY, Natur (Leipzig), XII, 23, p. 309, 310.

This widely spread species, very common in Java, seems to be not so common in Singapore and Malacca. There are 5 ♀ specimens only in the collection of Raffles Museum, from the following localities:

Bukit Lantai, Sungei Ujong (V. Knight coll., July 1910); Cavanagh Rd., Singapore (24 Febr. 1916; V. K. coll.); Singapore (Dec. 1916).

Venation of tegmina in all specimens according my type IV. One of them shows on the left tegmen an interesting variation of this type, whilst the right is quite normal. On the left tegmen the medial vein arises from the radial vein at the usual place, but does not diverge from radius, on the contrary it runs close to radius. Parallel to it, once more communicating with it at place of beginning of radial sector. Then the medial vein and radial sector are quite united with each other for a short distance, till the middle of tegmen, where the simple media goes off from the radial sector, which is bifurcated before its end.

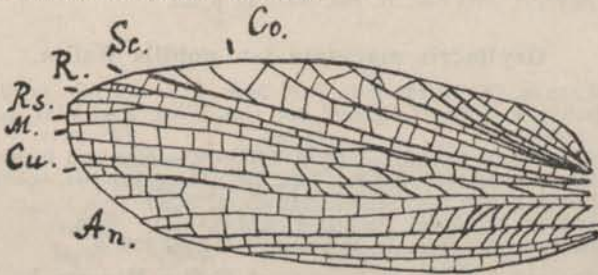


Fig. 3. *Gryllacris signifera* ♀, anomalous left tegmen, 2½ times enlarged.

Distribution: Corea, Philippine Islands, Borneo, Cochinchina, Singapore, Banka, Sumatra, Engano, Bua-Bua, Java.

Gryllacris rufovaria Kirby.

1888. KIRBY, Proc. Zool. Soc. Lond., p. 518.
 1900. KIRBY, Monogr. Christmas Isl., p. 148.
 1906. KIRBY, Syn. Cat. Orth., II, p. 145.

1 ♂ specimen of this very interesting species is contained in the collection of Raffles Museum. As to the locality Mr. Moulton says (in litt. dat. January 2nd 1923): "It had no label, and I can only assume it came from Christmas Island because everything else (Lepidoptera, Coleoptera, Hymenoptera) in the box is labelled Christmas Island 1904."

The species was originally described by Kirby from 1 male and 4 females, from Christmas Island, and since it was not yet rediscovered hitherto.

Veins of tegmina arranged according type IV. ♂ genitalia type E, similar to *G. fuscifrons*, but the horn-like projections on the last tergites shorter and stouter, more tooth-like. Subgenital plate also similar shaped as in *fuscifrons*, but the lobes more regular, the excision between them obtuse-angulate, in *fuscifrons* rounded.

Vertex and the dorsum of head and pronotum pale yellowish brown, quite concolorous, entirely without darker markings, whilst not so in the closely allied species, viz. in *fuscifrons* vertex being blackish, in *variabilis* pronotum marked with dark lines. Tegmina paler and more greyish than in *fuscifrons*, where they are orange brown. Wings having "the cross nervures blackish, bordered with dusky on each side" (Kirby), the greyish borders narrower and paler even than in *signifera*, much paler and narrower than in *fuscifrons*.

The specimen before me is positively not freshly emerged, and the colour must therefore be considered as typical for this species.

Gryllacris maculata Giebel.

1861. GIEBEL, Zeitschr. ges. Naturw., XVIII, p. 116.
 1871. WALKER, Cat. Derm. Salt. Brit. Mus., Suppl., p. 19.
 1906. KIRBY, Syn. Cat. Orth., II, p. 144.
 1911. GRIFFINI, Atti Soc. It. Sci. Nat., L, p. 24.

Gryllacris maculata var. **nobilis** Walker.

1869. WALKER, Cat. Derm. Salt. Brit. Mus., I, p. 182 (*Gr. nobilis*).
 1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 353 (*Gr. lugubris*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 145 (*Gr. nobilis* and *lugubris*).
 1909. GRIFFINI, Atti Soc. It. Sci. Nat., XLVII, p. 313 (*Gr. nobilis*).
 1911. GRIFFINI, Atti Soc. It. Sci. Nat., L, p. 24.
 1913. GRIFFINI, Tijdschr. Ent., LVI, p. 185.
 1914. GRIFFINI, Atti Soc. It. Sci. Nat., LIII, p. 339.

Represented in the collection of Raffles Museum by 10 specimens (4 ♂♂, 6 ♀♀) from Singapore (7th Mile Stone, Bukit Timah.—28.11.1907, coll. by Dr. Falshaw.—Cavanagh Rd., June and Sept. 1913, V. K. coll.—27 Sept. 1913, coll. H. Overbeck.—April 1914.—April 1921, Capt. Bartlett coll.).

Venation of tegmina according type IV in all specimens. One of the ♀♀ has the right tegmen normal, whilst the left shows a remarkable abnormality similar to that described from *Gr. signifera*, but the basal part of medial vein is wanting. Therefore arises from the radial vein before its middle, one common shaft divided after a very short distance into the simple media and the radial sector, which emits before its end 3 branches backwards.

Distribution: Singapore, Java.

I have hitherto not yet found this species in Java, whilst it seems to be the commonest species of Singapore, because it is represented by so many specimens in the Raffles Museum.

***Gryllacris kledangensis* n. sp.**

♀. Large, reddish brown; vertex not darker than the remaining surface of head.

Head ovate, as seen in front, hardly wider than pronotum. Occiput and vertex strongly convex; the latter somewhat wider than the first antennal joint, with blunt lateral margins; 3 yellow ocelli-

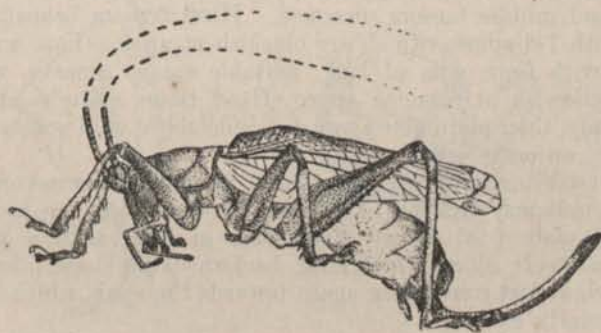
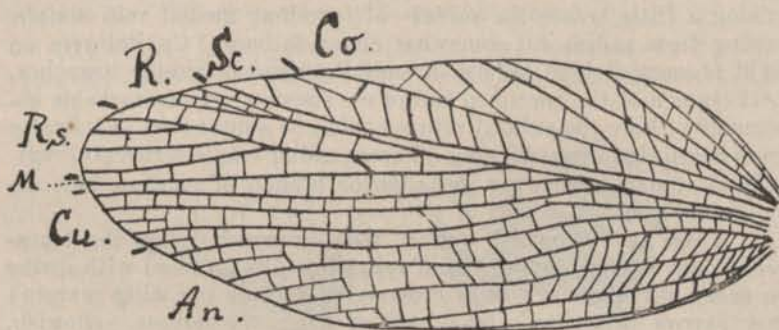


Fig. 4. *Gryllacris kledangensis*. Above: Fore wing, $2\frac{1}{2}$ times enlarged.—Beneath: total, lateral view, natural size.

form spots present. Forehead depressed in its lower part, nitid, with distant, impressed punctures. Antennae and mouth parts coloured as body.

Pronotum moderately large, about as long as wide. Fore margin rounded, somewhat produced in its middle; fore sulcus deeply impressed; longitudinal furrow indistinct, reduced to a round dimple in the middle of disc. The two posterior sulci close to each other, the hindermost close to the hind margin; metazona between them convex. Disc behind the anterior furrow distinctly convex. Hind margin straight, truncate. Lateral lobes distinctly longer than high, roundly inserted, with rounded fore angle, and obliquely truncate hind angle; lower margin somewhat descendent backwards; humeral sinus hardly distinguishable. The U-shaped sulcus deeply impressed, the posterior one less, but also distinct; space between them hump-shaped arched.

Tegmina a little overreaching the hind knees and end of abdomen, somewhat pointed at apex, brownish yellow, with yellowish brown veins. Venation according to type IV. Radial vein and sector with 3 branches (except the ends of veins themselves); sector arising a little before the middle of tegmina; medial vein simple, arising from radius till somewhat closer to base. Cubital vein on right tegmen divided before the middle into two simple branches. Left tegmen of the specimen before me shows a very remarkable abnormality: here the cubital vein seems to be simple; but proximally from beginning of media goes off from radial vein a bifurcate longitudinal vein, representing the anterior branch of cubitus, here divided into two.

Wings pale brownish yellow, with brownish veins, the transversal ones (except before radial vein) broadly bordered with dusky on each side; the last row of cross veins (before the wing margin) very narrow infumated; basal part of wing unicolorous, yellowish, because there are no transversal veins. The dark stripes between radial vein and sector not as dark as those of anal field, but not narrower.

Legs moderately long, stout, pilose, of the same colour as body. Fore and middle femora unarmed. Hind femora beneath on each side with 7-8 spines, which are blackish at apex. Fore and middle tibiae with four pairs of long, movable spines beneath, which are pale yellowish at extreme apex. Hind tibiae cylindrical in basal fifth only, then plain above, on each side above with spines, blackish at apex, on outside 7, on inside 6.

Ovipositor longer than the hind femora, somewhat curved upwards, obliquely truncate at apex, of the same colour as body. Subgenital plate (♀) longer than wide at base, with a prominent median keel; sides converging backwards at base, then nearly parallel, at last converging again towards the apex, which is sharply triangularly excised.

Length of body 40 mm. (somewhat extended), of pronotum 8 mm., of tegmina 34 mm., width of tegmina 12.7 mm., length of hind femora 20.5 mm., of ovipositor 26 mm.

This new species comes nearest perhaps to Griffini's "spec. indetermin." from Mentawai (Ann. Mus. Genova (3) V, p. 120), but differs by its larger size, the longer ovipositor, and the well defined cross-bands of wings. It reminds one in size and its whole appearance of *fuscifrons* Gerst., but diverges from it by the pale vertex and basal joints of antennae, by the ocelliform spots somewhat larger and less well defined, and by the much longer ovipositor; the cross-bands of wings are a little broader than in *fuscifrons*; the subgenital plate of ♀ of a similar shape, but with more sinuated lateral margins and the excision at apex more pointed. In its measurements, *kledangensis* agrees very well with the Moluccan *compromittens* except the hind femora are somewhat shorter and the ovipositor is somewhat longer; it may distinguished from it by the paler, not orange coloured wings, and the shape of subgenital plate of ♀.

1 ♀ from Gunong Kledang, Ipoh, Perak (March 1898).

***Gryllacris peraka* n. sp.**

♂. Very similar to the preceding species, but somewhat smaller, and the cross-bands of wings narrower.

Moderately large, yellowish brown; head, antennae and mouth-parts unicolorous, except the three ocelliform spots of vertex, and

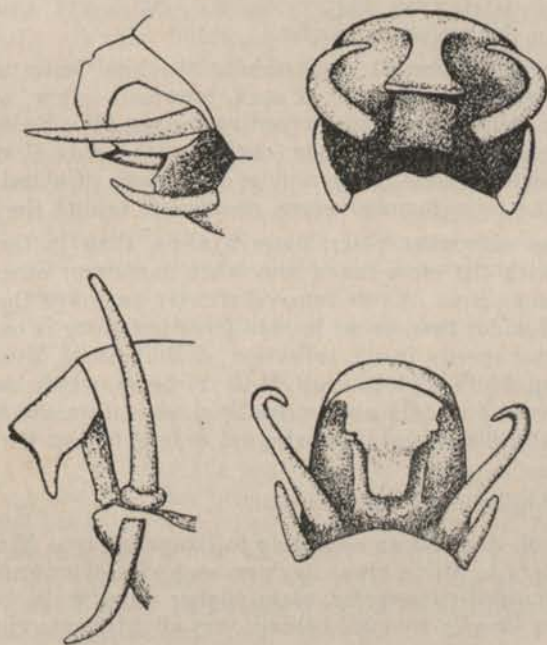


Fig. 5. End of ♂ abdomen of *Gryllacris signifera* (above), and *Gr. Peraka* (beneath). Left: lateral view; right: seen from behind. Enlarged.

the somewhat paler, yellowish clypeus. Pronotum somewhat darker reddish brown along the furrows, but these markings not well defined.

Head as wide as pronotum, nearly ovate, as seen in front, somewhat conical beneath against the mouth-parts. Occiput and vertex strongly convex, smooth, shining; the latter punctured in front, about one and a half times as wide as the first antennal joint, with blunt lateral margins, and with 3 yellow ocelliform spots. Forehead strongly depressed in its lower part, nitid, with impressed punctures.

Pronotum moderately large, a little wider than long. Fore margin rounded, a very little produced in the middle; fore furrow deeply impressed; longitudinal sulcus shallow, distinguishable in the middle part of disc only. From the transition of anterior sulcus into the U-shape of lateral lobes runs an oblique furrow towards the middle of disc, thus dividing the arched fore part of the latter in a median hump slightly divided by the longitudinal sulcus, and in a lateral one on each side. The two posterior cross-furrows not very close to each other, the hindermost tightly at the hind margin. This prominent at extreme border, straight, truncate. Lateral lobes not very adpressed, distinctly longer than high, with the fore angle more rounded, the hind angle more obliquely truncate; lower margin with prominent border, a very little descending backwards; humeral sinus hardly visible. Sulci and space between them as in the preceding species.

Tegmina somewhat overreaching the hind knees and end of abdomen, somewhat pointed at apex, brownish yellow, with yellowish brown veins. Venation according to type IV. Radial vein and sector divided into 3 branches (enclosing the ends of veins themselves); sector arising in the middle of tegmen. Cubital vein bifurcate, on the right tegmen before, on the left behind the middle.

Wings somewhat paler, more hyaline, than in the preceding species, with the cross-bands somewhat narrower; otherwise quite as in *kledangensis*. Cross-bands distinctly narrower than in *fuscifrons*, but wider than usual in *signifera*; but there is one specimen of the latter species in the collection of Buitenzorg Museum (from Buitenzorg, 30, VII, 1920; coll. H. C. Siebers), which has the cross-bands as wide and dark as *peracca*, head, pronotum and legs sharply marked with black, and otherwise not different from the true *signifera*.

Legs quite as in *kledangensis*.

End of ♂ abdomen according to Brunner's type H; upper part of ninth tergite with a blunt tooth on each side, then produced down into a rounded-rectangular plate higher than wide. Subgenital plate (♂) broadly rounded behind, very slightly emarginated at extreme apex (much less than in *signifera*).

Length of body 29.5 mm., of pronotum 6.5 mm., of tegmina 29 mm., width of tegmina 10.5 mm., length of hind femora 18 mm.

1 ♂ from Gunong Kledang, Perak (2646'; Nov. 1916).

In size and whole appearance very similar to *Gr. signifera*, but without black markings on head and pronotum, and with a different end of ♂ abdomen.

Diverging from Griffini's "spec. indeterminata" from Mentawai, by the somewhat larger size, the distinct, broad wing-bands, and the presence of ocelliform spots on vertex.

Gr. rufovaria Kirby from Christmas Island, finally, may be distinguished from *peracca* by the two or three outer rows of cross-nervures of wings not bordered with dusky, and by the last segment of ♂ abdomen terminating in two short, stout, conical projections.

***Gryllacris griffinii* n. sp. (Plate II, fig. 1).**

♂. Of smaller size. Brownish yellow, pronotum and legs with black marking. Head dark castaneous-brown.

Head obconical, as seen in front; eyes not very much protruding. Occiput and vertex somewhat convex; the latter with subacute lateral margins, about one and a half times as wide as the first antennal joint. Three ocelliform spots present, very small, well defined, pale yellow, bordered with black. The whole forehead roughened by deeply impressed dots. Subocular furrows broad and shallow. Clypeus paler reddish brown, yellowish brown at apex. Mandibles very dark castaneous. Palpi long and slender, yellowish, dark at apex. First antennal joint castaneous, with a small black spot near the eye; the following 6 joints reddish brown, dark at apex. The following joints gradually yellowish brown, uniformly coloured.

Pronotum rounded at the fore margin, somewhat produced in the middle; furrows very shallow, hardly visible; longitudinal sulcus more distinctly impressed in the middle of disc. Disc convex. Hind margin linear, prominent, truncate. Lateral lobes with the fore and hind angle blunt, obliquely truncate behind, without a humeral sinus; lower margin distinctly descending backwards, somewhat emarginated above the fore coxae. All margins prominent. The U-shaped and posterior sulcus deeply impressed; the space between them strongly convex.

Colour of pronotum brownish yellow, with the fore and hind margin castaneous, the latter black in its middle. Lower and hind margin of lateral lobes very broadly bordered with black. Behind the middle of fore margin a longitudinal black spot on the disc, behind it a black line along the median furrow. On each side of it an oblique black stripe running from behind its end towards the sides of fore margin, before the latter emitting a short branch against the first black spot. On the sides of disc a second black stripe with an obliquely backwards directed branch near its middle and a second one at the end.

Tegmina a very pale yellowish, somewhat rounded at apex, distinctly overreaching the hind knees and end of abdomen, with yellow longitudinal veins, and broadly blackish bordered cross-

nervures. Venation according to type IV, somewhat reduced. Radial vein and sector bifurcate only (on right tegmen) or divided into three branches (left). Radial arising from radius in the middle of tegmen; media going off from radial vein somewhat before the sector, simple. Cubital vein bifurcate in the vicinity of beginning of media.

Wings very pale yellowish, nearly hyaline, of cycloid type; their veins near the fore margin yellowish brown, the others dark. All cross veins broadly bordered with blackish on each side, the hyaline space between them not or not much wider than the dark bands. Extreme base of wing entirely infumated.

Pro-, meso-, and metapleurae with well defined black spots.

Legs short, very stout. Hind femora with 4 very small, dark spines on outer and 2 on inner margin, before the end. Fore and middle tibiae with 4 pairs of long, movable, unicolorous yellowish spines beneath. Hind tibiae cylindrical in basal third, then plain above, with 6 dark castaneous spines on each side; beneath with one yellowish spine only on each side before the apical spurs.

Colour of legs yellow, marked with black, tarsi darker, reddish brown. Fore femora entirely black on inside; beneath yellow at base only, the remaining part black; outside yellow at base, black at apex, beneath reaching the black colour farther to base, above the yellow farther towards the knee. Fore tibiae entirely black, except the spine; and an indistinct paler longitudinal spot along the front margin. Middle femora on outer surface as coloured in the fore pair, but the black band before the knee interrupted by yellow; the knee itself blackish; inside with a longitudinal black spot along the lower margin in the distal half. Middle tibiae yellow, with a black spot below the knee. Hind femora yellow, on outer surface with a black longitudinal stripe along the lower margin; below with a blackish spot before the knee; a second smaller one on inner surface near lower margin. Hind tibiae coloured as in the middle ones.

Abdomen yellow; eighth tergite laterally and along the hind margin black; ninth segment black at base and along the median furrow. End of abdomen (δ) according to Brunner's type A. Eighth segment not produced; ninth segment sharply curved downwards, with a deep and broad longitudinal sulcus; at the end slightly emarginated, with rounded, blunt lobes. Cerci not longer than ninth segment along the median sulcus. Subgenital plate triangular, about half as long as wide at base, sharply pointed at apex. Styles very short, scarcely twice as long as wide.

Length of body 20 mm., of pronotum 4 mm., of tegmina 20.5 mm., width of tegmina 6.5 mm., length of hind femora 10.8 mm.

I have allowed myself the pleasure of naming this beautiful coloured species after the celebrated Italian Entomologist Prof. Dr. Achille Griffini of Bologna, in acknowledgment of his numerous, important publications on Gryllacridae.

1 ♂ from Gunong Angsi, Negri Sembilan (2000'-2790': April 1918).

This new species belongs without doubt to the *podocausta*-group, and seems to be nearest to the Sumatran *modiglianii* Griffini; but diverging from it by the strong puncture of forehead, the distinct ocelliform spots, the stronger markings of pronotum, the broadly blackish bordered cross-veins of tegmina, the less numerous spines of hind femora and the coloration of legs.

***Gryllacris podocausta* De Haan.**

1842. DE HAAN, Temminck, Verh., Orth., p. 220.
 1860. GERSTÄCKER, Arch. f. Nat., XXVI, p. 259.
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., I, p. 173.
 1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 329.
 1891. PICTET & SAUSSURE, Mitth. Schweiz. Ent. Ges., VIII, p. 307 (*mutabilis*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 142 (*mutabilis*), 140.
 1908. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIII, 581, p. 1.
 1909. GRIFFINI, Mon. Zool. It., XX, 4, p. 109.
 1909. GRIFFINI, Ann. Mus. Nat. Hungar., VII, p. 307.
 1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 206.
 1911. GRIFFINI, Ann. Mus. Zool. Petersb., XVI, p. 71.
 1911. GRIFFINI, Atti Soc. It. Sci. Nat., L, p. 216.
 1911. GRIFFINI, Ann. Mus. Genova, (3) V, p. 81, 124.
 1913. GRIFFINI, Tijdschr. Ent., LVI, p. 175, 186.
 1913. GRIFFINI, Atti Soc. It. Sci. Nat., LII, p. 224.
 1920. KARNY, Zool. Mededeel., V, 4, p. 147, 202.

***Gryllacris podocausta* var. *pallidior* Pictet & Saussure.**

1888. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XXXVIII, p. 341 (*parvula*, nec WALKER).
 1891. PICTET & SAUSSURE, Mitth. Schweiz. Ent. Ges., VIII, p. 307, 309 (*mutabilis* v. p.).
 1906. KIRBY, Syn. Cat. Orth., II, p. 142 (*Gr. minima*).
 1908. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXIII, 581, p. 1 (*podocausta* var. *mutabilis*).
 1909. GRIFFINI, Atti Soc. It. Sci. Nat., XLVII, p. 174 (*podocausta* var. *mutabilis*).
 1909. GRIFFINI, Ann. Mus. Nat. Hungar., VII, p. 308 (*podocausta* var. *mutabilis*).
 1911. GRIFFINI, Ann. Mus. Genova, (3) V, p. 82.
 1911. GRIFFINI, Atti Soc. It. Sci. Nat., L, p. 217.
 1913. GRIFFINI, Tijdschr. Ent., LVI, p. 187.

1 ♂ from Selangor; somewhat pale, apparently discoloured, the usual dark markings fusco-castaneous, less well defined than in typical specimens. By these characters the specimen seems to be intermediate between the typical *podocausta* and the var. *pallidior*. Size somewhat larger than the Javanese specimens of Buitenzorg Museum (and than the measurements given by Brunner).

Length of body 21.5 mm., of pronotum 5 mm., of tegmina 19.5 mm., of hind femora 11 mm.

Venation of tegmina somewhat reduced, about intermediate between type IV and V; on the left tegmen normal (medial vein arising from radius), on the right tegmen media arising from cubitus. Such a variation is not uncommon amongst the species belonging to type V.

Was hitherto recorded only from Java and Sumatra.

Gryllacris podocausta subsp. **kuchingiana** Griffini.

1911. GRIFFINI, Boll. Mus. Zool. Anat. Torino, XXVI, 636, p. 11.

1912. GRIFFINI, Sarawak Mus. Journ., I, 2, p. 12.

1 ♂ from Govt. Hill, Singapore (June 1910; K. A. W. coll.).
Agrees perfectly with the description given by Griffini, but has not only the fore, but also the middle tibiae entirely black.

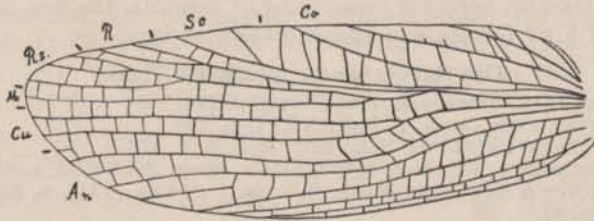


Fig. 6. Left tegmen of *Gryllacris podocausta kuchingiana*. $3\frac{1}{2}$ times enlarged.

Venation of tegmina as mentioned in *podocausta*, right tegmen normal, on the left medial vein going off not from radius itself, but from radial sector, similar as described from 1 ♀ of *maculata nobilis*.

The subspecies *kuchingiana* was hitherto known from Sarawak (Kuching) only.

FAM. TETTIGONIIDAE.*Subfam. Phaneropterinae.*Genus **Elimaea** Stål

1874. STÅL, Rec. Orth., II, p. 11, 27.

1878. BRUNNER v. W., Mon. Phan., p. 90.

1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 45.

1906. KIRBY, Syn. Cat. Orth., II, p. 394.

Elimaea caricifolia (De Haan).1842. DE HAAN, Temminck, Verh. Orth., p. 193 (*Locusta Phaneroptera*).1870. WALKER, Cat. Derm. Salt. Brit. Mus., III, p. 478 (*Phaneroptera?*).1878. BRUNNER v. W., Mon. Phan., p. 97 (*femorata*).1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 46 (*femorata*).1906. KIRBY, Syn. Cat. Orth., II, p. 396 (*caricifolia, femorata*).

1906. DOHRN, Stett. Ent. Zeit., 67, II, p. 345.

1920. KARNY, Zool. Mededeel., V, 4, p. 182, 209.

1 ♀ from Lundu, Sarawak (24 April 1913).

Known from Borneo, Sumatra (Langkat), and Western Java.

Elimaea signata Brunner v. W.

1878. BRUNNER v. W., Mon. Phan., p. 99.

1903. ?KRAUSS, Semon, Zool. Forsch. Austral., V, p. 748, 762.

1906. KIRBY, Syn. Cat. Orth., II, p. 396.

1906. DOHRN, Stett. Ent. Zeit., 67, II, p. 348 (*var. adspersa*).

1910. KIRBY, Syn. Cat. Orth., III, p. 573.

2 ♀ ♀ from Singapore (24. May 1921.—Bukit Timahi; 17. July 1911).

Originally described from Bukit near Singapore, the *var. adspersa* from Sumatra. The indication from Java (Krauss) belongs perhaps to *parumpunctata*. I have collected at the same locality (Tjibodas) the latter species, but never *signata*.

***Elimaea moultonii* n. sp.**

♀. Yellowish-green, with the disc of pronotum yellow with a few small black dots, and on each side with a sharp black line constricted near the middle. Head without black dots. Vertex narrow, pointed, longitudinally sulcate. Antennae backish, especially on outer and lower side, and with some distant pale rings. Disc of pronotum constricted near the middle, convex in front, with roundly inserted lateral lobes; behind excavate with somewhat protruding lateral margins; hind lobe broadly rounded, finely bordered with black; lateral lobes a little longer than high, broadly rounded, with some small blackish dots in the upper part. Fore coxae not spined. Meso- and metasternal lobes nearly elliptical, rounded. Tegmina about twice as long as abdomen, a little wider than the length of pronotum; radial branch going off from the radial vein near the middle; all areas with regular, parallel transverse veins; anterior area unicolorous; middle field with a few blackish dots in the middle of each cell; posterior area densely dotted with blackish. Hind wings distinctly exceeding the tegmina. Fore femora strongly compressed, curved, sharply edged above, and furnished with small black spines below, 6 on the inner (anterior) margin, and 3 on the outer one. Middle femora with about a dozen spines below along the outer margin; posterior femora with only a few very small ones. Lobes covering the tympana a very little arched, adpressed. Ovipositor curved upwards, wide, compressed; its upper margin serrate along the whole length, the lower one near the apex only. Subgenital plate (♀) nearly quadrate, but semicircularly emarginated at the hind margin, with long, sharply pointed, backwards directed lobes.

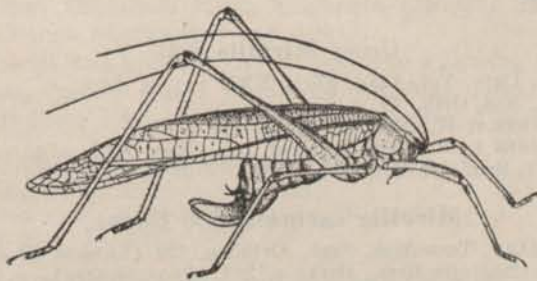


Fig. 7. *Elimaea moultonii*, natural size. Del. Sochanam.

Length of body 22 mm., of pronotum 4.5 mm., of tegmina 38 mm., width of tegmina 6 mm., length of intermediate femora 12.5 mm., of hind femora 25 mm., of ovipositor 7 mm.

I have the pleasure to name this very characteristic species after its discoverer Mr. J. C. Moulton.

There are 2 ♀♀ of *E. moultonii* in the collection of Raffles Museum, from Long Akar and Lio Matu, Baram River, Sarawak (30 Aug. and 16 Oct. 1920; leg. J. C. Moulton).

This species comes nearest amongst the hitherto known *Elimaeas* to *puncticosta* Bolivar, and differs from it especially by the coloration of pronotum, the later arising radial branch, and the shape of subgenital plate of ♀. *E. puncticosta* was described by I. Bolivar without indication of locality in a paper containing several new species from Himalaya and the Philippine Islands. Mr. C. Bolivar, however, informs me (*in litt.*) that the type specimens originate from the Philippine Islands (Mindanao, Samar).

Elimaea chloris (De Haan).

1842. DE HAAN, Temminck, Verh., Orth., p. 192 (*Locusta Phaneroptera*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 380 (*Phylloptera?*).
 1878. BRUNNER v. W., Mon. Phan., p. 100.
 1891. KARSCH, Berl. Ent. Zeitschr., XXXVI, 1, p. 208.
 1893. BRUNNER v. W., Ann. Mus. Genova, (2) XIII, p. 167.
 1899. KRÜGER, Zuckerrohr u. s. Kultur, p. 319.
 1904. KRAUSZE, Ins. Börse, XXI.
 1906. KIRBY, Syn. Cat. Orth., II, p. 396.
 1906. v. DEVENTER, Dierl. Vijanden v. h. Suikerriet, p. 281 (2e druk 1912).
 1915. KONINGSBERGER, Java Zoologisch en Biologisch, p. 278.
 1919. DAMMERMAN, Landbouwdierkunde, p. 101.
 1920. KARNY, Zool. Mededeel., V, 4, p. 209.

This common and widely distributed species is represented in the collection of Raffles Museum in both sexes from the following localities:

Penang (1,500'-2,428'; May 1917).—Gunong Kledang, Perak (2,646'; Nov. 1916).—Gunong Angsi, Negri Sembilan (2,000'-2,790'; April 1918).—Mt. Ophir, Johore (14-15 Aug. 1905).—Kedah Peak (Dec 1915).—Tebing Tinggi, Kelantan (July 1920; coll. V. Knight).

Further distribution: Java, Sumatra, Bhamò, Cambodia, Annam, China.

Genus *Mirollia* Stål.

1873. STÅL, Oefv. Vet.-Akad. Förh., XXX (4), p. 42.
 1874. STÅL, Rec. Orth., II, p. 12.
 1878. BRUNNER v. W., Mon. Phan., p. 106.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 6.
 1906. KIRBY, Syn. Cat. Orth., II, p. 398.

Mirollia carinata (De Haan).

1842. DE HAAN, Temminck, Verh., Orth., p. 199 (*Locusta Phylloptera*).
 1860. STÅL, Eugenies Resa., Orth., p. 321 (*Phaneroptera*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 381 (*Phylloptera*).
 1874. STÅL, Rec. Orth., II, p. 27.
 1878. BRUNNER v. W., Mon. Phan., p. 107.

1891. KARSCH, Berl. Ent. Zeitschr., XXXVI, 1, p. 208.
 1892. DOHRN, Stett. Ent. Zeit., LIII, p. 66.
 1906. KIRBY, Syn. Cat. Orth., II, p. 398.
 1920. KARNY, Zool. Mededeel., V, 4, p. 184, 209.
 1921. KARNY, Phil. Journ. Sci., XVIII, 5, p. 613.

1 ♀ from Gunong Tamabo, Baram River, Sarawak (15. XI. 1920; J. C. Moulton).

This species was hitherto known from Sumatra, Java, and the Philippine Islands (Luzon), but not yet from Borneo.

Genus *Ducetia* Stål.

1874. STÅL, Rec. Orth., II, p. 11.
 1878. BRUNNER v. W., Mon. Phan., p. 108.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 53.
 1902, 03. JACOBSON & BIANCHI, Orth. Pseudoneur. Russ., p. 324, 336, 374.
 1906. KIRBY, Syn. Cat. Orth., II, p. 398.
 1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 5.

Ducetia thymifolia (Fabricius).

1775. FABRICIUS, Syst. Ent., p. 283 (*Locusta*).
 1815. THUNBERG, Mem. Acad. Petersb., V, p. 282 (*Locusta japonica*).
 1842. DE HAAN, Temminck, Verh., Orth., p. 193 (*Locusta Phaneroptera quinquenervis*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 341 (*Phaneroptera quinquenervis*), 342 (*Phan. neochlora*), 344 (*Phan. privata*), 348 (*Phan. thymifolia?*).
 1874. STÅL, Rec. Orth., II, p. 26 (*japonica*).
 1878. BRUNNER v. W., Mon. Phan., p. 110 (*japonica*).
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 53 (*japonica*).
 1891. KARSCH, Berl. Ent. Zeitschr., XXXVI, 1, p. 208 (*quinquenervis, japonica*).
 1893. BRUNNER v. W., Ann. Mus. Genova, (2) XIII, p. 168 (*japonica*).
 1902, 03. JACOBSON & BIANCHI, Orth. Pseudoneur. Russ., p. 336, 374 (*japonica*).
 1904. KRAUSZE, Ins. Börse, XXI (*japonica*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 398.
 1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 6 (*japonica*).
 1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 192 (*japonica*).
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 276.
 1915. KARNY, Suppl. Ent., p. 76.
 1920. KARNY, Zool. Mededeel., V, 4, p. 209.
 1921. KARNY, Phil. Journ. Sci., XVIII, 5, p. 613.

1 ♂ from Thompson Road, Singapore (28 May 1911), and 1 ♀ from Changi, Singapore (Aug. 1911).

This species was hitherto known from the following localities: India, Ceylon, Cochin-China, Cambodia, Sumatra, Java, Lombok, Borneo, Philippine Islands, Formosa, Japan, and Australia.

Genus *Scambophyllum* Brunner v. W.

1878. BRUNNER v. W., Mon. Phan., p. 134.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 8.
 1906. KIRBY, Syn. Cat. Orth., II, p. 405.

Scambophyllum sanguinolentum (Westwood).

1848. WESTWOOD, Cab. Orient. Ent., p. 52 (*Phylloptera sanguinolenta*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 381 (*Phylloptera ?? sanguinolenta*).

1878. BRUNNER v. W., Mon. Phan., p. 135.
 1891. KARSCH, Berl. Ent. Zeitehr., XXXVI, 1, p. 210.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 63.
 1906. KIRBY, Syn. Cat. Orth., II, p. 405.

This beautiful species is represented in the collection of Raffles Museum from the following localities: Lebong Tandai, Sumatra (July 1918, C. J. Brooks coll., 1 ♂).—Maxwell's Hill, Perak (2,100': 19 April 1904; 1 ♂).—Gunong Angsi, Negri Sembilan (2,000'-2,790'; April 1918; 2 ♂♂, 1 larve).—Gunong Kledang, Perak (2,646': Nov. 1918; 1 ♂, 1 larve).

This species was hitherto known only from Sumatra.

Genus *Zulpha* Walker.

1870. WALKER, Cat. Derm. Salt. Brit. Mus., III, p. 478.
 1878. BRUNNER v. W., Mon. Phan., p. 141 (*Eurypalpa*).
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 9 (*Eurypalpa*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 408.

Zulpha perlaria (Westwood).

1848. WESTWOOD, Cab. Orient. Ent., p. 33 (*Phanacroptera*).
 1870. WALKER, Cat. Derm. Salt. Brit. Mus., III, p. 479.
 1878. BRUNNER v. W., Mon. Phan., p. 142 (*Eurypalpa*).
 1891. KARSCH, Berl. Ent. Zeitschr., XXXVI, 1, p. 210.
 1893. BRUNNER v. W., Ann. Mus. Genova, (2) XIII, p. 168 (*Eurypalpa*), 177 (*Sathrophyllia*).
 1904. KRAUSZE, Ins. Börse, XXI (*Eurypalpa*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 408.
 1922. KARNY, Natur (Leipzig) XIII, 13, p. 207.

1 ♂ from Kedah Peak (Dec. 1915), 1 ♂ from Kledang, Perak (2,646'; Nov. 1916), and 6 ♂♂ from Bukit Kutu, Selangor (April 1915), agreeing perfectly with the description given by Brunner, but having the tegmina distinctly wider (9 mm.).

Distribution: India, Carin Ghecu, Tonkin (Than-Moi), Sumatra, Java, Borneo, Penang.

Genus *Leptoderes* Serville.

1839. SERVILLE, Hist. Nat. Ins. Orth., p. 409.
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 360.
 1878. BRUNNER v. W., Mon. Phan., p. 142 (*Leptodera*).
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 70 (*Leptodera*).
 1898. SAUSSURE, Rev. Suisse Zool., V, p. 228, 806 (*Euparthenus*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 408.

Leptoderes ornatipennis Serville.

1839. SERVILLE, Hist. Nat. Ins. Orth., p. 410.
 1841. CHARPENTIER, Orth., pl. 12 (*Leptodera ornata*).
 1842. DE HAAN, Temminck, Verh., Orth., p. 199 (*Locusta Phylloptera*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 360 (*ornatipennis*, *ornata*).
 1878. BRUNNER v. W., Mon. Phan., p. 143 (*Leptodera*).
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 70 (*Leptodera*).
 1892. DOHRN, Stett. Ent. Zeit., LIII, p. 66 (*Leptodera*).
 1898. SAUSSURE, Rev. Suisse Zool., V, p. 229, 806 (*Euparthenus gratiosa*).
 1904. KRAUSZE, Ins. Börse, XXI (*Leptodera*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 408.
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 276.
 1920. KARNY, Zool. Mededeel. V. 4, p. 187, 209.

1 ♂ from Gunong Kledang, Perak (2,646'; Nov. 1916).
Hitherto known from Java, Sumatra, and Borneo.

Genus *Arnobia* Stål.

1876. STÅL, Bihang Svenska Akad., IV (5), p. 56.
1878. BRUNNER v. W., Mon. Phan., p. 162.
1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 11.
1902, 03. JACOBSON & BIANCHI, Orth. Pseudoneur. Russ., p. 324, 336, 374.
1906. KIRBY, Syn. Cat. Orth., II, p. 423.
1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 11.

Arnobia pilipes (De Haan).

1842. DE HAAN, Temminck, Verh., Orth., p. 194 (*Locusta Phaneroptera*).
1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 341 (*Phaneroptera*).
1878. BRUNNER v. W., Mon. Phan., p. 162.
1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 72.
1902, 03. JACOBSON & BIANCHI, Orth. Pseudoneur. Russ., p. 326, 375.
1904. KRAUSZE, Ins. Böree, XXI.
1906. KIRBY, Syn. Cat. Orth., II, p. 423.
1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 11.
1909. REHN, Bull. Amer. Mus. Nat., N. Y., XXVI, 13, p. 192.
1920. KARNY, Zool. Mededeel., V, 4, p. 209.

2 ♀♀ from the Botanic Gardens of Singapore (11 July 1911), and 1 ♂ from Gunong Angsi, Negri Sembilan (2,000'-2,790'; April 1918).

The species is hitherto known from Malacca, Sumatra, Java, Borneo and Japan.

Genus *Phygela* Stål.

1876. STÅL, Bihang Svenska Akad., IV (5), p. 56.
1878. BRUNNER v. W., Mon. Phan., p. 160.
1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 11.
1906. KIRBY, Syn. Cat. Orth., II, p. 423.

Phygela haanii Stål.

1876. STÅL, Bihang Svenska Akad., IV (5), p. 56.
1878. BRUNNER v. W., Mon. Phan., p. 161.
1906. KIRBY, Syn. Cat. Orth., II, p. 423.

1 ♀ from Bukit Timah, Singapore (30 June 1911).—4 ♂♂ from Singapore; Mt. Ophir, Johore (22 Aug. 1905); Gurun, Kedah (Dec. 1915); Gunong Kledang, Perak (2,646'; Nov. 1916).

The female is very typical. Males with narrower tegmina (12 mm. wide), but distinctly wider than in the ♂♂ of *marginata*, with a very fine black line along the sides of hind margin of the pronotal hind lobe. Male genitalia as in *Ph. marginata* described by Brunner (Addit. p. 72). Antennae in both sexes uniformly yellowish-brown.

Distribution: Malacca, Singapore;—In the collection of Buitenzorg Museum, there is one specimen (♂) from Western Java.

Genus *Tapiena* Bolivar.

1878. BRUNNER v. W., Mon. Phan., p. 163 (*Tapiena* n. sp. SERV. 1825).
1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 74 (*Tapiena*).
1906. KIRBY, Syn. Cat. Orth., II, p. 424 (*Tapiena*).
1906. BOLIVAR, Mem. Soc. Esp. Hist. Nat., I, p. 334.

Tapiena ensigera n. sp.

♂. Green, body yellowish green, tegmina somewhat nitid. Head and pronotum as in the other *Tapienas*. Radial vein of tegmina with three branches, the first of them going off in the middle and bifurcate before its middle; the others simple, obliquely running to the hind margin. Wings overreaching the tegmina by a triangular, green field of the same state of chitization as tegmina, a little longer than wide at base.

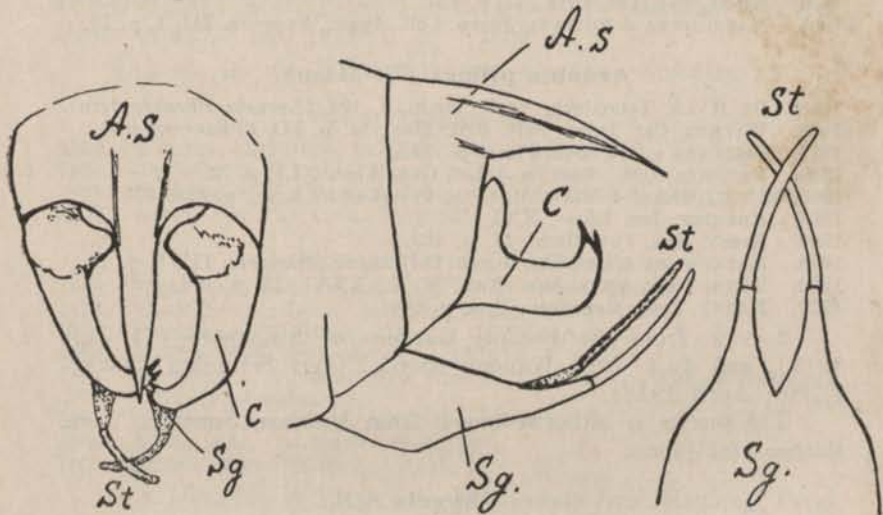


Fig. 8. *Tapiena ensigera*, end of ♂ abdomen. A. s. Anal Segment. C. Cerci. Sg. Subgenital plate. St. Styles.—Enlarged.

Anal segment produced in the middle of hind margin into a long, dapper-shaped process, sharply pointed at apex and reaching to the apex of cerci. These very stout, equally curved inwards,

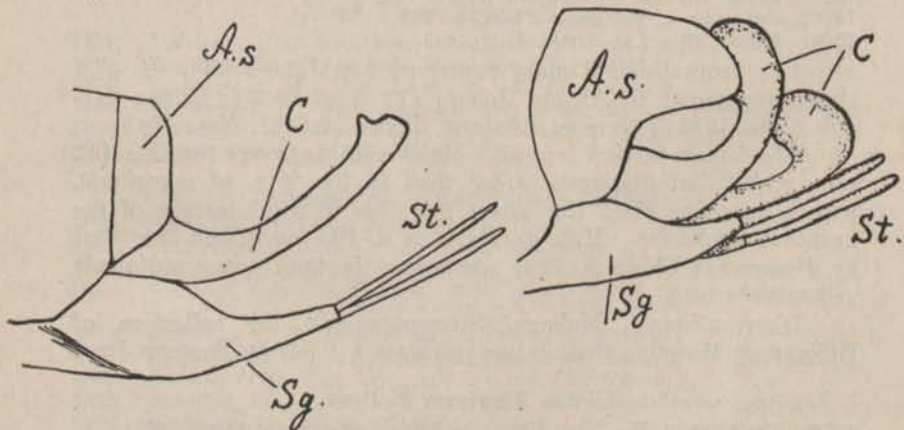


Fig. 9. End of ♂ abdomen of *Tapiena incisa* (left), and *T. bullata* (right). Lateral view, enlarged. A.s. Anal segment. C. Cerci. Sg. Subgenital plate. St. Styles.

with a large triangular process directed towards the supra-anal plate, at base, and with two short, sharply pointed, black spines at apex. Subgenital plate longer than wide at base, with sinuated lateral margins, deeply triangularly incised at apex nearly to its middle; its lobes long and narrow, nearly cylindrical, bearing very long and slender styles nearly twice as long as the lobes themselves.

Length of body 22-26 mm., of pronotum 5.3-5.6 mm., of tegmina 33-34 mm., width of tegmina 6.8-7.7 mm., length of hind femora 14-15.3 mm.

♀ unknown.

There is no other *Tapiena* hitherto known with such a remarkable formation of apex of abdomen in the ♂.

1 ♂ from Gunong Kledang, Perak (2,646'; Nov. 1916), and 2 ♂♂ from Bukit Kutu, Selangor (April 1915; 3,000'-3,460').

***Tapiena bullata* n. sp.**

♂. General appearance, colour, and venation of tegmina quite as in the preceding species.

Anal segment produced into two arched, rounded lobes, shorter than wide at base. Cerci thickened at base, but without a process, then strongly curved inwards, and dilated at the end into a broad, ovate node. Subgenital plate similar as in *ensigera*, but the incision of the shape of an equally-sided triangle, the lobes therefore shorter and wider. Styli not longer than in the preceding species, but nearly three times as long as the lobes of subgenital plate.

Length of body 24 mm., of pronotum 6 mm., of tegmina 35 mm., width of tegmina 8 mm., length of hind femora 16 mm.

♀ unknown.

By the shape of anal segment intermediate between *cutellata* Br. v. W. and *truncata* Br. v. W.

1 ♂ from Gunong Kledang, Perak (2,646'; Nov. 1916).

***Tapiena incisa* n. sp.**

♂. General appearance, colour and venation of tegmina as in the two preceding species.

Anal segment truncate, but triangularly excised in the middle of hind margin. Cerci somewhat slender, crossed at base, blunt at the end and with an obtuse tooth inwards from the apex. Subgenital plate very long and slender, truncate at apex. Styles long and slender, cylindrical, a little curved inwards.

Length of body 21 mm., of pronotum 5.3 mm., of tegmina 34 mm., width of tegmina 7 mm., length of hind femora 15.5 mm.

♀ unknown.

Near to *truncata*, but differing by the incised anal segment, and by the truncate subgenital plate.

1 ♂ from Gunong Tamabo, Baram River, Sarawak (13 Nov. 1920; J. C. Moulton).

Tapiena pentagona n. sp.

♀. Reddish brown; general appearance and venation of tegmina as in the other *Tapiena*'s above described.

Ovipositor sickle-shaped, broad, pointed at apex; its lower margin finely serrate at the end. Subgenital plate large, pentagonal, pointed at apex.

Length of body 24 mm., of pronotum 5.2 mm., of tegmina 34 mm., width of tegmina 9 mm., length of hind femora 15.5 mm., of ovipositor 6.5 mm.

1 ♀ from Mt. Ophir, Johore (15 Aug. 1905).



Fig. 10. ♀ subgenital plate of *Tapiena emarginata* (above), and *T. pentagona* (beneath). Enlarged.

Tapiena emarginata n. sp.

♀. Colour, general appearance and venation of tegmina as in *pentagona*. But the subgenital plate small, broadly triangular, distinctly emarginate at apex.

Length of body 24 mm., of pronotum 5.3 mm., of tegmina 32 mm., width of tegmina 8.5 mm., length of hind femora 14.4 mm., of ovipositor 5.5 mm.

1 ♀ from Johore.

Genus **Poecilopsyra** Dohrn.

1892. DOHRN, Stett. Ent. Zeit., LIII, p. 69.

1906. KIRBY, Syn. Cat. Orth., II, p. 427.

Poecilopsyra octoseriata (De Haan). (Plate II, fig. 5.)

1842. DE HAAN, Temminck, Verh., Orth., p. 195 (*Locusta Phaneroptera*).

1870. WALKER, Cat. Derm. Salt. Brit. Mus., III, p. 439 (*Tegra*).

1892. DOHRN, Stett. Ent. Zeit., LIII, p. 70.

1906. KIRBY, Syn. Cat. Orth., II, p. 427.

1920. KARNY, Zool. Mededeel., V, 4, p. 190, 210.

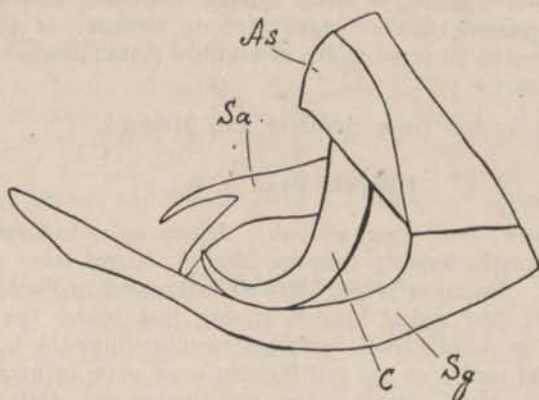


Fig. 11. End of ♂ abdomen of *Poecilopsyra octoseriata*. Lateral view, enlarged. As. Anal segment. Sa. Subanal plate. C. Cercus. Sg. Subgenital plate.

♂ (hitherto unknown): Anal segment at the posterior margin with a deep trapezoidal impression. Supra-anal plate small, triangular, with impressed surface and padded margins. Cerci stout, incurved, with the apical part slender, acute. Subgenital plate twice as long as the cerci, laterally keeled, by a deep apical incision divided into two styliform processes, but without articulated styli. Subanal plate with two sharp spines on each side, the lower one nearly as long as the cerci and distinctly longer than the upper one.

Length of body (without subgenital plate!) 22 mm., of pronotum 5 mm., of tegmina 37 mm., width of tegmina 7.4 mm., length of hind femora 19 mm., of subgenital plate 5.7 mm.

1 ♂ from Semangko Pass, Selangor-Pahang (2,700'; March 1912).

The species was hitherto known only from Sumatra and Borneo.

Genus *Elbenia* Stål.

1876. STÅL, Bihang Svenska Akad., IV (5), p. 56.
 1878. BRUNNER v. W., Mon. Phan., p. 165.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 78.
 1898. BRUNNER v. W., Abh. Senckenb. Ges., XXIV, p. 254.
 1906. KIRBY, Syn. Cat. Orth., II, p. 425.

Elbenia nigrosignata Stål.

1876. STÅL, Bihang Svenska Akad., IV (5), p. 56.
 1878. BRUNNER v. W., Mon. Phan., p. 166.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 78.
 1898. BRUNNER v. W., Abh. Senckenb. Ges. XXIV, p. 254, 255.
 1906. KIRBY, Syn. Cat. Orth., II, p. 425.
 1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 192.

1 ♂ from Pahang, a little smaller than the measurements given by Brunner (1878): length of body 19 mm., of pronotum 5 mm., of tegmina 33 mm., width of tegmina 7 mm., length of hind femora 16 mm.

Hitherto known from Sumatra and Malacca.

***Elbenia fissa* n. sp.**

♂. Green; head pale whitish. Antennae unicolorous, pale. Pronotum smooth, broadly rounded behind, lateral lobes about as long as high. Tegmina green, blackish infuscated in the basal half of anal field; first radial branch arising just before the middle, bifurcate in its middle, both branches running into the hind margin; the distal one is on the left tegmen once more bifurcate in its middle, on the right simple; there are further one (left) or two (right) simple, oblique radial branches, directed towards the hind margin. Fore coxae with a sharply pointed spine. Fore femora armed beneath along the fore margin with 5 black spines; middle femora on the outer margin with pale spines; hind femora on both margins furnished with some spines dark at extreme apex.

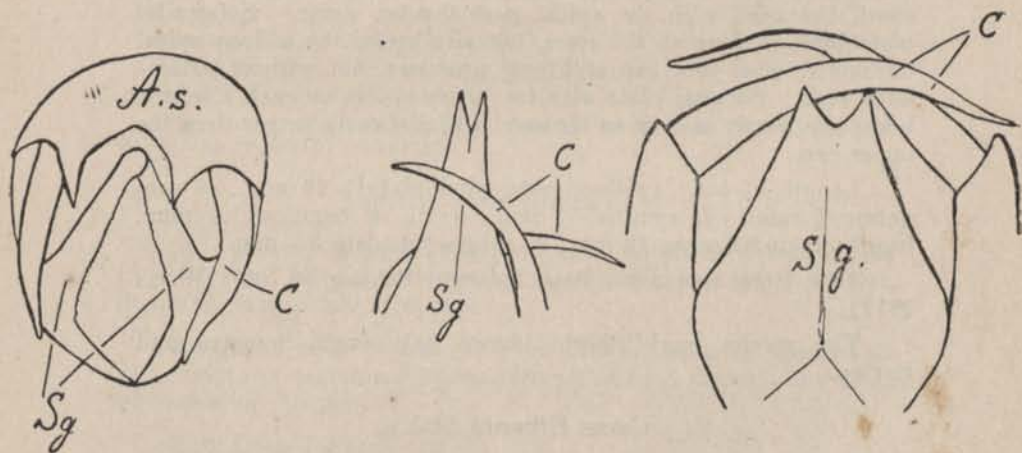


Fig. 12. End of ♂ abdomen of *Elbenia*. Left: *E. nigrosignata*, seen from behind. Middle: *E. fissa*, ventral view. Right: *E. fusca*, ventral view. A.s. Anal segment. C. Cerci. Sg. Subgenital plate.—Enlarged.

Anal segment truncate behind; supraanal plate ovate. Cerci long and slender, curved inwards, crossing each other, sharply pointed, dark at extreme apex. In the only specimen before me one cercus embraces the subgenital plate beneath, the other lies above. Subgenital plate acutely triangular, long and slender, excised at apex by a sharply pointed triangle.

Length of body 18 mm., of pronotum 5 mm., of tegmina 34 mm., width of tegmina 7 mm., length of hind femora 17 mm.

1 ♂ from Kedah Peak (Dec. 1915); and perhaps belongs to the same species also a somewhat damaged specimen from Ayer Molek, Johore (June 1917; Xavier coll.).

This species comes in Brunner's key (1898) close to the Philippine *modesta*, and differs from it at once by the anal field of tegmina infuscated, and by the form of subgenital plate and anal segment of ♂. In its general appearance it agrees perfectly with *nigrosignata*, but the formation of the end of ♂ abdomen is entirely different.

Elbenia fusca n. sp.

♂, ♀. Unicolorous dark brown; the anal field with a blackish spot near the base, especially in ♂, less distinct in ♀. Pronotum practically as in the preceding species. Radial vein of tegmina curved backwards before the apex, obliquely running into the hind margin; moreover with two branches, the second of these simple, obliquely directed towards the hind margin, the first arising before the middle, and bifurcate somewhat before its middle. Fore coxae armed with a sharp spine. Fore femora with some black dots and short, brownish spines beneath. Spines of hind femora darker at extreme apex.

Anal segment of ♂ slightly emarginated behind. Supraanal plate rounded, broader than long. Cerci strongly curved inwards, crossing each other, pointed at apex. Subgenital plate of ♂ similar as in *fissa* but broader and more bluntly emarginated at apex.

Ovipositor sickle-shaped, pointed at apex, longer than pronotum; its margins practically smooth. Subgenital plate of ♀ large, arched, bluntly triangular, emarginated at apex.

			♂	♀
Length of body	..	..	22 mm.	21.5 mm.
" " pronotum	..	..	6 "	6 "
" " tegmina	..	..	40 "	40.5 "
Width " "	..	..	8 "	8 "
Length of hind femora	..	..	23 "	23.5 "
" " ovipositor	..	..	—	9 "

This new species comes in Brunner's key close to *modesta*; it may be distinguished from it and also from *fissa* by the brown colour, and by the shape of subgenital plate (in both sexes). The latter reminds (in the ♂) somewhat to *fissa* but is broader and not so sharply incised. According its size *fusca* is intermediate between the two others, nearer to *modesta* than to *fissa*.

Elbenia bispinosa n. sp.

♀. Pale green. Antennae unicolorous. Pronotum practically as in the two preceding species. Tegmina parallel-sided, rounded at apex, not darker in the anal field; radial vein with two branches; the second simple, directed towards the apex, the first

arising distinctly before the middle, 2- or 3-furcate. Fore coxae armed with a long, somewhat curved, sharply pointed spine. Spines of femora very small, practically not darker than the body.

Anal segment of ♀ truncate behind, but produced into two long, slender, sharply pointed spines close to middle. Ovipositor nearly twice as long as pronotum, curved upwards, pointed at apex, in the apical half with the surface and the lower margin somewhat granulate: upper margin smooth throughout its whole length. Subgenital plate (♀) triangulate, blunt at apex.

Length of body 25 mm., of pronotum 5.5 mm., of tegmina 39 mm., width of tegmina 7.8 mm., length of hind femora 21 mm., of ovipositor 10.4 mm.

This species is allied to the Philippine *E. manillensis* Pictet, but may be distinguished from all hitherto known species by the remarkable shape of anal segment in ♀.

Elbenia loliifolia (De Haan).

1842. DE HAAN, Temminck, Verh., Orth., p. 194 (*Locusta Phaneroptera*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 348 (*Phaneroptera*).
 1878. BRUNNER v. W., Mon. Phan., p. 164, 165 (*Casigneta* ?).
 1906. KIRBY, Syn. Cat: Orth., II, p. 424 (*Casigneta*).
 1920. KARNY, Zool. Mededeel., V, 4, p. 189, 209 (*Habra*).

I have placed this species in *Habra*, with which it agrees better by venation of tegmina than with *Elbenia* or *Phaula*. I had then a ♀ only for my study, and from *Habra* the ♂ only was described. In the Buitenzorg Museum, however, *Habra* is represented in both sexes, and I see from these, that this genus does not belong to the *Phaula*-group. Now I must therefore place *loliifolia* in *Elbenia*, although its venation does not agree perfectly with this genus, but represents an intermediate type between *Elbenia* and *Phaula*.

I place in this species one ♂ of the Raffles Museum, from Penang (1,500'-2,428'; May 1916); but I do so with some doubt, because I have here no ♀ for comparison, and the ♂ is hitherto not yet described. I will describe here therefore the specimen before me; it cannot certainly be decided, whether it is really *loliifolia*, or a new species, until Javanese ♂♂ of *loliifolia* are discovered.

First radial branch of tegmina arising from the middle of radial vein, bifurcate in its middle, both branches running obliquely to the hind margin, the distal one once more bifurcate before the end. Further two simple radial branches obliquely directed to the hind margin. All transverse veins very prominent. Anal segment (♂) broadly rounded; cerci simple curved inwards. Subgenital plate (♂) deeply split into two cylindrical lobes, distinctly overreaching the cerci, and strongly curved upwards before their end. These lobes longer than the basal undivided part of subgenital plate.

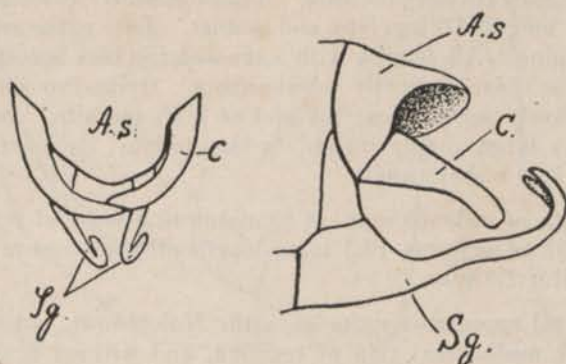


Fig. 13. End of ♂ abdomen of *Elbenia lolifolia* (?), dorsal and lateral view. A.s. Anal segment. C. Cerci. Sg. Subgenital plate.—Enlarged.

Length of body 17.5 mm., of pronotum 4 mm., of tegmina 29 mm., width of tegmina 5 mm., length of subgenital plate 3 mm.

The species was hitherto known from Java only.

Genus *Phaula* Brunner v. W.

1878. BRUNNER v. W., *Mon. Phan.*, p. 167.

1891. BRUNNER v. W., *Verh. zool.-bot. Ges. Wien*, XLI, p. 79.

1902, 03. JACOBSON & BIANCHI, *Orth. Pseudoneur. Russ.*, p. 324, 336, 375.

1906. KIRBY, *Syn. Cat. Orth.*, II, p. 425.

Phaula gigantea n. sp.

♀. Yellowish green, tegmina and apex of wings green, somewhat transparent. Eyes black. Pronotum smooth; hind margin of disc rounded; lateral lobes much higher than long. Venation of tegmina as in *Phaula* group 1.1 (Brunner), or in *Holochlora* but the mediastinal vein indistinct, not sharply prominent; radial vein with 4 oblique branches running to the hind margin, the first

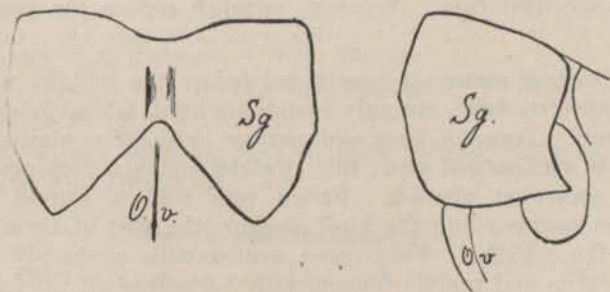


Fig. 14. Subgenital plate (Sg.) and base of ovipositor (Ov.) of *Phaula gigantea* ♀. Ventral and lateral view.—Enlarged.

of which bifurcate near the base. Tegmina nearly twice as wide as pronotum long. All legs long and slender. Fore coxae armed with a sharp spine. All femora with some short spines beneath. Fore and middle tibiae distinctly sulcate above. Ovipositor short, blunt at apex, finely serrate near the end of both margins. Subgenital plate (♀) large, deeply incised in the middle; its lobes laterally produced into a sharp angle.

Length of body 25 mm., of pronotum 7.5 mm., of tegmina 52 mm., width of tegmina 13.5 mm., length of hind femora 30 mm., of ovipositor 7.3 mm.

General appearance quite as in the *Holochloras*, but without a prominent mediastinal vein of tegmina, and without a sharp fold at the base of ovipositor. By these characters my new species should come in *Liotrachela*, but differs from this genus by the venation of tegmina, especially the arrangement of the branches of radial vein. It must therefore come in *Phaula* with which it agrees not only by this character, but also by the transparent constitution of tegmina. But it differs from all hitherto known *Phaulas* by its larger size and the blunt relatively short ovipositor. Perhaps it should form a new genus, which would be in the same relation to *Liotrachela* as *Phaula* is to *Elbenia*.

1 ♀ from Kedah Peak (Dec. 1915).

Genus *Psyra* Stål.

1876. STÅL, Bihang Svenska Akad., IV (5), p. 55.
 1878. BRUNNER v. W., Mon. Phan., p. 169.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 87.
 1906. KIRBY, Syn. Cat Orth., II, p. 427.

Psyra obliterata n. sp.

♂. Yellow (probably green when alive). Disc of pronotum dark in its last third. Tegmina green, with a large black spot in the anal field. Abdomen purplish red on the dorsal surface.

Pronotum somewhat constricted before the middle, with two deep transverse sulci, strongly rounded behind, lateral lobes higher than long. Tegmina long and narrow, without a glaring stripe along the mediastinal vein; this straight, but not very prominent, nearly somewhat abortive. Radial vein with 4 simple, oblique branches running into the hind margin; the first of them arising before the middle. Fore coxae armed with a sharply pointed spine. Fore and middle femora with 3-5 spines on the fore margin, unarmed behind. Hind femora in the apical half on both margins with about 6 spines dark at extreme apex.

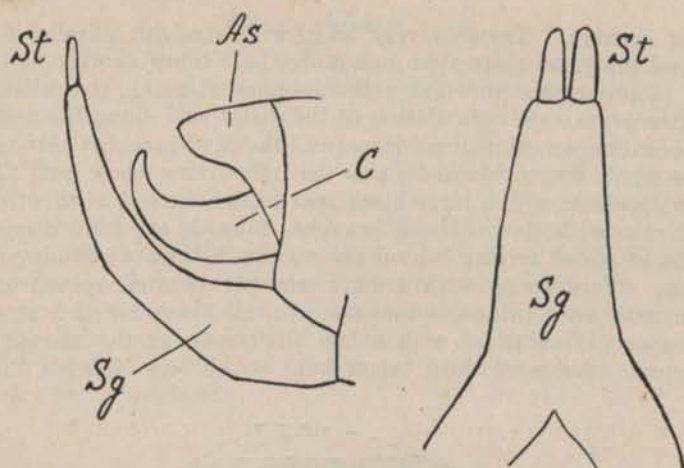


Fig. 15. End of ♂ abdomen of *Psyra obliterated*, lateral and ventral view, enlarged. A.s. Anal segment. C. Cercus. Sg. Subgenital plate. St. Styles.

Anal segment of ♂ produced behind in a short, broadly rounded lobe. Cerci thick, curved inwards, blackish at the end, sharply pointed at extreme apex. Subgenital plate (♂) long and slender, truncate at apex; styles not very long, somewhat depress.

Length of body 26 mm., of pronotum 5.5 mm., of tegmina 47 mm., width of tegmina 8 mm., length of hind femora 23 mm.

This new species belongs to the *melanonota*-group, but differs from this and the other allied species at once by the shape of anal segment and subgenital plate (♂).

1 ♂ from Bukit Kutu, Selangor (April 1915; 3,000'-3,460').

Psyra melanonota Stål.

1842. DE HAAN, Temminck, Verh., Orth., p. 194 (*Locusta Phaneroptera ensis* ♀ nec ♂).
1876. STÅL, Bihang Svenska Akad., IV (5), p. 56.
1878. BRUNNER v. W., Mon. Phan., p. 172.
1891. KARSCH, Berl. Ent. Zeitehr., XXXVI, 1, p. 210.
1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 87.
1904. KRAUSZE, Ibs. Börse, XXI.
1906. KIRBY, Syn. Cat. Orth., II, p. 427.
1920. KARNY, Zool. Mededeel., V, 4, p. 192, 210.

3 ♂♂ from Pulo Pisang (30. March—1. April 1921) and from Pulo Jarak (8. April 1921).

Distribution: Malacca, Java, Borneo, Celebes, Moluccas (Amboina), and New Britain.

Psyra punctulata n. sp.

♀. Brownish yellow; antennae dark, with distant pale rings. Eyes very prominent, dark. Disc of pronotum rounded posteriorly, with a fine black line close before the hind margin; lateral lobes

as long as high. Tegmina very long, with straight, parallel fore and hind margins, more than one and a half times as wide as the length of pronotum, brownish yellow, somewhat nitid; the cells between the transverse reticulation in the distal half along the costa, and along the posterior ulnar vein (and the hind margin) throughout the whole length blackish; also the cells of the whole anal field filled with black, with a large black spot before the end of this field. Radial vein with three oblique branches towards the hind margin, the first of which arising behind the middle, bifurcate already near its base. Fore coxae with a long, sharply pointed spine. All femora with some minute spines beneath, all knees blackish at extreme apex. Fore tibiae with a few black spots at the margin of tympanum. Lobes of third tarsal joint on all legs blackish.

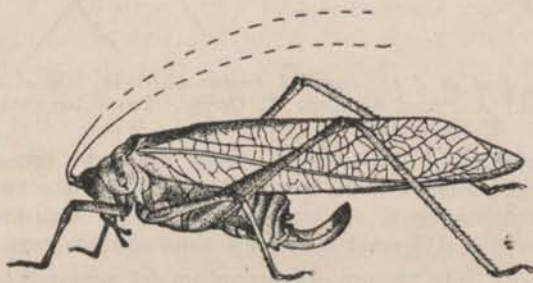


Fig. 16. *Psyrha punctulata* ♀. Natural size. Del. Soehanam.

Anal segment with a very deep, triangular impression from its hind margin to the hind margin of the preceding segment. Ovipositor strongly compressed, sickle-shaped, slender, nearly twice as long as pronotum, acute at apex; in the distal part strongly granulated on its whole surface and serrate on both margins; basal half smooth; at extreme base a sharp edge protruding similarly as in the *Holochloras*. Subgenital plate bluntly triangular, rounded, wider than long, with a deep, triangular impression along the middle.

♂ unknown.

Length of body 26 mm., of pronotum 5.8 mm., of tegmina 46.8 mm., width of tegmina 9 mm., length of hind femora 24.8 mm., of ovipositor 10.5 mm.

It is a very difficult matter to describe a new *Psyrha* from the female only; but there is no doubt that this specimen before me represents a new species belonging to the group of *marginata* and *longelaminata*, both recorded from Borneo. From the former, *punctulata* may be distinguished especially by the first radial branch arising behind the middle, from *longelaminata* by the narrower tegmina.

1 ♀ from Gunong Tamabo, Baram River, Sarawak (13.11.1920; J. C. Moulton).

***Psyra peraka* n. sp.**

♀. Body and legs yellowish (certainly green when alive), tegmina green. Antennae unicolorous, brownish yellow. Eyes very prominent, dark. Disc of pronotum rounded behind, not bordered with black; lateral lobes a little longer than high. Tegmina long, one and a half times as wide as the length of pronotum, with a more rounded hind margin than in the preceding species, green, the fore and hind margin and the mediastinal vein brownish yellow. First radial branch arising close before the middle, then bifurcated and both branches communicating with the anterior ulnar vein on the left tegmen, freely running into the hind margin on the right tegmen; further 3 (left) or 2 (right) simple oblique radial branches to the hind margin. Fore coxae armed as in *punctulata*; leg: unicolorous.

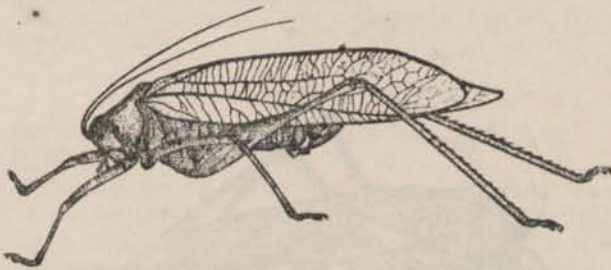


Fig. 17. *Psyra peraka* ♀. Natural size. Del. Soehanam.

Anal segment (♀) equally truncate behind, without an impression; supra-anal plate ovate. Ovipositor as in the preceding species. Subgenital plate larger than in *punctulata*, heart-shaped, in basal part with strongly prominent lateral borders almost forming downwards protruding lobes; broadly emarginated at apex, with bluntly triangular, rounded lobes.

♂ unknown.

Length of body 26 mm., of pronotum 6 mm., of tegmina 42 mm., width of tegmina 9.4 mm., length of hind femora 25 mm., of ovipositor 10.3 mm.

Differing from the preceding species by the colour of antennae, tegmina and leg:, by the more rounded hind margin of tegmina, and by the form of subgenital plate of ♀. Without doubt very near to the Philippine *longestylata*; I cannot give the sexual character separating these two species, because I have a female only of *peraka* whilst from *longestylata* the male only is known.

2 ♀♀ from Gunong Kledang, Perak (2,646'; March 1898 and Nov. 1916). To the same species belongs perhaps further a somewhat damaged specimen from Singapore.

Genus ***Dicranopsyra*** Dohrn

1892. DOHRN, Stett. Ent. Zeit., XLIII, p. 71

1906. KIRBY, Syn. Cat. Orth., II, p. 427

Dicranopsyra leopardina n. sp.

♂. Yellowish (probably green when alive). Eyes prominent, brown. Antennae unicolorous, yellowish. Disc of pronotum smooth, with a small blackish spot in its middle, strongly produced behind, with rounded hind margin; lateral lobes rounded, higher than long. Tegmina parallel-sided, dark green, with bright yellow longitudinal and transverse veins; close behind the radial vein a longitudinal row of about 20 black spots; mediastinal vein sharp, reddish brown, close before it a dark brown stripe. Radial vein with three oblique branches running to the hind margin, the first of which arising in the middle, bifurcate near base, more or less communicating with the anterior ulnar vein. Apex of hind wings also green with yellow veins; their remaining surface pale green.



Fig. 18. *Dicranopsyra leopardina* ♂. Natural size. Del. Soehanam.

Mesosternal lobes ovate, those of metasternum semicircularly rounded. Fore coxae armed with a sharply pointed spine. Fore and middle femora beneath on the fore margin with 4 dark brown spines, unarmed behind. Middle femora one and a half times as long as those of the fore pair, somewhat curved. Knees concolorous. Fore tympanum rimate, the hind one broadly open. All tibiae distinctly sulcate above, those of middle legs with a few dark spines on hind margin. Both lower margins of all tibiae set with spines along the whole length. All spines of hind legs (femora and tibiae!) very dark black, with a black spot apposed to their base.

Anal segment (♂) deeply split in two finger-like lobes, similar to *Holochlora ensis* ♂, touching the subgenital plate close before the end. Cerci slender, nearly straight, curved inwards at extreme apex, without spines. Subanal plate compress, curved upwards, blunt at apex, about five times as long as high. Subgenital plate long and slender, in its apical half divided in two lobes bearing at their ends the short, cylindrical, articulately inserted styles.

♀ unknown.

Length of body 26 mm., of pronotum 5 mm., of tegmina 41 mm., width of tegmina 8.5 mm., length of hind femora 23 mm.

By the very remarkable colour (especially of tegmina), this new species may be distinguished at once from all hitherto known species of *Psyra*, *Dicranopsyra* and *Holochlora*. In general appearance it reminds to *Psyra*, but comes by the aberrant shape of the ♂ end of abdomen to *Dicranopsyra*; but the subgenital plate resembles not *Isopsera* (as in *multicolor*), but *Holochlora ensis*. From the latter genus *D. leopardina* differs by its more slender appearance.

2 ♂♂ from Kedah Peak (Dec. 1915).

Genus *Holochlora* Stål.

1873. STÅL, Oefv. Vet.-Akad. Förh., XXX (4), p. 42.
 1874. STÅL, Rec. Orth., II, p. 17.
 1878. BRUNNER v. W., Mon. Phan., p. 174.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 89.
 1906. KIRBY, Syn. Cat. Orth., II, p. 430.
 1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 15.
 1921. KARNY, Treubia, I, 4, p. 297.

Holochlora signata Brunner v. W.

1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 92.
 1906. KIRBY, Syn. Cat. Orth., II, p. 431.

Represented in the collection of Raffles Museum from the following localities: Fort Canning, Singapore (12 Oct. 1913; Xavier; 1 ♂), Bukit Kutu, Selangor (April 1915; 3,457'; 1 ♂), Singapore (1 ♀), and Govt. Hill, Singapore (May 1917; Xavier coll.; 1 ♀).

Antennae uniformly pale, but in the ♂ from Bukit Kutu distinctly pale and dark annulated; it has perhaps also the anal segment a little stronger produced behind than in the typical *signata*, but I cannot find other characters to separate it specifically from *signata*.

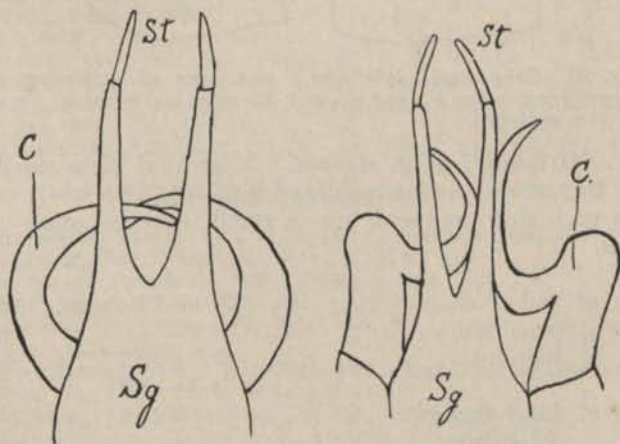


Fig. 19. End of ♂ abdomen of *Holochlora signata* (left) and *H. fracticercus* (right), ventral view, enlarged. C. Cerci. Sg. Subgenital plate. St. Styles.

H. signata was hitherto known from Singapore and Borneo only, but it is also not uncommon in the vicinity of Buitenzorg, Western Java (specimens in the collection of Buitenzorg Museum).

Holochlora fracticerca n. sp.

♂, ♀. General appearance quite as in *signata* the black dot at base of radial vein, typical for the latter also present in *fracticerca*. Differing only by the characters of apex of abdomen:

♂. Anal segment produced on each side into a rounded lobe, which is excavate in its middle, with a well defined black spot in this concavity; between the lobes, the anal segment is excavated and produced downwards into a bluntly triangular process. Cerci swollen at base, then abruptly acutangularly curved inwards, further slender and a second time strongly curved, in the apical half directed outwards, not crossing each other. Subgenital plate practically as in *signata*.

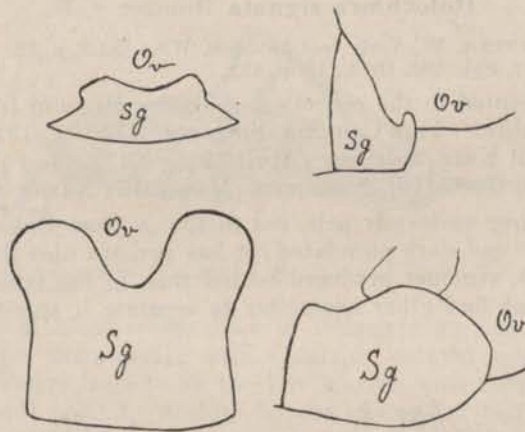


Fig. 20. Subgenital plate (Sg.) and base of ovipositor (Ov.) of *Holochlora fracticerca* ♀ (above) and *H. signata* (beneath), ventral and lateral view, enlarged.

♀. Ovipositor as in *signata*. Subgenital plate small, transversely trapezoidal, in the middle of hind margin slightly emarginate, on each side produced into a small, rounded angle, directed upwards.

	♂	♀
Length of body	22 — 26 mm.	22 mm.
" " pronotum	5.7— 6 "	6 "
" " tegmina	39.5—40.3 "	39.5 "
Width	8.5— 8.7 "	8.7 "
Length of hind femora	22.5 "	23.5 "
" " ovipositor	— "	5.5 "

2 ♂♂ and 1 ♀ from Gunong Kledang, Perak (2,646'; Nov. 1916).

Holochlora ensis (De Haan).

1842. DE HAAN, Temminck, Verh., Orth., p. 194 (*Locusta Phaneroptera ensis* ♂, nec ♀).
1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 341 (*Phaneroptera*).
1878. BRUNNER v. W., Mon. Phan., p. 180 (*javanica*).
1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 91 (*javanica*).
1891. KARSCH, Berl. Ent. Zeitschr., XXXVI, 1, p. 211 (*javanica*).
1902. KRAUSS, Semon, Zool. Forsch. Austral., V, p. 748 (*javanica*).
1906. KIRBY, Syn. Cat. Orth., II, p. 431 (*javanica*).
1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 193 (*javanica*).
1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 277 (*javanica*).
1920. KARNY, Zool. Mededeel., V, 4, p. 192, 210 (*Psyra*).
1921. KARNY, Phil. Journ. Sci., XVIII, 5, p. 615 (*javanica*).

1 ♂ from Pahang (July 1891), and 1 ♀ without locality label.

Distribution: Further India, Malacca, Sumatra, Java, Borneo, Mindanao.

Genus **Phaneroptera** Serville.

1831. SERVILLE, Ann. Sci. Nat., XXII, p. 158.
1835. BRULLÉ, Hist. Nat. Ins., IX, p. 143.
1838. BURMEISTER, Handb. Ent., II, p. 688.
1839. SERVILLE, Hist. Nat. Ins., Orth., p. 413.
1839. RAMBUR, Faun. Andal., II, p. 43.
1840. BLANCHARD, Hist. Nat. Ins., III, p. 24.
1840. HERRICH-SCHÄFFER, Nomencl. Ins., Orth., p. 13.
1846. FISCHER de WALDHEIM, Orth. Ross., p. 139.
1853. FISCHER Friburgensis, Orth. Eur., p. 236.
1853. FIEBER, Lotos LI, p. 173.
1854. FIEBER, Syn. Eur. Orth., p. 49.
1867. FRIVALDSKY, Ertek. Termesz. Kör. I (12), p. 83, 106.
1874. STÅL, Rec. Orth., II, p. 14.
1876. BOLIVAR, Ortopt. Españ., p. 175, 232.
1877. BOLIVAR, An. Soc. Españ., VI, p. 257, 314.
1878. BRUNNER v. W., Mon. Phan., p. 209.
1882. BRUNNER v. W., Prodr. Eur. Orth., p. 291.
1883. FINOT, Orth. France, p. 89, 97.
1889. FINOT, Faune France, Orth., p. 174, 181.
1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 107.
1900. BOLIVAR, Ann. Sci. Nat. Porto, VI, p. 8.
1900. TÜMPEL, Geradfl. Mitteleur., p. 221, 223, 254.
- 1902.03. JACOBSON & BIANCHI, Orth. Pseudoneur. Russ., p. 324, 336, 376.
1906. KIRBY, Syn. Cat. Orth., II, p. 434.
1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 19.

Phaneroptera brevis Serville.

1838. BURMEISTER, Handb. Ent., II, p. 690 (*gracilis*, nec GERMAR).
1839. SERVILLE, Hist. Nat. Ins., Orth., p. 418.
1842. DE HAAN, Temminck, Verh., Orth., p. 193.
1860. STÅL, Eugénies Resa, Orth., II, p. 29 (*subnotata*).
1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 347 (*brevis, gracilis*), 348 (*subnotata*).
1871. WALKER, Cat. Derm. Salt. Brit. Mus., Suppl., p. 38 (*subnotata*).
1874. STÅL, Rec. Orth., II, p. 29 (*subnotata*).
1878. BRUNNER v. W., Mon. Phan., p. 215 (*subnotata*).
1903. KRAUSS, Semon, Zool. Forsch. Austral., V, p. 747 (*sp.*).
1906. KIRBY, Syn. Cat. Orth., II, p. 436 (*gracilis*).
1906. v. DEVENTER, Dierl. Vijanden v.h. Suikerriet, p. 281 (2e druk 1912) (*spec.?*).

1909. REHN, Bull. Amer. Mus. Nat. Hist., N.Y., XXVI, 13, p. 195 (*subnotata*).
 1915. BRUNNER, Univ. Stud. Lincoln, XV, 2, p. 278 (*gracilis*).
 1920. KARNY, Zool. Mededeel., V, 4, p. 195, 210.
 1921. KARNY, Phil. Journ. Sci., XVIII, 5, p. 616.
 1921. KARNY, Trop. Natuur, X, 5, p. 69 (Fig. 7).
 1922. KARNY, Natur. (Leipzig) XIII, 13, p. 202.

2 ♂♂ from Singapore: Kim Kiat Road (23 May 1911); Impounding Reservoir (1 Feb. 1913).

Distribution: Singapore, Java, Borneo, Philippine Islands, Timor, Tondano, N. Australia.

Genus *Isopsera* Brunner v. W.

1878. BRUNNER v. W., Mon. Phan., p. 218.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 109.
 1906. KIRBY, Syn. Cat. Orth., II, p. 438.

Isopsera scalaris Rehn.

1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 195.

1 ♀ from Bukit Kutu, Selangor (April 1915; 3,457').

Measurements: Length of body 17.5 mm. (somewhat contracted), of pronotum 3.8 mm., of tegmina 27 mm., width of tegmina 6 mm., length of hind femora 16 mm., of ovipositor 5 mm.

Hitherto known from Sumatra only (1 ♀ described by Rehn). The ♂ (not yet described) is represented in the collection of Buitenzorg Museum from Sumatra and will be published in an other paper together with the other *Phaneropterinae* of Buitenzorg Museum. Then will be described also a very similar species from Western Java which has a longer and more pointed subgenital plate in the ♀. In *scalaris* it is a little shorter and more blunt, the V-shaped emargination deeper, nearly rectangular.

Genus *Sympaestria* Brunner v. W.

1878. BRUNNER v. W., Mon. Phan., p. 185.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 13.
 1892. DOHRN, Stett. Ent. Zeit., LIII, p. 72.
 1906. KIRBY, Syn. Cat. Orth., II, p. 432.
 1922. KARNY, Natur. (Leipzig) XIII, 13, p. 202.

Sympaestria acutelobata Brunner v. W.

1878. BRUNNER v. W., Mon. Phan., p. 185.
 1892. DOHRN, Stett. Ent. Zeit., LIII, p. 73.
 1906. KIRBY, Syn. Cat. Orth., II, p. 432.
 1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 195.

3 ♂♂ from Bukit Kutu, Selangor (April 1915; 3000'-3460');
 1 ♂ from Baram, Sarawak (13 Sept. 1920; coll. J. C. Moulton).

Fore coxae without spine (in both sexes).

♂ (hitherto unknown) of the same size as the ♀. Anal segment transversely truncate, with a short, sharp tooth in the middle

of hind margin. Supra-anal plate acute, triangular, distinctly longer than wide, with sinuate lateral margins. Cerci long, cylindrical, strongly incurved, crossing each other. Subgenital plate long and slender, triangularly splitted at apex, with the styles cylindrical, as long as or longer than the lobes of subgenital plate.

Hitherto known from Borneo, Java, Sumatra and Singapore.

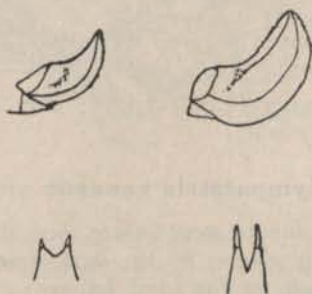


Fig. 21. *Sympaestria brevicauda* (left), and *S. acutelobata* (right). Lateral view of ♀ ovipositor (above), and ventral view of ♂ subgenital plate (beneath).—3 times enlarged.

Sympaestria brevicauda n. sp.

♂, ♀. Very similar to the preceding species, and of the same colour. Tegmina with the hind margin more rounded, and the radial branch shaped as in *acutelobata*. The green apex of wings overreaching the tegmina shorter and less pointed than in Brunner's species. Fore coxae not spined in the ♂, with a short, sharply pointed spine in ♀. Lobes of metasternum somewhat obliquely

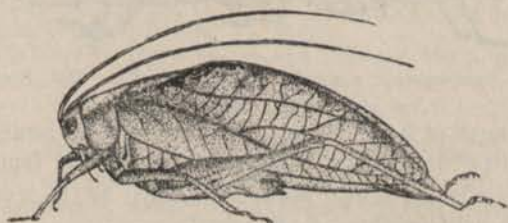


Fig. 22. *Sympaestria brevicauda* ♂, natural size. Del. Soehanam.

truncate behind, blunter than in *acutelobata*. ♂ genitalia similar as in that species, but the hind margin of anal segment in the middle with only a wide, very short and blunt edge. Subgenital plate (♂) broader, roundly emarginate, with short, conical styles. Ovi-

positor (♀) distinctly shorter and more pointed than in *acutelobata*; its superior margin smooth, the inferior margin with only a few denticles near the apex. Subgenital plate of ♀ very similar to that of the former species, triangular, longitudinally sulcate, but a little more blunt at apex than in *acutelobata*.

	♂	♀
Length of body	25 — 26 mm.	25.5 mm.
" " pronotum	7	7
" " tegmina	40	38
Width	14	14.2
Length of hind femora	19.5—20.5	21
" " ovipositor	—	4

1 ♂ from Penang (1,500'-2,428'; May 1917), and 1 ♂ and 1 ♀ without locality label.

Sympaestria genualis n. sp.

♂. Very similar to *acutelobata*, but distinguished at once from both preceding species by the dark knees of all femora (especially sharply black on the hind femora), whilst these are colorous both in *acutelobata* and *brevicauda*. Tegmina a little less nitid than in the preceding species, of the same shape and venation as in *acutelobata*. Fore coxae not spined. Lobes of metasternum more rounded, similar as in *brevicauda*. Anal segment nearly as in this species, incision of subgenital plate acutely triangular; styles as in *acutelobata*.

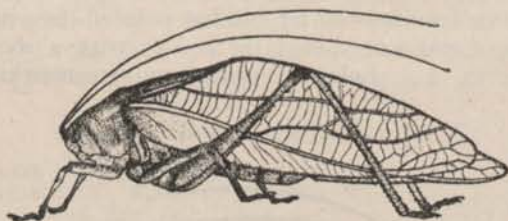


Fig. 23. *Sympaestria genualis* ♂, natural size. Del. Soehnam.

♂. Length of body 31 mm., of pronotum 6.5 mm., of tegmina 45 mm., width of tegmina 13.3 mm., length of hind femora 20 mm.

1 ♂ from Bukit Kutu, Selangor (April 1915; 3,000'-3,460'), together with *acutelobata*.—♀ unknown.

Sympaestria triramosa n. sp.

♀. Very similar to the preceding species, but the hind knees only sharply black, fore and middle knees unicolorous with their femora. Tegmina more nitid than in *genualis*, similar as in *acutelobata*, with a sharp black line along the ulnaris posterior. It may

be distinguished at once from all the *Sympaestrias* enumerated above by the very characteristic shape of radial branch; this going off from radial vein distinctly before the middle, furcated in its

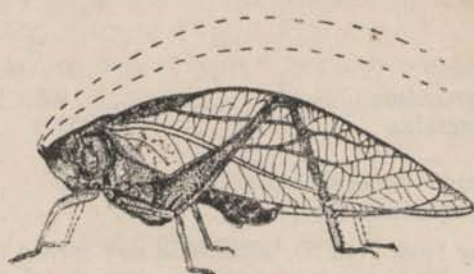


Fig. 24. *Sympaestria triramosa* ♀, natural size. Del. Sochanam.

middle in two branches running against the hind margin; before this furcation goes an oblique branch to the ulnaris anterior; therefore the radial branch is triramose, the first branch running to the ulnaris anterior, the following two to the hind margin.—Fore coxae with a short, sharply pointed spine. Ovipositor and subgenital plate of ♀ nearly as in *brevicauda*, but the upper margin of the former also very finely serrate. ♂ unknown.

♀. Length of body 25.5 mm., of pronotum 7 mm., of tegmina 44 mm., width of tegmina 14.5 mm., length of hind femora 20 mm., of ovipositor 4 mm.

1 ♀ from Gunong Tamabo, Baram River, Sarawak (15 Nov. 1920; coll. J. C. Moulton).

Genus *Stibaroptera* Bolivar.

1878. BRUNNER v. W., Mon. Phan., p. 354 (*Stibara*, nec HOPE).
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 23 (*Stibara*, nec HOPE).
 1892. DOHRN, Stett. Ent. Zeit., LIII, p. 72 (*Sympaestria* p. p.).
 1906. KIRBY, Syn. Cat. Orth., II, p. 432 (*Sympaestria* p. p.).
 1906. BOLIVAR, Bol. Soc. Españ., VI, p. 393.
 1910. KIRBY, Syn. Cat. Orth., III, p. 574 (*Sympaestria* p. p.).

Stibaroptera major n. sp.

♂, ♀. Green. nitid; lateral margins of pronotal disc and the principal veins of tegmina yellowish; hind margin of pronotum not darker bordered; along the (yellow) ulnaris posterior a black line in both sexes. Tegmina not hatched with black. Knees concolorous.

Lateral lobes of pronotum distinctly higher than long. Fore coxae not spined. Venation of tegmina as in *nitidifolia* (see Karny, Zool. Mededeel., V, 4, p. 200; 1920), with both branches of radial sector running into the hind margin. Anal segment of ♂ transversely truncate, emarginate in the middle of hind margin;

cerci of ♂ slender, cylindrical, blunt at apex, crossing each other. Subgenital plate of ♂ acutely triangular, with slightly sinuate sides, strongly incised at apex with short, nearly rudimentary styles. Ovipositor and subgenital plate of ♀ shaped as in *Sympaestria acutelobata*.

	♂	♀
Length of body	37 mm.	35 mm.
" " pronotum	9.5 "	10 "
" " tegmina	57 "	56 "
Width	19 "	21 "
Length of hind femora	20 "	22 "
" " ovipositor	— "	7.5 "

Differing from both *St. nitidifolia* and *cornea* by the tegmina not hatched with blackish, and by the somewhat longer ovipositor. From the *Sympaestrias* quite different by both branches of radial sector running into the hind margin.

The species described by A. H. Krausze (Ins. Börse, XX, 1903, p. 308-309) from Tonkin as "*Ischyra martha*" belongs perhaps also to *Stibaroptera*, but the original description is very laconical and quite insufficient, so that I cannot decide it with certainty. But at all events, *martha*, however, may be distinguished from my new species by the shorter ovipositor with the margins smooth, not serrate.

Stibaroptera longipes (Dohrn), finally, is more slender, and has longer legs than the species described hereabove.

1 ♂ from Bukit Lantai, Sungei Ujong (V. Knight coll.; July 1910), and 1 ♀ from Gunong Kledang, Perak (2,646'; Nov. 1916).

Genus *Baryprostha* Karsch.

1891. KARSCH, Berl. Ent. Zeitschr., XXXVI, p. 211.
 1906. KIRBY, Syn. Cat. Orth., II, p. 416.
 1906. DOHRN, Stett. Ent. Zeit., 67, II, p. 354.

Baryprostha bellua Karsch.

1891. KARSCH, Berl. Ent. Zeitschr., XXXVI, p. 212.
 1906. KIRBY, Syn. Cat. Orth., II, p. 416.
 1906. DOHRN, Stett. Ent. Zeit., 67, II, p. 354.

1 ♀ from Gunong Angsi, Negri Sembilan (2,000'-2,700'; April 1918).

This excellent species was hitherto known from Sumatra only. In the collection of Buitenzorg Museum there are also specimens from Western Java.

Genus *Xantia* Brunner v. W.

1878. BRUNNER v. W., Mon. Phan., p. 370.
 1891. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, XLI, p. 19.
 1906. KIRBY, Syn. Cat. Orth., II, p. 459.

Xantia borneensis Brunner v. W.

1878. BRUNNER v. W., Mon. Phan., p. 371.

1906. KIRBY, Syn. Cat. Orth., II, p. 459.

There are 4 green ♂♂ in the collection of Raffles Museum, from Bukit Kutu, Selangor (April 1915).

Hitherto known from "India" and Borneo.

In the collection of Buitenzorg Museum also represented from Java.

*Subfam. Mecopodinae.*Genus **Mecopoda** Serville.

1831. SERVILLE, Ann. Sci. Nat., XXII, p. 154.

1835. BRULLÉ, Hist. Nat. Ins., IX, p. 140.

1838. BURMEISTER, Handb. Ent., II, p. 685.

1389. SERVILLE, Hist. Nat. Ins., Orth., p. 532.

1840. BLANCHARD, Hist. Nat. Ins., III, p. 12.

1842. DE HAAN, Temminck, Verh., Orth., p. 187.

1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 265 (*Lucera*).

1874. STÅL, Rec. Orth., II, p. 22, 47.

1886. KARSCH, Berl. Ent. Zeitschr., XXX, p. 108, 111.

1892. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLII, p. 211.

1906. KIRBY, Syn. Cat. Orth., II, p. 363.

1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 27.

1916. CAUDELL, Wytzman, Genera Insectorum, fasc. 171, p. 23.

Mecopoda elongata (Linnaeus).1758. LINNAEUS, Syst. Nat., ed. X, I, p. 429 (*Gryllus Tettigonia elongatus*).1763. JOHANSSON, Amoen. Acad., VI, p. 398 (*Gryllus javanus*).1764. LINNAEUS, Mus. Ludov. Utric., p. 127 (*Gryllus Tettigonia elongatus*).1775. FABRICIUS, Syst. Ent., p. 284 (*Locusta*).1793. FABRICIUS, Ent. Syst., II, p. 37 (*Locusta*).1813. STOLL, Speetres, Saut., p. 13 (*Gryllus Tettigonia ferruginea*).1815. THUNBERG, Mem. Acad. Petersb., V, p. 279 (*Conocephalus elongatus*),280 (*Locusta longipes*), 282 (*Locusta scalaris*).1831. SERVILLE, Ann. Sci. Nat., XXXI, p. 155 (*maculata*).1835. BRULLÉ, Hist. Nat. Ins., IX, p. 140 (*virens*).

1838. BURMEISTER, Handb. Ent., II, p. 685.

1839. SERVILLE, Hist. Nat. Ins., Orth., p. 533 (*virens*).1840. BLANCHARD, Hist. Nat. Ins., III, p. 22 (*ferruginea*), 23 (*virens*).1842. DE HAAN, Temminck, Verh., Orth., p. 187 (*javana*, *macassariensis*, *niponensis*).

1862. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, p. 93.

1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 262 (*Decticus pallidus*), 263 (*Decticus tenebrosus*), 265 (*Lucera bicoloripes*).1870. WALKER, Cat. Derm. Salt. Brit. Mus., III, p. 457 (*elongata*), 458 (*rufa*, nec STOLL).

1871. WALKER, Cat. Derm. Salt. Brit. Mus., Suppl., p. 48.

1891. KIRBY, Trans. Ent. Soc. London, 3, p. 406.

1892. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLII, p. 214.

1893. BRUNNER v. W., Ann. Mus. Genova, (2), XIII, p. 171.

1899. KRÜGER, Zuckerrohr u. s. Kultur, p. 319.

1903. KRAUSS, Semon, Zool. Forsch. Austral., V, p. 747, 748.

1905. TANI, Ins. World, 9, pl. 6.

1906. KIRBY, Syn. Cat. Orth., II, p. 364.

1906. v. DEVENTER, Dierl. Vijanden v. h. Suikerriet, p. 281 (2 druk 1912).

1908. GRIFFINI, Atti Soc. It. Sci. Nat., XLVI, p. 277.

1908. MATSUMURA AND SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 28.
 1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 196.
 1909. MAXWELL-LEFROY, Ind. Ins. Life, p. 91, 96.
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 275.
 1915. KARNY, Suppl. Ent., p. 75.
 1915. KONINGSBERGER, Java Zoologisch en Biologisch, p. 278.
 1916. CAUDELL, Wytsman, Genera Insectorum, fasc. 171, p. 24.
 1919. DAMMERMAN, Landbouwdierkunde, p. 101.
 1920. CAUDELL, Ent. News, XXXI, p. 55.
 1920. KARNY, Zool. Mededeel., V, 4, p. 172, 207.
 1921. KARNY, Phil. Journ. Sci., XVIII, 5, p. 612.
 1921. KARNY, Natur (Leipzig), XII, 23, p. 308.
 1921. KARNY, Trop. Natur, X, 5, p. 67, 70.

This common and widely distributed species is represented in the material of Raffles Museum in different colour variations from the following localities:

(a) *Tegmina unicolorous green*:

♂♂: Fort Canning, Singapore (May 1910, 1 ♂; 12-28 Jan. 1916; 4 ♂♂); Museum Ground, Singapore (17 June 1921; coll. P. M. de Fontaine; 1 ♂).

♀♀: Long Sennyai, Baram, Sarawak (4 Oct. 1920; 1 ♀).

(b) *Tegmina green with large black blots*:

♀♀: Pontianak (from S. Mayer Esq.; 13 March 1901; 1 ♀). Singapore (June 1902; 1 ♀; 9 Sept. 1915; 1 ♀); Fort Canning, Singapore (10 Dec. 1913; 1 ♀).

(c) *Tegmina unicolorous testaceous*:

♂♂: Tak Sadang (Feb. 1901; 1 ♂); Fort Canning, Singapore (29 Jan. 1916; 1 ♂); ? (May 1898; 1 ♂).

(d) *Tegmina unicolorous fuscous*:

♂♂: Baram River, Sarawak (1920; J. C. Moulton; 1 ♂). Singapore (presented by F. J. Benton Esq.; 17 June 1913; 1 ♂); Dindings (1897; 1 ♂); Cavanagh Rd., Singapore (Sept. 1913; 2 ♂♂); Gunong Angsi, Negri Sembilan (2,000'-2,790'; April 1908; 1 ♂); Singapore (21 May 1921; 1 ♂); Kota Tinggi, Johore (Aug. 1917; 1 ♂).

♀♀: Baram River, Sarawak (1920; J. C. Moulton; 1 ♀); Lio Matu, Baram River, Sarawak (15 Oct. 1920; J. C. Moulton; 1 ♀). Long Sennyai, Baram, Sarawak (4 Oct. 1920; 1 ♀); Gurun Kedah (Nov.-Dec. 1915; 2 ♀♀); Singapore (1 ♀); Fort Canning, Singapore (28 Jan. 1916; 1 ♀).—1 ♀ without locality label.

(e) *Tegmina fuscous with large black blots*:

♀♀: Lio Matu, Baram River, Sarawak (20-25 Oct. 1920; J. C. Moulton; 2 ♀♀); Gunong Tamabo, Sarawak (15 Nov. 1920; J. C. Moulton; 1 ♀). Tak Sadang (Feb. 1901; 1 ♀); Fort Can-

ning, Singapore (28-31 Jan. 1916; 2 ♀ ♀); Bukit Panjang, Singapore (April 1910; 1 ♀); Singapore (3 ♀ ♀); Bukit Timah, Singapore (14 May 1911; 1 ♀); Singapore (1 Aug. 1913; 1 ♀); Botanic Gardens, Singapore (11 July 1911; 1 ♀); Singapore (1 March 1913; 1 ♀). ? ♀ ♀ without locality label.

(f) *Tegmina fuscous* with pale blots:

♂ ♂: Bukit Lantai, Sungai Ujong (V. Knight coll., July 1910; 1 ♂).

♀ ♀: Singapore (1 ♀); Gunong Kledang, Perak (2,646'; Nov. 1916; 1 ♀).

This species is known as noxious (v. Deventer l.c., Dammerman l.c.).

Distribution of the species: Brit. India, Ceylon, Burma, Malacca, China, Corea, Japan, Formosa, Philippine Isl., Borneo, Java, Sumatra, Engano, Nias, Is. Batu, Is. Mentawai, Amboina, Halmahera, Aru, Key Isl., Australia.

Subfam. *Phyllophorinae*.

Genus *Phyllophora* Thunberg

1815. THUNBERG, Mem. Acad. Petersb., V, p. 219, 286.
 1874. STÅL, Rec. Orth., II, p. 21.
 1898. BRUNNER v. W., Abh. Senckenb. Ges. XXIV, p. 260.
 1899. KIRBY, Ann. Mag. Nat. Hist., (7), IV, p. 302.
 1903. BOLIVAR, Ann. Mus. Nat. Hungar., I, p. 173, 175.
 1906. KIRBY, Syn. Cat. Orth., II, p. 369.
 1912. CAUDELL, Wytzman, Genera Insectorum, fasc. 138, p. 8.

Phyllophora lanceolata Brunner v. W.

1842. DE HAAN, Temminck, Verh., Orth., p. 201 (*speciosa* nec THUNBERG).
 1898. BRUNNER v. W., Abh. Senckenb. Ges., XXIV, p. 263.
 1899. KIRBY, Ann. Mag. Nat. Hist., (7), IV, p. 309.
 1903. BOLIVAR, Ann. Mus. Nat. Hungar., I, p. 177.
 1903. KRAUSS, Semon, Zool. Forsch. Austral., V, p. 747.
 1906. KIRBY, Syn. Cat. Orth., II, p. 368 (*Hyperhomala*).
 1908. GRIFFINI, Zool. Anz., XXXII, 22, p. 647 (*Hyperhomala*).
 1911. GRIFFINI, Riv. Mens. Sci. Nat. Natura, II, p. 14 (*Hyperhomala*).
 1912. CAUDELL, Wytzman, Genera Insectorum, fasc. 138, p. 9 (*Hyperhomala*).
 1920. KARNY, Zool. Mededeel., V, 4, p. 207 (*Hyperhomala*).

1 ♀ from Pontianak, W. Borneo (from S. Mayer Esq., 13 March 1901).

This specimen is the first *Phyllophorinae* mentioned from Borneo. It is somewhat smaller than the specimens from other localities, but otherwise not different.

Further distribution: Halmahera, Amboina, Ceram, New Guinea, Torres Straits (Murray Isl.), Duke of York Isl., New Britain, New Ireland.

Subfam. *Pseudophyllinae*.Genus *Pseudophyllus* Serville.

1831. SERVILLE, Ann. Sci. Nat., XXII, p. 143.
 1835. BRULLÉ, Hist. Nat. Ins., IX, p. 136.
 1839. SERVILLE, Hist. Nat. Ins., Orth., p. 464.
 1840. BLANCHARD, Hist. Nat. Ins., III, p. 21.
 1842. DE HAAN, Temminck, Verh., Orth., p. 203.
 1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 10 (*Chloracris*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 36.
 1906. KIRBY, Syn. Cat. Orth., II, p. 294.

Pseudophyllus prasinus (Pictet & Saussure).

1831. SERVILLE, Ann. Sci. Nat. XXII, p. 143 (*neriifolius*, nec STOLL).
 1839. SERVILLE, Hist. Nat. Ins., Orth., p. 466 (*neriifolius*, nec STOLL).
 1840. BLANCHARD, Hist. Nat. Ins., III, p. 21 (*neriifolius*, nec STOLL).
 1842. DE HAAN, Temminck, Verh., Orth., p. 203 (*Locusta Pseudophyllus neriifolia*).
 1862. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, p. 93 (*neriifolius*, nec STOLL).
 1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 22 (*Chloracris prasina*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 36 (*neriifolius*).
 1902. KRAUSS, Semon, Zool. Forsch. Austral., V, p. 748 (*neriifolius*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 294.
 1919. DAMMERMAN, Landbouwdierkunde, p. 100 (*Cleandrus Pseudophyllus neriifolius*).
 1920. KARNY, Zool. Mededeel., V, 4, p. 207.

Bukit Kutu, Selangor (April 1915; 3000'-3460'; 1 ♂, 1 ♀);
 Semangko Pass, Selangor—Pahang (2700'; March 1912; 1 ♂);
 Seremban (presented by R. Pears Esq., 15. April 1912; 1 ♀);
 and 1 ♀ without locality label.

This species was hitherto known only from Java and China,
 and is noted as noxious in the former island (Dammerman l.c.).

Genus *Cratioma* Bolivar.

1874. STÅL, Rec. Orth., II, p. 51 (*Cratylus*, nec MEYER).
 1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 6 (*Cratylus*, nec MEYER).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 34 (*Cratylus*, nec MEYER).
 1906. KIRBY, Syn. Cat. Orth., II, p. 293 (*Cratylus*, nec MEYER).
 1906. BOLIVAR, Bol. Soc. Españ., VI, p. 394.
 1910. KIRBY, Syn. Cat. Orth., III, p. 572.

Cratioma dilatatum n. sp.

♀. Pale yellow (living green?). Head short, with the vertex small and the eyes globular, prominent. Front nearly twice as wide as long. Antennae long, not darker annulated.

Pronotum granulated, with two transverse furrows, the posterior of which situated before the middle. Posterior margin angulated. Lateral lobes higher than long, with the lower margin obtuse angulate. Prosternum unarmed. Mesosternum broad, at the front margin emarginated, with the angles produced into a blunt, incurved tubercle. Metasternum broad; its lateral margins converging backwards.

Tegmina unicolours yellow, widest after the middle, with the hind margin nearly straight and the fore margin in the apical part strongly curved backwards. Subcostal and radial vein in the basal half separated, but running close together, in the distal half distinctly diverging. Radial sector arising before the mid-

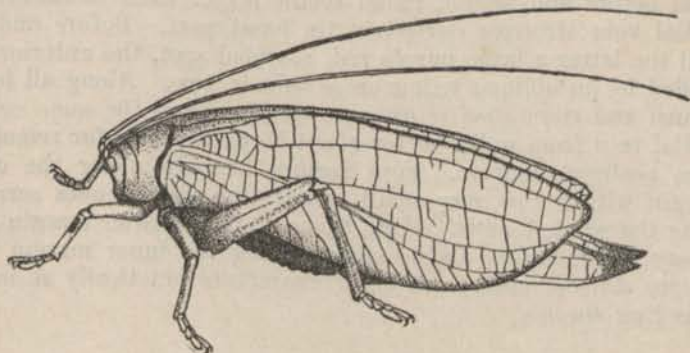


Fig. 25. *Craticma dilatatum* ♀, natural size. Del. Soedirman.

dle, to the medial vein somewhat nearer than to the radial, ending before the tip of tegmina. Medial vein from the radial sector nearly twice as far remote as from hind margin, in the left tegmen connected near the base with the radial vein by an oblique cross-nervure, in the right one by the usual transverse veins only; ending before the apex of tegmina. Wings reaching beyond the tegmina, with greenish apex.

Fore femora unarmed, the middle ones beneath with a few small tubercles before the knee. Hind legs short; femora beneath on both margins with nearly a dozen short spines; hind tibiae pilose, above and beneath on both margins with some small spines.

Ovipositor somewhat broad, with the lower margin curved, the upper straight, in the apical part black, with the tip acute. Subgenital plate of ♀ triangular, cut out at apex.

Length of body 35 mm., of pronotum 9 mm., of tegmina 54 mm., greatest width of tegmina 19 mm. (behind the middle), length of hind femora 16 mm., of ovipositor 15 mm.

1 ♀ from Johore.

This new species approaches *Cr. fenestratum*, but differs by the unicolorous antennae, the form of tegmina, the shorter and slenderer hind legs, and the hind tibiae spined above.

Cratioma cruentatum n. sp.

♀. General colour brownish yellow (probably green when alive). Tegmina widest in or somewhat before the middle, more narrowed distally than in the preceding species, both margins converging towards the apex, the anterior one somewhat stronger curved than the hind margin. Subcosta and radius somewhat less remote from each other than in the preceding species. The areas before and behind radial sector larger than in *dilatatum*; medial vein stronger curved in its basal part. Before and behind the latter a large purple red, rounded spot, the anterior one divided by an oblique yellow cross vein in two. Along all longitudinal and transverse veins some small dots of the same colour. Medial vein from radial sector about three times as far remote as from posterior margin. Fore femora beneath along the outer margin with a few very small spines; the middle ones serrated along the whole length. Hind tibiae above on outer margin with 4 very small, hardly visible spines, along the inner margin with 6 more distinct ones. All other characters practically as in the preceding species.

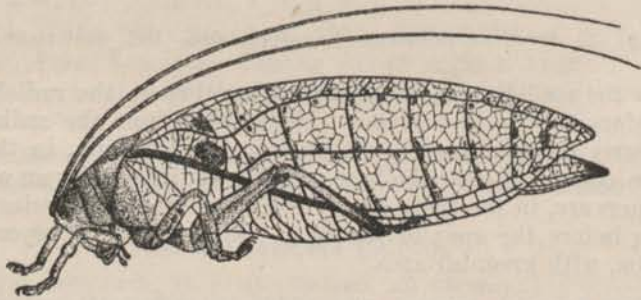


Fig. 26. *Cratioma cruentatum* ♀, natural size. Del. Soehanam.

Length of body 31 mm, of pronotum 10.5 mm, of tegmina 62 mm, greatest width of tegmina 20 mm (before the middle), length of fore femora 6.5 mm, of hind femora .16 mm, of ovipositor 16.5 mm.

1 ♀ from Gunong Angsi, Negri Sembilan (2000'-2790'; April 1918).

This species should come after Brunner's key to *Cleandrus*, on account of the distinct difference in size of the spines at outer and inner margin of hind tibiae above; but I have placed it rather to *Cratioma* on account of the contiguous cross veins of tegmina, a character very typical for *Cratioma*, whilst all the *Cleandrus*-species hitherto known have these veins alternating.

Without doubt, *Cr. cruentatum*, is very closely allied to *dilatatum*, but diverging not only by the purplish marked tegmina, a character which may be variable in some specimens, but also by the shape and venation of tegmina belonging in both species certainly to the same type, not quite conformable, however, in details, as may be seen from the descriptions given above.

Genus *Cleandrus* Stål.

1874. STÅL, Rec. Orth., II, p. 50.
 1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 6.
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 38.
 1906. KIRBY, Syn. Cat. Orth., II, p. 294.

Cleandrus titan (White).

1846. WHITE, Ann. Nat. Hist., XVIII, p. 24 (*Pseudophyllus*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 400 (*Pseudophyllus*).
 1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 12 (*neriifolius*, n. STOLL).
 1893. BRUNNER v. W., Ann. Mus. Genova, XXXIII, p. 172 (*rex*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 40 (*rex*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 295.

I place in this species one ♂ from Gunong Angsi, Negri Sembilan (2000'-2790'; April 1918) which differs from the description of Brunner (l.c.) by its smaller size and the less spinose legs. But the latter character seems not to be important, as Brunner from the ♀ only describes the spination of legs exactly; but from the ♂ he has not known the front and hind legs and says only, that the legs are less spinose than in ♀. I describe here therefore the armation of the legs as it is in the specimen of the Raffles Museum, but I do not think that there are specific differences.

Front femora above without spines, beneath with 5 moderate ones at the anterior (inner) keel, and with 5 or 6 smaller, hardly conspicuous ones at the outer (hind) carina. Middle femora above unarmed, beneath with 6-9 at the outer (anterior) keel increasing from base to knee, and with 6 or 7 little ones at the inner carina. Hind femora above acutely tuberculated, but without sharply pointed spines, except at the extreme base; beneath about a dozen sharp spines on both keels, on the inner carina moderate and subequal in length, on the outer distinctly increasing from base to knee. Fore tibiae above without spines, beneath with 5-6 small ones on each carina. Middle tibiae above with 3-4 spines beneath on the outer (anterior) keel with 4, on the inner with 5 smaller ones. Hind tibiae above without spines on the outer carina, and with 6-7 large spines strongly dilated at base on the inner one; beneath with 6-7 similar ones at the outer keel and with 8 small, slender spines at the inner carina.

Tegmina without the eye-spot as characteristic for *Cl. neriifolius*, and even without the small ring veins at this place, but with a regularly reticular venation between the radial and medial vein.

The longitudinal veins not darker tinged, but along the transversal veins on both sides with a row of nebular, blackish dots, finished near the longitudinal veins, especially near the media, by a somewhat larger and darker, distinctly black dot.

Length of body 36 mm, of pronotum 12 mm, of tegmina 70 mm, width of tegmina 32 mm, length of fore femora 10 mm, of hind femora 22 mm.

The species was hitherto known from Silhet, Burma, Tenasserim, Siam, Cambodia, Canton, Sumatra, Borneo, and New Caledonia.

Cleandrus hercules n. sp.

1 ♀ specimen, somewhat damaged, without locality label, in the collection of Raffles Museum, Singapore. Another, undamaged ♀ in the collection of Buitenzorg Museum from Borneo; I will describe therefore this species in another paper together with the material of Buitenzorg Museum, and give here a figure only of the specimen from Borneo.

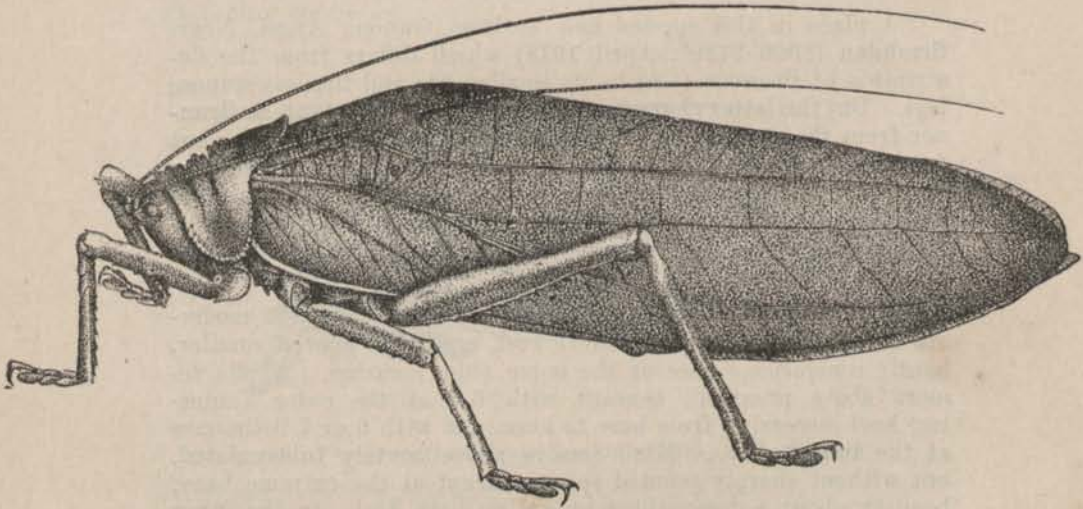


Fig. 27. *Cleandrus hercules* ♀, natural size. Del. Soedirman.

Genus **Onomarchus** Stål.

1874. STÅL, Rec. Orth., II, p. 51.
 1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 6, 14 (*Onomarchus*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 42.
 1906. KIRBY, Syn. Cat. Orth., II, p. 296.

Onomarchus leuconotus (Serville).

1839. SERVILLE, Hist. Nat. Ins., Orth., p. 469 (*Pseudophyllus*).
 1842. DE HAAN, Temminck, Verh., Orth., p. 204 (*Locusta Pseudophyllus leuconota*).

1862. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, p. 93 (*Pseudophyllus unnotatus*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 410 (*Pseudophyllus*).
 1874. STÅL, Rec. Orth., II, p. 68.
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 43.
 1906. KIRBY, Syn. Cat. Orth., II, p. 296.
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 273.
 1920. *Pseudophyllium* DAMMERMAN, Trop. Natuur, p. 152.
 1920. KARNY, Zool. Mededeel., V, 4, p. 208.

This common and widely distributed species is in the collection of Raffles Museum represented from the following localities:

Singapore (4 ♀♀.—6. July 1915; 1 ♀.—17. Sept. 1913; 1 ♀.—Presented by J. Lowe Esq., 1. Sept. 1911; 1 ♀.—Race Course, April 1916. 1 ♂.—Ponggol, May 1910; 1 ♂.—Fort Canning, 22. June 1898; 1 ♂.—April 1918, 1 ♀.—Presented by Teo Soo Pia, 9. Sept. 1913; 1 ♀.—Jan. 1896, 1 ♀.—Fort Canning, 18. Oct. 1917; 1 ♀.—Purchased, 20. Feb. 1918; 1 ♀.—Coronation Rd., 19. May 1921; Chua Hong Kay; 1 ♀.—Fort Canning, 27. Jan. 1916, 1 ♀; 12. Jan. 1916, 1 ♂; Nov. 1917, 1 ♀.—Presented by St. V. B. Down, 24. May 1921, 1 ♀.—).—Kiau, (2400'; 20. March 1899; 1 ♂).—Selangor (14. April 1897, 1 ♀).—Carcosa, Kuala Lumpur (5. April 1921, Knight coll.; 1 ♀, somewhat smaller than the others and very pale whitish).—Without indication of locality: 1 ♂, 4 ♀♀.

All these specimens belong to the true *leuconotus* (syn. *cretaceus* Pict. & Sauss.). The ♂♂ have the tegmina unicolorous and the pronotum perfectly smooth; in the ♀♀ the latter is somewhat tuberculated, but distinctly less than in *submuticus*. The tegmina are in some ♀♀ unicolorous, in some with one small whitish spot near the base, in others with two such transversal spots as in *latipennis*. But the formation of tegmina does not agree with this Chinese form, and is that of the true *cretaceus*. The ♂ from Kiau (Mt. Kinabalu, North Borneo) is distinctly larger than the others, of brown colour, and with the pronotum somewhat tuberculated; but I cannot distinguish it as a separate species. The measurements of this ♂ are:

Length of body 40 mm., of pronotum 10 mm., of tegmina 71 mm., width of tegmina 21 mm., length of hind femora 21 mm..

Perhaps belongs it to the Bornean form *tenebrosus* Walker, but it is not to be said certainly, since the original description is not sufficient and from that form hitherto the ♀ only is known.

Distribution: Cambodia, Tonkin, Malacca, Singapore, Sumatra, Java, Borneo, Mindanao, China.

Genus *Temnophyllus* Brunner v. W.

1895. BRUNNER v. W., Mon. Pseudophyll., p. 46.
 1906. KIRBY, Syn. Cat. Orth., II, p. 297.

Temnophyllus speciosus Brunner v. W.

1895. BRUNNER v. W., Mon. Pseudophyll., p. 46.
 1906. KIRBY, Syn. Cat. Orth., II, p. 297.

1 ♀ from Pahang (1891) differing from typically coloured specimens by the black coloration of apical half of supra-anal plate and of the apex of ovipositor. All other characters quite as in *speciosus*, distinctly diverging from *atrosignatus*.

Hitherto known from Malacca and Northern Borneo.

Genus **Promeca** Brunner v. W.

1895. BRUNNER v. W., Mon. Pseudophyll., p. 52.
 1906. KIRBY, Syn. Cat. Orth., II, p. 299.

Promeca unicolor Brunner v. W.

1895. BRUNNER v. W., Mon. Pseudophyll., p. 52.
 1906. KIRBY, Syn. Cat. Orth., II, p. 299.

1 ♀ from Kadamaian River, Kinabalu (2100'; 21. III. 1899; R. Hanitsch).

Only known from Mt. Kinabalu, North Borneo.

Genus **Phyllomimus** Stål.

1873. STÅL, Oefv. Vet.-Akad. Förh., XXX (4), p. 44.
 1874. STÅL, Rec. Orth., II, p. 52.
 1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 17 (*Microprion*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 53.
 1906. KIRBY, Syn. Cat. Orth., II, p. 297 (*Microprion*), 299.

Phyllomimus detersus (Walker).

1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 406 (*Pseudophyllus detersus*, *Ps. sinensis*).
 1873. STÅL, Oefv. Vet.-Akad. Förh., XXX (4), p. 48 (*granulosus*).
 1874. STÅL, Rec. Orth., II, p. 69 (*granulosus*).
 1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 19 (*truncatifolia*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 55 (*granulosus*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 299.
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 273.

Delendus:

1921. KARNY, Phil. Journ. Sci., XVIII, 5, p. 611 (belonging to *philippinensis* PICTET & SAUSSURE which must be considered as a different species!).

There are in the collection of Raffles Museum two ♀♀, each with the usual black spot at the base of tegmina after the radial vein.

Cape Rachado Light House, Coast Malay Peninsula (Dec. 1920)—Long Mujan, Baram River, Sarawak (4. Oct. 1920: J. C. Moulton).

The species was hitherto known from China, Philippine Islands, Java, Celebes and Moluccas.

Phyllomimus punctiger n. sp.

♀. Very near to *detersus*, but more compressed and slender. Pale yellowish (probably green when alive), tegmina bright green, especially towards the apex. Disc of pronotum as in *detersus*, but rounded behind. Lateral lobes considerably longer than high, with obliquely truncate fore angle and bluntly rectangular hind angle; lower margin somewhat ascendent backwards. Fore angle set with some blunt teeth, lower margin without such. Humeral sinus distinct, better developed than in *detersus*, roundly emarginated. Tegmina as in *detersus*, but somewhat more narrowed towards the apex, which is narrowly rounded; at base behind the radial vein a very small black dot visible with magnifying-glass only; a similar black dot in the middle of each cell between radial and medial vein, in distal half of tegmen. Mesosternum with slightly emarginate fore margin and obliquely truncate fore angles bearing some well developed tubercles. Metasternum considerably wider than mesosternum; both strongly transverse. Legs as in *detersus*, but hind femora beneath on outer margin with about 20 teeth which are blackish at apex. Ovipositor somewhat shorter than in *detersus*, of the same shape. Subgenital plate (♀) triangular, acutely excised at apex.

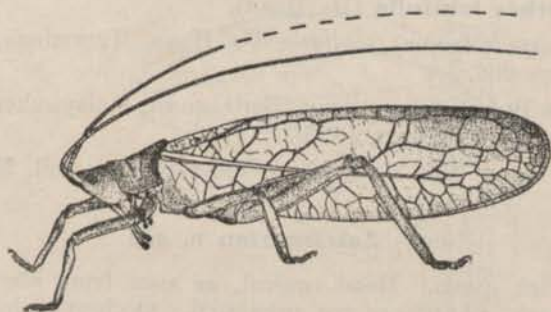


Fig. 28. *Phyllomimus punctiger* ♀, natural size. Del. Soehanam.

Length of body 28 mm., of pronotum 7.5 mm., of tegmina 49 mm., width of tegmina 15 mm., length of fore femora 8 mm., of hind femora 17 mm., of ovipositor 15 mm.

1 ♀ from Pulo Jarak (7. April 1921; V. Knight).

Phyllomimus inversus Brunner v. W.

1895. BRUNNER v. W., Mon. Pseudophyll., p. 57.

1906. KIRBY, Syn. Cat. Orth., II, p. 300.

1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, p. 196.

1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 274.

1 ♀ from Penang (1500'-2428'; May 1917). The teeth on lower margin of hind femora somewhat more numerous than in description of *inversus* given by Brunner, practically as in *pallidus*. But all other characters agree with *inversus*, not with *pallidus*.

Subgenital plate (♀) trapezoidal, about as long as wide at base, emarginated at apex.

Further distribution: Java, Sumatra, Philippine Islands.

Genus **Phyllozelus** Pictet & Saussure.

1892. PICTET & SAUSSURE, Icon. Saut. Vertes, p. 11.
 1893. BRUNNER v. W., Ann. Mus. Genova, XXXIII, p. 174.
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 60.
 1906. KIRBY, Syn. Cat. Orth., II, p. 300.

Phyllozelus siccus (Walker).

1869. WALKER, Cat. Derm. Salt. Mus., II, p. 403 (*Pseudophyllus*).
 1893. BRUNNER v. W., Ann. Mus. Genova, XXXIII, p. 174 (*infumatus*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 60 (*infurcatus*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 300.

2 ♀♀ and 1 ♂ from Singapore (♂: 1. Aug. 1913.—1 ♀: June 1902, pres. by John Haffenden Esq.).

Further distribution: India, Ceylon, Burma, Assam, Silhet, Himalaya, Sumatra.

Genus **Timanthes** Stål.

Timanthes lobifolia (De Haan).

1842. *Locusta (Aprion) lobifolia* De Haan, Temminck, Verh., Orth., p. 206.

Further literature see in my "Beiträge zur malayischen Orthopterenfauna X" (Treubia, 1923).

2 ♀♀ from West Sumatra (Lebong Tandai; coll. Mr. C. J. Brooks).

Genus **Zatricaprion** n. gen.

Yellowish green. Head conical, as seen from above, with pointed vertex. Antennae not annulated. Occiput arched, without a keel. Pronotum rounded behind, arched, with a very indistinct median carina, without granulated length-rows; hind furrow placed at or behind the middle of disc. Fore angle of tegmina strongly produced; prae-radial field with remote, parallel transverse nervures, bifurcate before their ends; post-radial fields with remote, oblique cross veins, contiguous or subcontiguous to each other throughout from radial to cubital vein. Wings hyaline, not overreaching the tegmina. Prosternum without spines. Mesosternum broad, transverse, plain, at fore margin sharply bordered, not indented, with sharp fore angles. Metasternum trapezoidal, its sides strongly converging backwards. Both genicular lobes of fore femur very short and blunt, not produced. Hind femora somewhat dilated towards the apex, densely serrate beneath on outer margin. Subgenital plate of ♂ very narrow, in its posterior part nearly cylindrical, with two well developed, strongly depressed styles.

This new genus comes in Brunner's key between *Gonyatopus* and the *Micropion-Tomias*-group, diverging from the latter by the quite different venation of tegmina, from *Gonyatopus* by the outer genicular lobe of fore femora not produced and the transverse nervures of tegmina oblique, less numerous and more regularly disposed. By this latter character and by the quite different shape of δ subgenital plate, *Zatricaprion* may be distinguished also from *Tympanoptera* Pictet & Saussure (nec Brunner v. W.). The oblique, contiguous cross veins of tegmina remind one somewhat of *Heteraprium*, but in the latter the shape of pronotum is quite different, and there are between the oblique veins everywhere perpendicular ones inserted, in *Zatricaprion* between medial and cubital vein only in the distal part of tegmen.

***Zatricaprion reticulatus* n. sp.**

δ , φ . Yellowish green, tegmina pale green, with a bright yellow stripe along the fore margin continued throughout the lower margin of lateral lobes of pronotum.

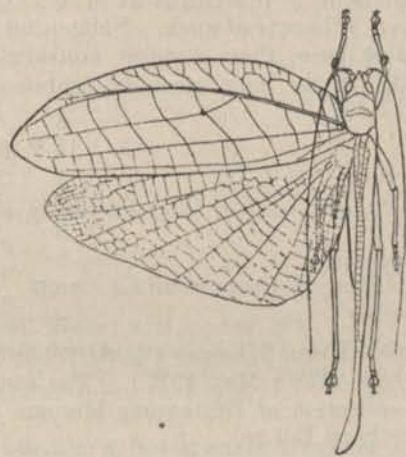


Fig. 29. *Zatricaprion reticulatus*, natural size. Del. Soedirman.

Vertex blackish bordered, as seen from above, in the δ ; unicolorous in φ . Pronotum remotely and very bluntly granulated; lower margin of lateral lobes with some very small and blunt teeth. Fore margin of tegmina rounded, hind margin straight. Field between radial vein and sector a little wider than that between sector and media, and this somewhat wider than that between medial and cubital vein. Tympanum of δ about as long as pronotum. All femora serrate beneath, the two posterior pairs more closely than the anterior one.

Supra-anal plate of ♀ ovate, longer than wide at base, somewhat pointed at apex, reaching to the end of cerci. Ovipositor strongly compressed, blackish towards the apex, with both margins serrate before apex, the upper one very slightly sinuate, the lower one upcurved; apical part with some strongly prominent parallel, perpendicular wrinkles, especially along the upper margin. Subgenital plate of ♀ bluntly triangular, slightly emarginate at extreme apex.

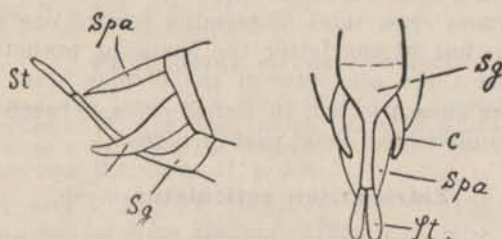


Fig. 30. End of ♂ abdomen of *Zatricapriion reticulatus*, lateral and ventral view, enlarged. Spa. Supraanal plate. C. Cerci. Sg. Subgenital plate. St. Styles.

Supra-anal plate of ♂ practically as in ♀. Cerci cylindrical, very slightly curved, subacute at apex. Subgenital plate (♂) long; its sides parallel at base, then strongly converging; apical part nearly cylindrical. Styles long, strongly depressed.

	♂	♀
Length of body	18.5 mm.	24 mm.
" " pronotum	4 "	5 "
" " tegmina	33 "	42 "
Width	9 "	12.5 "
Length of fore femora	5 "	5 "
" " hind	10.5 "	12 "
" " ovipositor	—	13.5 "

1 ♂ from Bukit Kutu, Selangor (April 1915; 3457'), and 1 ♀ from Penang (1500'-2428'; May 1917). The same species is represented in the collection of Buitenzorg Museum by 3 ♀♀ from Sumatra and Northern Borneo.

Genus *Heteraprium* Krauss.

1903. KRAUSS, Seron, Zool. Forsch. Austral., V, p. 764.

1910. KIRBY, Syn. Cat. Orth., III, p. 572.

Heteraprium brunneri Krauss.

1903. KRAUSS, Seron, Zool. Forsch. Austral., V, p. 747, 764.

1910. KIRBY, Syn. Cat. Orth., III, p. 572.

1 ♀ from Pontianak (S. Mayer Esq., 13. March 1901), quite conformable in all characters with some specimens of Buitenzorg Museum from New Guinea. It is very interesting, that this species hitherto known from New Guinea and Waigiou only, occurs also in Western Borneo.

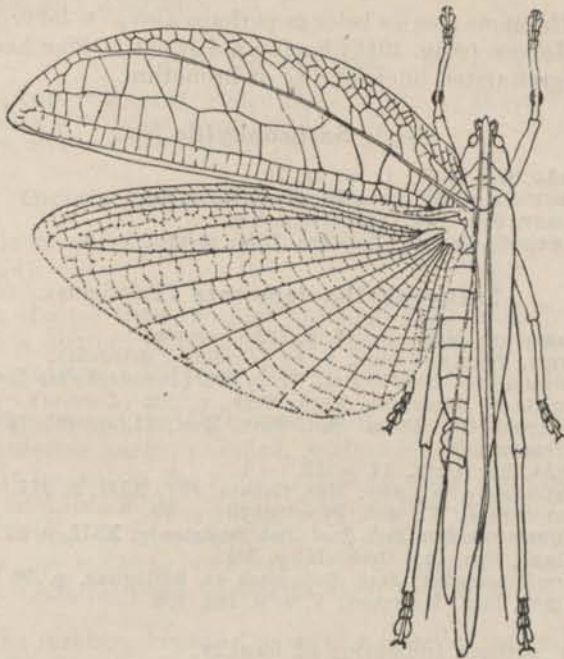


Fig. 31. *Heteraprium brunneri* ♀, from Digoel, natural size. Del. Soedirman.

Genus **Chondrodera** Karsch.

1890. KARSCH, Ent. Nachr., XVI, p. 266, 273.
 1891. KARSCH, Berl. Ent. Zeitschr., XXXVI, p. 77, 93.
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 79.
 1906. KIRBY, Syn. Cat. Orth., II, p. 305.

Chondrodera borneensis Brunner v. W.

1895. BRUNNER v. W., Mon. Pseudophyll., p. 80.
 1906. KIRBY, Syn. Cat. Orth., II, p. 305.

1 ♀ from Bentong, Pahang (22. May 1916; presented by Mr. Stuart Greenhill) belongs apparently to this species. The white spot at the base of tegmina is not only blackish-, but also reddish-margined; their surface has the four oblique transverse punctured stripes as described by me for *rubromarginata* (Zool. Mededeel V, 4, p. 180) and also the black spots as described by Brunner for *borneensis*. The basal fore edge of tegmina is more or less blunt, not as sharply produced as in *Timanthes*. Fore femora pilose, but without spines, which are present in *rubromarginata*. Hind femora armed with about 8 spines, therefore more than in the typical *borneensis* (after Brunner's description).

This species was hitherto known from Borneo and Sumatra only.

To the same species belongs perhaps also a ♀ larve from Kota Tinggi, Johore (Aug. 1917) having a distinct median keel between the two granulated lines on disc of pronotum.

Genus *Sathrophyllia* Stål.

1874. STÅL, Rec. Orth., II, p. 54, 70.
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 86.
 1906. KIRBY, Syn. Cat. Orth., II, p. 306.
 1909. MAXWELL-LEFROY, Ind. Ins. Life, p. 96.

Sathrophyllia femorata (Fabricius).

1787. FABRICIUS, Mant. Ins., I, p. 233 (*Locusta*).
 1813. STOLL, Spectres, Saut., p. 16 (*Gryllus Tettigonia*).
 1838. BURMEISTER, Handb. Ent., II, p. 698 (*Pseudophyllus fenestratus*).
 1842. DE HAAN, Temminck, Verh., Orth., p. 202 (*Locusta*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 401 (*Pseudophyllus femoratus*).
 1874. STÅL, Rec. Orth., II, p. 72.
 1893. BRUNNER v. W., Ann. Mus. Genova, (2), XIII, p. 177.
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 88.
 1902. KONINGSBERGER, Bull. Inst. Bot. Buitenzorg, XIII, p. 12 (*Dehaania*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 307.
 1915. KONINGSBERGER, Java Zoölogisch en Biologisch, p. 96 (*Dehaania*).
 1920. KIRBY, Zool. Mededeel., V, 4, p. 181, 208.

1 ♀ without indication of locality.

Distribution:—India, Burma, Cambodia, Sumatra, Java, Borneo.

Genus *Tegra* Walker.

1870. WALKER, Cat. Derm. Salt. Brit. Mus., III, p. 439.
 1874. STÅL, Rec. Orth., II, p. 54 (*Tarphe*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 90 (*Tarphe*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 308.

Tegra novae-hollandiae (DeHaan).

1842. DE HAAN, Temminck, Verh., Orth., p. 202 (*Locusta*).
 1870. WALKER, Cat. Derm. Salt. Brit. Mus., III, p. 439.
 1874. STÅL, Rec. Orth., II, p. 72 (*Tarphe*).
 1893. BRUNNER v. W., Ann. Mus. Genova (2) XIII, p. 177 (*Tarphe*).
 1895. BRUNNER v. W., Mon. Pseudophyll., p. 90 (*Tarphe*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 308.
 1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 202 (*Tarphe*).
 1920. KARNY, Zool. Mededeel., V, 4, p. 181, 208.

4 ♀♀, 2 without locality label, 1 from Pahang, and 1 from Bukit Kutu, Selangor (April 1915). The latter and one of the unlabelled specimens with the middle femora nearly unicolorous; the two other ones having on their outside a large, pale testaceous cross band. 1 ♀ from West Sumatra (Lebong Tandai; coll. C. J. Brooks).

This species was hitherto known from the following localities: India, Himalaya, Bhamò, Assam, Malacca, Tringany, Sumatra, Java, Borneo and Australia.

Genus *Olcinia* Stål.

1877. STÅL, Oefv. Vet.-Akad. Förh., XXXIV, (10), p. 45.

1895. BRUNNER v. W., Mon. Pseudophyll., p. 92.

1906. KIRBY, Syn. Cat. Orth., II, p. 308.

Olcinia excisa n. sp. (Plate II, fig. 4).

♀. Pale brownish yellow, marbled with blackish grey and with reddish brown.

Vertex shorter than the first antennal joint, slightly sulcate above, with a distinct incision at tip. Eyes globular, prominent. Front pale, greyish. Antennae broken off in the type specimen.

Pronotum nearly saddle-shaped, with some sharply pointed tubercles; anterior margin rounded, produced; hind margin deeply triangulately incised in the middle, thus forming two triangular, posteriorly produced lobes. The margins of this incision regularly set with tubercles, quite symmetrical. It is therefore certainly no abnormality nor violation, but positively a character peculiar for this species. Lateral lobes formed as usual in this genus.

Tegmina reaching beyond the tip of ovipositor, set with some elevated nodes, the fore margin produced into five obtuse lobes, the hind margin nearly straight. Apical part relatively narrower than in *O. crenifolia*, with the tip rounded off. Veins as in *crenifolia*. Wings reaching beyond the tip of tegmina, with the apical part coriaceous, of the same colour as tegmina; the remaining part pale, hyaline, with the transverse veins black, surrounded with greyish.

Legs formed as usually in this genus. Foramina shell-shaped. Upper margin of the middle femora slightly bisinuate, but distinctly less than in the genus *Cymatomera*. Prosternum without spines or tubercles. Meso and metasternum very broad; fore margin of the former slightly emarginated in the middle, not crenulated, with the lateral angles obliquely truncated. Abdomen shining black.

Ovipositor straight, somewhat broad, black, with the upper margin straight, the lower one somewhat convex, acute at the tip. Cerci stout, blunt. Subgenital plate small, bluntly triangular, emarginated at apex.

Length of body 38 mm., of pronotum 6.5 mm., of tegmina 54 mm., width of tegmina 18.5 mm., length of hind femora 19 mm., of ovipositor 23 mm.

1 ♀ from Borneo.

This species is to be placed into the genus *Olcinia* by the shape of tegmina; it is very different from both hitherto known species of this genus, from the Sundaic *crenifolia* by the pale front, from the Philippine *erosifolia* by the pale hind knees. From both these species, and also from all hitherto known species of the whole *Sathrophyllia*-group it may easily be distinguished by its deeply emarginated hind margin of pronotum, a character hitherto unknown in this group. It could therefore possibly form a peculiar genus.

Genus *Typhoptera* Kirby.

1895. BRUNNER v. W., Mon. Pseudophyll., p. 94 (*Capnoptera*, nec LOEW).
 1900. ANNANDALE, Proc. Zool. Soc. London, p. 854, 855 (*Capnoptera*, nec LOEW).
 1906. KIRBY, Syn. Cat. Orth., II, p. 309.

Typhoptera unicolor (Brunner v. W.).

1895. BRUNNER v. W., Mon. Pseudophyll., p. 96 (*Capnoptera*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 309.

From this species hitherto the ♀ only was known. In the collection of Raffles Museum, however, it is represented by 2 ♂♂, both from Penang (1500'-2428'; May 1917).

♂. Smaller in size than ♀. Antennae with a few widely remote, broad, pale rings, the first of them 1 cm. distant from base. All other characters quite as in ♀, especially also the black-banded colour of abdomen.

Anal segment somewhat shorter than the preceding one, broadly rounded, bluntly emarginate at the middle of hind margin. Supra-anal plate elliptical, longer than wide, with a median, longitudinal furrow. Cerci short, conical, pointed and somewhat incurved at extreme apex. Subgenital plate nearly twice as long as wide at base, with parallel margins in basal half and converging ones in distal half, angulately excised at apex. Styles cylindrical, nearly twice as long as the apical lobes of subgenital plate, brown at base only, further blackish.

Length of body 22 mm., of pronotum 4.5 mm., of tegmina 37 mm., width of tegmina 9.5 mm., length of fore femora 6 mm., of hind femora 12 mm.

Hitherto known from Malacca only.

Subfam. *Listroscelinae*.

Genus *Xiphidiopsis* Redtenbacher.

1891. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 531.
 1900. BOLIVAR, Ann. Soc. Ent. France, LXVIII, p. 781 (*Xyphidiopsis*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 284.
 1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 98, 99.
 1912. KARNY, Wytsman, Genera Insectorum, fasc. 131, p. 5.

As to the relations of this genus to *Teratura* and the *Mecconeminae* see Treubia, I, 4, p. 294 (1921).

***Xiphidiopsis cyclolabia* n. sp.**

♂, ♀. Of small size, as usual in this genus. General colour greenish yellow, lateral margins of pronotum with a broad yellow stripe. Occiput concolorous, or (in one of the specimens before me) longitudinally marked with blackish to the tip of vertex.

Pronotum rounded, smooth; hind lobe very strongly produced backwards, rounded, nearly longer than wide at base; lateral lobes somewhat longer than high, with obtuse-angulate lower margin and distinct humeral sinus. Tegmina very long and narrow, well overreaching the end of abdomen and the hind knees. Wings about 1 mm. longer than tegmina. Sterna unarmed. Fore coxae with a sharp, curved spine. Fore and middle femora unarmed, sulcate beneath. Fore tibiae with open tympanum on both sides; beneath armed with 4 pairs of not very long, movable, dark spines. Middle tibiae dilated and somewhat swollen in two basal thirds, suddenly narrowed in apical third; spines as in the fore tibiae. Hind femora unarmed; hind tibiae strongly spined above, with a very few, small spines beneath.

Anal segment of ♂ truncate; supra-anal plate small, transverse. Cerci (♂) strongly incurved, touching each other at apex, stouter in basal part, narrower apically, blunt at apex; upper margin (in lateral view) twice emarginated. Subgenital plate of ♂ trapezoidal, truncate behind, with moderately long, cylindrical styles.

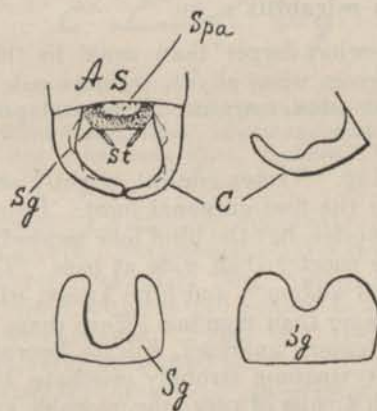


Fig. 32. Above: End of ♂ abdomen of *Xiphidiopsis cyclolabia*; left: dorsal view (A.s. Anal segment. Spa. Supraanal plate. C. Cerci, Sg. Subgenital plate. St. Styles); right: cercus, lateral view.—Beneath: ♀ Subgenital plate (Sg.) of *Xiphidiopsis cyclolabia* (left) and *Teratura simplex* (right).—Enlarged.

Anal segment of ♀ strongly excised, of a similar shape as the subgenital plate (♀, fig.). Cerci (♀) somewhat long and slender,

clavate in apical half, pointed at extreme apex. Ovipositor of the shape usual in this genus, very slightly upcurved, with smooth margins, pointed at apex; upper valvules at base on each side with a shallow longitudinal impression. Subgenital plate of ♀ deeply emarginated, nearly to its base, with rounded lobes, which are about twice as long as wide.

	♂	♀
Length of body	9 -11 mm.	10 mm.
" " pronotum	3.7- 3.8 "	3.5 "
" " tegmina	15.5-18 "	18 "
" " hind femora	8 - 9.5 "	9.5 "
" " ovipositor	—	6.5 "

2 ♂♂ and 1 ♀ from Gunong Kledang, Perak (2646'; Nov. 1916).

By the development of spines on fore tibiae, this species seems to be about intermediate between *Xiphidiopsis* and *Teratura*. Of the former genus, it comes nearest to the Indian *X. forficata* Bolivar, but diverging by the form of ♂ cerci and supra-anal plate (♀ of *forficata* being unknown hitherto). It is perhaps still nearer allied to the Philippine *Teratura simplex* Karny, but diverging from it by the twice emarginated upper margin of cerci in ♂ (equally curved in *simplex*) and by the more strongly excised subgenital plate in ♀.—Further there is no other species hitherto known which could be confounded with *cyclolabia*.

***Xiphidiopsis mirabilis* n. sp.**

♂. Size somewhat larger than usual in this genus. Body yellow (probably green when alive), tegmina pale yellowish green, with darker yellow hind margin. Head and prothorax without markings.

Eyes protruding. Vertex conical, slightly sulcate above, not yet half as long as the first antennal joint. Pronotum shaped as in the preceding species, but the hind lobe somewhat less produced backwards, a little shorter than wide at base. Tegmina far over reaching the end of abdomen and hind knees; wings a very little (only 0.7 mm.) longer than tegmina. Fore coxae strongly spined. Fore and middle femora unarmed, sulcate beneath. Fore tibiae with the anterior tympanum strongly conchate, the posterior one open; beneath with 6 pairs of very long, movable spines, decreasing in length from base to apex. Middle tibiae of the same shape as in the preceding species, spined as the fore tibiae, but the spines a little shorter. Hind femora swollen at base, slenderer towards the apex, unarmed. Hind tibiae above with short, black spines throughout the whole length (except extreme base), beneath in the two apical thirds with pale spines, longer and closer to each other than the upper ones.

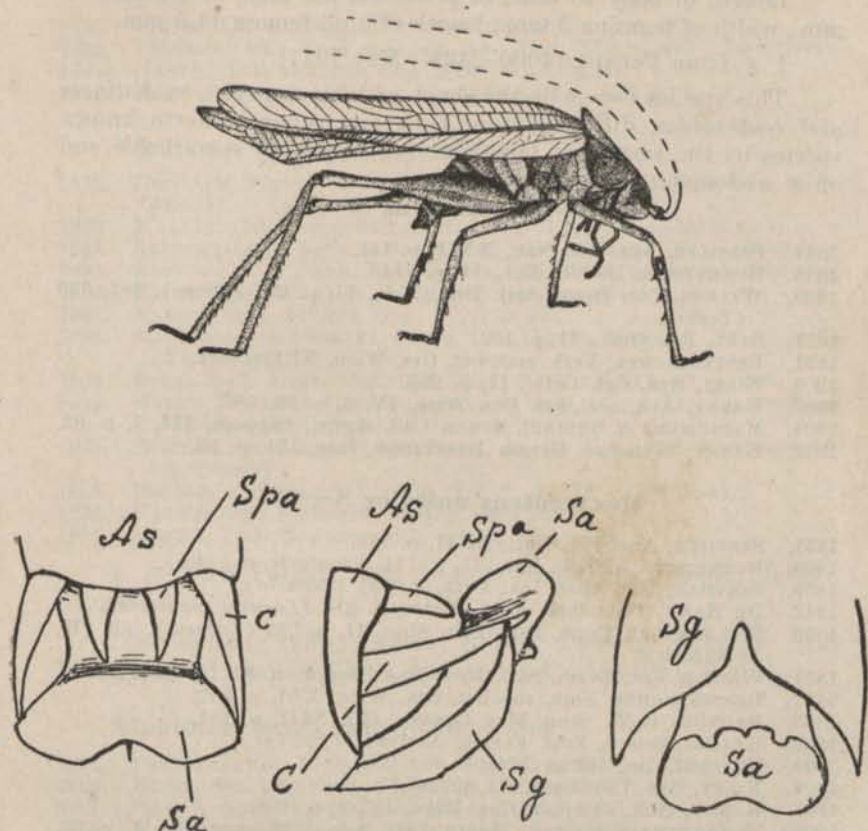


Fig. 33. *Xiphidiopsis mirabilis* ♂; above: total, twice enlarged.—Beneath: End of abdomen, dorsal, lateral and ventral view, enlarged. A.s. Anal segment. Spa. Supra-anal plate. C. Cerci. Sa. Subanal plate. Sg. Subgenital plate.

Anal segment (♂) slightly emarginate on each side, broadly rounded in the middle. Supra-anal plate divided into two horn-like projections. Cerci moderately long, nearly straight. Subgenital plate deeply excised, with sharply pointed lobes; the margin of this excision slightly S-shaped. There is above from the subgenital plate a very remarkable second plate (perhaps a subanal plate as in the *Holochloras*?) of a very characteristic shape; its lateral margins converging from base to middle, then diverging again and thus forming a large, rounded end-lobe, emarginated behind, strongly arched above, excavate below; the proximal margin of this excavation with a short, pointed tooth in the middle, and a large, blunt tubercle on each side, which protrudes strongly backwards (perpendicularly to the under surface of this plate). This plate gives a very remarkable character to this species, nothing similar being hitherto known from others.

Length of body 15 mm., of pronotum 5.5 mm., of tegmina 24 mm., width of tegmina 3 mm., length of hind femora 11.5 mm.

1 ♂ from Penang (2000'-2428'; May 1917).

This species comes by the shape of tympana close to *distincta* and *tenthroides*, differing from both and other hitherto known species by the somewhat larger size and the very remarkable end of ♂ abdomen.

Genus *Hexacentrus* Serville.

1831. SERVILLE, Ann. Sci. Nat., XXII, p. 145.
 1838. BURMEISTER, Handb. Ent., II, p. 714.
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 281 (*Piura*), 302, 393 (*Tedla*).
 1874. STÅL, Rec. Orth., II, p. 102.
 1891. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 547.
 1906. KIRBY, Syn. Cat. Orth., II, p. 287.
 1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 98, 107.
 1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 62.
 1912. KARNY, Wytzman, Genera Insectorum, fasc. 131, p. 15.

Hexacentrus unicolor Serville.

1831. SERVILLE, Ann. Sci. Nat., XXII, p. 146.
 1838. BURMEISTER, Handb. Ent., II, p. 714 (*plantaris, unicolor*).
 1839. SERVILLE, Nat. Hist. Ins., Orth., p. 531 (*Locusta*).
 1842. DE HAAN, Temminck, Verh., Orth., p. 216 (*Locusta plantaris*).
 1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 283 (*Locusta*), 302 (*H. plantaris*).
 1871. WALKER, Cat. Derm. Salt. Brit. Mus., Suppl., p. 36 (*Locusta*).
 1891. REDTENBACHER, Verh. zoo.-bot. Ges. Wien, XLI, p. 552.
 1893. BRUNNER v. W., Ann. Mus. Genova, (2), XIII, p. 181.
 1903. KRAUSS, Semon, Zool. Forsch. Austral., V, p. 747.
 1904. KRAUSZE, Ins. Börse, XXI.
 1906. KIRBY, Syn. Cat. Orth., II, p. 287.
 1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 108.
 1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 63.
 1909. REHN, Bull. Amer. Mus. Nat. Hist., N. Y., XXVI, 13, p. 206.
 1912. KARNY, Wytzman, Genera Insectorum, fasc. 131, p. 16.
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 272.
 1915. KARNY, Suppl. Ent., p. 74.
 1920. KARNY, Zool. Mededeel., V, 4, p. 206.
 1921. KARNY, Philipp. Journ. Sci., XVIII, 5, p. 610.

In the collection of Raffles Museum represented from the following localities: Pahang (1 ♂).—Singapore (June 1902; 1 ♂.—Cavanagh Rd., May 1913; 1 ♂).—Baram River, Sarawak (Long Mujan; 4. Oct. 1920; J. C. Moulton; 2 ♂ ♂, 1 ♀.—9. Sept. 1920; J. C. Moulton; 1 ♀.—27. Sept. 1920; J. C. Moulton; 1 ♂).

This species was hitherto known from India, Burma, Singapore, Sumatra, Java, Lombok, Amboina, Celebes, Borneo, Philippine Isl., Formosa, Japan, China, Amoy, CochinChina, Annam.

Subfam. *Conocephalinae*.

Genus *Xiphidion* Serville.

1831. SERVILLE, Ann. Sci. Nat., XXII, p. 151.
 1838. BURMEISTER, Handb. Ent., II, p. 707 (*Xiphidion*).

1853. FIEBER, *Lotos*, III, p. 170 (*Xyphidium*).
 1891. REDTENBACHER, *Verh. zool.-bot. Ges. Wien*, XLI, p. 493 (*Xiphidium*).
 1907. KARNY, *Abh. zool.-bot. Ges. Wien*, IV, 3, p. 85.
 1912. KARNY, *Wytzman, Genera Insectorum*, fasc. 135, p. 8, 10.

Xiphidium longipenne (DeHaan).

1842. DE HAAN, *Temminck, Verh., Orth.*, p. 189 (*Locusta Xiphidium longipennis*).
 1869. WALKER, *Cat. Derm. Salt. Brit. Mus.*, II, p. 274 (*Xiphidium*).
 1891. REDTENBACHER, *Verh. zool.-bot. Ges. Wien*, XLI, p. 512 (*Xiphidium*).
 1893. BRUNNER v. W., *Ann. Mus. Genova*, (2), XIII, p. 181 (*Xiphidium*).
 1906. KIRBY, *Syn. Cat. Orth.*, II, p. 278 (*Anisoptera*).
 1907. KARNY, *Abh. zool.-bot. Ges.*, IV, 3, p. 92.
 1908. MATSUMURA & SHIRAKI, *Journ. Coll. Agric., Sapporo*, III, 1, p. 54 (*Xiphidium*).
 1909. REHN, *Bull. Amer. Mus. Nat. Hist.*, N. Y., XXVI, 13, p. 206.
 1912. KARNY, *Wytzman, Genera Insectorum*, fasc. 135, p. 11 (*Conocephalus Xiphidium longipennis*).
 1913. BOLIVAR, *Asoc. Esp. Progr. Cienc.*, 4a, Ci. Nat., p. 8 (*Conocephalus longipennis*).
 1915. BRUNER, *Univ. Stud. Lincoln*, XV, 2, p. 272 (*Xiphidium*).
 1920. KARNY, *Zool. Mededeel.*, V, 4, p. 169, 206.
 1921. KARNY, *Philipp. Journ. Sci.*, XVIII, 5, p. 608.

1 ♂ from Pahang, and 3 ♀♀ from Kota Tinggi, Johore (August 1917).

Distribution: India, Ceylon, Burma, Penang, Sumatra, Aru, Philippine Isl., Japan, China, Cambodia, Cochinchina, Zanzibar.

Xiphidium longicorne Redtenbacher.

1891. REDTENBACHER, *Verh. zool.-bot. Ges. Wien*, XLI, p. 513 (*Xiphidium*).
 1906. KIRBY, *Syn. Cat. Orth.*, II, p. 278 (*Anisoptera*).
 1907. KARNY, *Abh. zool.-bot. Ges. Wien*, IV, 3, p. 92.
 1908. MATSUMURA & SHIRAKI, *Journ. Coll. Agric., Sapporo*, III, 1, p. 55 (*Xiphidium*).
 1912. KARNY, *Wytzman, Genera Insectorum*, fasc. 135, p. 11 (*Conocephalus Xiphidium longicornis*).

1 ♀ from Long Mujan, Baram River, Sarawak (4. Oct. 1920; J. C. Moulton).

Distribution: India, Java, Borneo, Pelew, Yap, Raratonga, Caroline Isl., Japan.

Xiphidium maculatum Le Guillou.

1841. LE GUILLOU, *Rev. Zool.*, p. 294 (*Xiphidium*).
 1842. DE HAAN, *Temminck, Verh., Orth.*, p. 189 (*Locusta Xiphidium lepidum*).
 1869. WALKER, *Cat. Derm. Salt. Brit. Mus.*, II, p. 275 (*lepidum, maculatum*).
 1891. REDTENBACHER, *Verh. zool.-bot. Ges. Wien*, XLI, p. 515 (*Xiphidium*).
 1893. BRUNNER v. W., *Ann. Mus. Genova*, (2), XIII, p. 181 (*Xiphidium*).
 1903. JACOBSON & BIANCHI, *Orth. Pseudoneur. Russ.*, p. 385 (*Xiphidium*).
 1906. KIRBY, *Syn. Cat. Orth.*, II, p. 278 (*Anisoptera*).
 1907. KARNY, *Abh. zool.-bot. Ges. Wien*, IV, 3, p. 93 (1907).
 1908. MATSUMURA & SHIRAKI, *Journ. Coll. Agric., Sapporo*, III, 1, p. 51 (*Xiphidium*).
 1912. KARNY, *Wytzman, Genera Insectorum*, fasc. 135, p. 11 (*Conocephalus Xiphidium maculatus*).

1913. BOLIVAR, Asoc. Esp. Progr. Cienc., 4a, Ci. Nat., p. 8 (*Conocephalus maculatus*).
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 272 (*Xiphidion*).
 1915. KARNY, Suppl. Ent., p. 74.
 1920. KARNY, Zool. Mededeel., V, 4, p. 170, 206.
 1921. KARNY, Trop. Natuur, X, 5, p. 70, Fig. 10.
 1921. KARNY, Philipp. Journ. Sci., XVIII, 5, p. 609.

2 ♂♂ and 3 ♀♀ from P. Ayer Merbau, near Singapore (14.-16. May 1921; F. N. Chasen).

Distribution: Africa, Madagascar;—South and East Asia: India, Ceylon, Burma, Penang, Malacca, Sumatra, Java, Borneo, Celebes, Philippine Isl., Formosa, Amoy, Japan.

Subfam. *Agraeiinae*.

Genus *Subria* Stål.

1874. STÅL, Rec. Orth., II, p. 101.
 1891. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 433.
 1897. BRONGNIART, Bull. Soc. Ent. France, p. 83.
 1906. KIRBY, Syn. Cat. Orth., II, p. 255.
 1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 51, 57.
 1912. KARNY, Wytzman, Genera Insectorum, fasc. 141, p. 9.

Subria moultonii new spec. (Plate II, fig. 2).

♀. Size stouter than usually in this genus. Colour testaceous, marbled with brownish black.

Vertex conical, distinctly shorter than the first antennal joint, at extreme apex very slightly sulcate. Antennae having the first joint a little incrassate in the apical half of the inner margin; the two first joints beneath black, the others a little infuscated; the upper surface of antennae unicolorous brown, not darker annulated. Eyes globular, prominent. Front shining, on the sides a little darker, with some faintly impressed points. Clypeus ferruginous, mandibles black at their inner margin.

Pronotum nearly saddle-shaped, with two distinct constrictions, the later of which more expressed, near the middle of the disc. The whole surface strongly impressed-punctured. Hind margin roundly produced backwards. The whole pronotum concolorous testaceous, but at the limit between the disc and the lateral lobes a somewhat broad, deeply black, double S-shaped sinuated longitudinal band. Lateral lobes longer than high, without teeth, behind the fore coxae highest, with the lower margin sinuated; humeral sinus distinct, but not very much expressed.

Prosternum without spines. Meso- and metasternum rounded off. Tegmina narrow, broadest near the base, hardly reaching to the tip of ovipositor, rounded at apex, testaceous, marbled with blackish.

Legs somewhat long, yellowish brown, marbled with blackish, unarmed above; hind femora strongly incrassate in the basal half. Genicular lobes acute, but the outer ones of fore femora blunt; on

the hind femora both terminated in a spine. Fore femora beneath on the inner (anterior) margin with 3-4 small spines, on the outer one with 1-3 near the apex. Middle femora on the outer margin 4-5 spined, on the inner unarmed. Hind femora with both margins shortly spined. Fore and middle tibiae a little compressed, rounded above, not sulcate, beneath on both margins spined, above without spines. Foramina linear. Hind tibiae well spined above, beneath with only a few small spines.

Ovipositor darker than the body, compressed, a little narrowed near base, somewhat broader in the middle, with the upper margin nearly straight, the lower one convex, blunt at tip.

Length of body 28.5 mm, of pronotum 10 mm, of tegmina 36 mm, of hind femora 23 mm, of ovipositor 20 mm.

1 ♀ from Baran River, Sarawak (1920; J. C. Moulton).

I have allowed myself the pleasure of naming this interesting new species after its discoverer, Mr. J. C. Moulton of the Raffles Museum at Singapore.

This new species resembles somewhat in colour and size the *Diaphlebus*-group of the *Mecopodinae*, but is distinguished at once by the linear foramina, the strongly produced hind margin of the pronotum and the smaller femoral spines. The vertex is less sulcate than in *Subria sulcata*, the disc of pronotum pale as in *concolor*, *gracilis* and *truncata*. But from these species *S. moultonii* differs by its stouter size, the strongly constricted pronotum and the black bands at the sides of the disc.

Subria sulcata Redtenbacher.

1891. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 435.
 1893. BRUNNER v. W., Ann. Mus. Genova, (2), XIII, p. 180.
 1906. KIRBY, Syn. Cat. Orth., II, p. 256.
 1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 57.
 1912. KARNY, Wytzman, Genera Insectorum, fasc. 141, p. 10.

1 ♀ from Fort Canning, Singapore (10 Dec. 1913), and 1 ♀ from Gilstead Rd., Singapore (Aug. 1917; V. K. coll.).

This species was hitherto known from India, Burma, Cambodia, Sumatra, and Java. The indication "Alto Amazonas" is to be considered as very doubtful.

Genus **Oxylakis** Redtenbacher.

1891. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 447.
 1906. KIRBY, Syn. Cat. Orth., II, p. 258.
 1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 52, 63.
 1912. KARNY, Wytzman, Genera Insectorum, fasc. 141, p. 18.

Oxylakis punctipennis Redtenbacher.

1891. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 447.
 1906. KIRBY, Syn. Cat. Orth., II, p. 258.
 1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 63.
 1912. KARNY, Wytzman, Genera Insectorum, fasc. 141, p. 18.

1 ♀ from Bukit Timah, Singapore (30. VI. 1911), 1 ♀ from Kota Tinggi, Johore (Aug. 1917), and 1 ♀ from Cavanagh Rd., Singapore (4. March 1916; V. Knight coll.).

The species was hitherto known from Singapore and Borneo.

Genus **Odontoconus** Fritze & Carl.

1908. FRITZE & CARL, Mitt. Schweiz. Ent. Ges., XI, p. 301.

1912. KARNY, Wytsman, Genera Insectorum, fasc. 141, p. 35.

Odontoconus robustus n. sp. (Plate II, fig. 3).

♀. Size much stouter than in *O. spinipes*. Brownish ferruginous, unicolorous, but the tegmina with some small blackish spots.

Vertex distinctly longer than the first antennal joint, but shorter than in *O. spinipes*, acute at apex, with a blunt tubercle beneath and a sharp tooth on its upper surface, not divided from the frontal fastigium. Antennae ferruginous, unicolorous, distinctly longer than the body. Eyes somewhat small, but globular, prominent. Front strongly impressed-punctured.

Pronotum broad, as seen from above, without longitudinal keels, the disc roundly turned into the lateral lobes. The whole surface of pronotum with strongly impressed points. The disc plain, with two soft transversal furrows, the fore margin rounded, hind margin truncate. No margin tinged with black. Lateral lobes longer than high, but shorter than in *O. spinipes*, with the anterior angle rounded off; the lower margin oblique, sinking posteriorly, with a short spine near the anterior angle; hind angle rounded off, humeral sinus scarcely perceptible.

Tegmina reaching across the basal half of ovipositor, narrow, broadest near base, rounded at apex; fore margin distinctly sinuate, hind margin nearly straight. Near the fore margin the space between the transversal veins black, the veins themselves ferruginous; behind the radial veins some small blackish spots. Subcosta and radial vein distinctly separate in the basal half, nearly in contact in the apical half. Radial vein without a distinct sector. Wings pale greyish.

All femora strongly compressed, unarmed above. Fore femora beneath with 5-6 spines on both margins; the inner (anterior) genicular lobe acute, the outer one blunt. Middle femora with 7-8 spines on the outer, 3 in the basal half of the inner margin; the outer genicular lobe obtuse, the inner one acute. Hind femora with both margins spinose and the genicular lobes produced into a short spine. Fore and middle tibiae without spines above, strongly spined beneath on both margins. Foramina linear. Hind tibiae above and beneath on both margins spined.

Prosternum with two long, sharp spines. Mesosternal lobes produced into a short, erect spine. Metasternal lobes triangular, terminated in a blunt tubercle. Anal segment truncate, in the middle somewhat excavated. Cerci crossed, in the basal half very

stout, in the apical half narrowed to a sharp spine. Ovipositor nearly as long as the hind femora, with both margins curved, acute at the tip. Subgenital plate triangular, emarginate at apex, with the lobes short, rounded.

♀. Length of body 37.5 mm., of pronotum 10.5 mm., of tegmina 32 mm., of hind femora 20 mm., of ovipositor 19.6 mm.

1 ♀ from Bukit Timah, Singapore (23. Aug. 1911).

There was one species only hitherto known of this genus, *O. spinipes* from Borneo, from which *O. robustus* easily may be distinguished by the characters given above.

Genus *Peracca* Griffini.

1897. GRIFFINI, Boll. Mus. Zool. Anat., XII, 306, p. 1.

1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 55, 78.

1912. KARNY, Wytzman, Genera Insectorum, fasc. 141, p. 35.

Peracca conspicuithorax Griffini.

1897. GRIFFINI, Boll. Mus. Zool. Anat., XII, 306, p. 2.

1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 78.

1912. KARNY, Wytzman, Genera Insectorum, fasc. 141, p. 36.

Of this very fine species, a single specimen only was hitherto known to science, a ♂ from Perak, in the collection of the Museum at Torino (Italy).

The Raffles Museum possesses 1 ♂ from Bukit Lantai, Sungei Ujong (Knight coll., July 1910).

Subfam. *Copiphorinae*.

Genus *Eumegalodon* Brongniart.

1835. BRULLÉ, Hist. Nat. Ins., IX, p. 156 (*Megalodon*, nec SOWERBY).

1838. BURMEISTER, Handb. Ent., II, p. 724 (*Megalodon*, nec SOWERBY).

1839. SERVILLE, Hist. Nat. Ins., Orth., p. 536 (*Megalodon*, nec SOWERBY).

1840. BLANCHARD, Hist. Nat. Ins., III, p. 28 (*Megalodon*, nec SOWERBY).

1842. DE HAAN, Temminck, Verh., Orth., p. 210 (*Locusta Megalodon*).

1869. WALKER, Cat. Derm. Salt. Brit. Mus., II, p. 231 (*Lesina*), 334 (*Megalodon*).

1891. REITENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 356 (*Megalodon*).

1892. BRONGNIART, Bull. Soc. Ent. France, LX, p. clxxvi.

1892. BRONGNIART, N. Arch. Mus., (3), III, p. 279.

1906. KIRBY, Syn. Cat. Orth., II, p. 289 (*Lesina*, *Eumegalodon*).

1907. KARNY, Abh. zool.-bot. Ges. Wien, IV, 3, p. 1, 6.

1912. KARNY, Wytzman, Genera Insectorum, fasc. 139, p. 7.

Eumegalodon vaginatus n. sp.

♀. Brownish testaceous, with the tegmina and legs greyish brown.

Checks with a blunt wrinkle, running from the eyes to the outer margin of mandibles. Front laterally with a rough impressed punctation, reddish castaneous, in the middle part very finely

punctured, shining black. At the lower margin (at clypeal suture) very little prominent, without a distinct tubercle. Clypeus and the upper part of labrum testaceous, mandibles castaneous, at the tip with the lower part of labrum shining blackish. Antennae brownish testaceous, with some darker, remote rings, at the base verdure beneath; the first antennal joint beneath blackish. Vertex tumescent at base, twice as long as the first antennal segment, sharply pointed, directed forwards; above testaceous, beneath black. Eyes globular, prominent, testaceous.

Prozona of pronotum with a sharp, upwards directed spine on each anterior angle, and after it a small and narrow projection, bearing two sharp spines of the same length as the projection, and three smaller ones; mesozona with a similar projection, ending in a long sharp spine, and before and behind it with two shorter ones. Disc between these projections with two dark spots and behind two smaller ones; metazona at the posterior margin on each side with three long, sharp spines (one of them directed upwards, one backwards, and one sideways), and a little one before these. Lateral lobes with some black touches; anterior margin bearing three small spines, the third of which at the angle.

Tegmina short and narrow, widest near the apex, reaching not beyond the tip of abdomen, with some small dark spots, above testaceous at the base.

Fore femora beneath at the anterior margin with 4 strong spines, at the posterior unarmed; above with 5 at the anterior and 4 at the posterior margin, and one in the middle before the knees; the inner (anterior) genicular lobe spined, the outer one acute, but without a spine. Middle femora beneath at the anterior margin with 5, at the posterior without spines; above with 5 spines at the anterior margin, and one on the surface before the knee, but unarmed at the posterior margin; genicular lobes spined. Hind femora strongly spined beneath, with spined genicular lobes, above without spines.

Ovipositor longer than the whole body, curved upwards at base, and then nearly straight. Cerci ♀ short and heavy, acute at apex. Subgenital plate (♀) semicircularly emarginated, with the lobes produced into a short spine.

Length of body 51.5 mm., of pronotum 17 mm., of tegmina 31.5 mm., of hind femora 31 mm., of ovipositor 64 mm.

1 ♀ from Gunong Pulai, Johore, 2000'; Aug. 1905; presented by C. B. Kloss.

This species resembles *E. ensifer* in its whole appearance, the fore femora spined above, and the short tegmina, but the formation of front, the small lateral projections of pronotum, and the spined subgenital plate of ♀ agree better with the Bornean *E. blanchardi*. Therefore *vaginatus* cannot be confounded with one of these, especially since the ovipositor is distinctly longer than in any other species.

To the same species belongs perhaps also a very small ♂ larva (length of body 7 mm) from Gunong Kledang, Perak (2646'; Nov. 1916), with two pairs of very long spines and some tubercles at the disc of pronotum. General colour pale, reddish brown longitudinal stripes on each side of body reaching from the eyes to the end of abdomen. All legs pale above, blackish beneath; hind femora above also with two narrow dark stripes.

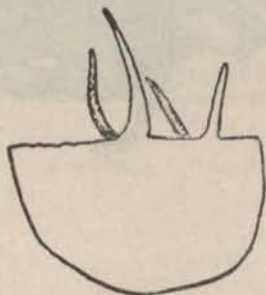


Fig. 34. Pronotum of a young *Eumegalodon* (?), seen from the right side. Enlarged.

***Eumegalodon intermedius* n. sp.**

♂, ♀. Greyish brown. Cheeks without a distinct wrinkle. Front smooth, but not shining, of the same colour as the body; beneath at clypeal suture with a distinct tubercle, but less prominent than in *E. ensifer*. Mouth black, clypeus with the upper part of labrum and the base of mandibles testaceous. Antennae greyish testaceous, darker annulated. Vertex blunt, but little longer than the first antennal joint, curved upwards. Eyes globular, prominent.

Pronotum shaped as in *ensifer*; the lateral projections large, horizontally produced, with more and shorter spines than in *vaginatus*. Anterior and posterior margin spined as in *vaginatus*, but the upper spine behind less upwards directed than in the former species. Tegmina twice as long as abdomen, narrowed in the middle, broadly rounded in the apical half.

Genicular lobes as in *vaginatus*. Fore femora beneath at the anterior margin with 4 strong spines, at the posterior unarmed; above with 3 at the anterior and 3-4 at the posterior margin, but without a spine on the upper surface before the knee. Middle femora beneath at the anterior margin with 4, at the posterior without spines; above with only one spine near the middle of the anterior margin. Hind femora as in *vaginatus*.

Anal segment of ♂ roundly emarginated, with acute lobes. Cerci (♂) heavy, blunt. Subgenital plate of ♂ deeply cut out, with blunt styles. Ovipositor shorter than the body, but reaching distinctly beyond the tip of tegmina, somewhat directed upwards, nearly straight. Subgenital plate of ♀ semicircularly emarginated, with acute lobes.

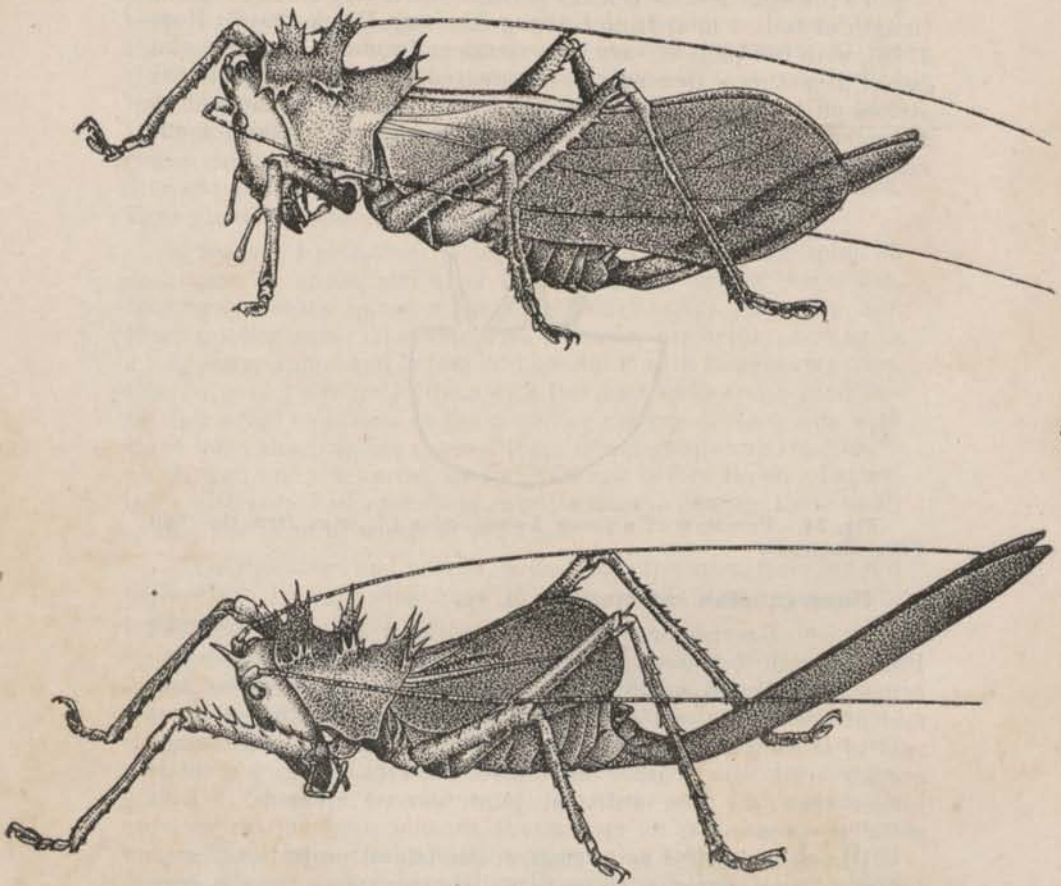


Fig. 35. ♀ of *Eumegalodon intermedius* (above) and *E. vaginatus* (beneath). Natural size. Del. Soedirman.

	♂	♀
Length of body	46 mm.	49 mm.
" " pronotum	23 "	21 "
" " tegmina	50 "	59 "
" " hind femora	24 "	30.5 "
" " ovipositor	—	44 "

1 ♂ from Sempam River, Pahang (1100'; 18. 1907; presented by G. Kruger), and 1 ♀ from Bukit Segana (April 1904; from Dr. Gimlette).

This species agrees in its whole appearance especially the large tegmina, with *E. blanchardi* from Borneo, but by above spined fore femora, the large projections of pronotum and the presence of frontal tubercle approaches *E. ensifer*. The shape of subgenital plate in ♀ is intermediate between the two mentioned species.

Eumegalodon was hitherto known only from the Sundaic Islands, but not yet from the Malay Peninsula. The two species here described from the Malay Peninsula are both new, and well distinguished by the above given characters from the insular forms *ensifer* and *blanchardi*. From *Lesina lutescens*, described by Walker as a *Hetrodide* (!), is a larval form only known, belonging after Kirby also to this genus, but not satisfactorily characterized, and must therefore be considered as a doubtful species. From the two others, my two new species may be distinguished by means of the following table:

Comparative Table of the Species of *Eumegalodon*

	E. VAGINATUS.	ENSIFER,	INTERMEDIUS.	BLANCHARDI.
Vertex	long, sharply pointed, directed forwards	Shorter, more blunt, curved upwards		
Frontal tubercle at clypeal suture	scarcely perceptible	large, prominent	distinct, but little prominent	absent
Lateral projections of the disc of pronotum	small and narrow, with long spines	large, horizontally produced		small, directed upwards
Tegmina	reaching not beyond the tip of abdomen	1½ times as long as abdomen	twice as long as abdomen	2½ times as long as abdomen
Fore and middle femora above	Strongly spined			without spines
Ovipositor	longer than the whole body	Shorter than the body		
Lobes of subgenital plate of ♀	produced into a short spine	rounded	acute	produced into a sharp spine

Genus *Euconocephalus* Karny.

1907. KARNY, *Abh. zool.-bot. Ges. Wien*, IV, 3, p. 4, 39.
 1912. KARNY, *Wytzman, Genera Insectorum*, fasc. 139, p. 33.

Euconocephalus indicus (Redtenbacher).

1842. DE HAAN, *Temminck, Verh., Orth.*, p. 213 (*Locusta Conocephalus verrugera*, nec SERVILLE).
 1891. REDTENBACHER, *Verh. zool.-bot. Ges. Wien*, XLI, p. 408 (*Conocephalus*).
 1893. BRUNNER v. W., *Ann. Mus. Genova*, (2), XIII, p. 180 (*Conocephalus*).
 1906. KIRBY, *Syn. Cat. Orth.*, II, p. 249 (*Conocephaloides*).
 1909. MAXWELL-LEFROY, *Ind. Ins. Life*, p. 96 (*Conocephalus*).
 1912. KARNY, *Wytzman, Genera Insectorum*, fasc. 139, p. 34.
 1920. KARNY, *Zool.-Mededeel.*, V, 4, p. 162, 205.

1 ♂ from Singapore (1913); 1 ♀ from Bukit Kutu, Selangor (April 1915), and 2 ♀ ♀ without indication of locality.

Hitherto known from China, India, Himalaya, Burma, Tenasserim, Penang, Sumatra, Java, Borneo, and Australia.

Euconocephalus picteti (Redtenbacher).

1891. REDTENBACHER, *Verh. zool.-bot. Ges. Wien*, XLI, p. 410 (*Conocephalus*).
 1906. KIRBY, *Syn. Cat. Orth.*, II, p. 249 (*Conocephaloides*).
 1912. KARNY, *Wytzman, Genera Insectorum*, fasc. 139, p. 34.

1 grey brown ♀ (hitherto unknown) from Long Mujan, Baram River, Sarawak (4. Oct. 1920; J. C. Moulton).

Ovipositor straight, shorter than the hind femora. Subgenital plate trapezoidal, broadly emarginated at apex, with acute lobes.

Length of body 30.5 mm., of vertex 1.7 mm., of pronotum 7.5 mm., of tegmina 39.5 mm., of hind femora 23 mm., of ovipositor 20 mm.

Hitherto known from Perak, Malacca, and Sumatra.

Euconocephalus mucro (DeHaan).

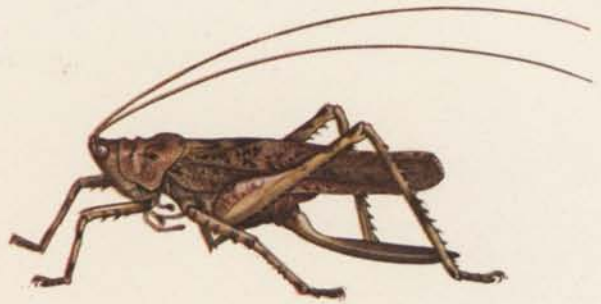
1842. DE HAAN, *Temminck, Verh., Orth.*, p. 212 (*Locusta Conocephalus*).
 1869. WALKER, *Cat. Derm. Salt. Brit. Mus.*, II, p. 323 (*Conocephalus*).
 1884. BOLIVAR, *Viaje al Pacif., Ins.*, p. 88 (*Conocephalus sobrinus*).
 1891. REDTENBACHER, *Verh. zool.-bot. Ges. Wien*, XLI, p. 413 (*Conocephalus sobrinus*).
 1904. KRAUSZE, *Ins. Börse*, XXI (*Conocephalus sobrinus*).
 1906. KIRBY, *Syn. Cat. Orth.*, II, p. 249 (*Conocephaloides sobrinus*).
 1909. REHN, *Bull. Amer. Mus. Nat. Hist.*, N. Y., XXVI, 13, p. 204 (*Conocephalus sobrinus*).
 1912. KARNY, *Wytzman, Genera Insectorum*, fasc. 139, p. 34 (*sobrinus*).
 1915. BRUNER, *Univ. Stud. Lincoln*, XV, 2, p. 270 (*sobrinus*).
 1920. KARNY, *Zool. Mededeel.*, V, 4, p. 162, 205.

3 pale green specimens from Cavanagh Rd., Singapore (May 1910; V. Knight coll.; ♂); Long Loba, Baram River, Sarawak (Dec. 1920; J. C. Moulton; ♀), and Baram, Sarawak (15. Sept. 1920; J. C. Moulton; ♀).

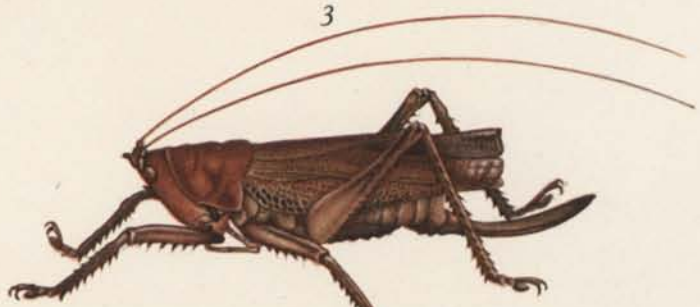
The specimen from Singapore has the vertex a very little more blunt at apex than the two Bornean ones, but agrees otherwise perfectly with them in all characters.



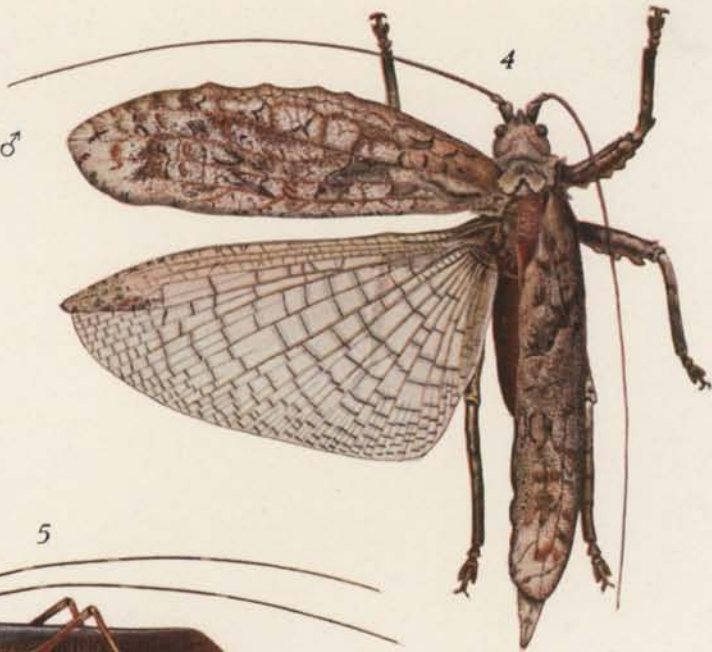
Gryllacris griffinii ♂



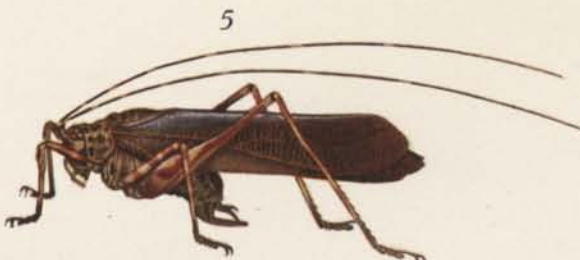
Subria moultoni ♀



Odontoconus robustus ♀



Olcinia excisa ♀



Poecilopsyra octoseriata ♂

Distribution: Sumatra, Java, Borneo, Celebes, Lombok, Philippine Isl.

***Euconocephalus pallidus* (Redtenbacher).**

1891. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 414 (*Conocephalus*).
 1893. BRUNNER v. W., Ann. Mus. Genova, (2), XIII, p. 180 (*Conocephalus*).
 1904. KRAUSZE, Ins. Börse, XXI (*Conocephalus*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 250 (*Conocephaloides*).
 1909. MAXWELL-LEFROY, Ind. Ins. Life, p. 96 (*Conocephalus*).
 1912. KARNY, Wytsman, Genera Insectorum, fasc. 139, p. 35.
 1912. KARNY, Abh. Ber. Zool. Mus. Dresden, XIV, 2, p. 4, 20.
 1913. BOLIVAR, Assoc. Esp. Progr. Cienc., 4a, Ci. Nat., p. 8.
 1915. BRUNER, Univ. Stud. Lincoln, XV, 2, p. 269.
 1915. KARNY, Suppl. Ent., p. 74.
 1921. KARNY, Philipp. Journ. Sci., XVIII, 5, p. 607.

1 brown ♂ from Lio Matu, Baram River, Sarawak (20. Oct. 1920; J. C. Moulton), and 1 green ♀ from Gilstead Rd., Singapore (Febr. 1917; V. Knight.).

The ♂ agrees in all characters with the typical *pallidus*, but has somewhat shorter tegmina: length of body 33.5 mm., of tegmina 37 mm., of hind femora 20 mm.

Distribution: India, Ceylon, Burma, Tonkin, Penang, Singapore, Java, Borneo, Philippine Isl., Formosa, Tshushima, New Guinea.

***Euconocephalus nasutus* (Thunberg).**

1798. DONOVAN, Ins. China, pl. 11, f. 2 (*Locusta acuminata*, nec LINNAEUS).
 1815. THUNBERG, Mem. Acad. Petersb., XV, p. 273 (*Conocephalus*).
 1862. BRUNNER v. W., Verh. zool.-bot. Ges. Wien, p. 93 (*Conocephalus acuminatus*).
 1891. REDTENBACHER, Verh. zool.-bot. Ges. Wien, XLI, p. 416 (*Conocephalus acuminatus*).
 1903. JACOBSON & BIANCHI, Orth. Pseudoneur. Russ., p. 383 (*Conocephalus acuminatus*).
 1906. KIRBY, Syn. Cat. Orth., II, p. 250 (*Conocephaloides*).
 1908. MATSUMURA & SHIRAKI, Journ. Coll. Agric., Sapporo, III, 1, p. 40 (*Conocephalus acuminatus*).
 1912. KARNY, Wytsman, Genera Insectorum, fasc. 139, p. 35 (*acuminatus*).

1 dark, grey green ♀ from Long Mujan, Baram River, Sarawak (4. Oct. 1920; J. C. Moulton), smaller than the typical form:

Length of body 32.5 mm., of tegmina 39.5 mm., of hind femora 23 mm., of ovipositor 21 mm.

Hitherto known from China, Japan, Siam, India, and Java.

EXPLANATION OF PLATE II.

(Del. Raden Soedirman Atmosaprodjo.)

- Fig. 1. *Gryllacris griffinii* new spec., ♂.
 Fig. 2. *Subria moultonii* new spec., ♀.
 Fig. 3. *Odontoconus robustus* new spec., ♀.
 Fig. 4. *Olcinia excisa* new spec., ♀.
 Fig. 5. *Poecilopsyra octoseriata* (DeHaan), ♂.

Observations upon some coins obtained in Malaya and particularly from Trengganu, Kelantan and Southern Siam.

BY SIR J. A. S. BUCKNILL, M.A.

President of the Numismatic Society of India.

In the course of my residence in the Malay Peninsula (1914-1920) I was constantly on the look-out for unusual coins; but I found that, with the exception of common currency—nearly always much worn—of neighbouring countries such as China, the Dutch East Indies, Sarawak, British North Borneo, Siam, French Indo-China, Japan and India, there was very little of interest obtainable. Occasionally one met with abraded V. O. C. Dutch Doits of the 18th century which were current in Malacca prior to the British occupation and in the early days in Penang and Singapore; rubbed one cent pieces of the 1810 issue of Penang and four-Kapang copper money of 1804 emanating from the British Settlement of Bencoolen (Fort Marlbro') in Sumatra were sometimes come across as were also a few of the commoner copper tokens issued between 1804 and 1836 by British Merchants in the Peninsula; but, in the main, the results were disappointing and I imagine there must have been a good many collectors over the ground before my time. However, in the present paper, I am attempting to give some account of my very amateurish numismatic investigations and a short description of the small number of rarer coins which came under my notice. My personal interest in the indigenous currency emanating from various Sultanates was stimulated by the discovery of specimens of the pewter coinage of Trengganu, Kelantan and Kedah in a small earth-caked lot of coins which I bought at a venture from a Chinese at Singapore in 1917.

In the autumn of 1918 I had to visit Trengganu on official business and stayed there for nearly three weeks: this State, owing to its inaccessibility except by sea, is the least known and most backward of those in British Malaya. Through the kindness of the Hon. Mr. J. L. Humphreys, the resident representative of the High Commissioner, I, then, and subsequently, received much information as to the currency of the locality and numerous specimens of coins found there; and as if to impress one with the importance of not attaching to the locality of a "find" any local origin I may mention that I obtained from this out-of-the-way spot such curious diversities as a Spanish dollar of Carolus III dated 1786 counterstamped with the head of our George III, an American Jackson "donkey" Cent of 1834, a Maria Theresa dollar of 1780, a brass Nuremberg rech-pfennig (calculating counter) of the 18th century and a six stiver silver piece of 1771 from the mint of Dordrecht in Holland.

From the Hon. Mr. H. W. Thomson, the then acting British Adviser in the State of Kelantan, I received several interesting pewter pieces issued by the Sultans of that country and by His Siamese Majesty's Lord Lieutenant of the Province of Patani His Excellency Phya Dejanujit I was sent quite a number of pewter coins coming from local mints at the towns of Patani, Yaring and Saiburi. I think that some of these issues may be, as yet, undescribed but unless one has easy access to Numismatic Periodicals (which here unfortunately I have not) it is very difficult to say so with confidence; and I am submitting these notes for publication more with the hope of gaining further than of giving novel information. I must express to many gentlemen, amongst whom I must mention Mr. J. P. Moquette and Mr. W. H. Valentine, my grateful thanks for much help in deciphering what are to me very difficult scripts. Where I am responsible for transcriptions I put them forward only as approximately accurate and the translations as free.

Trengganu Coinage and Gold Coins from Malaya.

This State lies on the Eastern seaboard of the Peninsula between latitude $4^{\circ} 30'$ and $5^{\circ} 45'$ North. Its area is estimated at 6,000 square miles and its population was in 1911 reported to be slightly over 150,000; with the exception of 10 Europeans, about 4,000 Chinese and 500 persons of other nationalities, the people were of Malay race and Moslem religion. It came under British protection in 1909 having been for a long period prior to that date under the somewhat nominal Suzerainty of Siam: but, owing to its lying off the regular trade routes, being shut in by high mountain ranges and almost unapproachable except by sea, its development has been very slow; and even when I visited the country in 1918 there were practically no roads and no railway or telegraph: it produces however quantities of tin and wolfram. I did not find, in such books as I was able to consult with the somewhat scanty numismatic literature at my disposal, very much written on the coinage of this country. I particularly regret my inability to consult the American Journal of Numismatics which, I understand, contains important contributions to the study of Malayan coinage.

Professor H. C. Millies in his admirable, posthumously published, work "*Recherches sur les monnaies des Indigènes de L'Archipel Indien et de la Péninsule Malaie*" (La Haye; Martinus Nijhoff, 1871) devotes barely three and a half out of 180 pages of his quarto volume to Trengganu: but, though he refers to several tin coins of which he figures ten and all of which he speculatively ascribes to this State, he is frankly quite dubious as to their true provenance: and I personally am somewhat doubtful if many or indeed any of them really emanated from Trengganu. An Austrian named Joseph Haas, who was at one time a Consul at Bangkok, published in 1880 at Shanghai an interesting article entitled "*Siamese Coinage:*" in writing of Trengganu, then under Siamese protection, he alleges that that State had issued Silver Quarter

Reals (a Real being presumably a Spanish dollar), Copper Keping and Pewter "Pichis" or "Pitis." My own information has been chiefly derived from the Hon. Mr. J. L. Humphreys than whom no one has ever enjoyed better opportunities of obtaining an accurate knowledge of matters in Trengganu: he has lived for a number of years in the Capital often being the only European in the town and always in the closest touch with the Court and the best educated section of the community; whilst, in addition, he knows most intimately the language and its caligraphy. As a preface to my observations I think it may be convenient to give a tabulated list of the Sultans, the ruling line of which is believed to run from the seventeenth century: the dates are, so far as I could ascertain, substantially correct though it is believed that there were some short interregna.

Name of Sultan. *Hegira date.* *A.D.*

Zenalabidin I. ? to 1135 ? to 1722
Mansur I. 1135-1208 1722-1793.

Millies, who could only ascertain the names of two of the Sultans, designates (p. 148), on apparently good authority, this Ruler as "Padoukah Sri Sultân Mansour Riâyat Schâh, fils d'ue fue sultan Zeinou l-'âbidin."

Zenalabidin II. 1208-1223 1793-1808

Millies (p. 149) designates this ruler as "Padouka Sri Sultân Zeinou-l-'âbidin, fils du Sultan Mansour."

Ahmad I. 1223-1242 1808-1826

A.H. 1222: i.e. A.D. 1807-8, is the date borne by some of the tin coins which Millies speculatively ascribes to Trengganu.

Abdulrahman. 1242-1246 1826-1830 No issue of coinage.

Daud. 1246 1830 No issue of coinage.

Mansur II. 1246-1252 1830-1836

Mr. Humphreys states that (a) prior to the reign of Mansur II at least two types of Gold coins were known. (b) In Mansur III's reign one issue of pewter "pitis" took place: 960 = \$1.

Herr Haas writes that an issue of Copper Keping occurred in 1835.

British Merchants in Malaya issued a copper Keping inscribed "Trengganu" and dated A.H. 1251 (1835-6).

- Muhammed. 1252-1255 1836-1839
 No issue of coinage. The Malay writer Abdullah bin Abdul Kader states writing in 1838 that "pitis" in Trengganu ran 2840 to the dollar.
- Omar. 1255-1293 1839-1876
 1848-49 (A.H. 1265) and 1854-55 (A.H. 1271). Issue of pewter "pitis." 960 of these coins said to equal one dollar.
- Ahmad II. 1293-1299 1876-1881 No issue of coinage.
- Zenalabidin III. 1299-1347 1881-1918
 His Highness Sir Zeinal Abidin ibni Almerhum Ahmad K.C.M.G., Sultan. 1892-3 (A.H. 1310). Issue of pewter ten Keping pieces. 1907-8 (A.H. 1325). Issue of pewter one cent and half cent pieces.
- A son of Zenalabidin III. 1337-1338 1918-1919 No issue of coinage. This youth only reigned a few months and then abdicated in favour of his younger brother.
- Present ruler, another son of Zenalabidin III. 1338- ? 1919- ? 1920 (but coins are dated A.H. 1325). Issue of pewter. One cent piece from the A.H. 1325 die materially altered

Before referring in detail to the coinage it is perhaps desirable that I should give a few words of explanation as to the names by which the coins are known and as to their relative value.

The "pichi" or "piti" is essentially a pewter coin: it seems to have varied in value very much at different times just as it has in size.

Mr. Humphreys tells me that at one time no less than 3840 of these pitis were required to equal a dollar and Millies, at p. 147 of his work quoted above, writes:—

"Un savant Malai, qui a publié plusieurs ouvrages dans sa langue, Abdoullah, fils d'Abdou'l-Kader, fit en 1838 un voyage de Singapore à Kalantan sur la côte orientale de la presqu'île. Judicieux observateur il nota ce qu'il vit de plus remarquable et pour plaire aux Anglais il publia le récit de son voyage en Malai à Singapore en 1838,¹ ayant surtout pour but d'expliquer à ses compatriotes combien le Gouvernement juste et libéral des Anglais est préférable à la tyrannie, l'injustice et la barbarie des petits despotes malais. En parlant de l'état de Tréngganou ou

1. Bahwa ini Kesah pu-layar-an Abdullah, ben Abdul-Kadir, Munshi-Deri Singapura Ka-Kalantan. Turkarang ulih-nya. Singapura. 1254-1838, in 8° (Publié aussi en caractères malais).

“Trangganou sur la côte orientale, qui jadis acquit quelque renommée et joua, encore dans la siècle passé, un assez grand rôle dans les relations politiques de la péninsule, mais qui maintenant est tombé dans un profond avilissement, il fait aussi mention des monnaies du pays. Il dit (p. 48) que la monnaie d'échange à Trangganou est de 3840 pitis d'étain pour une piastre.”

I am not quite sure at what precise date the “pitis” bore such a low value but I imagine that it was in the early years of the nineteenth century when the dollar, piastre or rial referred to meant the Spanish dollar of commerce then current practically throughout Malaya and worth rather over five shillings. But apparently the later and now generally remembered table of values is as follows:—

30 Pitis	=	1 Kĕnĕri (this was not a coin)
4 Kĕnĕri	=	1 Kupang
4 Kupang	=	1 Mas (<i>i.e.</i> Sa'mas)
2 Mas or	}	= 1 Rial (<i>i.e.</i> Dollar)
8 Kupang or		
960 Pitis		

The word “piti” is said by some to be derived from the Siamese, though Millies thinks it may have a Javanese origin. The word “Kupang” must not be confounded with the word “Keping” mentioned by Haas. The former (which means simply “a fourth”) does not, I think, designate a coin at all; the latter is a word of Javanese origin and in Malay gives the idea of “a flat piece;” it has been extensively used in Malaya as the name of and on numerous kinds of money of which perhaps the best known are the bronze 1, 2, 3 and 4 Kapang pieces issued by the East India Company between 1783 and 1804, for its Settlement at Bencoolen (Fort Marlborough) in Sumatra and the many varieties of 1 and 2 Keping bronze tokens minted to the order of and issued between 1804 and 1840 by British Merchants trading in the Straits Settlements or used all over the Peninsula and Archipelago. The one Keping or Kapang piece was as a rule about the size of a Dutch doot and 400 were equivalent to a Spanish dollar.

Pewter pieces of ten Keping were issued in Trengganu in 1892-3.

The word “Mas” simply means Gold in the Malay language.

Since the time when Trengganu came under British protection in 1909 and no doubt, but to a less extent, before that date, the currency of the Straits Settlements has been in force but side by side with the local pewter. All “pitis” however are now obsolete and only the Cent issues current. The pewter Cents issued by Zenalabidin III were called “White” cents from their colour; the Straits Bronze cents were similarly known as “Red” cents. Four of Zenalabidin's cents equalled in value three Straits' cents; as 100 Straits cents make one Straits dollar (now fixed at a value of 2 shillings 4 pence) so do 133½ of Zenalabidin III's pewter cents.

But owing to the then high price of tin the cents of the 1920 Trengganu issue have been placed on an equal footing with the Straits' cents. It will, one would imagine, be somewhat confusing to have two very similar pewter coins of the same denomination and face value (one cent) but actually of different worth synchronously current.

I will now endeavour to deal, so far as I can, with the coinage in detail.

A. *Gold: from Trengganu and other neighbouring places.*

Mr. Humphreys says (writing in 1919) that "Before Mansur II it is known that "there were two gold coins at least."

"(1). Mas sa-Kupang = 120 pitis ($\frac{1}{4}$ of a dollar)

"(2). Sa-Mas = 480 pitis (= 4 Kupang); a half dollar."

He means by this that gold coins were made in Trengganu at one time. He adds "When the gold coins were made, gold was at \$20-25 a tahlil (or less); now it is \$72."

He sent me three gold coins from Trengganu.

(1). An octagonal coin: dull yellow gold; size about 17.5 mm.: weight about 38.8 grains. On one side in Arabic are the words "Sultan Sulaiman." On the other side in Arabic the words "Khalifat-ul-mo'minin" (*i.e.* Commander of the Faithful). This coin was obtained in Trengganu in March, 1920.

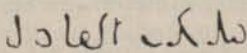
It appears, however, to be almost exactly similar to that figured by Millies (plate XXIII Fig. 242) and ascribed by him to Johore. Millies states that this ruler is "Sultan Soleiman Schâh" who was Sultan "Selon une opinion assez probable, de 1722 jusqu'en 1754 ou 1759." [Pl. III, fig. 1].

(2). An octagonal coin; dull yellow gold; but somewhat clipped so that it appears almost circular. It looks rather as if it had been subjected to heat but is clear enough; size about 11.5 mm.: weight about 7.4 grains. On one side is again "Sultan Sulaiman" and on the other "Khalifat-ul-mo'minin."

This coin corresponds almost exactly with Millies' plate XXIII Fig. 243 (Johore). In sending me this coin which was obtained in Trengganu in September, 1920, Mr. Humphreys speaks of it as called a "dinar." [Pl. III, fig. II].

(3) A circular coin; bright yellow gold; size about 9 mm. weight about 9.4 grains. On one side in Arabic is "Shah Alam;" on the other side "Malik-ul-Adil" (The Just King). This was obtained in Trengganu in June, 1920. [Pl. III, fig. III]. This coin is a puzzle. A large number of numismatists have seen it but are unable to say where it comes from. Personally I thought it might be from Atjeh (Acheen) in North Sumatra but Mr. J. P. Moquette of Weltevreden, Java, points out that "Malik-ul-Adil" does not occur on coins from that place, though "Sultan-al-Adil" is common on coins both from Atjeh and Borneo; but he cannot guess its provenance. Mr. Allan of the British Museum and Mr.

Howland of the American Numismatic Society were equally doubtful, though the latter suggests it belongs to some Malay Peninsula State. Mr. Valentine thinks it *does* come from Acheen as the name "Shah Alam" occurs on some of the gold coins of that locality in a longer legend "Paduka Shah Alam" (see Millies Plates XVI). Mr. J. Schulman of Amsterdam is, however, certain that it is *not* from Acheen, but thinks it emanated from some small South Indian State (possibly of Beejapur) owing to its type and characters. But Mr. Gravely of the Madras Museum is disposed to think it was issued by one of the Mughal Emperors. The mere finding of coins in a particular place, it need hardly be pointed out, is not of much value in fixing where they were minted but the fact is that we are still somewhat ignorant as to the coinage of the native States of Malaya; and very slender reasons have been at times assigned for attributing a specimen to a particular locality. An example of this slight groundwork may be seen in the case of those ten coins which Millies ascribes to Trengganu. He writes, (p. 145. I venture to give a translation of his French text), after discussing various specimens which he attributes to Kedah and Johore,—“We have not been able to discover any coins, which can with certainty be assigned to the other petty States of the central portion of the Malay Peninsula, but we must here mention a group of tin coins, of which, although of very simple appearance, the identification presents some difficulties. These pieces only, as a rule, show mere titles, either on the obverse, or spread over the two faces, sometimes with, but frequently without, a date.” He then, in a paragraph too long for quotation here, indicates the features common to the group. These are the presence of the words (in Arabic script) “Le Roi de Juste” or “Le Calife des Croyants.” (i.e. “Malik-ul-Adil and Khalifat-ul-Mouminin”), either alone or in combination. The reason why he thinks that these coins should be attributed to Trengganu is because the Malay gentleman Abdullah bin Abdul Kadir in his book to which I have referred above, says, in writing of the tin currency of that State “Elles pourtent

pour empreinte les mots  (i.e. Malik-al-

Adil) et sont de la grandeur de nos dutes.” Professor Millies therefore comes to the conclusion “Il me semble par cette notice très probable, que toutes les monnaies citées de cette classe appartiennent à l'état malai de Trangganou.”

Millies is at any rate generally regarded as correct in attributing coins such as No. 1 and No. 2 described above to Johore but no Gold coins are known with certainty to have been issued from any other Peninsula State. So Nos. 1 and 2 may be eliminated from consideration as Trengganu coins.

It is, perhaps, convenient, as these were the only gold coins which were acquired by me personally, to refer here; in order

to group them together, to the small collection of little gold coins which are in the Raffles Museum at Singapore and which, obtained in Malaya—some quite recently—seem to be perhaps of local origin. These coins have been kindly placed at my disposal for the purposes of this paper by Major J. C. Moulton, O. B. E., the Director of the Raffles Museum: casts of them have been examined by Mr. J. P. Moquette of Weltevreden, Java and I have been fortunate enough to be able to avail myself of his observations upon them.

They are eight in number:—

(A) An octagonal coin: rather bright yellow gold: size about 13 mm.: weight about 9.5 grains.

On one side in Arabic are the words “Sultan Abdul Sjah” and on the other “Chalifat al Muminin.”

This coin was obtained at Klang, a town in the State of Selangor on the West coast of the Peninsula, and was presented in 1911 to the Raffles Museum by an Arab curio-dealer named Ismail with whom the Museum had frequent dealings.

Mr. Moquette writes of this coin that it is similar to the one figured by Millies in his work mentioned above as fig. 241 on Pl. XXIII: and gives the legends thus

سلطان عبد الجليل شاه خليفة المومنين

Millies, who ascribes the coin to Johore, states (p. 143) that it would appear that there were three kings of that State named “Abdou-l-Djalil Shah:” the dates of their respective reigns seem somewhat uncertain: the 1st, however, appears to have been in power during part of the latter half of the 16th Century; the 2nd in the 17th Century and the 3rd at the beginning of the 18th Century: it is to the last of these Sultans to whom Millies attributes the coin figured by him.

The English writer Alexander Hamilton who visited Johore in 1703 speaks in his volume “A new account of the East-Indies. [London. 1739.] of the macie [mas] of Johor, a gold piece, of the value of about 3s 6d” [Pl. III, Fig. IV.]

(B) An octagonal coin: bright yellow gold: size about 12 mm.: weight about 9.8 grains.

This coin is similar to No. 1 (the preceding) but is somewhat smaller and, according to Mr. Moquette, from quite another die.

This coin was given to the Hon. Mr. W. G. Maxwell, C.M.G. (now Chief Secretary in the Federated Malay States) by the ex-Sultan of Rhio and presented by Mr. Maxwell to the Raffles Museum in 1919. It is interesting to notice (as showing how familiar with these kinds of coins the older Malay gentlemen were)

that Mr. Maxwell writes that the ex-Sultan told him that the coin was "a Rhio coin." To students of the history of Malaya the close dynastic connection between Johore and Rhio is of course very familiar. [Pl. III. Fig. V.]

(C) A circular coin: dull yellow gold: diameter about 13.5 mm.: weight about 9.5 grains: a well executed coin.

There seems no doubt that this coin is of the State of Acheen in North Sumatra.

On one side in Arabic appears the legend "Sri Paduka Sultanah Inaiat Sjah" (*i.e.* the usual honorific titles) and on the other "Zakiat ad-dien berdawlat Sjah:" (Pious in religion prosperous ruler).

Mr. Moquette gives the inscription thus:—

The lady referred to was the 3rd queen who, according to Millies. (p. 93) reigned from about 1678 to 1688 and whose coins are perhaps not quite so rare as are those of her predecessors.

He figures a specimen very similar to this coin as fig. 139 Pl. XVI.

This coin was found, together with other coins, in an old pot, underground on an Estate known as Deli Toewa in Sumatra and was presented to the Raffles Museum by a Mr. B. J. Weissman in 1905. [Plate III, fig. VI.]

(D) A circular coin: rather bright yellow gold: diameter about 9.6 mm.: weight about 8.8 grains.

This coin is another puzzle.

On one side is the representation of some animal—rather roughly executed—which looks to me like an antelope; but has been, by others, designated a deer, a horse and even a lion with horns! On the other side is, apparently in Arabic "Malik ul-adil."

This coin was obtained at Kota Bharu, Kelantan by Mr. G. W. Thomson and presented to the Raffles Museum by Dr. John D. Gimlette in 1906. [Pl. III, fig. VII.]

(E) A circular coin: very bright yellow gold: diameter about 10.3 mm.: weight about 9.4 grains.

This coin is very similar to (D).

It was obtained in Kelantan which is of course close to the Siamese Province of Patani. [Pl. III, fig. VIII.]

Writing of these two coins Mr. Moquette says "These coins with a deer (?) have on the other side

ملك العادل

malik ul adil) and it is very curious that similar coins were found at Jaring near Patani. These coins were described in the Journal of the Royal Asiatic Society for Great Britain and Ireland, 1903. Art. XIII, pp. 339-343 by Lieutenant Colonel Gerini with remarks by Dr. Codrington."

Dr. Codrington, I may mention, regarded the two coins upon which he comments (which were found in the grounds of a Siamese Buddhist Monastery) as imitations of some Southern Indian fanam (the Indian coin) and thought that the animal was intended to represent a maneless lion: he suggested that they were minted in Acheen and were coined in the reign of the ninth ruler Salah-al Din (A.H. 917-946 *i.e.* A.D. 1511-1539.)

Writing of (E) Mr. Moquette says "This is the same coin as described by Gerini and Codrington only struck from another die and I am sure that (D) is from the same origin. Dr. Codring-

ton's reading العادل is perfect but, as you can see on this

coin in combination with the representation by Gerini, the circle of dots is complete (on your coin above and on Gerini's beneath) so it is impossible to read anything else *i.e.* Sultan or Malik. The

meaning is clear but the style of writing

عادل

very ugly.

What the animal may be I cannot guess but I never saw (on a coin) a lion with horns. I am certain, however, that this coin is not Achinese. I do not see the sun or moon. Perhaps the head and tail of the beast (whatever it may be) are hiding an inscription but this is mere guess work and I can see nothing clearly."

Of (D) he writes "I read (with hesitation) ملك !!!

Malik" and with certainty العادل "ul adil" written thus

العادل

The subjoined photographic reproductions show one of Gerini's specimens and are useful for the purposes of comparison:—



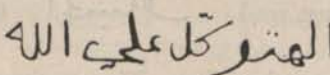
(F) A circular coin: fairly bright yellow gold: diameter about 10 mm.: weight about 9.3 grains.

Found in Kelantan. [Pl. III, fig. IX.]

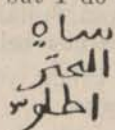
(G) A circular coin: fairly bright yellow gold: diameter about 11.2 mm.: weight about 9 grains.

Found in Kelantan. [Pl. III, fig. X.]

These two coins are also somewhat of an enigma. They are no doubt from the same source though from different dies.

On both, on one side, appears a legend which Mr. Moquette gives as  (i.e. Al mutuwakkil Ali

allah). Of the other side Mr. Moquette writes. "The inscriptions are the same but I do not know what to make of them. I

see pretty clearly,  but query further."

The subjoined photographic reproductions show one of Gerini's specimens and are useful for the purposes of comparison:—



× 2



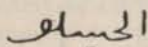
× 6



× 6



× 2

"It is possible one must read  but I cannot

guess the meaning of the combination. These coins might, possibly, have been imported from Egypt as there were, I believe, three Abbasid Khalifs called Almutu Wakkil Ali Allah but it is also quite possible that one of the Malayan Sultans bore this honorary title which would be a fine one for a new believer."

(H) A circular coin: fairly bright yellow gold: diameter about 10 mm.: weight about 8.5 grains.

This coin was obtained at Kota Bharu, Kelantan by Mr. G. W. Thomson and presented to the Raffles Museum in 1906 by Dr. John D. Gimlette. According to Mr. Thomson this coin and (D) are known in Kelantan as "Mas dinar;" a designation which however would no doubt be applied to any small gold coin in Malaya.

This coin is worn or has been touched by fire and the characters were to us undecipherable. [Pl. III, fig. XI.]

I am afraid the above records do not advance knowledge materially. It is interesting to notice that of all the last ten coins each weighs about one quarter of the large first piece. The Malays seem quite familiar with this class of small gold coin: but as showing of how little value in determining origin the mere discovery of pieces is I may mention that Sir Lionel Woodward (Chief Judicial Commissioner of the Federated Malay States) obtained for me in Deli, Sumatra three minute gold coins which were popularly supposed to be of local emanation but which turned out to be comparatively recent emissions from Travancore in Southern India.

B. *Silver.*

I could find nothing more than what Haas writes (*vide supra*) as to the Silver Quarter Real said to have been issued in Trengganu.

C. *Copper.*

Possibly the copper Kepings stated by Haas to have been issued in Trengganu in 1835 is the Bronze One Keping piece which is described as No. 17 by Lt. Colonel Leslie Ellis in his article, entitled "British Copper Tokens of the Straits Settlements and Malay Archipelago." (*Numismatic Chronicle*. Series III, Volume XV, p. 147) and the obverse of which is figured by him as Fig. 7 on Plate VI.

Owing to the dearth of small British money in Malaya at the end of the eighteenth and the beginning of the nineteenth centuries Merchants issued large numbers of their own tokens for use as currency. Ellis describes about forty varieties. They often bore the names of States such as Perak, Selangor, Atcheen, Dilli, Siak, etc., and generally speaking seem to have been minted in Birmingham and issued between 1804 and 1835.

A specimen (a proof in bronze) in my collection, particularly designed for Trengganu, has in Malay on the Obverse "Negri Trengganu" (Country Trengganu) and on the Reverse "Satu Keping, 1701" (One Keping 1251 = 1835). It is a circular coin; diameter 21 mm. Plain edge. Struck, no doubt, at the Soho Mint, Birmingham. [Pl. III, fig. XII.]

I could not find any other sort of copper coin connected with Trengganu.

D. *Tin.*

The Malay Peninsula is very rich in tin and to that metal resort was naturally made for coinage. Mixed with a varying amount of lead some are very plastic, whilst others are hard. The former quickly wear and blacken in circulation and their inscriptions soon become defaced.

I will try to deal with these pewter issues in chronological sequence.

A. Millies, as I have mentioned above, figures ten tin coins which he speculatively ascribes to Trengganu. On some of these is a date A.H. 1222 (*i.e.* 1807-8). I have not seen any of these dated coins but he figures (Plate XXIII, Fig. 250) another coin, examples similar to which I have received from Mr. Humphreys who tells me that they are locally assumed to belong to Trengganu and ran 3840 to the dollar. What date to give them it is hard to say; possibly they are the "pitis d'étain" mentioned by Abdullah. But I am inclined to think they are either of the late 18th century when the country was at its zenith or do not belong to Trengganu at all as their appearance and workmanship are certainly better than and quite unlike any other coins emanating from the State.

The following is a short description of the two types which I have received.

1. A circular coin of hard pewter (tin with a little lead). Size 26.6 mm. Plain edge. Clearly and deeply struck; probably a cast coin. Obtained in 1919 in Trengganu by Mr. J. L. Humphrey. Vide Millies, Plate XXIII, Fig. 250; and Netscher and van der Chijs in "De Munten van Nederlandsch Indie" (Batavia, Lange & Co., 1863). Plate XXVI, Fig. 245 where the authors figure a similar coin and describe it as attributable to the States of Sambas and Mampawa situated on the western coast of Borneo on grounds which Professor Millies is at some pains to show are not at all conclusive. Superficially they look as if they were heavily coated with copper and are of a deep brown colour quite unlike any later Trengganu "Pitis" all of which are of softer metal contents and of typical silvery-white pewter coloration; but underneath this deep brown coating (or patination?) the bright metallic tin is easily observable.

Obv. In Arabic script in two lines "Malik-al-Adil."

Rev. Plain. [Pl. IV. fig. XIII.]

2. A similar coin but considerably smaller being only 23.6 mm: in diameter. Obtained in Trengganu by Mr. J. L. Humphreys in 1920. Although it has the same inscription it is from an entirely different die or mould; the letters are not of the same shape or size and there is a ring of strokes close to the edge. Neither Millies' nor Netscher and Van der Chijs' figures are at all similar. [Pl. IV. fig. XIV.]

I think the larger coin belongs perhaps to a later and more decadent date than the smaller which is generally better turned out.

B. Of the issue mentioned by Mr. Humphreys as having taken place in Mansur II's reign I have not received or seen any specimens.

C. One is on firmer ground when one comes to the next known issue namely that made in the reign of Sultan Omar (1839-76) as one has in this case both place-name and date. I have several of these. Their description may be given thus:—

3. A circular coin of very thin pewter; punched with a male die with a faint impression; issued in the reign of Sultan Omar (1839-76). Obtained in 1919 in Trengganu by Mr. J. L. Humphreys. Size 23 mm.

Obv. In Arabic script "Thuriba Trengganu 1265." (*i.e.* Struck Trengganu 1265). The Hegira date 1265 equals A.D. 1848-49.

Rev. Plain. [Pl. IV, fig. XV.]

But I have two other specimens of similar character but on which the date is different. These are with Mr. W. H. Valentine at present. I describe them thus:—

4. A circular coin similar to No. 3 and with the same provenance.

Obv. In Arabic script "Thuriba Trengganu 1271." (*i.e.* Struck Trengganu 1271). The Hegira date 1271 equals A.D. 1854-5.

Rev. Plain.

So it would appear that in Omar's reign there were two issues of "Pitis" but differing only in date. I have no specimen with me to figure.

D. The next issues, with which I am acquainted, are those of the Sultan Zenalabidin III, a grave and dignified gentleman whose acquaintance I had the honour of making.

The first may be described thus:—

5. A circular coin of soft pewter of moderate thickness; stamped in a die on both sides:—Issued in the reign of Sultan Zenalabidin III. Various specimens obtained in Singapore and Trengganu. Dated A.H. 1310. (= A.D. 1892-3). Size from 27.5 to 28.6 mm. Very roughly struck; plain edge.

- Obv. A wreath of leaves surrounding the inscription in Arabic character—"Sapuluh keping"—(*i.e.* Malay for "Ten Keping") and the figures "1*" (*i.e.* 10). A circle of strokes close to the edge.
- Rev. A circle of strokes close to the edge; then a plain line circle and within in Arabic character "Sarī Trengganu, ١٣١١"
(= Currency, Trengganu 1310, *i.e.* 1892-3).

This 1892 Trengganu issue of a piece of 10 Keping must however be regarded as the issue of a "Cent" piece though as a matter of fact they bore a local currency ratio to the Straits Copper cent of 4 to 3. I regret I have now no specimen with me to figure.

Next in order comes an issue of regular One Cent and Half cent pieces which may be thus described.

6. A circular coin of soft pewter of moderate thickness: issued in the reign of Sultan Zenalabidin III. Struck in a die on both sides. Dated A.H. 1325 (= A.D. 1907-8). Numerous specimens from Trengganu. Size 28.3 mm. Good workmanship; milled edge.

Obv. The figure "1" within an interior beaded circle; outside, and within another beaded circle close to the edge, a wreath of leaves.

Rev. Within an interior beaded circle in Arabic character—"Kerajaan Trengganu Sanah 1325" (*i.e.* Malay for "State Trengganu, Year 1325," *i.e.* 1907-8). Outside, and within another beaded circle in Arabic character "S. Z. A." (the initial letters of Sultan Zenal Abidin) each letter separated from the other by a six-pointed star. [Pl. III, fig. XVI.]

7. A coin similar in all respects but smaller and on the Obverse the figures " $\frac{1}{2}$ " replace the figure "1." I have no specimen with me to figure.

E. Lastly comes the issue in 1920 of one cent pieces in the time of the present young Sultan. I have described these fully in a previous article published in this Journal March, 1922).

I must not leave Trengganu without a short mention of the gambling Tokens or counters. As was usual, in most of the Malay States the right of keeping a gambling establishment where the playing of games of chance such as Fan-Tan or Chap-Jee-Kee could alone *lawfully* be carried on was "farmed" out by the Government to the person who would bid the highest sum for the privilege. So far as I know the lessee was generally a Chinaman. This system has been gradually eliminated in the States under British Protection but existed until three or four years ago in Johore and was only abolished in Trengganu in 1919.

For the convenience of his patrons the successful lessee in Trengganu sold counters for the purpose of making stakes, which were redeemable for cash on leaving the establishment. I have re-

ceived several of these tokens. They are locally known as "Jokoh," "Jongkol," "Jokong" or "Jongkong." (a word probably of Malay origin of which the true form may be "Jongkong" meaning a small hollowed-out boat and perhaps having reference to the hole in the centre of the coin and in Trengganu means any tin or pewter coin allowed to be produced by a private individual).

They are of two kinds.

A. A circular pewter coin with a square hole in the centre; diameter 33 mm. Plain edge.

Obv. Within three circles of dotted lines in Chinese "Hiap Chin Peng Kee." This means "United Prosperity Peng's Chop." "Peng" is part of the farmer's name; and "Chop" means "Firm" or "Business."

It is interesting to note that to prevent forgery a piece of thin copper wire about 20 mm. long is stamped into the face of the coin. This would make imitation a somewhat laborious task.

Rev. Within two circles of dotted lines in Malay "Ini Bun Peng punya." This means "This is Bun Peng's;" "Bun Peng" being the Farmer's name. [Pl. III, fig. XVII.]

B. A somewhat similar coin but about 32 mm. in diameter and probably a later issue than A.

Obv. Within a single circle of small triangles and in larger script than in A, the same inscription; each word separated by a line of small diamonds. The anti-forgery wire is present.

Rev. Within a single circle of small triangles in Malay "Bun Peng;" in place of the two other Malay words as in A appear two Chinese conventional representations of a shrimp; each word and figure is separated by a line of small diamonds. I am told that the "shrimp" is an emblem of good fortune. [Pl. III, fig. XVIII.]

When in the district of Trengganu known as Kemamam I found, at a place called Chukai, that important Chinese Merchants issued their own paper currency in private notes of excellent appearance which I was informed had a large though territorially limited circulation.

Kelantan.

Kelantan is another of those Malay states which came like Trengganu under British Protection in 1909; it also lies on the Eastern littoral between $4^{\circ} 38'$ and $6^{\circ} 15'$ north latitude. Its area is about 5,800 square miles. It is a far more progressive State than Trengganu; its population in 1911 was estimated at about 290,000 of whom some 270,000 were Malays, 10,000 Chinese, 5,000 Siamese and rather over 100 Europeans. I do not know of much which has been published about its coinage. Millies has nothing to say of its coins though he mentions the State by name. I made a few remarks about Kelantan in connection with gold

coins received from Trengganu, but I do not know that it is certain that any coinage was issued by Kelantan except Pewter "pitis;" of these however I have seen several issues. I believe that at any rate the latter of these ran 480 to the dollar. I give a short description.

A. First issue. 1882-3.

A pewter coin with a circular hole in the centre. Size 28.3 mm. Plain edge. I obtained this in Singapore in 1917. On one side in Arabic script is "Thuriba fi jamaddil akhir 1300" (*i.e.* "Struck in the month of Jamadil Akhir 1300"). The Hegira date 1300 = 1882-3.

On the other side is, in Arabic Script "Dama sama mulka dowlat Kelantan" (*i.e.* "Permanent be the prosperity of the Country Kelantan"). This coin is now with Mr. W. H. Valentine and I regret that I have with me no specimen to figure. One was sold at Lord Grantley's sale in Amsterdam in 1921 as part of Lot 1509.

B. Second issue. 1895-6.

A pewter coin with a circular hole in the centre. Diameter about 29 mm. Plain edge. Inscriptions in Arabic script on both sides. These read on one side "Thuriba fi jamadil akhir sanat 13" (which I take to mean "Struck in the month of Jamadil Akhir 1313 A.H." = 1895-6 A.D.) and on the other "Dowlat Kelantan dama sama mulki ki."

It is a well made clearly stamped coin. I had two specimens which I obtained in Singapore in 1919. [Pl. IV, fig. XIX.]

C. Third issue. 1896-7.

I have not seen a coin of this issue but noticed one for sale in Schulman's LXVIIIth catalogue. It is there thus described:—"Kelantan. Piti teboh. A.H. 1314. Legende arabe des deux côtés autour d'un trou rond, en caractères incuses, et le nom du mois Djamada 'l-awal. A. J. N. (American Journal of Numismatics) 1904, p. V. n. 40. Etain, 30 m.m. Beau et rare. 5 florins." A specimen was also sold at Lord Grantley's sale as part of Lot 1509 in Amsterdam in 1921: and at Mr. Axel Lagerman's sale at the same place in 1922. Lot 1462 (which sold for 20 florins = £1-13-4) is figured and thus described by Mr. J. Schulman:

"Kelantan. Etat independant. Une branche de 13 Pitis (monnaies d'étain) avec trou circulaire et une inscription malaie en beaux caractères, avec 'Malekah beland jan kirdjan Kalantan, ect.' et au revers 'Sounih fi Djamada 'l awwal senet 1314' = A.D. 1897. H. W. A. J. N. fig. 40. Longueur 250 mm."

"La branche décrite se trouve dans l'état où sont ces monnaies assortir du moule, donnant une idée de quelle manière les monnaies de Malacca sont fabriquées."

D. 4th issue. 1899-1900.

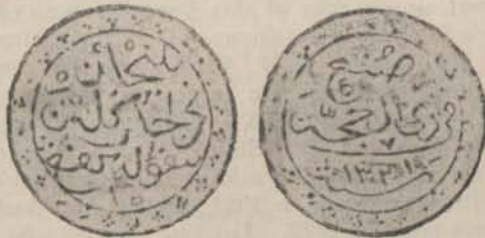
A pewter coin with a round hole in the centre. Size 30 mm. Plain edge. On one side in Arabic script. "Saniah fi jamadil awal 1317" (i.e. Impressed in the month of Jamadil Awal 1317). The Hegira date = 1899-1900. On the other side in Arabic script "Mulka belanjaan kerajaan Kelantan" (i.e. Currency State Kelantan (may it be) prosperous). I obtained this coin in 1917 in Singapore. It is now with Mr. W. H. Valentine. I regret I have no specimen with me to figure.

E. 5th issue. 1903-4.

A pewter coin with a round hole in the centre. Size about 21.5 mm. Plain edge. On one side in Arabic script is "Thuriba fi Zulhijjah sanat 1321" (i.e. Struck in the month of Zulhijjah year 1321). The Hegira date = 1903-4. On the other side is in Arabic script "Belanjaan kerajaan Kelantan" (= Currency State Kelantan). I have two specimens of this coin kindly sent to me in 1920 by the Hon. Mr. H. W. Thomson then Acting British Adviser in the State. [Pl. IV, fig. XX.]

F. 6th issue. 1903.

A pewter coin *without* a hole in the centre. Size about 29.5 mm. Plain edge. On one side in Arabic script is "Belanjaan kerajaan Kelantan sapolah (10) kapang" (i.e. Currency State Kelantan Ten Kepangs). On the other side is "Soenga (? Saniah) Fi Zial Hajjat Sanat 1321." The Hejira date is 1903. Mr. W. H. Valentine showed me a specimen of this coin in the autumn of this year (1922) and I give the transcription of the legend as he reads it. I expect that the latter of the two inscriptions probably means "Struck in the month of Zulhijjah year 1321." I attach a reproduction of this coin taken from a rubbing.



In 1919 the ruling Sultan was His Highness Sir Mohamed IV bin Almerhum Sultan Mohammed, K.C.M.G.

Patani.

Amongst the earth-caked coins which I purchased in Singapore in 1918 was one, which when cleaned up, gave much trouble in determination though it was fairly legible. It was a pewter coin with a legend in Arabic and Mr. Valentine was inclined to think it belonged to Kedah. The inscription seemed to read "Al

dowlah ul Rhairiah fi balad Sui 1307" but the word "Sui" or "Shui" or "Sinui" was doubtful. At one time Mr. Valentine read the word as "Sunyi" (*i.e.* "tranquil;" the common Malay word for "quiet"). But "Dar-ul-Aman" (Country of Peace) is the official honorific title of Kedah; as "Dar-ul-Salam" is an honorific name for Acheen, "Dar-ul-Redzwan" for Perak and "Dar-ul-Ihsan" for Selangor. Indeed on coins of Kedah dated A.H. 1224 (*i.e.* 1808-9) one sees "Dar al aman balad Kedah." On another similar pewter coin in Mr. Valentine's possession is an inscription "Malik al adl fi balad al Siwi (or Shiwi) 1309." In order to ascertain where the coin really did come from I laboriously sent it to a large number of people.

Mr. J. Schulman of Amsterdam wrote of a similar coin (which he sent me on approval) on 28.10.19.—"Thank you for your information on account of the "Sinui" coin. I don't know where "Sinui" is situated but my specimen reads clearly "Fi balat el-Sinui;" this *may* be an honorific title of Kedah."

In January, 1920 I sent the coin to Mr. W. H. Dinsmore, the Judge at Kedah, who showed it to many notables of that State; they were unanimous that it was not a Kedah issue.

In February, 1920 I sent it to the Hon. Mr. J. L. Humphreys the British Agent at Trengganu who is a most accomplished Malay scholar. He wrote in reply in March—"I have shown the coin to the only persons whom I thought likely to be able to explain it. None of them can. But they all consider it to be a "Barat" coin. The word "Barat" (as you probably know) means as used here, "Western" and as used in Trengganu, which is on the eastern sea-board of the Malay Peninsula, refers to Kelantan or some Malay-Siamese State."

In March, 1920 I sent it to the Hon. Mr. W. H. Thomson the British Adviser in Kelantan. He replied stating that he had first exhibited it at the State Council where it was declared not to have emanated from Kelantan; secondly to various persons of learning, one of whom, a Haji, stated that it came from the Siamese province of "SAI" which adjoins Kelantan on the north sea-board: he was, as it turns out, not far wrong.

At the end of March, 1920 I sent it to Mr. J. P. Moquette of Weltevreden, Java. He was unable to say definitely what it was but thought it read "From the State (country) of SAI." He said that he had many coins of this kind but all were more or less illegible.

In May, 1920 I sent it to the Siamese Lord Lieutenant of the Province of Patani. His Excellency replied to me very courteously in June in the following terms—"I beg to say that this coin, an issue of Changvad (District) Saiburi, is quite obsolete and is out of use since some years, say in 1909. I have the pleasure to return the old coin you sent and a few more of similar type which I found in this Province. They are marked in separate little parcels in the name of various places where they were originated."

His Excellency's parcel of coins was very interesting and it is of these which I propose to try to give a short description.

Millies has little to say about the coins of Patani but describes one pewter specimen (Plate XXIII, Fig. 245) which bears on one side an Arabic inscription in the Malay language meaning "Ceci est un pitis courant du radja de Patani" and on the other a similar legend "Le calife des croyants l'an 1261 (*i.e.* 1845-6)."

In Schulman's LXVIIIth Catalogue another Patani pewter piece is advertised for sale thus:—

- "Patani. Piti teboh. A.H. 1309 avec "Zarb fi belad el-
- "Pathani. Rev. Ini pitis belandjah dar el-(Mankarain ?)
- "Pathani. Plomb. Inédit, t.b.c. 2 florins."

My coins from His Excellency emanated apparently from three mints: one at Patani itself, which is inland; another at a little town called now, and marked on the official railway map as, Yaring which is on the coast about 30 miles north of the third mint which was also situated on the coast about 130 miles south of Singora at a small port called Saiburi on the mouth of a river. I should not have been surprised to learn that there were other places of similar character where pewter coins of this type were produced: but His Excellency in a letter to me dated May 28th 1921 informs me that "as far as can be ascertained pewter coins were made "only at Patani, Yaring and Saiburi: they were not struck by "Government authority and are not allowed currency to-day. It "is something like 20 years ago when these pewter coins were last "used. The value of the coins was roughly:—

- "Patani: 800 to \$1 (Straits Settlements).
- "Yaring: 500 " " "
- "Saiburi: 500 " " "

"It is unlikely that the coins would be used in any part other than "that of the immediate vicinity of origin; for even at the present "time a good deal of trade between the peoples near the sea and "those inland is carried on by barter." I will deal with the places separately.

Patani.

A. *1st issue.* (A.H. 1261, *i.e.* A.D. 1845-6).

This is the coin mentioned by Millies (see above).

B. *2nd issue.* (A.H. 1297, *i.e.* A.D. 1880-1).

Two circular coins sent me by the Lord Lieutenant of Patani in June, 1920. Pewter with a large central hole. Size 28 mm. On one side in Arabic "Al Sultan al Fatani sanah 1297 (*i.e.* The Sultan of Patani, year 1297). On the other side in Arabic "Wa Khalifat al-Karam." (*i.e.* Generous Ruler). Schulman was cataloguing this coin for about 2s 6d a few years ago. [Pl. IV, fig. XXI.] The central hole is, I need hardly say, a common feature in Far Eastern currency of low value: they can thus be strung and carried easily in bulk on a cord.

C. *3rd issue.* (A.H. 1301, i.e. A.D. 1883-4).

Three circular coins sent me by the Lord Lieutenant of Patani in June, 1920. Pewter with a circular central hole. Size .22 mm. On one side in Arabic "Al-mutassarif fi bilad al Fatani sanah 1301" (i.e. Currency of the country of Patani year 1301). On the other side in Arabic "Thuriba fi harat al dowlah uzza Nasaruh" (i.e. Struck in the State May God prosper it). [Pl. IV, fig. XXII.]

D. *4th issue.* (A.H. 1305, i.e. A.D. 1887-8).

Three circular coins sent me by the Lord Lieutenant of Patani in June, 1920. Pewter; with a circular hole in the centre. Size 25 mm. On one side in Arabic "Al-murassarif fi balad al Fatani sanah 1305" (i.e. Currency of the country of Patani year 1305). On the other side in Arabic script and the Malay language "Ini pitis belanja di dalam Negri Patani" (i.e. "This piti is currency within the Country of Patani"). [Pl. IV, fig. XXIII.]

E. *5th issue.* (A.H. 1309, i.e. A.D. 1891-2).

This is the coin mentioned by Schulman in his catalogue (vide above).

Yaring.

A. Millies (p. 153) refers to a tin coin figured by Netscher and Van der Chijs (Plate XXIV, Fig. 220) and ascribed by them to Djambi which reads "Ini pitis harba (?) sanat 1261;" the word which the Dutch authors were unable to decipher Millies thinks must be "Jarung" or "Djarung." The name as now placed on the Siamese official Railway Map which I consulted is written "Yaring" and the Lord Lieutenant himself so spells it; but I have seen it spelt "Jerim," "Jeering," "Djering." 1261. A.H. = 1845-6.

B. Two circular coins sent me by the Lord Lieutenant of Patani in June, 1920. Pewter; with a circular hole in the centre. Size 28 mm.

On one side is an inscription in Arabic character which is rather difficult to decipher but seems to read—"Ini pitis balad Jariz sanah 1293," (i.e. "This is a piti of the country of Jariz, year 1293.") [i.e. A.D. 1876-7.]

The other side is blank; and so I gather was that of the one mentioned by Netscher and Van der Chijs or otherwise they would have figured both sides.

I am rather doubtful as to the last figure of the date. [Pl. IV, fig. XXIV.]

C. Three circular coins sent me by the Lord Lieutenant of Patani in July, 1920. Pewter; with a circular hole in the centre. Size 25.5 mm.

On one side is an inscription in Arabic character which seems to read "Haza al dowan al raij al maadani fi balad al Bahrein (or Yahrein) 1312" (*i.e.* This metal fraction is currency of the towns of the country of Yahrein 1312). *i.e.* 1894-5.

The other side is blank. [Pl. IV, fig. XXV.]

Saiburi.

Millies (p. 154) mentions "Cherai," "Thrai," "Tjerai," "Saj," "Chrai Buri" (*i.e.* "the Country of Chrai"). These all mean the place now marked on the railway map as "Saiburi" and are the same as "Sai," "Sui," "Sinui," "Sainoosi," "Saiburi."

A. Three circular coins sent to me by the Lord Lieutenant of Patani in July, 1920. Pewter; with a circular central hole. Sizes 28.6; 28.1; 28.5 mm.

On one side is an Arabic inscription within an interior plain line circle; outside this circle is another similar circle and between the two a simple border of what appears to be a mere design thus (*e*) The inscription seems to read "al dowan al khairiah fi balad al Sanoosi 1307" (*i.e.* Metal fraction of the villages of the country of Sanoosi 1307). [*i.e.* 1889-90.]

On the other side the outside border is repeated and what may be an attempt at a floral design takes the place of the Arabic inscription.

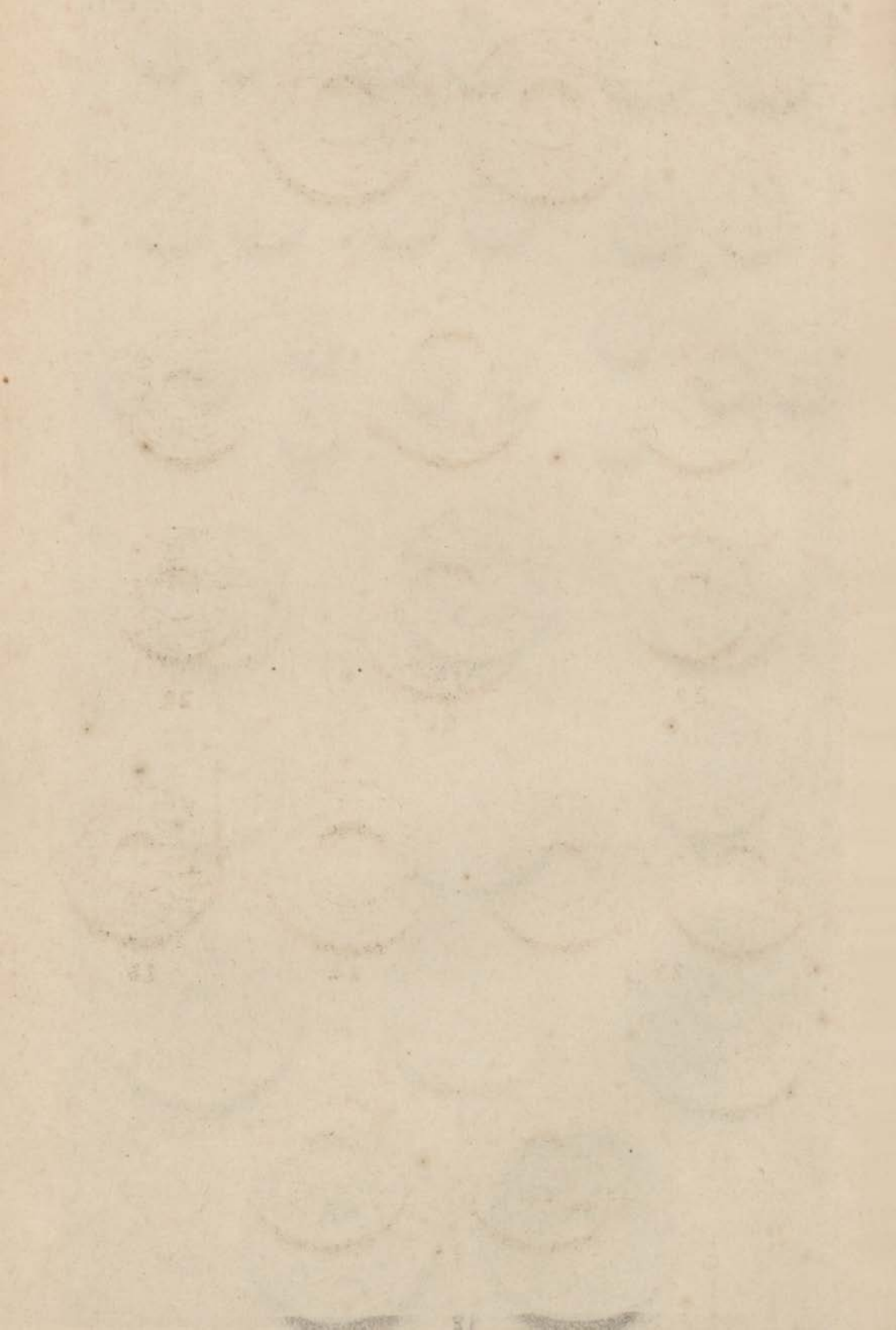
Mr. Moquette who has similar coins tells me that his (which are not very legible) appear to read *اسبيوي* (*i.e.* Assabiwi). [Pl. IV, fig. XXVI.]

I may leave Patani with an amusing story told me by Mr. Humphreys about the origin of the word "Wang" (used almost all over the Malay Peninsula to mean "money"). It is *said* to be derived from a corruption of the name "Awang" given to her adopted Chinese son by the Raja Nangchayan who is supposed to have been Queen of Patani about 1700 A.D. This Awang manufactured $2\frac{1}{2}$ cent pieces which were called "Wang" after him. Hence the Malay proverb "Sa-tali tiga wang" literally "One string (of cash = $7\frac{1}{2}$ cents) three wang (of $2\frac{1}{2}$ cents each);" *i.e.* $7\frac{1}{2}$ cents is the same as three times $2\frac{1}{2}$; so our "Six of one and half a dozen of the other" has a nice Malay counterpart!

Patna, Bihar and Orissa,

India.







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Notes on Dipterocarps.

No. 9. On differences in the seedlings between *Balanocarpus maximus*, King, and *B. Heimii*, King.

By I. H. BURKILL.

The germination of three species of the genus *Balanocarpus* was described in the No. 81 of this Journal (March 1920), —of *B. Heimii*, King, under the wrong name of *B. maximus* (pp.3-4), of *B. penangianus*, King, (pp. 65-66) and of *B. Curtisii*, King, (pp. 59-60). It is now possible to describe that of the true *B. maximus*, from seeds collected by Mr. R. E. Holttum in the Selaru forest reserve, Negri Sembilan, on November 27th. 1922 (no. 9709).

The fruit has the shape of a very short cigar. Falling from the tree at maturity, it naturally rests horizontally, and so lying germinates at once, thrusting out its radicle as in Fig. 1.

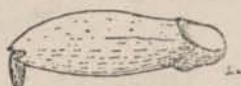


Fig. 1. The germinating fruit of *Balanocarpus maximus*. $\frac{1}{2}$ nat. size.

If at this stage the fruit-wall be removed the cotyledons will be seen parallel as in figure 2, the placental cotyledon just excluding the dorsal cotyledon from the base of the fruit-cavity, but both reaching the apex. In section, at *a.* in the figure, the dorsal cotyledon will be found to embrace the placental very slightly: but in a section at *b.*, which cuts the lobes of the cotyledons, these are found to surround the radicle equally.

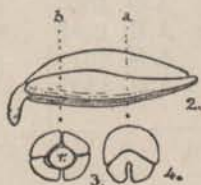


Fig. 2. The embryo of *Balanocarpus maximus*. exposed, seen obliquely from the side and from the placental face. Fig. 3, a section of it at *b.* and fig. 4, a section of it at *a.* $\frac{1}{2}$ nat. size.

The whole embryo is purple.

The first outward sign of germination is the appearance of 2, 3 or 4 small radiating cracks at the very apex, as the fruit-wall gives way in front of the thrust of the radicle. It is rare to find four cracks, and in the sample of seed examined only 3 per cent exhibited so many. Three is the most usual number, but two is quite frequent, even to making 26 per cent. The radicle forces the cracks open until they are about 2 mm. long: that suffices to free it; and it turns downward to the soil as in figure 1. The cotyledons by growing meanwhile exercise a pressure inside the fruit-wall which extends one of the cracks around the radicle, until it reaches the very base; and the fruit-wall then by their expansion is thrown off. This one crack varies greatly in position: to what an extent is indicated by the diagram (fig. 9 on p. 221), wherein the distance from the placenta to the crack is recorded for thirty fruits, all of which had been split at the tip by the radicle in three radiating lines. The diagram shows that the long crack was produced in eight of the fruits within 45° of the placenta; it was produced twenty times within 90° of the placenta, that is to say over the placental cotyledon or about its edge; and it was produced a further nine times within the octant between 90° and 135° . It was produced in one fruit only at a greater angle.

These observations are fully in accord with the idea discussed in this Journal (No. 86, 1922, pp. 287-291) that in the Dipterocarps the fruit is not dehiscent, but is ruptured from within by the growth of the embryo. The position of the longest crack comes from the attempt of the cotyledons to flatten themselves in growth, which tendency is certainly modified by the very frequent irregularities in the packing of the cotyledons, and probably modified by the wetness or dryness, *i.e.* relative hardness, of the opposite sides of the fruit as it lies prone upon the moist soil.

When the young plant of *B. maximus* has thrown off the fruit-wall and seed-coats, the lobes of its cotyledons diverge as in figures 5 and 6. They are, as the drawing shows, nearly equal; and they stand parallel through life as in figure 8.



Fig. 5. The dorsal cotyledon from the outside, and fig. 6. the placental cotyledon from the face towards the dorsal cotyledon. $\frac{1}{2}$ nat. size.



Fig. 7. The cotyledons of *B. Heimii*, showing how unlike they are to those of *B. maximus*. On the left is the dorsal cotyledon, from the outside and on the right the placental cotyledon, from the face towards the dorsal cotyledon, $\frac{1}{2}$ nat. size. The arrow on the placental cotyledon points to the angle of the impression made on it by the dorsal cotyledon where the point 2 fits.

The parallel position is as in *B. penangianus*: and the fruit of that species is certainly in other characters like that of *B. maximus* e.g. the smoothness, the grey surface, and the way in which the radicle emerges when but very little disturbance to the fruit-wall has occurred.

The cotyledons are followed by a pair of leaves, and the seedling is now as drawn in figure 8. There is much purple pigment in it, both through the cotyledons, and on the underside of the leaves.

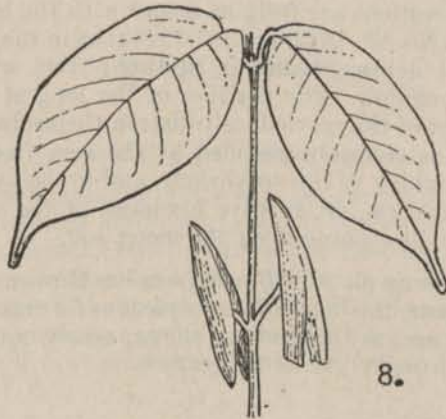


Fig. 8. The seedling of *B. maximus* carrying its cotyledons parallel and with its first pair of leaves.

Balanocarpus Heimii has a very unlike seedling; and it is drawn here in figure 10 to show that its cotyledons besides possessing a different shape and being packed differently when within the fruit wall, come to stand horizontally, and to show also that four (sometimes five) leaves follow them in a cluster.

The fruit whence came the seedling drawn, was collected by Mr. R. E. Holttum in the Senaling Inas forest reserve, Negri Sembilan, on November 28th., 1922.

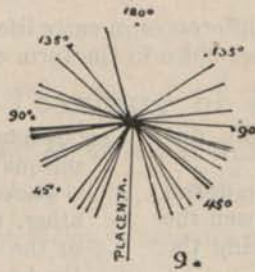


Fig. 9. The position of the long split by which the embryo of *B. maximus* escapes from the fruit-wall in relation to the placenta. The reader is to assume that he is looking at the apex of a fruit with the placenta downwards, and then the radiating lines indicate the position where the fruit-wall in thirty fruits was ruptured.

The first leaves show glandular patches as described by Dr. F. W. Foxworthy and the writer, in the *Journal* No. 86, p. 278, for *Vatica Wallichii*, Dyer, and *V. ridleyana*, Brandis.

Having a supply of fruits of *Balanocarpus Heimii* along with those of *B. maximus*, they too were set to germinate, and a small experiment was done with them as follows. Some twenty fruits were bound round with rubber rings and left to be ruptured by the embryo within. When so treated the rupture never extended below the ring which by its pressure counteracted the thrust of the cotyledons within.

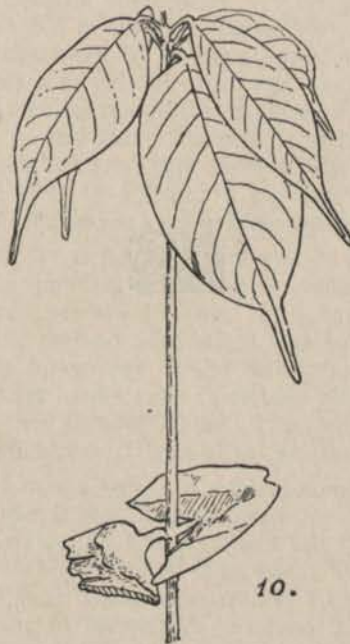


Fig. 10. The seedling of *B. Heimii* with its horizontal cotyledons and first five foliage leaves. $\frac{1}{2}$ nat. size.

In conclusion the differences in early life between *B. maximus* and *B. Heimii* may be set down in the form of a table:—

<i>B. maximus</i>	<i>B. Heimii</i>
cotyledons not markedly dissimilar.	cotyledons very dissimilar and unequal.
packed parallel, the dorsal only just failing to reach the base, and both reaching the apex.	packed the one above the other, the dorsal at the apex of the fruit, the placental at the base.
held upright after germination and continuing so through life.	becoming horizontal, and the dorsal from having been folded within the fruit, reflexed so greatly as to be convex above.
first leaves a pair.	first leaves four or even five together.
young plant purple.	young plant green.



The Teaching of Malay

At the School of Oriental Studies, London.

By C. O. BLAGDEN, M.A., BARRISTER-AT-LAW.

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Malay forms but a small and relatively unimportant item in the curriculum of the School of Oriental Studies, which has taken all Asia and Africa for its province and casts a benevolent eye over Polynesia as well. But to readers of this Journal Malay is of especial interest. So I need make no apology for saying a few words about a subject that I have taught at the School for the last five years. Nor do I propose to apologize for the inevitably personal note: it is my business that I am to speak of, and of course "there is nothing like leather."

The teaching in our School is at once scientific and practical. While the School is a centre of research in which scholars of long experience gladly assist advanced students to make further progress in special departments of knowledge, along literary, philological, epigraphical, historical or other lines, yet the greater part of the School's time is devoted to the training of beginners in elementary rudiments. One must begin by laying a solid foundation; moreover most of the students aim only at attaining a competent knowledge of one or more Eastern languages for business or everyday purposes. The School is not an institution devoted to dryasdust speculations and "ologies": it endeavours, very successfully, to adapt scientific means to practical ends by giving, in the most compendious and accurate way, a training in the spoken languages of Asia and Africa.

In teaching Malay it has been my aim to observe these principles. My opening question to every new student has been: "For what purpose do you propose to learn the language?" Upon his answer depended the method adopted in teaching him. If he was aiming merely at a knowledge of the colloquial, I advised that it would not be necessary or desirable to trouble himself with the Arabic script or the literary form of Malay. If he was one who had later to pass official examinations, I framed my syllabus accordingly.

In either case I have always made the spoken language the starting point. I consider it essential to devote the first few months to it exclusively, reserving the literary form till the student has acquired familiarity with the spoken language. The two styles differ very much, and to learn them concurrently from the beginning is apt to confound them in the pupil's mind, so that he tends to mix them up and talk like a badly written book, a serious fault in speaking any language.

I have found it useful to begin with a brief characterization of the structure of Malay, contrasting sharply as it does with that of European languages, and to add some introductory information as to the position of the language in relation to the cognate Indonesian languages and other foreign tongues. Such matters do not directly assist anyone in learning to speak, but they stimulate interest in intelligent pupils. Learning is like digestion: much has to be presented that is not necessary for the mere purpose of being assimilated but renders the process of assimilation more agreeable. To give the essentials in tabloid form might be sufficient, but would be desperately uninteresting.

In the same spirit, I endeavour to intersperse all manner of information, geographical, historical, or anecdotal, illustrating the customs and ideas of the Malays, thus giving pupils some notion as to environment in which they will find themselves in the East. Diversions of this sort are a relief from the application of the mind to the memorizing of new words and sentences, a task that is apt, if undiluted, to fatigue the brain.

Correct pronunciation is of the very first importance, so, I have invariably devoted several lessons in the early stages of the course to a careful exposition of the sounds of the language. Considering that the sounds of Malay offer relatively few difficulties to the average European, it is remarkable how badly many Englishmen pronounce the language. This is due to want of systematic training. Most people pick up Malay by ear. But neither their ears nor their tongues have ever been trained, and as they do not hear correctly, they fail to realise that they habitually mispronounce. Even if they have had a *munshi*, the result is often the same, because many *munshis*, having no knowledge of phonetics, do not know how to correct bad tendencies in pronunciation, and others are too diffident. I have made it a practice to pronounce the individual Malay sounds and illustrate them by specimen words, repeatedly encouraging pupils to say them after me and pointing out to them where they went wrong, and why. Though pupils differ much in their facility for imitating foreign sounds, I have found that good results were achieved. This is not merely a matter of ideal scientific accuracy. It is not generally recognized how much more readily a man is understood if his pronunciation is really "just so" than when it is only "more or less." Let anyone try to remember what English sounds like when spoken by some unfortunate foreigner who is asking his way in London and mangles some ordinary place name like Piccadilly or Covent Garden!

It is mainly in pronouncing the Malay vowels that people are apt to err. But there are other niceties. How many Europeans distinguish between final *h* and the glottal stop which is written as final *k*? How many have realised that final *p* and *t* are habitually unexploded? (I do not remember to have seen this mentioned in any Malay grammar.) How often do we find Malay words stressed just like English ones, whereas the stress should be much weaker,

and Malay long vowels made as long as the corresponding English ones, when really they are but little longer than the Malay short vowels. Intonation, a subtle element which pervades every language (not solely "toned" languages) and puts the finishing touch to correct and intelligible speech, has remained unexplored in Malay. It has been my endeavour to attend to these various points and to introduce my pupils from the start to a sound standard of pronunciation, based on the Malay of Johore and the coast districts of Malacca. It is so much easier to learn the right than to unlearn the wrong.

One passes on to the construction of phrases. It is a psychological fact, on which all good teaching depends, that the human memory has laws, by which we must be guided. One is the principle of the association of ideas. It is a matter of common sense, supported by experience, that it is unprofitable to attempt to memorize strings of unconnected foreign words: one forgets most of the A's and B's long before one reaches the M's and N's, to say nothing of the Z's. Groups of two or three words, conveying simple definite meanings, can be profitably memorized, particularly if they are chosen so as to embody phrases useful in practical life. By way of introduction, I lay stress on the great difference between the inflected synthetic languages (like Latin) and a language of the type of Malay, bringing out the importance in the latter of the syntactical order of words in the phrase and sentence. Whereas in the former type of language intimate relation between two ideas can usually be indicated by grammatical concord (expressed in the form of changed terminations of words), in the latter it is shown by juxtaposition according to certain principles of order. I illustrate this by a number of typical combinations of simple words, exemplifying the various relations of two nouns (the second being either in apposition or in one of the numerous varieties of what we should call the genitive relation), of a noun and an attributive adjective, of an adjective qualified by a noun and so on. Then follow nouns with demonstrative pronouns, with and without adjectives.

At this stage may be pointed out the influence of Chinese syntax, which has affected Bazaar Malay and in that dialect has caused the demonstrative to be put before the noun. While all systematic teaching of colloquial Malay must be based upon the standard colloquial, from which alone the various foreign modifications classed as Bazaar Malay can be explained, it is necessary that these latter also should be introduced to the pupil's notice, inasmuch as he will often have to hear them and use them when he meets Malay-speaking foreigners, especially in the towns.

From such combinations as *rumah bĕsar ini*, "this big house", I pass by a mere change in the order of the words to the type of Malay sentence that contains no verb: e.g., *ini rumah bĕsar*, *rumah ini bĕsar*, and *bĕsar rumah ini*, conveying, with slightly differing shades of mental attitude, the information that the house in question is a big one. I dwell on the fact that thousands of sentences are

constructed on these simple lines, without any *ada* (which European and other foreigners are so fond of introducing). Next I explain cases where *ada* really is wanted; and then introduce sentences involving simple intransitive verbs with their subjects, and the ways of expressing perfect and future shades of meaning. At this stage it is convenient to bring in the pronouns and a few simple transitive verbs with their objects.

Thus, without much teaching of formal grammar, the main principles of Malay syntax are illustrated and explained in a progressive way, fresh parts of speech such as prepositions, adverbs, particles, etc., being added as occasion arises. And here let me enter an emphatic protest against the persons who in their ignorance sometimes say that Malay has no grammar. Either they do not know Malay, or they do not know what constitutes grammar, or, perhaps, they know neither. It would be as sensible to say that English has no grammar. We still suffer from a one-sided illusion that grammar is made up of *amo*, *amas*, *amat*, or *mensa*, *mensam*, *mensæ* and the like, whereas (properly understood) the word stands for the whole system and *rationale* of any given language, deduced from its manner of putting its materials together into phrases and sentences, and in no other possible way. The latest authority on these matters* admits that all the complexities of English grammar have not yet been unravelled, and the same may well be true of Malay.

While grammar as such is of no great help when one is teaching people their own native language, it is different when we try to teach Malay to European pupils. They encounter a linguistic system quite alien to them, and the question is how they are to be enabled to assimilate it. I find that when concrete examples are freely used to illustrate (and even precede) abstract rules, the process of assimilation becomes surer, easier and less tedious, having regard to the fact that the average pupil is not, and cannot be expected at short notice to become a linguistic expert or enthusiast. But some generalization in the direction of rules is inevitable. The trouble I used to find with my Malay *munshi's* teaching was that I could never get him to help me to such a generalization. He would give me a sentence of a certain type, which I may call the A type. Then one would attempt to frame some other sentence on the analogy of it, but would be told that that it was wrong because one had to use another type; the B type! One naturally put the question: "When must I use the A type and when must I use the B type of sentence?" As a rule, the *munshi*, not being acquainted with any general principles, could not give any definite answer.

Now that is manifestly unsatisfactory. A language is made up of a potentially infinite number of sentences. It is impossible to memorize them all. But the vast majority of them are not indepen-

* *The Teaching of English in England* (Report of the Departmental Committee appointed by the President of the Board of Education), 1921.

dent individual phenomena: they fall into groups, classifiable on pretty definite principles. When, therefore, a number of typical sentences have been memorized, it becomes necessary to acquire some working grasp of the principles which determine the varieties of types of sentences. And that is what I call grammar.

It has been my practice during the first part of the course to employ almost exclusively only simple (or underived) words, meaning thereby words which are unaffected by prefix or suffix. Not till a later stage do I explain and illustrate the system of affixation bit by bit by phrases and sentences. This seems to be in due proportion to the comparative degree of its importance in the spoken language, and also in accordance with the principle of proceeding from the simple to the complex. Meanwhile the sentences given as examples that began with groups of two or three words, have been gradually lengthened, always with a caution as to the avoidance of complexity and with attention to the characteristic colloquial Malay terseness and economy of material.

As occasion serves, idiomatic phrases are introduced, especially common colloquialisms; and if they are idiomatic in the true sense of falling under no general rule, the fact has been emphasized. In such cases there is nothing to be done but to memorize the individual phrase; and when allowance has been made for the utility of grammatical rules and principles, I am convinced that, as a matter of method, memorizing sentences remains the fundamental way of learning a language. To that end I secure frequent repetition by the pupil of sentences uttered by myself in the same lesson, and eventually, by revision of sentences given in previous lessons. While not discouraging the taking of notes, I consider that everything should be done as much as possible through the memory of the sounds heard, in fact aurally, rather than by reliance on the written word by visual association. I have in mind a pupil, who suffered from slightly defective hearing and for whom I was tempted to modify my method by writing words upon the black board. The result was unfortunate, for there came a time when he could not identify or understand anything until he had mentally spelt it out to himself. His memory, instead of being aural, as it should have been, had been allowed to become almost entirely visual.

On the basis outlined above, I proceed, for the relatively few pupils who require it, to pass to the Malay literary language, first explaining the principles of the Arabic alphabet and its historic adaptation (very imperfect, unfortunately) to the requirements of Malay spelling. Having given the pupil plenty of exercise in reading and writing the Arabic character, I take him on to simple texts printed in that script while I still continue to teach him the spoken language. For most pupils, I continue the colloquial, introducing fresh sentences with additional words on all sorts of subjects chosen chiefly for practical utility.

Unfortunately, most pupils have not the time to take an extended course. After a few months, or even weeks, the East calls

them, and they pass out of my ken. But I am satisfied by experience that even in such a short time most of them have laid a solid foundation, which stands them in good stead and enables them to make more rapid progress when they reach the Malay Peninsula. I am inclined to believe that two or three months of the teaching described are equivalent to the first six months of a beginner in the East who arrives knowing no Malay at all, and has to pick it up as best he can. Probably even with an efficient *munshi* he could not learn as much in four months; and there are many things he would not have learnt from a *munshi* in those four months, which I make a point of bringing to his notice at a relatively early stage. Young men destined for the East often have a few months' notice before they leave England, an interval they could profitably employ in learning the elements of the language and acquiring some ideas about the country and the people. A pretty strong case can be made out for sending them to the School to give them a good start. For most Asiatic languages this has been done, as the School with its 400 or 500 pupils a year is evidence. It is unfortunate that, for reasons which I trust are temporary, Malay has not yet received the attention it deserves.

Of advanced students, men, who having already been to the East and acquired familiarity with the written language, desire either for examination or other purposes to progress still further, I have had only a few. It has been a great pleasure to read with them, though I doubt if I have not learnt more from them than they from me. I think I can safely say that I have learnt more about Malay in the last five years than in the preceding twenty (or perhaps even twenty-seven, for I first landed at Singapore in December, 1888). If one wants to learn a subject, there is nothing like trying to teach it: I propose to go on learning a good while longer; and though in the last few years several books have been published that are of great assistance in the way of studying and teaching Malay, I still feel the want of adequate materials for learning the colloquial. With the literary language it is otherwise; there are plenty of texts in it, though of course there can never be too many. But I am not here concerned with what has been written in literary Malay.

In my five years of teaching I have had very nearly fifty pupils, of whom just over a fifth were women. I have found little difference in aptitude between the two sexes. I have had two Chinese pupils, and one Malay, the son of a Sultan, who had been long enough in England to forget his mother tongue almost entirely. He proved a very apt and pleasant pupil, making rapid progress in a short time: it was no doubt an instance of subconscious memory. Most of my pupils studied with me only for a few months, which was all the time they had. But in the main they made good use of it. The majority were men with commercial or agricultural careers in view. Only about a fifth of the whole were Government officials; and with *one* exception, so far as I am aware, these all attended Malay courses on their own initiative, without prompting or assistance from Government. It is, of course, entirely a matter for the

Government to decide if it will avail itself of the facilities afforded by the School. The institution is in receipt of a considerable grant from the British Treasury and a smaller one from the Indian Government, besides lesser subventions from other public sources. It has also received pupils from the India Office, War Office, and Admiralty, and also to some extent from the Colonial Office.

Some of the departments of Government have realized that the School can be of use to them, and I cannot but regret that the study of Malay has been left out in the cold. If I venture, very respectfully, to give expression to that regret, I may perhaps be allowed to add that personal considerations do not enter very largely into it. I have had enough pupils to keep me fairly busy, though I could as easily have dealt with classes of five, seven, or ten, as with classes of two or three pupils. I am thinking more of the future of Malay studies in general, and particularly in London. The University of London is the only one in Great Britain (or, so far as I know, in the British Empire) in which Malay is taught. In Holland and France the language has been taught for many years; here in London for the last five years only. Probably I shall not continue to teach it many years longer. But I hope that when the time for my retirement arrives, the teaching of Malay will not be allowed to drop. If it does, it will not be for want of a competent successor to myself, but only for lack of a sufficient number of pupils to warrant the School in keeping up a Readership.

If the readership were abolished, it would be highly regrettable. Apart from the practical advantage of giving beginners a good start, there is the matter of having some one in England whose business it is to further the higher branches of Malay studies and assist advanced scholars who are working either in the East or during their terms of leave at home. So far from allowing the post to lapse, I should like to see it supplemented by the appointment, as assistant to the Reader, of a young educated Malay, who could under the Reader's supervision do useful work in editing unpublished texts (of which there are so many in MS. in England) and share the work of teaching. It is the policy of the School, whenever circumstances permit, to have side by side with a European lecturer a native to assist in teaching his own language. Thus there are native teachers in Arabic, Turkish, Persian, Chinese, Japanese, and several of the more important languages of India. In pronunciation, fluency, and intimate knowledge of idiom, a native will almost invariably be superior to the European, while the latter, being usually the senior in years, will excel in breadth of grammatical and literary knowledge and in the technique of teaching, besides having a more thorough understanding of the difficulties that beset European students in learning an Asiatic language. So far there have never been enough pupils to warrant the appointment of a Malay assistant. Until the number of pupils is increased, no such development can be expected, and I hardly hope to see it in my time. But I trust that my successor will be more fortunate; and that, in any event, the teaching of

Malay in London, begun so recently and under such adverse circumstances as the war, the rubber slump, the general depression of trade and the absence of official support, will not be dropped or allowed to languish and lag behind the teaching of other Eastern languages. Surely it is in our interest that it should hold its own and develop, as time goes on, in friendly rivalry with Arabic, Hindustani, Chinese, Japanese and the other great vernaculars of the East.



On a New and Interesting Dragonfly (Odonata) from Gunong Tahan.

BY F. F. LAIDLAW, M.A.

The mountain Gunong Tahan was until the close of the last century somewhat mysterious and until actually climbed by Europeans its height was the subject of rather exaggerated surmises. According to native tradition the mountain is guarded by its own "genius" or Jin. It is appropriate that the first dragonfly (I believe) ever recorded from this mountain should then be a new and in some respects quite remarkable insect, and I give it a name, *Macromidia genialis* which will associate it with the presiding deity of the mountain, in the hope that he may long guard its forest treasures unspoilt. It is a coincidence that the great Bornean mountain Kinabalu has yielded another species of the genus.

Macromidia is a genus of the sub-family CORDULINAE and one of a small number which constitutes the group *Macromiina* of Tillyard. The anal area in this group is loop-like, not unlike that of some of the AESCHNINAE or of the CHLOROGOMPHINAE. All other CORDULINAE except the archaic Australian *Synthemini*, and a few forms with very reduced venation, show at least some indication of the development of an "Italian" or "stocking" loop with a specialization of the vein called the "cubital supplement."

The genus is purely Oriental in distribution and contains but three species, viz. that here described, *M. rapida* from Tonkin and *M. rapida* from Borneo.

The genus differs from *Macromia* chiefly in its more rounded wings, in the presence of cross-veins between the radius and first branch of the media immediately beyond the nodus, and in the relative great length of the pterostigma. The male of *Macromidia* carries a keel on the tibiae of all three pairs of legs, whilst in the Oriental species of *Macromia* this keel is absent from the middle pair of tibiae. The two genera are quite different in general appearance, *Macromia* being built on much bolder lines. *Macromidia* and more especially the new species described below rather resembles another Oriental genus *Idionyx*, which latter genus belongs to a different section of the sub-family. The only other Oriental genus of the *Macromiini* is *Azuma*, a genus in venation little distinct from *Macromia*, and containing a few very large species whose larval stage differs remarkably from that of *Macromia* in the shape of the mask. The larva of *Macromidia* is of course still unknown.

Macromidia genialis n. sp.

Male. Differs from its known congeners in its smaller size, and by the fact that the triangle of the forewing is followed almost to the level of the nodus by a single row of cells for about seven cells. *M. rapida* Martin, the genotype, and *M. fulva* Laidlaw, both have two rows of cells in this area. They are both of them also rather larger.

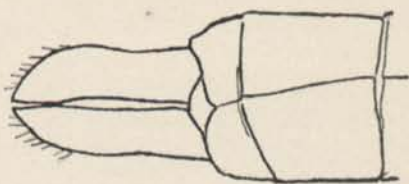
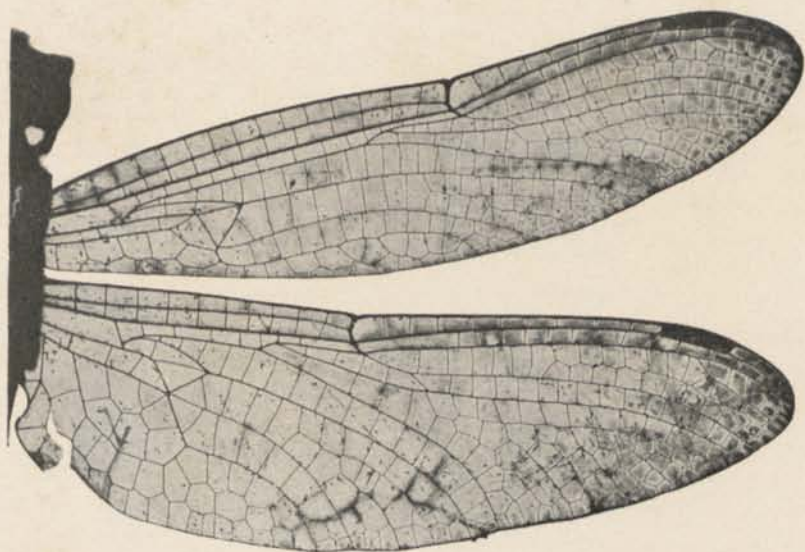
The present species has the hind-wing 27.5 mm. long, pterostigma 2.5 mm. the abdomen 28.5 mm. + 1.5 for the anal appendages. Nodal indicator $\frac{7}{6}-\frac{15}{6}+\frac{15}{6}-\frac{7}{7}$ Upper lip, post and anteclypeus shining black, frons and vertex metallic blue, the latter distorted from pressure, but with a fringe of long black hairs. Occiput black, synthorax with the dorsum dark brown paler, anteriorly and ventrally, sides metallic blue, with an obscure brownish stripe along the second lateral suture. Coxae yellowish-brown, femora dark brown, tibiae black. Abdomen entirely black, except that the ventral margin of the second segment and its genital lobe is pale yellow. The genital hamule is black, armed with a lateral process which projects to the outside of the genital lobe and is yellow in colour.

Type ♂ (and only known specimen): MALAY PENINSULA, Pahang, Gunong Tahan alt. 1000 ft. 3rd Dec. 1921 coll. F. N. Chasen. Presented by the Raffles Museum, Singapore, to the British Museum.

Explanation of Plate V.

- Fig. 1. Fore and hind-wing of *Macromidia genialis*.
 Fig. 2. Anal appendages of *Macromidia genialis* seen from above.
 Fig. 3. Genital lobe and genital hamule of *Macromidia genialis* seen from the right side.





Some Pierine Butterflies New to Malaysia.

BY J. C. MOULTON, M.A., B.Sc.

Director, Raffles Museum, Singapore.

While re-arranging part of the butterfly collection of the Raffles Museum, Singapore, I came across a few species apparently new to different parts of Malaysia, which seem to me worthy of record. Three I describe as new subspecies viz.

Appias paulina Cr. **grisea** subsp. nov.

Udaiana cynis Hew. **tiomana** subsp. nov.

Gandaca harina Horsf. **aora** subsp. nov.

They were taken by Mr. V. Knight, formerly Assistant Director, Raffles Museum, on Pulo Aor, a small island off the East Coast of the Malay Peninsula, S. E. of Pulo Tioman, in Lat. 2° 30' N. Good series of these particular forms are in the Selangor Museum, from Pulo Tioman. I am indebted to Mr. H. C. Robinson, Director of the F. M. S. Museums, for the opportunity of examining them.

I am also under an obligation to Mr. G. Talbot, Curator of the Hill Museum, Witley, to Mr. N. D. Riley of the British Museum and to Dr. F. A. Dixey F.R.S. of Oxford, for information regarding examples of these Pierines in the collections under their care.

1. *Pieris canidia* Sparrm.

Loc. Singapore, 5 ♂♂, 2 ♀♀ May, October, December 1922, February 1923 (Raffles Museum).

Distrib. This species has a wide range throughout India and east through Burma to China, the Philippines and Formosa. It is known in Tonkin, and Godfrey¹ records a single specimen taken in the Me Song forest, Prae, Northern Siam, in April 1916. This apparently is the furthest record south. Mr. Riley informs me that there are none in the British Museum from localities further south than Tonkin. Dr. Dixey, the eminent authority on the Pierinae, knows of none further south than Hainan and the South Shan States.

Its appearance in Singapore—together with its apparent absence in Peninsular Siam or the Malay Peninsula—suggests the possibility of introduction by human agency. The specimens agree

¹ *Siam Nat. Hist. Soc. Journal*. Vol. II. Dec. 1916. "The Butterflies of Siam" by E. J. Godfrey, p. 114.

well with those from India figured by Moore in *Lepidoptera Indica* (pl. 520). It is possible that the larva has come down to Singapore from India or China on some vegetable. As is natural in a great port, ships are already responsible for several curious additions to the fauna of Singapore.

2. *Pieris rapae* L.

Loc. Malay Peninsula, Kuala Lumpur "taken near Agricultural Department Dec. 1917, teste C. B. Holman-Hunt," (Selangor Mus.).

Distrib. According to Fruhstorfer in *Seitz Macrolepidoptera* (p. 140) this species ranges over Europe and east as far as Afghanistan and Kashmir. Its occurrence in the Malay Peninsula is difficult to explain, except by the supposition of introduction by human agency.

3. *Appias libythea* Fab. *zelmira* Cr.

Loc. Singapore, May 1922, 1 ♂ and 2 ♀♀. Pulo Aor, 13th June 1912, 1 ♂ coll. V. Knight (Raffles Mus.)

Distrib. The typical form ranges throughout India and Ceylon, replaced further east by *A. l. zelmira* Cr. which Fruhstorfer states is a rainy-season form sometimes met with even in Bengal. In the Philippines another subspecies occurs. *A. libythea* has been recorded in Siam and Tenasserim, but not further south before. There is a good series in the Selangor Museum from Hat Sanuk, Siamese Malaya, Lat. 12° N.

4. *Appias paulina* Cr. ¹ *grisea* subsp. nov.

MALE: Differs from the Peninsular and Bornean forms in having the basal third of the fore wing and the greater part of the hind-wing dusted with lead-grey, which extends broadly along the costa of the forewing, leaving the apex creamy-white except for very slight dusting of black at the tip. The underside of the hind-wing is yellower than in Bornean specimens.

Forms from Kelantan and the east coast of Pahang approach this in the reduced black marking at the apex, but they lack the conspicuous grey dusting at the base of the wings.

FEMALE: Dark blackish-brown above, dusted slightly at the base of both wings with greyish or yellowish scales; four yellow spots across the apex of the fore-wing, the fourth very small; an ill-defined discal greenish-white band from third median nervule to inner margin. Cilia of both wings golden yellow. Underside fore-

¹ Recorded by Fruhstorfer (*t.c.* p. 155) as *A. melania* F., but the correct name should be *A. paulina* Cr., as the true *A. melania* = *A. asterias* Miskin from Australia (*vide* F. A. Dixey in *Proc. Ent. Soc. Lond.* 1911, p. lix).

wing greenish-yellow at base, greenish-white over disk, succeeded by broad irregular sub-apical brown-black band, apex broadly golden yellow. Hind-wing golden yellow, with narrow irregular, almost macular or catenate, post-discal brown band.

Much darker than the female of the mainland.

Loc. East Coast of Malay Peninsula: Pulo Aor, 13. vi. 12 ♂ ♂ coll. V. Knight (Raffles Mus.); Pulo Tioman 12 ♂ ♂, 4 ♀ ♀ June-July 1916 (Selangor Mus.).

Distrib. The typical form occurs in Ceylon with various subspecies ranging from Assam south through the Malay Archipelago.

The type ♂ of *A. p. grisea* is from Pulo Aor, the type ♀ from Pulo Tioman. Both have been deposited in the British Museum.

5. *Phrissura aegis* Feld. *caepia* Fruhst.

Loc. Borneo, Brunei, 11th June 1921, 1 ♂ coll. J. C. Moulton (Raffles Mus.).

This probably represents a new subspecies, but as I have only one male before me I place it provisionally under the name of the Palawan subspecies from which it appears to differ in the absence of any yellow on the underside, and in the more noticeable white strigae in the black apical-hind-marginal portion of the fore-wing.

It was taken by a Dayak collector near Brunei, the ancient capital of Borneo.

Mr. Talbot kindly informs me that there is a specimen of this species in the Hill Museum, Witley, labelled "Borneo," and that in 3 ♂ ♂ from Palawan and in this Bornean specimen some slight variation occurs and he therefore concludes that the Bornean form is probably not separable. I suspect however that if a long series were obtained it would not be difficult to separate the Bornean form from the Palawan form.

Distrib. The typical form occurs in Mindanao. Other forms are found in other parts of the Philippines, in Palawan, Sula Mangoli, and Celebes. It has not been recorded from Borneo before.

6. *Udaiana cynis* Hew. *tiomana* subsp. nov.

MALE: Differs from the typical form from the Malay Peninsula in having the base and the basal portion of the costa on the underside of the hind-wing infuscated with fuscous and greenish scales, agreeing in this particular with the Bornean form *U. c. pryri*. It differs from the latter in having rather heavier fuscous spots to the hind margin of the hind-wing above. A narrow fuscous line crosses the disk of the hind-wing below in some specimens.

FEMALE: Is darker above than both forms, the whitish discal area of the hind-wing being very much reduced. The underside is dusted at the base of both wings with greenish scales.

Loc. East Coast of Malay Peninsula: Pulo Aor 13. vi. 12
2 ♂♂ coll. V. Knight (Raffles Mus.); Pulo Tioman 5 ♂♂ 2 ♀♀
June-July 1916 (F. M. S. Mus.).

7. **Gandaca harina** Horsf. *aora* subsp. nov.

Differs from the races in the Malay Peninsula (*distanti*) and Borneo (*elis*) in having the black distal border of the fore-wing very much reduced, being no more than 1 millimetre in depth at the apex and ceasing altogether at the 3rd median nervule. This is perfectly constant in the three specimens from Pulo Aor and in two from Tioman, but in two others from Tioman the border is very slightly broader, darker and longer, but is angulate at the apex and in that respect also different from the mainland form.

Loc. East Coast of Malay Peninsula, Pulo Aor, 13. vi. 12,
3 ♂♂ coll. V. Knight (Raffles Mus.); Pulo Tioman 4 ♂♂
June-July 1916. The type (from Pulo Aor) has been deposited in the British Museum.

Distrib. The species ranges from Assam to the Philippines and south to New Guinea, split up into several well-marked island races.

8. **Hebomoia glaucippe** L. *aturia* Fruhst.

Loc. East Coast of Malay Peninsula, Pulo Aor, 13. vi. 12,
1 ♂ coll. V. Knight (Raffles Mus.).

The above example differs from Peninsula specimens in having a distinctly pale lemon tinge to both wings in place of dead white. It probably represents a distinct subspecies, but in the absence of other specimens I place it provisionally with the Peninsula form. I have seen none from Pulo Tioman where the same form may be expected.

H. glaucippe ranges from India and China south to the Moluccas.

Fruhstorfer (*l.c.*, p. 175) observes that *H. g. vossi* from Nias and *roepstorffi* from the Andamans are the only West Malayan *glaucippe* forms with yellow upper surface to the wing. The Pulo Aor example is not so obviously yellow as these two forms from the other side of the Peninsula, but the yellow tinge is in marked contrast to the Peninsula form and is perhaps a link with the yellower forms of the Philippines.

On The Heel-Pad in certain Malaysian Birds.

BY F. N. CHASEN.

The presence of a peculiar structure known as the Heel-pad on the foot of the nestling Wryneck (*Iynx torquilla* Linn.), seems to have attracted the attention of most writers on European ornithology in recent years.

The fact of these heel-pads being found in the nestlings of other species of birds of a somewhat similar mode of nidification, with which phenomena it is essentially correlated, was not, until recently, appreciated to the same extent, although a few cases have been recorded and their presence in fully adult birds, of which a few cases are mentioned below, seems to have been overlooked.

Dr. A. Gunther was the first to give a lucid description and illustration of these pads. Referring to the Wryneck he says, "I have found a very peculiar modification of the skin covering the heel. The skin of this part is greatly thickened, forming a prominent pad 5 mm. long and half as broad, the surface of which is studded with obtusely conical tubercles." Again "In moving about the nest-hole, particularly when wishing to move to the edge of the cavity the young bird does not use the toes, but pushes itself forward by means of the rough surface of this heel-pad." (*Ibis*, 1890, p. 411). In *A History of Birds* (p. 261) W. P. Pycraft prophesies that the heel-pad "will perhaps be found to be present in the young of all birds which are reared in holes on the bare ground, or in hollow trees, when no real nest is made"—a statement, the accuracy of which is becoming more and more evident each day.

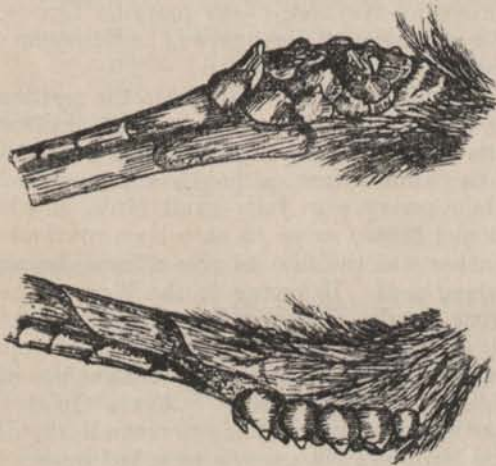
Apart from scattered references the only accessible paper on the subject is "Notes on the Heel-pads in certain families of Birds" by Count Nils Gyldenstolpe (*Arkiv for Zoologi*, Band 11, No. 12). After an examination of all the material in the Stockholm Museum the author just quoted concludes "Almost all species of birds nesting in hollows are in possession of more or less well-developed pads covering the metatarsal joints*. These pads are, however, mostly

* A few words as to the main features of the structure of a bird's hind-limbs and the usual method of terrestrial progression may not be out of place at this point, and will do much to elucidate the remarks above.

Starting at the distal end of the limb there are firstly, the toes. Most birds are digitigrade and it follows that the region usually called the sole of a bird's foot is homologous with the under-surface of the toes of man.

The metatarsals and the distal row of the tarsals are fused to form a bone commonly called the 'tarsus' but which should be more correctly de-

quite smooth, though easily defined by means of their thickness. They are generally covered with more or less irregular scales which are mostly larger than those of the surrounding parts of the tarsus. Only in a few families, viz. the *Rhamphastidae*, the *Capitonidae* and the *Picidae* are they furnished with pointed tubercles, but in some other families, such as the *Coraciidae*, the *Irrisoridae*, and the *Meropidae* the edges of the scuta are slightly raised above the level of the middle parts and then form a fairly rough surface by means of which the young birds are able to push themselves forward. In the first-mentioned three families the pointed tubercles are not being shed until a long time after the bird has left the nest, as shown by several specimens in our collection."



Heel-pads of *Chotochea chrysopogon*.

The interpretation adopted throughout the paper seems to be that a well-developed heel-pad furnished with pointed tubercles

signated 'tarsometatarsus.' Similarly the proximal row of tarsals are fused with the tibia to form a 'tibio-tarsus.' These elements can only be made out in the embryo or very young nestling, being represented in older individuals by the two long bones usually known as 'tarsus' and 'tibia.' The result of this compound structure of the limb is to form a 'meso-tarsal' or ankle joint as in reptiles.

It follows that the bird's heel and ankle are with the exception of a few plantigrade forms, always well off the ground. This ankle is just as often mis-called the knee.

In order to gain an appreciation of the various parts of the bird's leg we may liken it to the leg of a man standing on his toes. The birds 'tarsus' corresponds to the instep, (that is that part of the foot from the base of the toes to the ankle-joint).

The crus or leg proper is that part of the leg immediately above the bend of the leg or ankle and is furthermore erroneously termed the 'thigh,' but of course the true thigh (femur), is enclosed within the general contour of the body and the knee proper is always hidden in the plumage. In the great majority of cases the leg is feathered almost as far as the heel.

means that the nestling is active moving about the nest-hole, and that a pad consisting merely of a slightly thickened and swollen area points to an inactive condition in the nest.

The latest publication which mentions these pads is a paper by Collingwood Ingram in the *Ibis*, Series 11, No. 2, p. 867, where the author endorses the view held by Pycraft, namely that the function of the pads is to protect the young from injury in its unlined nest cavity.

Seth-Smith in recording the presence of well-developed pads in a young Toucanet (*Pteroglossus aricari*) remarks that the function is doubtless to enable the bird to climb up the side of the hollow cavity in a tree in which it is hatched, the pads forming, as it were, a second set of claws. This theory is supported by the fact that young parrots which have no well-developed tubercular pads are stated to use their beaks when moving about in their nest.

Field observations from living birds are badly needed in order to verify these views as to the functions of heel-pads, although the theories advanced are in very close agreement with the observed facts.

A very significant fact is that the points of the largest and more developed tubercles of the pad are in most, if not all cases, pointing in a direction most admirably calculated to give assistance to a nestling bird struggling along in a bare hollow.

There are two extreme types of heel-pad. One is the smooth cushion-like structure to be seen in certain small Owls and other birds. A stage further may be observed in those birds in which the scales on the pads are enlarged, slightly thickened, or even raised. In yet more modified types the scales are conical and raised, and in the opposite extreme have long, needle-like points, a condition well represented in the Toucans, Woodpeckers and Barbets. It is rather difficult to decide at what stage one is to recognise any enlargement of the ankle-joint as a functionable heel-pad. Collingwood Ingram has remarked that the nestling Starling has incipient heel-pads, an observation which the writer can support and augment by adding, from among British Birds, the Redbreast (*Erithacus rubecula*), of which there is a good series in the Norwich Museum which, at least when fresh—if not now—showed a distinct enlargement of the joint. Other instances are mentioned in the detailed notes given below under specific headings.

Certain features to be observed in the attitude and locomotion of nestling birds may possibly give a clue to the origin of the heel-pad.

It may be recalled that young birds are roughly grouped into two classes. There are the altricial or nidicolous young, typified by young Sparrows, which are hatched naked, blind and quite helpless—and there is the reverse type, the precocious or nidifugous nestlings which are hatched thickly clothed with down, able to see, and quite active. Game-birds, Bustards, Rails, Cranes, Sandgrouse, Ostrich-like birds, Gulls and Plovers are examples of active

young. Between these two extremes are many gradations. As may be expected the altricial nestling is regarded as "specialised" and the precocious as "primitive."

Furthermore, it may be remarked that the precocious nestling is usually hatched on or near the ground, more often than not in a roughly shaped hole as an apology for a nest whilst the altricial young are usually provided with shelter from their enemies in trees, bushes or in nesting holes.

I have stated that the precocious nestling is active as soon as hatched. How far this is an actual fact or not it is a little difficult to say. It is certain that many species can run about (i.e., *standing on their toes*), within a very short time of being hatched. Young Ringed Plovers, for instance, can scarcely give their "down" time to dry before doing so.

Young Ostriches can stand upright in a normal manner immediately after leaving the shell, and in less than an hour are running about. Beebe (*The Bird*, p. 481) gives a splendid photograph, taken from life, showing the actual hatching of a group of Ostrich's eggs, and in the picture are two baby Ostriches, standing quite upright on their toes. All this goes to prove that the precocious bird is from the very beginning *digitigrade* although there must be moments of rest, but here we may safely assume that there would be no locomotion on the tarsus as, if the bird wanted to move, it would get on its feet and walk in a normal manner.

Exactly the reverse state of affairs is found in the altricial bird which spends the first two or three weeks of its life squatted down on its tarsi and is, in fact—if the word is permitted in the absence of locomotion—*plantigrade*. In the case of the young Passerine birds it is a day or so before they have strength to raise their heads and several days more before they can raise themselves upon their legs.

Before a young Scops-Owl (*S. lempiji*) had strength to stand in a normal, i.e., *digitigrade* fashion, its favourite position of rest was sitting upon its tarsi. The actual point of friction was the "heel" and the rest of the foot was held off the ground, a short way. Beebe, in *Tropical Wild Life*, gives an illustration of a nestling Toucan and remarks that it has well-developed heel-pads on which it rests, at the same time holding its feet in the air. Shelford, in *A Naturalist in Borneo*, talking of Hornbills, states: "It is chiefly on the heels that the young nestling rests and not on the plantar surface of the feet as erroneously shown in Wallace's *Malay Archipelago*." I find a similar state of affairs in taking early nestlings of several species of perching-birds from the nest and placing them on my hand.

It would appear then that the heel-pad is really a consequence of the *plantigrade* condition in the nestling, and furthermore a peculiarity noted in the structure of the young Redbreast (*Erithacus*) seems to point to the fact that the *plantigrade* condition of the nestling is not only the result of physical weakness

but that it is owing, in some degree at least, to morphological considerations.

In the ripe embryo, the legs are very tightly packed into the ball-like mass into which the bird is curled, and are especially subject to be squeezed. The bird is bent upon itself, the ventral surface of the head lying next to the ventral surface of the thorax, with the tip of the beak closely approximated to the anus. The forelimbs are clasped tightly to the sides of the body, the elbows resting upon the thigh, and the wrist bent. The legs are bent upon themselves at the ankle, the front of the tarsus pressing upon the crus, the soles of the feet exposed, the toes very slightly flexed and close to the manus. The feature that demands attention is that there is no functionable point between crus and tarsus. The ankle region is swollen, but if the tarsus is even forced down to make the semblance of a right angle with the crus, it flies back when released, like the arm of a spring. In the newly hatched nestling there is the same stiffness and no sign of a crease on the back of the ankle denoting the joint as in the adults of all Passerine birds.

The gradual differentiation of the various parts of the limb (i.e., podotheca etc.) can be nicely observed in a series of nestlings of different ages, but it is several days before the tarsus and crus can be made to form one straight line without undue straining of tissues, a position from which in very young birds the legs would have immediately recoiled.

Thus it appears that the joint, in typical Passerine nestlings at least, is not functionable and the plantigrade condition inevitable. In this connection it would be interesting to examine some nestlings of a precocious species. Owing to the greater stage of development which these birds have reached on hatching it is no doubt possible to move the leg quite freely at the ankle as soon as the bird leaves the shell.

Gyldenstolpe records the presence of heel-pads in birds of sixteen families. With the exception of the Parrots, these are contained in the Orders Coraciiformes and Piciformes. Of these fifteen families the following groups are Neotropical or Ethiopian:—

Rhamphastidae,
Bucconidae,
Galbulidae,
Irrisoridae &
Momotidae.

Representatives of the remaining ten families are found in Malaysia. These are:—

ORDER PICIFORMES.

1. Capitonidae	.. ..	Barbets	.. ..	(12)
2. Indicatoridae	.. ..	Honey-guides	.. ..	(1)
3. Picidae	.. ..	Woodpeckers	.. ..	(29)

ORDER CORACIIFORMES.

4.	Coraciidae	..	..	Rollers	..	..	( 3)
5.	Alcedinidae	..	..	Kingfishers	..	..	(16)
6.	Bucerotidae	..	..	Hornbills	..	..	(11)
7.	Upupidae	..	..	Hoopoes	..	..	( 1)
8.	Meropidae	..	..	Bee-eaters	..	..	( 4)
9.	Caprimulgidae	..	..	Night-jars	..	..	( 4)
10.	Cypselidae	..	..	Swifts	..	..	(13)

The number in brackets indicates the number of species found in the Peninsula alone, according to Robinson's "*Handlist of the Birds of the Malay Peninsula*" (1910). The nestlings of the large majority of these birds are still undescribed, and likely to remain so for a few years.

The nesting site, which is the all-important factor to be considered, varies in the above families, but in most cases little or no nest is made, the eggs being deposited in an unlined hollow, or in a hole in a tree or bank. Thus the newly hatched nestling has to rest on a hard surface.

The only other Malaysian family included in the two Orders is the *Podargidae* (Frogmouths) but no information is available as to the nestlings of these birds.

Turning to birds of other orders, pads have already been recorded in certain Parrots, and very similar structures occur in the nestlings of certain small Owls (*Scops*, *Ninox*), which, like the Parrots, nest in hollow trees.

Incipient pads have been recorded in *Sturnus*, and they also occur in other Passerine genera more frequently than is supposed. Among birds of other orders, isolated instances may well be expected to occur, if the mode of nidification is such as to render the accessory structure of use to the nestling.

The remainder of this paper will be devoted to some specific observations on the Barbets and Woodpeckers which present points of remarkable interest, and to a short consideration of those cases in which the heel-pad is only present in a very undeveloped state.

Family: **Capitonidae.** *Barbets.*

The specimens examined included a fair series of all the familiar Malaysian forms, with smaller numbers of the rarer species. The most interesting point brought out is that in individuals, at least of some species, a well-developed pad is found in the fully adult bird, and if the plumage is any indication, even an "old" adult. The reason for this is a little obscure. Perhaps the roosting habits, or the position assumed by the brooding bird would give a clue.

Mesobucco duvauceli. Of seventeen skins in the Raffles Museum collection, six are young birds in almost uniform green plumage. With the exception of one very young specimen (wing only 67 mm.) these birds are fully grown. In one, there are some blue feathers appearing on the throat. In all of these there are

well-developed tubercular pads, the points of the tubercles being very sharp. The pad is about 6 mm. long and completely covers the breadth of the tarsus at the point at which it is situated. In no case is the pad complete; in one case there are 11 conical tubercles. Only the posterior scales are sharply pointed, the points being directed upward. In a slightly older bird, with some red feathers on the head, there is still a slight indication of the pad to be noted in the slightly conical scales, and this may also be true, although to a lesser extent, of fully adult birds.

Chotorhea versicolor. No nestlings were available, but three birds out of a series of twenty were found to have heel-pads, and these were all adults (male and female). One indeed, that with the largest pads, was the finest old male of the series. In the remaining seventeen birds the legs appeared to be quite normal, but this particular part of a skin is not easy to examine, particularly if the specimen is old and in not too good condition, for the skin of the heel always shrivels and easily peels. The pads consist of an elliptical ring of about ten or twelve large modified pointed scales or tubercles with about six smaller papillae within the ring. The points are directed upwards in the distal half of the pad, and downwards in the proximal half.

Chotorhea chrysopogon. In a male which I should say can in no way be judged a juvenile although the colours on the head have yet to reach their maximum intensity, I find the pads are extraordinarily well developed and fortunately complete.

Here again there is an elliptical row of large modified pointed scales, those on the outside of the ring being compressed and with longitudinal projecting edges rather than with sharp points. Maybe the points have been worn off. Those on the inside of the circle are scarcely as large and more pointed. The two posterior scales appear to be fused, and are larger and stronger than any of the others. Within the circle are six smaller conical papillae. The projections of the posterior scales are, as remarked by Gyldenstolpe of *Megalaema*, hollow.

From a study of Gyldenstolpe's figures and descriptions, and from the material in front of me at present it may be said that this is the typical arrangement of the pad in Barbets, although the number of tubercles may vary in species and, to a smaller extent, in individuals.

Cyanops armillaris henrici. In three immature birds which, although by no means adult, cannot be described as nestlings, there are well developed pads very similar to those described above, although there are fewer central papillae. The scales are also more uniform in size. The two large, posterior, upwardly directed and hollowed scales are still prominent.

Calorhamphus hayi. One of the Peninsular race (*hayi*) and one of the Bornean *fuliginosus* show some pads, but neither are in a good condition to describe.

There is no trace of a pad in any of the *Chotorhea mystacophanes*, *C. monticola*, *C. oorti*, *Zantholaema haematocephala* and *Psilopogon pyrolophus*.

Family: **Picidae.** *Woodpeckers.*

The pointed tubercles seem to be lost at a very early stage in this group. They no doubt are shed almost as soon as the bird leaves the nest, but the heel in some immature birds, and also in the adults of some species, shows enough deviation from a normal state to warrant the statement that they possess heel-pads. I have examined about two hundred skins of Malaysian Woodpeckers, none of them nestlings, unfortunately. In the adults of most species the region of the heel calls for no comment. In others there are slight modifications towards the formation of a pad, or, as it would perhaps be more accurate to say, there are remains of a pad still visible, although the striking structure characteristic of the nestling has long since been shed.

Chrysocolaptes validus xanthopygius. The ankle-joint is larger than usual and the back is covered with large scales, although these may be no larger than the scales on the back of the tarsus. The whole area, however, is swollen and suggestive of a functionable pad. In one specimen the development is greater than in the others, and in this bird the scales on the back of the tarsus (for the whole length) are larger than usual. The scales are particularly noticeable on that portion of the pad which lies on the crus.

Picus vittatus. The skins of two immature birds point to the fact that in life there would be a pad similar to that described in *C. validus*. The scales again are quite smooth.

Dryocopus javensis. In this species there is an unmistakable pad even in old and badly prepared skins. In two immature birds the edges of the scales overlap and are slightly raised, producing a roughened effect.

Dinopium javenensis. In a bird which one would have considered quite young enough to have pointed tubercles there is only the slightly swollen area indicative of a pad.

INCIPIENT PADS.

Family: **Eurylaemidae.** *Broadbills.*

In three late embryos of *Cymborhynchus macrorhynchus* the joint is distinctly swollen and there is a protuberance at that point on the tarsus at which a pad would appear. With regard to a heel-pad, which we should perhaps not expect to find in this group, these facts may have no significance. These embryos present a good case to show the original flexed condition of the leg, the difficulty in straightening the limb, and the consequent plantigrade condition.

Family: **Caprimulgidae.** *Nightjars.*

Gyldenstolpe records a quite young specimen of *C. macrurus* as having smooth, regular rows of scales, on the naked part of the metatarsal joint and expresses surprise that some remains of the heel-pad are still visible amongst the *Caprimulgidae*. In an embryo of *Lyncornis temmincki* I find that the region is well marked with rows of enlarged smooth scales, but these scales can also be traced if an adult is examined in the flesh, and it is by no means certain that there is any special development in this case although it is true that the ankle is more swollen and the scales are more easily distinguishable in the embryo than in the adult.

Family: **Cypselidae.** *Swifts.*

There are smooth but by no means conspicuous pads in three well-feathered nestlings of *Tachornis infumata*.

Family: **Ploceidae.** *Weaver-birds.*

It was surprising to find well developed, enlarged scales on the heel of a fledged example of *Ploceus infortunatus* and also in the nestlings of the small Weaver-birds of the genus *Munia* in none of which birds one would think that a protection for the heel would be required. The nests are soft enough, it is true, but these incipient pads may function when in the first few days after leaving the nest the young birds are frequently found fluttering about on the ground.

Family: **Nectariniidae.** *Sunbirds.*

In a nestling of *Arachneethra pectoralis* there is a marked projection which I find to be slightly indicated in an immature bird, and not to be seen in adults. It is too marked to be ignored, but it is by no means conspicuous. Dissection of the leg reveals that it is in the greater part due to the enlarged proximal end of the metatarsal bone, but the integument is also slightly thickened. As in others included under this heading of 'incipient pads', this case may have no significance.

Family: **Corvidae.** *Crows.*

In *Eulabes* the heel is very rough, but much the same kind of thing is to be seen in *Corvus* and in the *Dicruridae*. Collingwood Ingram records incipient pads in *Sturnus*, and *Aplonis* can also be mentioned. Whether or not these slight developments in the heel are to be recognised as functioning like heel-pads is a matter to be settled in the field.

Family: **Bubonidae.** *Owls.*

In a nestling of *Scops lempiji*, about eight days old, there are smooth bare pads on the heel, but they are by no means conspicuous. The remainder of the tarsus is already feathered as in the adult. The pads are flattened and hard. That these pads

function as protective cushions there can be no doubt, for I kept the particular bird from which the description was taken in captivity, and noted that it spent most of its time resting on the pads with the feet and toes in the air. To the nestling of *Ninox scutulata* the same remarks would apply as far as the pad and attitude are concerned.

Instances of Incipient Heel-pads could be multiplied indefinitely, but how much they are due to any modification towards a protective device, and how much to purely morphological reasons is a moot point. It is certain that in some groups of birds, e.g., many Passerine genera, not the slightest enlargement of the heel is ever to be observed.

The instances frequently occur in birds reared in soft lined and perhaps open nests, but that the structure becomes of definite use when it has developed to the cushion-like stage seen in *Ninox* one cannot doubt, although here it is possibly no more than a thickened surface on which the young bird can rest.

Careful observation of living birds is necessary to determine the part played by even the tubercular pads in the locomotion of nestlings.

I am very much indebted to Mr. W. P. Pycraft of the British Museum of Natural History for his kindness in reading through the M.S. of this paper and in offering some valuable advice thereon.

Miscellaneous Notes.

Two Malay Methods of Divination.

While staying at Lenggong, Upper Perak, in 1913 I attempted to see something of Malay magical practices, and, with this end in view, obtained the assistance of a Malay *kéris*-smith, named Awang, who was doing some metal-work for me at the time⁽¹⁾. He got up several magical performances for my benefit, none of which were particularly impressive, but among them was an exhibition of divining by means of floating needles, which was given by an old woman.

The needles were thoroughly dried and then gently placed on the surface of water contained in a bowl. Care was taken not to break the surface-film of the water, so that the needles should not sink. They were then watched to see if they would come together or keep apart. From observations thus made, it is said that a girl who is betrothed can tell whether her marriage will result in a life-long partnership or will end in a divorce⁽²⁾.

Divination by means of a ring is sometimes resorted to in an attempt to trace a thief. I have seen this method employed in Pahang. The chief performer was an elderly, blind man. The apparatus used consisted of a gold ring which was tied to a long hair—taken from a woman's head—and a basin. The basin was divided into eight compartments, internally, by four lines drawn with Indian ink, which crossed at its centre. In each compartment was written the name of a person who might possibly be the culprit. The unattached end of the hair was given to the blind man to hold with the thumb and index finger of his right hand, and his hand was so placed that the ring hung suspended within the bowl, in the centre, and about half way up. The old man then intoned an orthodox Mohamedan prayer, and, after this, the ring began to swing upon the hair.

When the test is successful the ring swings violently, and finally touches one of the sections containing a man's name. This man is considered to be the thief. On the occasion that I saw the performance, however, the ring, though it swung considerably, did not strike the side of the bowl, even when other names were twice substituted for the original eight. In consequence it was thought that the money which had been stolen had been taken by some one whose name was not included in those tried, though suspicion pointed very strongly to one of the men in the first eight.

I. H. N. EVANS.

(1) *Journal of the F. M. S. Museums*, Vol. V, p. 59 et seq.

(2) A similar method of divination is, or was, employed in India.

On the Persistence of an Old Type of Water-Vessel.

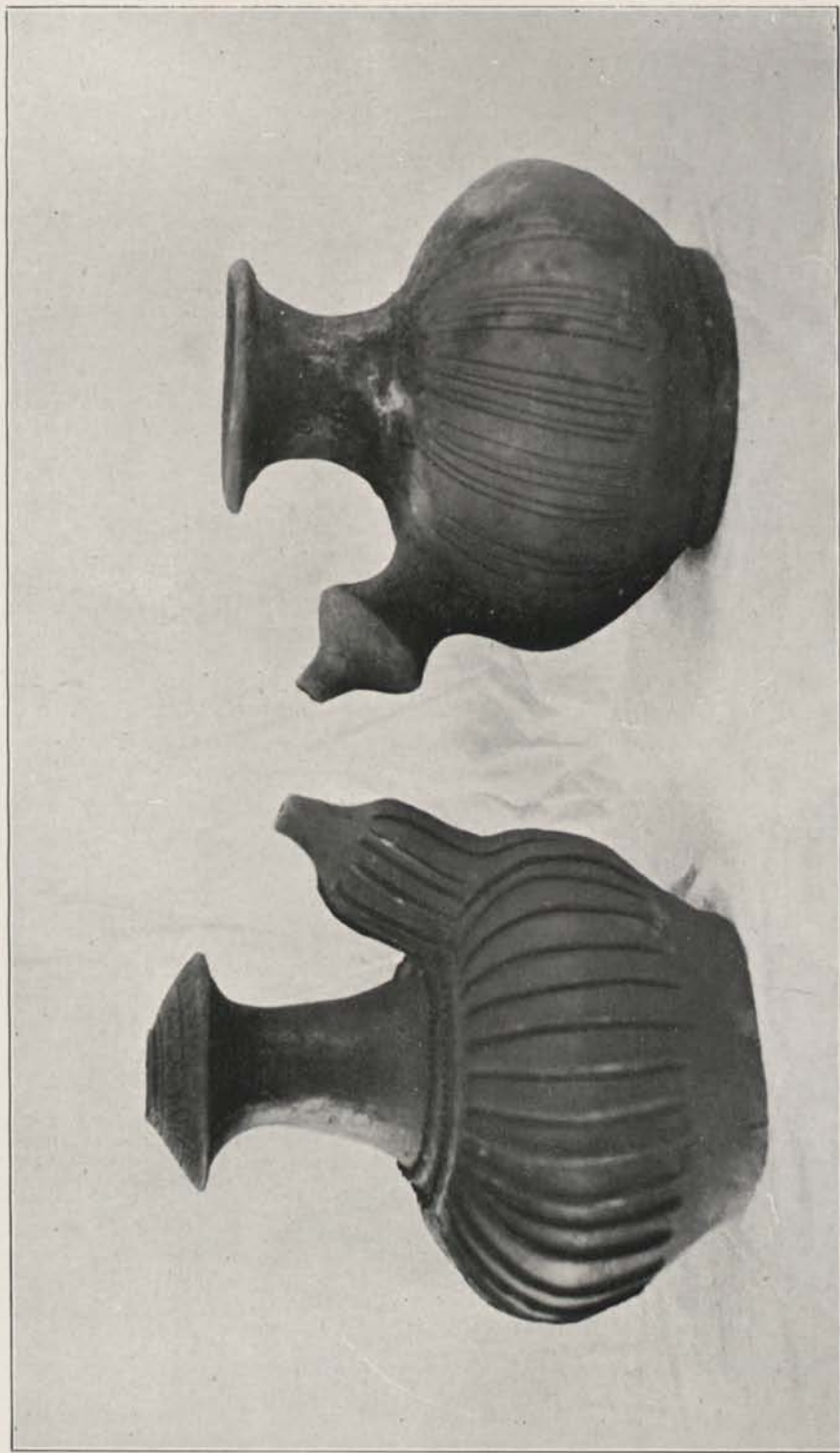
Spouted clay water vessels are found in the Peninsula at the present day in Negri Sembilan, and the Perak Museum possesses modern locally-made examples from Kuala Pilah. There is also in the Museum a single representative of this type of vessel from Kuala Tembeling in Pahang, but the spout is somewhat different from those from Negri Sembilan, and the top much more widely open. The Negri Sembilan specimens are pot-bellied vessels with a spout projecting from the top of the body: they have a rather small aperture at the top, and a slight rim, or foot, below.

In the Museum of the "Bataviaasch Genootschap van Kunsten en Wetenschappen" are some very similar vessels, both ancient and modern, and these are particularly interesting for purposes of comparison with spouted water-pots from the Malay States, as they show that an ancient type of vessel has persisted till the present day.¹

The modern material in the Batavian Museum comes from the West Coast of Sumatra and from Aceh. Examples from the former region are most like our Negri Sembilan specimens in that they are open at the top and of rather similar build, though they have not the small rim, or foot, at the bottom: being simply rounded. Those from Aceh are taller, due in part to their being raised on a considerable foot. Their tops are not open, but there is a small round hole in each at the side of the top. They are presumably filled through the spout by submerging the vessels bodily, the small hole being rather to provide an egress for the air, than an entrance for the water. The spouts, too, are longer actually, and in proportion, than those of the pots from Aceh and Negri Sembilan.

Let us now turn to the ancient specimens. Some of these are of Chinese make. One, an old blue-and-white vessel of the Ming Dynasty period, has an open top, a rather long straight neck, a short and fat spout, and a slight foot, comparable to that of the Negri Sembilan type. Another, an earthen vessel covered with green glaze, has an open top and a swollen and fluted spout, while the body is ornamented with perpendicular ribbings. A third vessel from the same locality as that last described—they both come from the Salayer Islands—is of fine red clay. It has an open top with a small lid, and a tumid spout. I do not know if it is of Chinese manufacture or not.

(1) My grateful thanks are due to the Committee of the Batavian Society and to Mr. Hoedt, the Curator of the Ethnographical Section of the Museum, for permission to take the photographs used in this article, and for other help.



Spouted water-vessels from Kuala Pilah, Negri Sembilan,
(Perak Museum, Taiping)



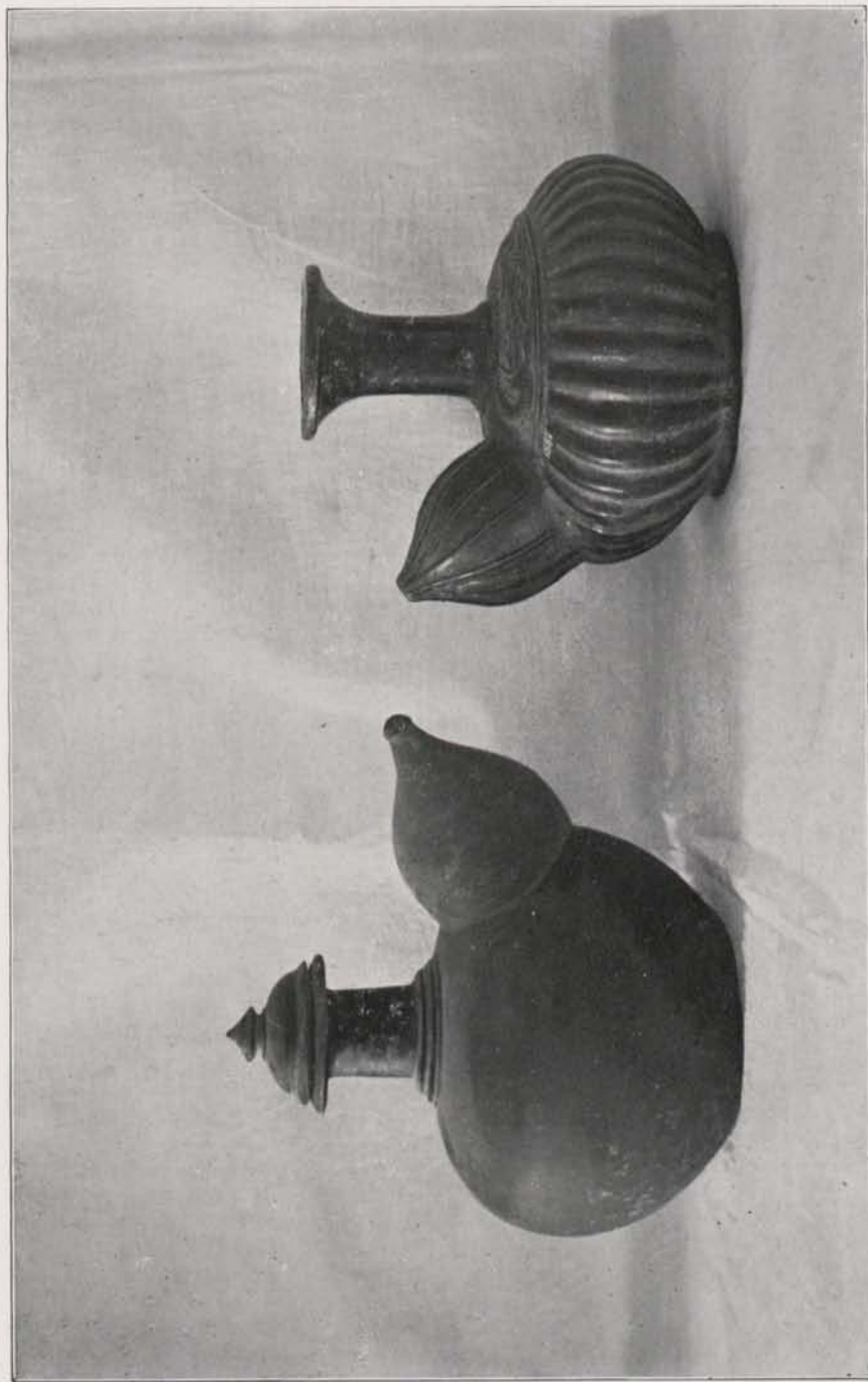
Water-vessels from the West Coast of Sumatra.
(Batavian Society's Museum)



Water-pots from Aceh.
(Batavian Society's Museum)



Ming period Chinese vessel from the Dutch East Indies.
(Batavian Society's Museum)



Ancient water-vessels from the Dutch East Indies. Both specimens come from Salayer Islands, and that on the right of the picture, which has a green glaze and dragon ornamentation, is obviously of Chinese make.
(Batavian Society's Museum)



Kendi (Gendi) in hand of a figure of Bhrkuti. (Tjandi Toempang, afd: Malang, res: Pasoeroean).

(Batavian Society's Museum)

Spouted water-vessels are also depicted in Javanese carvings of the Hindu period. One representation of such a vessel is to be seen in the hand of a figure of Bhirkuti, which is in the Batavian Museum. The type here seen has a foot and a closed top, and much resembles the examples from Aceh, the chief difference being that the spout is turned up against the body of the vessel, and ends in an animal's head, the open jaws forming the aperture of the spout.

In addition to this representation, there is also in the Museum a large model of a water-pot in stone. This comes from the Kedoe Residency, and is of the Hindu period. In the Museum "Guide to the Archaeological Collections" (No. 368) it is called a *gendî* (i.e. Malay *kendî*). It has a closed top, and a very short, rather widely open spout.

The antiquity of this type of water-vessel seems sufficiently well established, and it would appear that we must, probably, look to India as its country of origin, but there is some difficulty in accounting for the specimens from China. I will, however, attempt to deal with this in a little while.

In trying to find prototypes of the Javanese pottery I came across some pictures of vessels from Nepal¹ which seem to be nearly related to those from Aceh. They are of metal—probably copper or brass, though their exact material is not stated. They have fairly large feet, roughly spherical bodies, long necks, open tops, and long spouts which point upwards. One specimen has a head of the well-known fabulous Makara I believe, at the base of the spout.²

I think that there cannot be much doubt that this spouted type of vessel found its way from India to Java, but as I have already remarked the question of Chinese vessels of the same description presents more difficulty. Of course it is perfectly possible, indeed likely, that a water-vessel of a style which may well have been used in ceremonies connected with religious purification, found its way from India to China through the agency of Buddhist missionaries and pilgrims, and became established there.³ I doubt, however, whether spouted water-vessels at all corresponding to those described here are commonly found in China, and it must be remembered that the Chinese, for the promotion of their export trade, especially in later times, frequently copied objects from other countries or produced articles of non-Chinese type which they thought, from their shape, or the nature of their decorations, would find a ready sale among the peoples with whom they traded. In this category comes the so-called Siam-ware,⁴ and also certain

(1) *Journal of Indian Art and Industry*, Vol. VI, Pl. 29, figs. 1 and 2.

(2) *C.f.* the Javanese Hindu-period vessel in the hand of a statue, mentioned above.

(3) Dr. Bosch, Director of the Antiquarian Survey of the Dutch East Indies, to whom I spoke about this old form of water-vessel, called it a *kendî*, saying that it was a common type in Buddhist countries.

(4) *Chinese Porcelain*, p. 173 and fig. 294.

plates and saucers with Arabic inscriptions—for sale among the Mohamedans of the East Indies—and the “Sino-Persian” ware of the Ming dynasty period.

A search through Gulland’s two volumes on porcelain has resulted in my finding an illustration of only one spouted vessel which at all resembles the types from the East Indies.¹ The neck of this is long and open at the top, the spout long and shaped like that of a tea pot, the body hexagonal and having a small foot. It is described as a six-sided wine or spirit decanter.

I. H. N. EVANS.

Custom and Chanticleer

In Province Wellesley and Kedah it is not an uncommon occurrence to meet at the side of the road the remains of a domestic cock that has been flayed and spread-eagled on two sticks and so solemnly crucified. The only crime of the marauder thus held up to the gaze of his compatriots as a stern warning was to pursue his marital inclinations within the precincts of a Malay house.

For according to Malay etiquette poultry and other domestic animals that live below the house (*binatang di-bawah rumah*) must not presume on their privileged position to enter the house and indulge in such conduct as would create an atmosphere of *sial* or “nae luck about the hoose.” So the delinquent is mercilessly chased and straightaway slaughtered and his feathered skin exposed on a cross at a *sempang tiga* or point where three roads meet. In Malacca even the unfortunate hen is sometimes beheaded and her head thrown over the house top whilst that of the cock is ignominiously hurled over the roof in the opposite direction. Outraged modesty having been appeased the *kampung* subsides into slumber.

A. W. HAMILTON.

(¹) *Chinese Porcelain*, p. 173 and fig. 294.

A Brunei Code.

Mr. G. C. Woolley, Resident of the Interior, Tenom, British North Borneo, recently sent to our Society a Romanised copy of a code of laws formerly in force under the Brunei Sultans. The original belonged to the Orang Kaya di-Gadong, Sri Lela Mubammad Hussin and was dated A.H. 1121. Chapter 19 was quoted in the course of some enquiries into native claims to fruit trees at Membakut. Various MSS copies were claimed to have been circulated as a Code among the Pangerans and ruling chiefs.

Examination proved that this Brunei Code was merely a copy of the *Risalat Hukum Kanun* or *Undang-Undang Melaka*, of which Dr. Ph. S. van Ronkel, Professor of Malay at Leiden, recently published (Brill, Leiden, 1919) a comparative text (vide note in *Journ. Straits Branch, Roy. Asiat. Soc.* 1922, No. 85, p. 232). The fact that it has been adopted *in toto* for Brunei is of interest.

R. O. WINSTEDT.

Hikayat Sultan Ibrahim.

Of the shorter version of this popular Malay tale many editions exist. The Dutch editions will be found recorded in van Ronkel's catalogue of Malay MSS. in the Library of the Batavian Society (p. 120) or in "The Encyclopaedia of Islam" (No. 24, p. 433 *sub* Ibrahim b. Adham). I have used the sixth edition of a romanized text printed in 1908 at Singapore, a reprint, I imagine, of one of the Dutch texts. The story is as follows:—

Ibrahim bin Adham, Sultan of Irak, a great and just prince bethinks himself that "this world is like a wonderful dream whereof nothing remains when one wakes." So he hands over his kingdom to his most trusty vizier. And early one morning "before the beasts have stirred after their prey, or the stars grown dim or the birds have left their nests," he leaves his palace, alone, with a staff, a knife, a beggar's bowl and a ring. He traverses forest and plain, till he comes hungry to a clear river, on whose surface a pomegranate floats. He eats half the fruit and then is startled to think he may have taken some one's property without permission. The fruit is the property of Sharif Hasan of Kufa, whose orchard is in charge of two ascetics, Shaikh Ismail and Muftihi'l-'Arifin. Dying Sharif Hasan tells his beautiful fourteen-year-old daughter, Siti Saleha, that she will wed Sultan Ibrahim who will come as a *fakir* and ask pardon for having eaten a pomegranate. He dies. Muftihi'l-'Arifin comforts the daughter by relating how the Prophet once took a friend Abdu'r-Rahman to his poor hut and finding

Siti Fatimah with only one cloth handed her his scarf; so humble was the Prophet's home in this transitory world. Sultan Ibrahim comes and asks pardon. Siti Saleha informs him the only way to win forgiveness is to marry the owner. They wed. Soon Sultan Ibrahim (telling his wife that this world is like a vile woman gaily dressed) takes leave and wanders on to Mecca. Siti Saleha bears a son, Muhammad Tabir. Folk jeer at him as a bastard. His mother lets him fare in search of his father. His father gives him his ring and bids him go to Irak, speeding him away from Mecca because love for his son makes him forget his religious duties. The son comes to Irak, where the vizier welcomes him as his father's heir. But he refuses the throne and taking only some jewels for his mother's support returns to Kufa.

There is a longer Malay recension, said to have been translated from the Arabic of a certain Hadrami *shaiikh*, Abu Bakar (van Ronkel *ib.*, p. 121). It begins with an account of how Sultan Ibrahim builds a great fort and lets all his subjects inspect it to discover any flaw. At last an old man points out that it is impermanent. So the Sultan comes to give up this perishable world.

Another version is to be found in Book IV, Chapter I of the *Bustan al-Salatin* (Neimann's "Maleisch Leesboek" I p. 232), where the prince is told that there is only one fort, Paradise, which will never decay and whose people will never die.

There are Javanese, Sundanese and Achinese (Snouck Hurgronje's "The Achehnese" II, p. 184) versions. There is an Arabic romance, translated from the Turkish and a Hindustani poem on the same subject.

Ibrahim bin Adham was a native of Balkh (*obit circa* 160 A. H.-776 A. D.). Converted to asceticism he migrated to Syria where those who saw him thought him "a madman or a camel-driver." "A trait far more characteristic of Indian and Syrian than of Muslim asceticism appears in the story that one of the three occasions on which Ibrahim felt joy was when he looked at the fur garment that he was wearing and could not distinguish the fur from the lice." In the Sufi legend, he appears as a prince of Balkh who while hunting was warned by an unseen voice that he was not created to chase hares and foxes; whereupon he abandoned the world for ascetic piety.

Historically Ibrahim bin Adham belongs to a band of Muslim devotees, who followed the simple life of the Prophet and their desert ancestors and thought much of the Day of Judgment, but seldom adopted the hermit's life. Possibly these early recluses were inspired by the example of the Christian monks of Syria directly or through the medium of the Prophet's retirement from the world. It was a hundred years later that Sufism came with its *fakir* and *darwish*, divorced from all earthly ties and possessions. The ascetic bent of the Sufis owed something to the *Zindik* of Persia, the Manichaean or Maskedite sect which secretly abjured

Zoroastrianism; something to Sabian (Mandaean) influence; and something perhaps to Buddhist missionaries, who had been active in Persia before Islam and had founded monasteries in Balkh. (O' Leary's "Arabic Thought and its place in History").

The Sufi legend of Ibrahim the hunter prince of Balkh who turns ascetic is modelled upon the story of Buddha (J. R. A. S., 1904, p. 132 seqq.). In Malay literature there are many instances of princes who give up thrones for religion. In the *Hikayat Bayan Budiman* (Winstedt, Singapore, 1920, Tale XXIII) there is the story of Sultan Adam, to whom Desire appears in the shape of a lizard and who thereupon abdicates and goes to Istanbul and finally to Mecca. Rinkes quotes an historical instance, given in the *Sĕjarah Mĕlayu* (Chapter 7) and the *Hikayat Pasai* (Dulaurier p. 20) and suggests that all such cases are Islamic adaptations of the life of Buddha.

R. O. WINSTEDT.

Was Johore once named Langkasuka?

In the Singapore Free Press of March 14, 1923 the following paragraph appeared:—

"The word Lingui has been in frequent use during the past few weeks in connection with the water proposals for Singapore, but it appears that the word is incorrect, and that the correct name is Langyu, which means literally, kite and shark. It is believed that at one time at the junction of the Langyu river with the Johore river there was a royal settlement of the Sultan of Lingga, one of the Dutch islands, who had been driven out of his own country by invaders. Later he was re-established by a Bugis force."

The name, Langyu, is not to be explained by the literal methods of the amateur philologist. It is, however, connected with the bold and original theory of Dr. G. P. Rouffaer, summarized by me in this Society's Journal, No. 86, 1922, that an old name for Johore before 1450 A.D. was Ganggayu (i.e. Old Javanese *Gangga ayu* = 'fresh water') and that this is the Langka-suka of Malay legend, and perhaps the Lanka of the *Ramayana*. The "Malay Annals," (chapter 1) connects Ganggayu with Johore, and interprets the word to mean "a treasure house of jewels," which fits with *jauhar* = jewel, suggested by Rouffaer to be the origin of the name Johore.

R. O. WINSTEDT.

Arctic Amok.

In his book "The North Pole" Peary writes of the Eskimos (pp. 156, 7):—

"adults are subject to a peculiar nervous affection which they call *piblokto*—a form of hysteria. I have never known a child to have *piblokto*, but some one among the adult Eskimos would have an attack every day or two, and one day there were five cases. The immediate cause of this affection is hard to trace, though sometimes it seems to be the result of a brooding over absent or dead relatives, or a fear of the future. The manifestations of this disorder are somewhat startling.

"The patient, usually a woman, begins to scream and tear off and destroy her clothing. If on the ship, she will walk up and down the deck, screaming and gesticulating, and generally in a state of nudity, though the thermometer may be in the minus forties. As the intensity of the attack increases, she will sometimes leap over the rail upon the ice, running perhaps half a mile. The attack may last a few minutes, an hour, or even more, and some sufferers become so wild that they would continue running about on the ice perfectly naked until they froze to death, if they were not forcibly brought back.

"When an Eskimo is attacked with *piblokto* indoors, nobody pays much attention, unless the sufferer should reach for a knife or attempt to injure some one. The attack usually ends in a fit of weeping, and when the patient quiets down, the eyes are bloodshot, the pulse high, and the whole body trembles for an hour or so afterward."

I believe that in one of his earlier books (I have not got them by me) Peary records an instance of one of his Eskimo followers actually attacking and killing a companion while in a state of *piblokto*.

In spite of the female manifestations, which closely resemble those of *latah*,¹ the Eskimo condition does not seem to have any relation to the latter as it is not brought about by suggestion or shock: it is rather akin to *amok*.

Broadly speaking there does not seem to be much in common between the Eskimos of the Arctic circle and the Malays of the Equatorial belt—but they are both Mongoloid peoples.

C. BODEN KLOSS.

(1) Vide "A Contribution to the Psychology of 'Latah'" by Dr. D. J. Galloway in *Journ. Str. Br., Roy. Asiat. Soc.*, 1922, No. 85, pp. 140-150.

A Rare Petrel.

Included in a small collection of skins made at the Horsburgh Lighthouse, 33 miles east of Singapore Island, in October 1921 was a specimen of the uncommon *Oceanodroma m. monorhis* (Swinhoe) or Swinhoe's Fork-tailed Petrel.

Nagamichi Kuroda (IBIS, 1922 11th. Series, Vol. IV. No. 3 p. 439) has recently stated that this bird is only known from near Vladivostock, Japan (Prov. Mutsu, N. Hondo; Prov. Yamato, S. Hondo; Loo-Choo Is.) and coast of China (Amoy) but he has overlooked a record from Java (Semarang) given by Van Oort in 1911 (Notes Leyd. Mus. XXXIII, p. 111). Robinson and Kloss (Journ. F. M. S. Mus. 1922, Vol. X, pt. 4, p. 253) add the species to the fauna of the Malay Peninsula on a male obtained at the One Fathom Bank Lighthouse in the Straits of Malacca off the coast of Selangor in November 1918 and there are two specimens in the Raffles Museum, one, a female bird taken at Keppel Harbour, Singapore, in May 1913 by a former collector employed by the Museum and another which is the specimen mentioned above.

The authorities just quoted would furthermore extend the range to the coast of Siam and Sumatra waters (*vide* Journal Nat. Hist. Soc. of Siam, 1921 Vol. V. No. 1. and Journal F. M. S. Mus. 1918, Vol. III, pt. 2, pp. 265 and 284).

It is quite possible that *O. monorhis* occurs in Malaysian waters more frequently than is generally supposed for Mr. P. de Fontaine, the collector of the Horsburgh specimen, has given me some very interesting observations made during his short stay of a month at the lighthouse.

On October 28th when it was blowing hard from the N. E. a small flock composed of at least twelve of these Petrels came from the W. The sea was very rough and the flock, well closed up, was almost skimming the water, following the undulations of the waves. In the observer's opinion the birds were making for the shelter of the lighthouse rocks. He fired when the flock came within shot but only one bird dropped and this was immediately snapped up by a small shark.

The specimen actually obtained struck the light at 9 o'clock on the evening of October 29th and was captured alive.

The lighthouse-keepers (Malays) state that they are familiar with the species and that other specimens have struck the light on previous occasions. They have always failed to get the birds to Singapore alive.

Arrangements have now been made whereby the keepers can preserve any future specimens that come to hand and the status of the bird as a Malaysian species can probably be fixed more accurately in the near future than at present.

Mr. Koh Ah Wong the collector of the Keppel Harbour specimen now tells me that he bought it from a sailor on a boat lying in the dock at Singapore. The bird had flown on board and had been captured. The possibility therefore remains that the bird came on board before the boat entered the harbour.

The two birds in the Singapore Museum are extremely similar but differ markedly from that figured by Salvin in *Cat. Birds, Brit. Mus. Vol. XXV. pl. II.* which shows a bird generally brown in tone and decidedly so on the underparts, with conspicuous grey wing-coverts, and with either the inner secondaries or scapulars edged with light brown. They however agree well with the description on p. 356 (*loc. cit.*). In both specimens the under-parts are very little browner than the upper parts and only in the Keppel Harbour bird is the face at all lighter than the rest of the head. They both appear to be in good feather. There seems to be a difference in the relative lengths of the primaries in the two birds but one has unfortunately been mounted with the wings extended which prevents accurate observation. In one specimen the second long primary is distinctly tipped with buff.

It is interesting to note that both the skins retain the characteristic "petrel-like" smell.

The field-notes of the Horsburgh bird (not sexed) taken by de Fontaine are, length 205 mm., spread 490 mm., irides dark brown, beak, tarsi and toes black.

Kuroda gives the very small measurement of 141 mm. for the wing of the Yamato bird as against the 157-162 mm. of Hartert (*Völ. Pal. Faun. p. 1416*) and the Horsburgh bird which cannot be made less than 165 mm.

O. monorhis is not likely to be confused with any other Malaysian bird. *Oceanites oceanicus* (Kuhl), the only other small black petrel thought to occur in the Straits, has a white rump. *Puffinus leucomelas* Temm., recorded from Borneo, is a much larger bird with the underside entirely white.

F. N. CHASEN.

A Large Orang-Utan.

The following notes were made from an adult ♂ Mias or Orang-utan which was taken alive at Katoengou in Dutch West Borneo in 1922. The beast which shows indications of being an aged individual, died in Singapore in January 1923 and appeared to be so large that it was carefully measured after death. The figures taken appear in Col. A of the Table below. In Col. B the dimensions of a ♂ which died in the Jardin d' Acclimation at Paris are given but this animal seems to have been most abnormally proportioned. Beccari (¹) states that a large fleshy or fatty protuberance on the crown of the head added somewhat to its stature which makes the measurement of the extended arms even more remarkable.

Measurements.

	A	B	C	D
	Feet & inches.	Feet & inches.	Feet & inches	Feet & inches
Height, crown to heel	4. 7½	4. 7	4. 5½	4. 6
Spread of arms, between finger-tips	8. 0	8. 7½	7. 10¾	7. 11½
Length of arm, armpit to finger-tip	3. 4¾	..	3. 3½	3. 5
Length of hand	. 11½	..	. 10½	. 11½
Length of foot	1. 2	..	1. 0½	1. 1½
Breath of face	. 9	..	1. 1	. 11½
Length of faee	. 11½	..	. 11½	..
Circumference of neck	1. 10¾	..	2. 3¾	2. 2¾
" " chest	3. 2½	..	3. 5½	3. 6
" " arm	. 10½	..	1. 0½	1. 0½
" " forearm	. 11½	..	1. 2	1. 1½
" " thigh	1. 1¾	..	1. 7	1. 6
" " calf	. 10	..	. 11½	. 11¾
Ear	. 1½ ⁵ / ₁₆	..	..	..

1. BECCARI, O. *Wanderings in the Great Forests of Borneo* (1904) p. 148.

Cols. C & D are concerned with the measurements given by Hornaday (2) of the two largest of the 43 specimens collected by him in Borneo.

The above measurements of specimen A were taken very carefully by the Taxidermist at the Raffles Museum under immediate supervision and without reference to Hornaday's figures, the existence of which we were quite unaware of at the time. Beccari's record was not traced until much later. The height was taken by exactly the same method as described by Hornaday (*loc. cit* p. 405), the spread is a minimum full stretch rather than a maximum expansion. In the case of the other measurements, length of face and length of foot are the only dimensions easy to take and in which one can feel sure of getting a fair figure by the same method as used by another observer. In these main measurements it will be seen that the most recent animal slightly exceeds Hornaday's two specimens. In the case of the girth measurements the figures are smaller, but it must be remembered that Hornaday's records were taken from wild beasts shot in the prime of life and that the animal under discussion had been in captivity several months, had been ailing for a considerable time before it died and was generally badly nourished. The Mias again, is supposed from all accounts, to vary in its proportions. The author just quoted remarks:—"Some are short and thick set, and others are more slenderly built and longer limbed."

The skull measures:—

Basilar length	..	..	..	168	mm.
Zygomatic width	..	..	..	164	mm.
Mastoid width	..	..	..	135	mm.
Upper tooth row	..	..	..	68	mm.

In the girth measurements the hair was excluded as far as possible. The breadth of the face, including the callosities is in no way correlated with the size of the animal. Example D with a height of 54" is only 11½" across the face. C which is half an inch less in height runs to 13" on the face whilst A, the largest of the three beasts spans only 9". I have, on several occasions, seen much smaller animals with more prominent cheeks in Singapore.

Considerable doubt and extravagant ideas formerly existed as to the size which adults of this Ape attained, but Wallace (3), who himself examined seventeen freshly-killed Orang-utans critically surveyed the subject and concluded by fixing 4' 2" as the height allowable for the species under reliable evidence but this was just too low for Hornaday collected no less than 7 which exceeded this figure. Kelsall (4) also records a specimen with a height of over 4' 2" and another with a supposed height of 4' 7" and span of

2. HORNADAY, H. T. *Two years in the jungle* (1885) pp. 375 and 406.

3. WALLACE, A. R. *The Malay Archipelago* (1872) p. 63 (4th Ed.)

4. KELSALL, H. J. *Journ. Str. Branch, Roy. Asiat. Soc.*, No. 24 (1891), p. 168.



Head of large Orang-Utan from Borneo.

8' 10" is recorded in *Journ. Str. Branch, Roy. Asiat. Soc.* No. 10 (1882) p. 181. (As an instance of how erroneous records can be circulated in all good faith, it may be mentioned that the animal recorded herewith was always estimated by the owner to span 15' across the arms!).

Skin and Hair.

On all parts of the body the skin dark slatey black. Dorsally, thickly clothed with hair; ventrally, the armpits and chest (except on the mid-ventral line on which there is a scanty growth of hair) almost bare. On the groins the pelage very thin; the throat well covered. The crown covered with thick but comparatively short hair. The hairs on the forehead directed upwards, much shorter and finer. Well developed tufts forming a moustache on the sides of the upper lip, this moustache confluent with a well developed beard on the chin. Excluding individual or loose hairs the beard measures $5\frac{1}{2}$ " to 6" in length.

Hair longest on the thighs, arms (9-12") and shoulders (14"); shortest on the back and abdomen.

Two distinct colours apparent in the pelage, a dark sienna and a light reddish-golden. The dark colour extends over both sides of the trunk and on the crown and throat. The light colour on the limbs being lighter on the upper sides and most so on the forearms and hands. The hands the lightest part of the body, the crown and throat the darkest.

The above facts are scarcely in agreement with Hornaday's otherwise very admirable description (*loc. cit.* p. 400 *et seq.*) in which he states that the face and throat are quite bare except for a scanty beard of uncertain length in adult specimens, its longest hairs never exceeding four inches.

The two photographs represent the head of the individual forming the main subject of this paper. They were taken from the flesh and illustrate the comparative luxuriant growth of hair on the chin and upper lip which is not usual.

F. N. CHASEN.

Early stages of a Danaine Butterfly.

In his "Notes on Malaysian Butterflies" published in the *Journal of the F. M. S. Museums*, 1921, Vol. X. p. 162 Major J. C. Moulton, Director of the Raffles Museum, Singapore, comments on the remarkable fact that the life-history of the common Danaine *Ideopsis daos* is still unknown.

Fruhstorfer in Seitz's *Macrolepidoptera of the world (Fauna Indo-australia)* 1910, p. 216, surmises that the larva and pupa of *Ideopsis* when found will resemble those of *Radena* rather than of *Hestia*, with which the general appearance of the imago suggests affinity.

Piepers in *The Rhopalocera of Java: Danaidae* 1913, p. 23, pl. xiii, figs. 17c, 17d, describes and figures the larva and pupa of the allied Javanese species *I. gaura* Horsfield, and thereby proves the correctness of Fruhstorfer's surmise. The green bell-shaped or squat trunk-like pupa, with small black dots is very like *Radena* pupae and in marked contrast to the elongate *Hestia* type. The larva similarly agrees with *Radena* larvae in having but two pairs of fleshy processes instead of four, one from the 2nd thoracic segment directed forwards over the head, while the other pair is smaller and arises from the penultimate segment. The larva of *Ideopsis* however approaches *Hestia* in the simple colour pattern of yellow or red rings on black, in place of the rather complicated spotted pattern of *Radena* larvae.

I was fortunate enough to secure the larva of *I. daos* at Lebong Tandai, West Sumatra. The following notes may therefore be of interest in view of the fact that the larva and pupa of this species have not been described before. Major Moulton identifies the imago as *I. daos eudora* Fruhst., which is confined to West Sumatra.

Larva. In form cylindrical, slender. When mature the segments are coloured broadly black with a series of narrower light yellow and red rings. (Piepers describes the larva of *gaura* as "velvety black with a milky white transverse band on each segment"). On either side of the head there are slender tufts of red hairs (pencils), also at the extremity of the abdomen, but smaller: (In *gaura* Piepers says these processes are black, but red at the base).

It was feeding freely, without apparent attempt at concealment on a pepper-like vinous herb.

Pupa: Squat, trunk-shaped, light green with few black spots variously distributed frontally, two only occurring at the back below the cremaster. On the seventh segment which is the widest part of the pupa there is a row of ten black spots placed in a silver band between the wing plates. (Piepers mentions eight in *gaura*).

Imago. Emerges after about ten days at 8 a.m. Flies at noon. Although this insect is common at Lebong Tandai, it is not by any means abundant. I find from the capture of 25 specimens in 18 months that the ratio of males to females is as 1: 4.

The monthly record of captures in 1921 is as follows:—

May	Females	2	Males	-
June	"	1	"	-
July	"	5	"	-
September	"	1	"	-
November	"	-	"	1
December	"	2	"	1

There seems to be little or no variation in marking between the specimens other than sex distinction, and no seasonal difference.

I desire to express my thanks to Major Moulton for his kind assistance in preparing this note for publication.

CECIL J. BROOKS.



Reviews.

The Singapore Naturalist.

(Singapore: Methodist Publishing House, July 1922, Vol. I, pp. 1-80, price \$2.00).

We welcome the appearance of the first number of this publication which is produced by the Singapore Natural History Society. It meets a long-felt want. Local natural history is the theme, and it would be difficult to find a more delightful subject for serious study or for recreation in a rich tropical country such as this.

The Society was founded in May 1921. It has for its objects (i) the development of friendly intercourse between local Naturalists, (ii) the increase and diffusion of knowledge concerning local Natural History by means of papers, discussions, exhibition of specimens, field excursions, formation of collections, purchase of periodicals and publication of transactions. An ambitious programme perhaps in this climate, where the well-intentioned endeavour of an energetic few so soon succumbs to the apathetic "support" of the many. However a membership list of 66 shows that the Society in the first year of its existence has made a promising start. The account of the various excursions indicates that everybody's interests are catered for. The varied exhibits shown at the meetings and the wide range of subjects dealt with in the papers communicated to the Society demonstrates in an emphatic manner that the members are determined to make their Society an unqualified success.

With the marches of civilization the jungles of Singapore and their denizens are fast disappearing. This Natural History Society will do well to place on record all they can before it is too late.

"The Singapore Naturalist" devotes some 27 pages to the Proceedings of the Society. In his inaugural address in August 1921 the President, after dwelling on the objects of the Society, outlines a wider field of work which the Society should bear in mind, such as collecting animals for the London Zoo, keeping in view the possibility of forming a local Zoo in Singapore in the not too distant future; the compilation of a local Fauna, beginning with a list of Singapore birds; the protection of wild animals in this country.

The history of botanical research in this part of the world is reviewed in a comprehensive sketch by Mr. I. H. Burkill, Director of the Botanic Gardens, Singapore, showing that the botanical side of the Society is not to be neglected.

A summary of the poisonous snakes of Malaya is given in the Proceedings, followed by interesting notes on such subjects as

Weaver Birds' Nests, Long-horned Grasshoppers, Reptiles' eggs, Cicadas, a destructive weevil, the Yellow-bellied Giant Squirrel, Butterflies, and an albino Kingfisher.

These notes are very readable and form an attractive feature.

The second half of "The Singapore Naturalist" is devoted to Transactions, comprising five papers, of which we may notice an interesting account by Mr. C. L. Collenette of the life-history of a butterfly (*Atella phalanta*) and notes by Mr. V. H. C. Jarrett on acclimatisation experiments with a common snail (*Helix aspersa*), both valuable contributions and of a type which will do much to justify the birth of yet another periodical in this somewhat overloaded world of scientific literature. Mr. Chasen, the Honorary Secretary of the Society, contributes a very useful "A. B. C. of Preserving Animals." Simple directions for collecting, skinning, preserving are given. He very rightly emphasizes the importance of labelling every specimen. Too often is the heart of a Museum Curator or specialist broken by the entire absence of any data on some most interesting specimen. Locality and the date of capture are the first two essentials without which any specimen may be regarded as valueless, and, worse in the case of a rare species, it becomes a continual source of irritation to those who examine it. Measurements in the flesh, colour notes, and any observations as to habits etc. are of course also very desirable, particularly in a country such as Malaya where there is yet so much to learn about even our commonest friends of the jungle,—be they elephant, ant, snake or snail.

Of a totally different nature is a paper by Dr. G. E. Brooke entitled "The identification of Malayan Culicidae." The first four pages deal with the collection and preservation of Mosquitoes and no doubt will be read with interest by many besides the Members of the Singapore Natural History Society. The second part of the paper provides a dichotomous "Table for the diagnosis of the Female Culicidae of Malaya." Colour differences, rather than structural characters have been utilized. A diagram to show the parts of a mosquito, indicating the terms used for different parts (e.g. palp, scutellum, tarsus, tibia, abdominal segments etc.) would have been of use, and an explanation of words such as "labellae," "tenuiform" is needed.

The style of the remainder of "The Singapore Naturalist" forms a particularly successful compromise between the indigestible type of matter which fills so many scientific journals and the somewhat verbose pot-boilers published as "Nature Notes" in the newspapers.

So long as this principle is kept in view "The Singapore Naturalist" will find many readers, and the members of the Singapore Natural History Society may congratulate themselves on adding many valuable contributions to our knowledge of local Natural History.

Malay Poisons and Charm Cures.

(2ND ED.) BY J. D. GIMLETTE, M.R.C.S., L.R.C.P. (London: J. & A. Churchill 1922, pp. i-xii, 1-260).

The publication of this book carries one back to the days of those learned physicians, John Leyden (the friend of Sir Walter Scott and Raffles), who translated the "Malay Annals," and John Crawford, firstly army surgeon, and later Resident of Singapore, the author of many notable works on Malay subjects. After their time there was no work dealing with any Malay ethnographical topic from the pen of any English doctor until Dr. Gimlette first published this book.

This second edition is so expanded that it is in effect a new work and a work of signal interest and value. Of the merits of the purely scientific side of the book I have not the knowledge to speak nor is this Journal the place to dilate on them. It will suffice to quote from the introduction by that distinguished expert on poisons, Sir William H. Willcox:—"the work which, during a period of long and painful illness" (contracted in the course of his official duties in Kelantan) "Dr. Gimlette so bravely completed forms a very valuable addition to our knowledge of Medicine and Toxicology. The Government of the Federated Malay States is to be congratulated on its wise policy in giving support to the publication of this work, which is a piece of research leading the way to discoveries of importance in modern medicine." The patient labour involved in the collection and identification of animal, plant and inorganic poisons must have been enormous.

The first 109 pages contain what is probably the most fascinating and important account of the Malay "medicine-man" that has appeared from any English pen since Skeat published his "Malay Magic." Dr. Gimlette has been fortunate in unearthing Kelantan charms to illustrate the often heterodox pantheism, which the Malay *pawang* borrowed first perhaps from Hinduism and directly in the xvth century from the Sufism of Indian Muslim pundits. He notes correctly (p. 60) that some of the charms are derived from that Javanese source, on which H. Kraemer has lately written so valuable a paper (p. 99). All such charms are corrupt and difficult to translate and no doubt the specimens given will in time invite further study and elucidation. There are some misprint and a few mistranslations and pretty obvious corruptions of words. For *Angin Tanar Masshur* (p. 244) "Wind of Tanar the renowned" (p. 78) should certainly be read *tanah* and, I think, *Mahshar* "the plain of the Day of Judgment." In the same charm the translation hardly makes it clear that to the crude pantheism of the Malay the 4 stages to gnosis (*shariat, hakikat, tarikat, ma'rifat*) find their analogy in 4 component parts of the human frame. On p. 72, note 4, most of the words, at any rate, are Arabic and are used of "worlds" in the scheme of the Muslim mediaeval cosmogony, for which To' Drahman again found "seats" (*makam: astana*) in the animal world. *Zabrut* = 'alam *jabarut*, the world of

almightiness, wherein lie hidden the processes of the Divine nature intimated in the attributes and names of God; *nasud* = 'alam *nasut* the outward material world; *mēlukut* = 'alam *malakut*, the invisible intelligible world. According to a Javanese account, quoted by Kraemer, the 'alam *nasut* is situated in the eyelid or in the 'akl, the 'alam *malakut* in the white of the eye or in the *iman*, the 'alam *jabarut* in the black of the eye or the *ruh*, and the 'alam *lahut*, the divine spiritual world in the light of the eye or in the *rahsa*!

The doctrine of the 4 elements or natural properties (pp. 29-30) is explained at length in the *Taju's-Salatin*, a Malay classic of the beginning of the XVIIth century:—*tēlah di-jadikan kēadaan manusia itu daripada ēmpat pērkara, yang bērlainan pēri-nya, dan di-katakan anasir arba' nama-nya, dan suatu daripada ēmpat pērkara itu mēlawan akan sa-suatu, sapērti tanah dan ayer dan angin dan api; dan kēēmpat pērkara itu ada-lah kēadaan sa-sa-orang manusia sa-lama ada-nya itu ada, dan pēri kēēmpat pērkara itu, yang ada pada kēadaan sa-sa-orang manusia, ada-lah bērlain-lainan sēntiasa pada sēgala manusia jua, tiada dēngan ikhtiar-nya sa-hingga tiada ada ia dēngan sēntosa sa-lama hidup-nya; karna Tuhan Allah brikkan dalam tuboh sa-sa-orang manusia bēbērapa pērkara, yang suatu daripada itu mēlawan akan suatu dēngan pēri-nya dan dēngan khasiat-nya... Jikalau pēri sēgala pērkara itu sē-dang-lah pada tuboh manusia dan tiada kwang tiada lēbeh, maka dēngan sehat dan sēntosa tuboh manusia itu; hanya jikalau bukan sēdang itu dan ada-lah kurang atau lēbeh, maka bagai-bagai pēnya-kit datang pada tuboh manusia dari sēbab ini.* Health consists in the preservation of "the balance of power" between the four natural properties in the human body.

One notes that Kelantan folk-lore wrongly makes Asaf the father instead of the son of Barakhya (*Encyclopaedia of Islam*, No. VIII, p. 476, *sub* Asaf).

Dr. Gimlette has introduced the reader to a field almost untouched by students of the Malay Peninsula. Incidentally his book is enriched with exhaustive references, several appendices and an index. It is to be regretted that so few officers posted to States remote from modern influences have followed the author's painstaking and scholarly example. Not only have his studies added much to our knowledge of things Malayan: during his stay in the East they endeared him greatly to those to whom he gave a life's work and a limb.

R. O. W.

British North Borneo: An account of its history, resources and native tribes.

By OWEN RUTTER. (London: Constable and Co., Ltd., 1922, pp. i-xvi, 1-404, price 21s.).

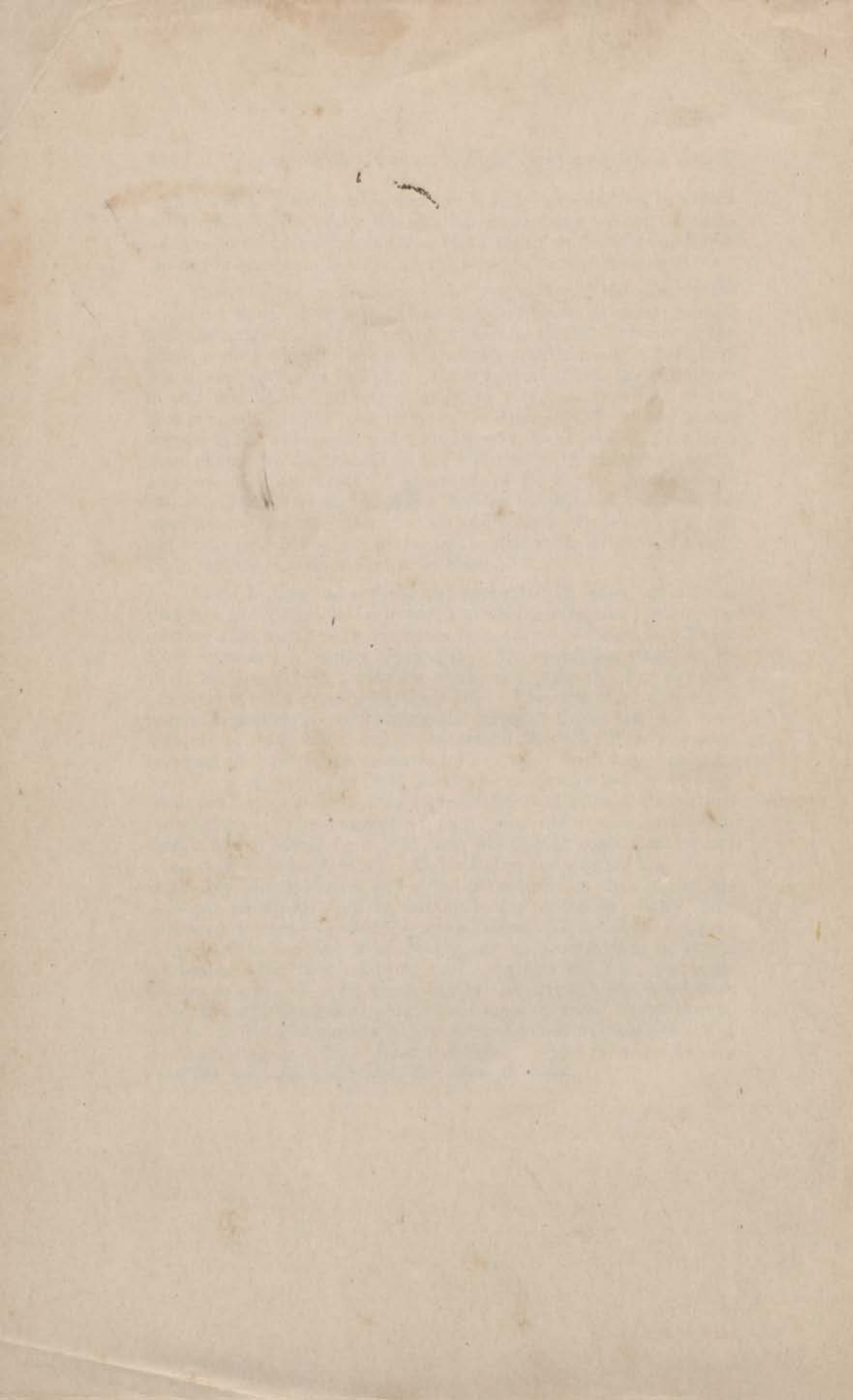
Major Rutter has given us a very full and very interesting account of North Borneo. The subject matter of his book is one which makes a special appeal to residents in North Borneo but the

author's style is so readable and, while fully informative, he avoids so successfully the heavy scientific air of so many writers on backward races that even the man who first learns that the State of North Borneo exists when he picks up the book will enjoy reading it.

The chapters on the history and geography of the country fill a distinct want. Major Rutter has had full access to official records and has compiled the first connected story of the brief history of the State, a story which covers comparatively speaking only a few years but is not lacking in incident. Geographical knowledge of Borneo is still incomplete; as yet no complete survey of the country has been made but it has been traversed by District Officers and rough surveys made with chain and compass, and the courses of river have been plotted by the inaccurate but often exciting method of watch and compass from a raft. The records of the Survey Office include valuable contributions by Major Rutter himself, who knows the weariness of making miles of chain and compass traverses on a zig-zag bridle path in the heat of the day, as well as the delights of shooting down the rapids of a river in flood.

North Borneo has suffered and probably will suffer again from that type of author who is prepared to write a 600-page book on the country after a stay of twelve hours on a passing steamer, but Major Rutter knows his subject thoroughly. He spent five years in the Civil Service, all on outstation work, and after the war has had practical experience of a planter's life. The outstation officer has unique opportunities of learning the customs of his natives. It is his duty to study them, and the successful District Officer is a man to whom this duty is particularly interesting. One cannot gain the confidence of natives or hold the scales of justice evenly between them until one has more than a superficial knowledge of their tribal conventions. The customs of each tribe differ considerably in details and it would be a bold man who would boast that he had a thorough knowledge of all. Major Rutter has gleaned his information from many sources and sifted it carefully in the light of his personal knowledge, and he has made few mistakes. Some inaccuracies are there—it would be indeed almost impossible to compose so detailed an account of a country and its peoples with no errors whatsoever—but they relate to minor matters and the book is an admirable piece of work which can be strongly recommended both to the few who desire authoritative information about North Borneo and to the many who merely desire to read a well written account of an interesting and little known country. The photographs are excellent and one could wish for more of them.

C. F. C. M.



LIST OF MALAY WORKS SOLD BY THE MALAYAN BRANCH
ROYAL ASIATIC SOCIETY.

Price \$2.50 each.

<i>Ht. Sri Rama (Chërita Pënglipor Lara)</i> (Jawi) Journal 17, 1887.	17, 1887.
" " " (Rumi) " "	55, 1910.
<i>Ht. Raja Donan</i> (Jawi)	18, 1887.
<i>Ht. Raja Ambong</i> (Jawi)	19, 1887.
<i>Shaer Raja Haji</i> (Rumi)	22, 1890.
<i>Ht. Shamsu'l-Bahrain</i> (Jawi)	47, 1906.
<i>Ht. Awang Sulong sërta Ht. Musang Bërngangut</i> (Rumi)	52, 1909.
<i>Ht. Saif al-Yezan (Saif dzu'l-Yazan)</i> (Rumi)	58, 1911.
<i>Ht. Raja-Raja Pasai</i> (Rumi)	66, 1914.
<i>Shaer Burong Punggok sërta përupamaan Mëlayu</i> (Rumi)	67, 1914.
<i>Ht. Marong Mahawangsa (Sëjarah Këdah) sërta Sëjarah Trengganu dan Këlantar</i> (Rumi)	72, 1916.
<i>Ht. Sëri Rama, tërsalin daripada naskhah tulisan lëbeh 300 tahun lama-nya</i> (Jawi)	71, 1915.

Ht. Raja Budiman (Jawi)—separate publication.

SPECIAL NUMBER.

Price \$8.50

A Bibliographic Enumeration of Bornean Plants
by E. D. MERRILL (pp. 1-637) September 1921.

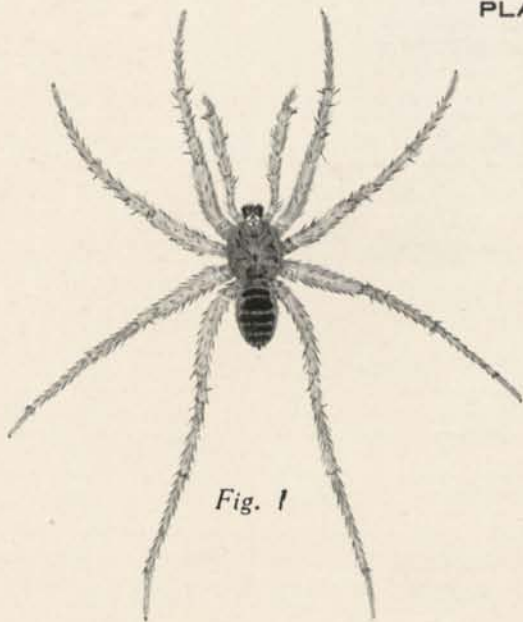


Fig. 1



Fig. 4

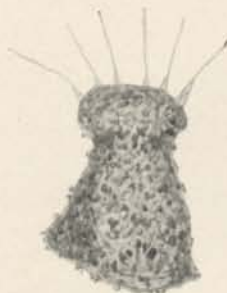


Fig. 2



Fig. 5



Fig. 7

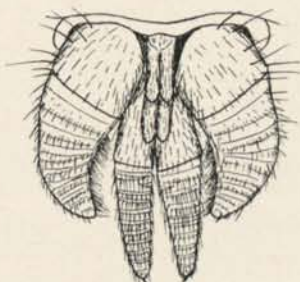


Fig. 3

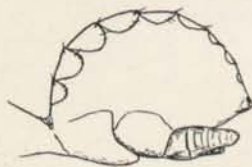


Fig. 8



Fig. 6

(b),— from outside.



(a),— from above.

Fig. 9

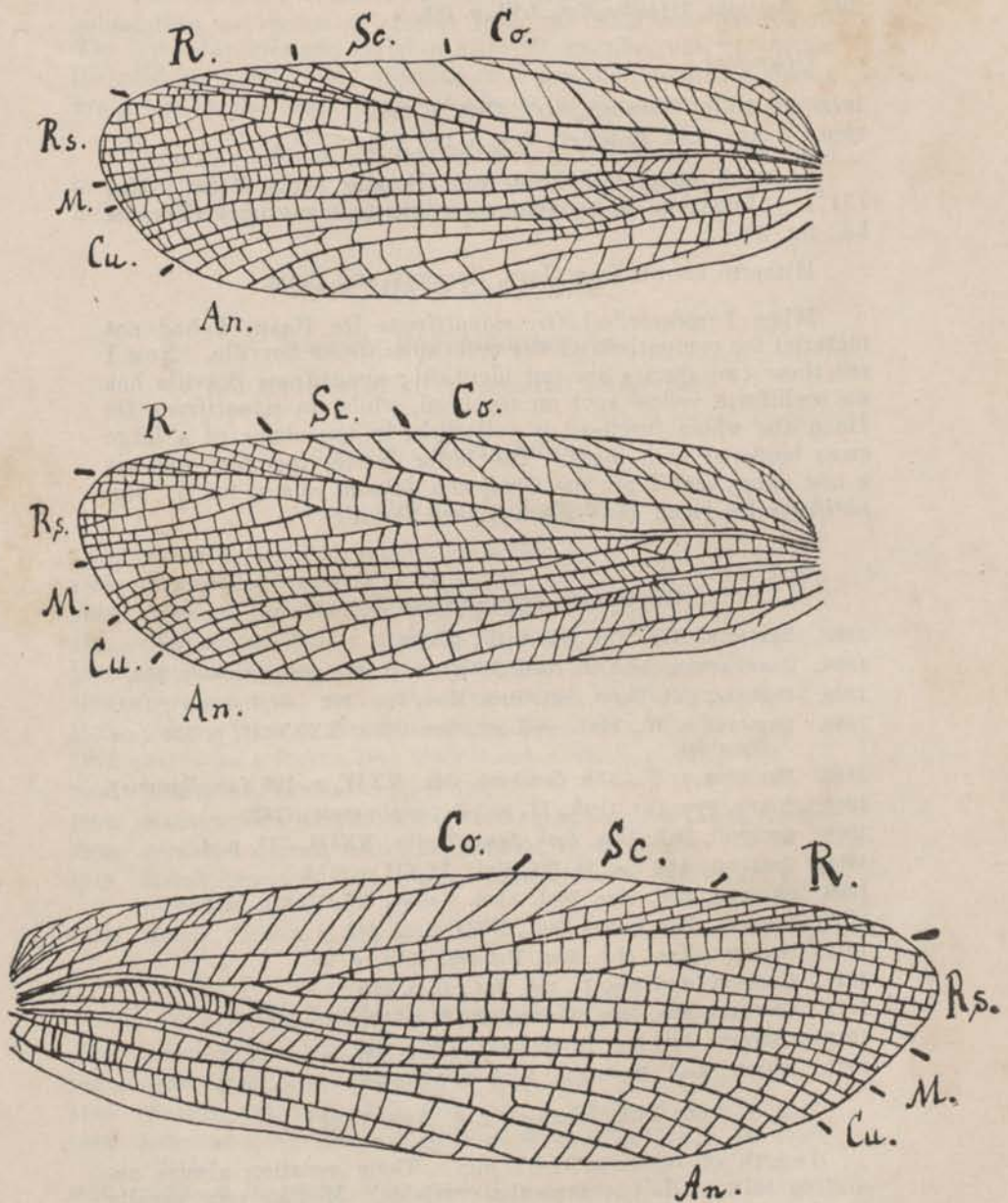


Fig. 1. Fore wings of *Gryllacris translucens* (above and middle) and its var. *secunda* (beneath). All $2\frac{1}{2}$ times enlarged.

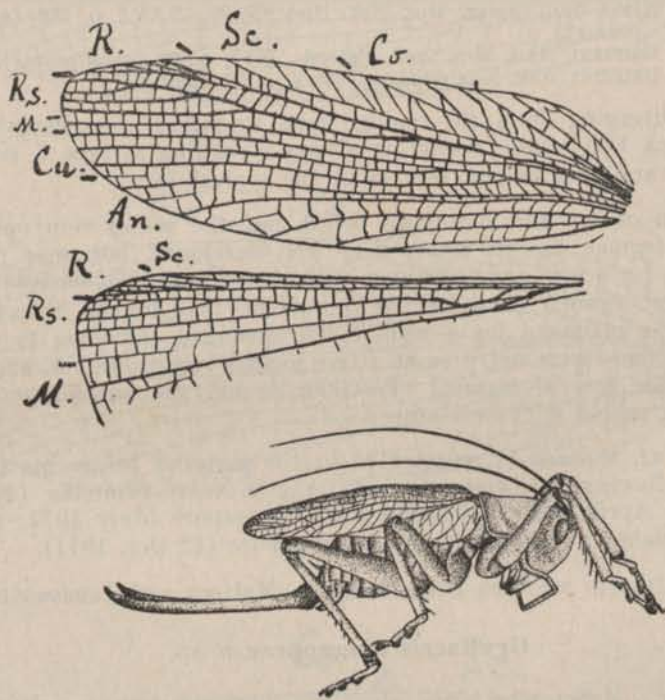


Fig. 2. *Gryllacris singaporeae*. Above: fore wing and fore part of hind wing, $2\frac{1}{2}$ times enlarged.—Beneath: total, lateral view, natural size.

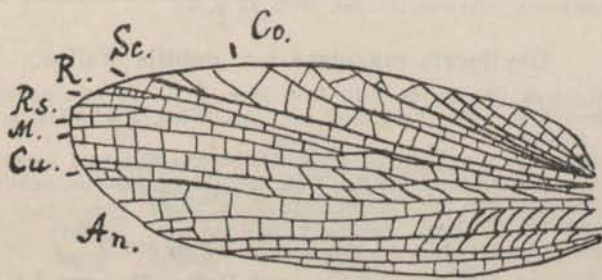


Fig. 3. *Gryllacris signifera* ♀, anormalous left tegmen, $2\frac{1}{2}$ times enlarged.

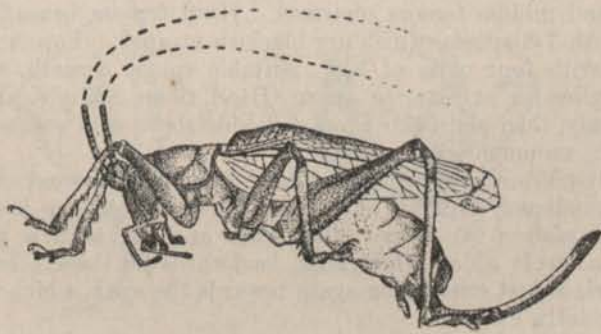
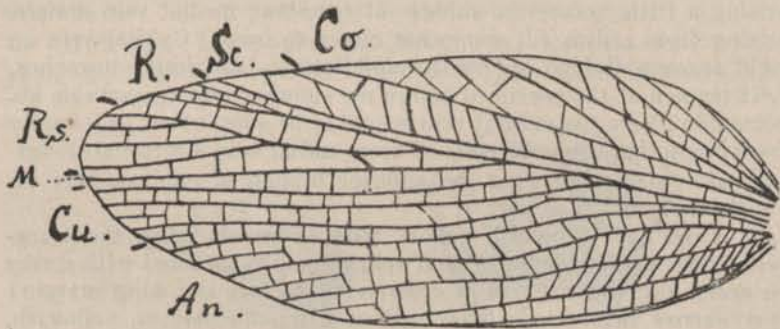


Fig. 4. *Gryllacris kledangensis*. Above: Fore wing, $2\frac{1}{2}$ times enlarged.—Beneath: total, lateral view, natural size.

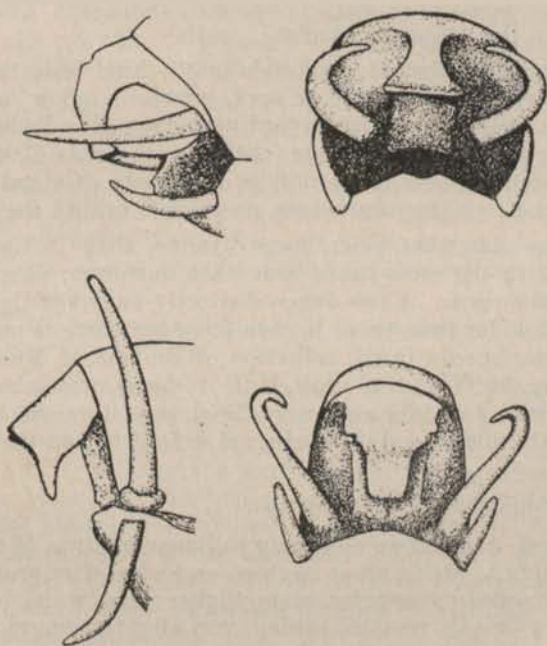


Fig. 5. End of ♂ abdomen of *Gryllacris signifera* (above), and *Gr. Peraka* (beneath). Left: lateral view; right: seen from behind. Enlarged.

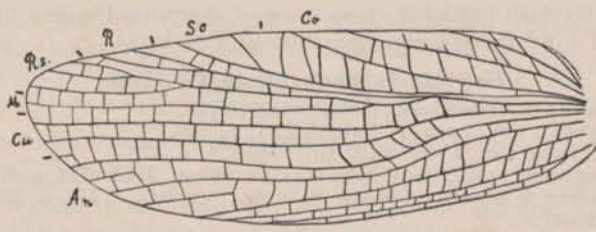


Fig. 6. Left tegmen of *Gryllacris podocasta kuchingiana*. $3\frac{1}{2}$ times enlarged.

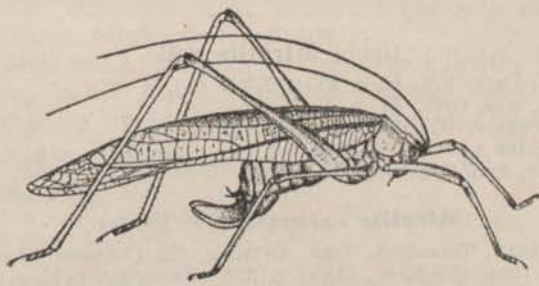


Fig. 7. *Elimaca moultonii*, natural size. Del. Sochanam.

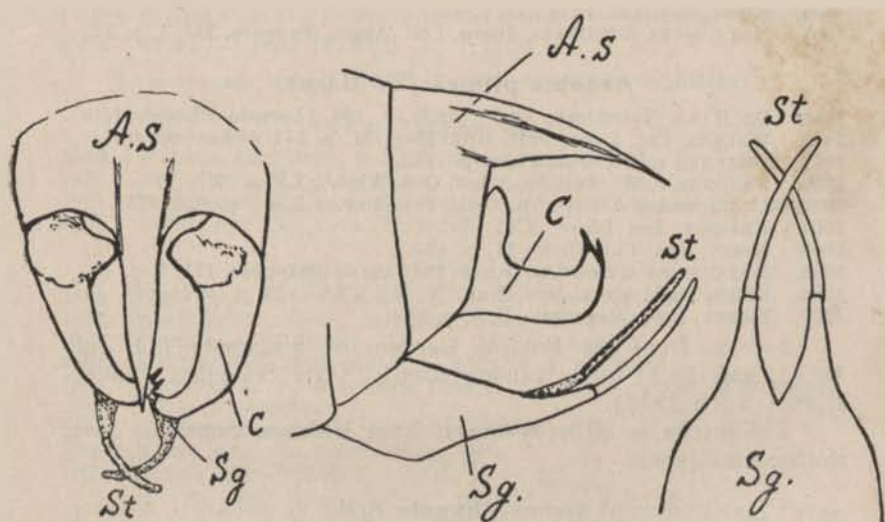


Fig. 8. *Tapiena ensigera*, end of ♂ abdomen. A. s. Anal Segment. C. Cerci. Sg. Subgenital plate. St. Styles.—Enlarged.

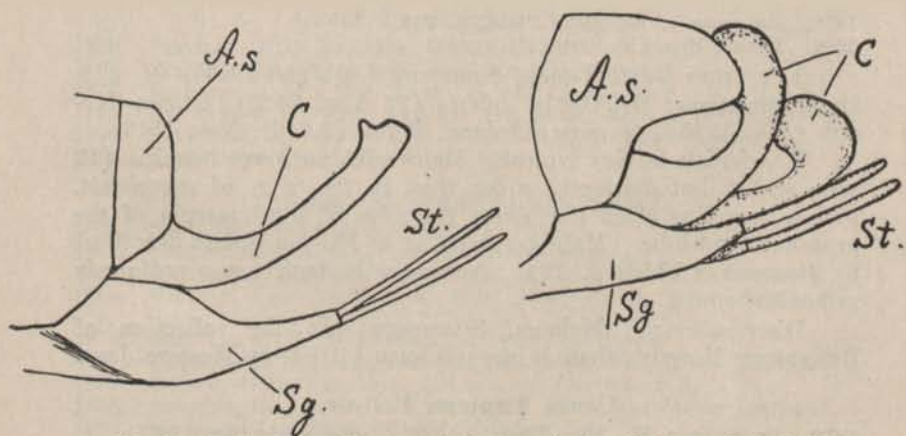


Fig. 9. End of ♂ abdomen of *Tapiena incisa* (left), and *T. bullata* (right). Lateral view, enlarged. A.s. Anal segment. C. Cerci. Sg. Subgenital plate. St. Styles.



Fig. 10. ♀ subgenital plate of *Tapiena emarginata* (above), and *T. pentagona* (beneath). Enlarged.

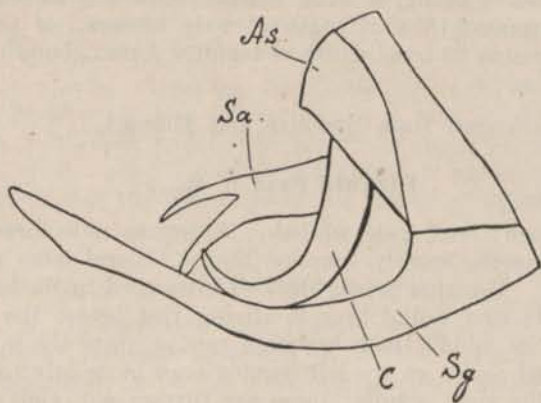


Fig. 11. End of ♂ abdomen of *Poecilopsyra octoseriata*. Lateral view, enlarged. A.s. Anal segment. Sa. Subanal plate. C. Cercus. Sg. Subgenital plate.

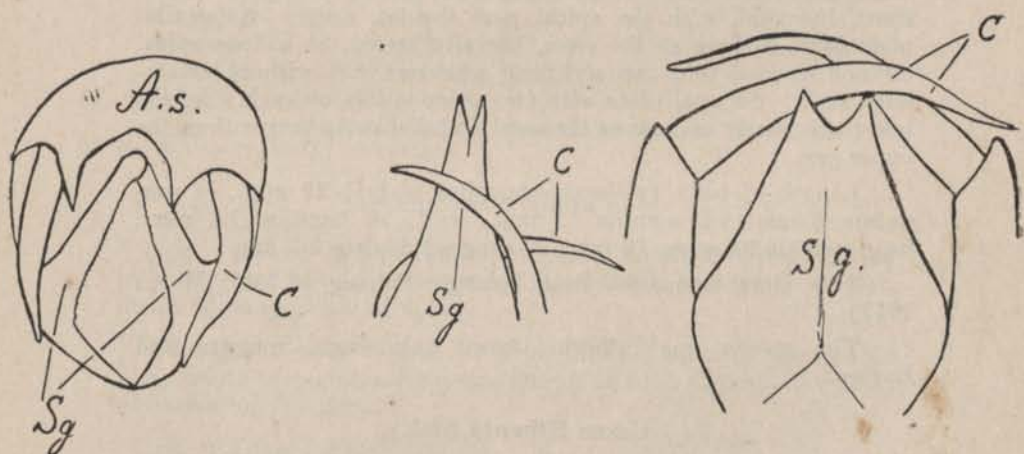


Fig. 12. End of ♂ abdomen of *Elbenia*. Left: *E. nigrosignata*, seen from behind. Middle: *E. fissa*, ventral view. Right: *E. fusca*, ventral view. A.s. Anal segment. C. Cerci. Sg. Subgenital plate.—Enlarged.

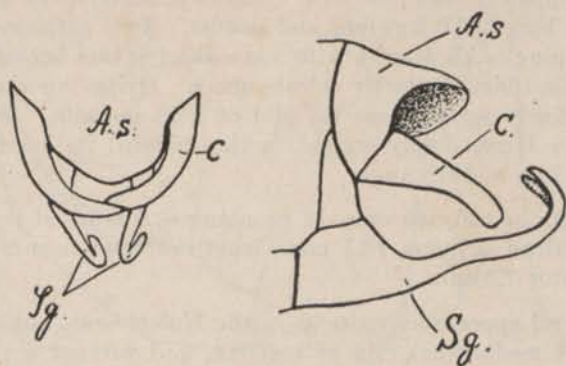


Fig. 13. End of ♂ abdomen of *Elbenia lotiifolia* (?), dorsal and lateral view. A.s. Anal segment. C. Cerci. Sg. Subgenital plate.—Enlarged.

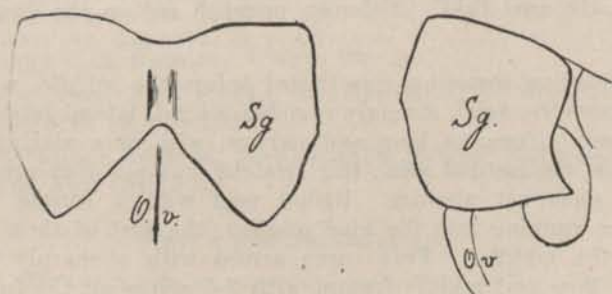


Fig. 14. Subgenital plate (Sg.) and base of ovipositor (Ov.) of *Paula gigantea* ♀. Ventral and lateral view.—Enlarged.

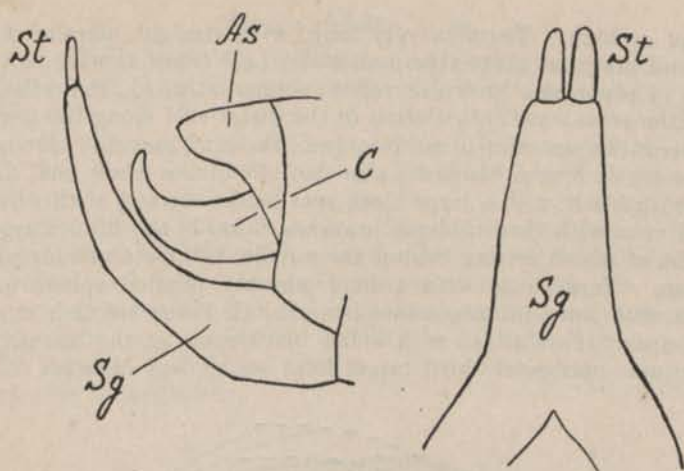


Fig. 15. End of ♂ abdomen of *Psyra obliterated*, lateral and ventral view, enlarged. A.s. Anal segment. C. Cercus. Sg. Subgenital plate. St. Styles.

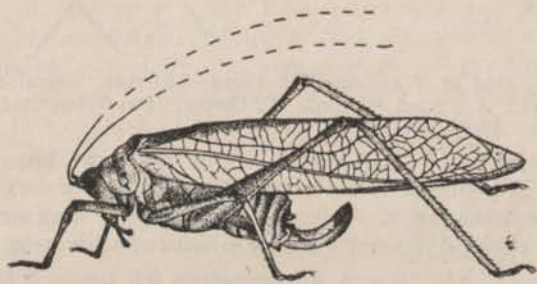


Fig. 16. *Psylla punctulata* ♀. Natural size. Del. Soehanam.

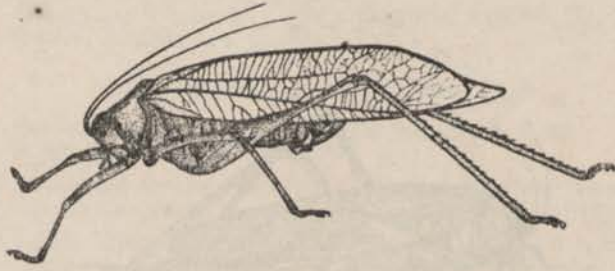


Fig. 17. *Psylla peraka* ♀. Natural size. Del. Sochanam.

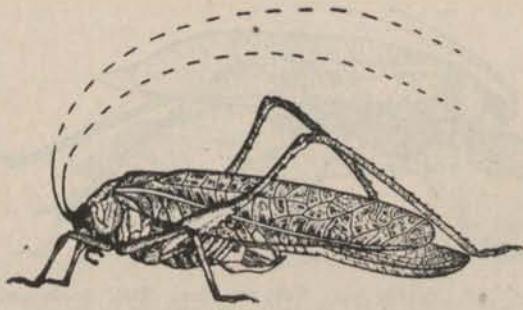


Fig. 18. *Dicranopsyra leopardina* ♂. Natural size. Del. Soehanam.

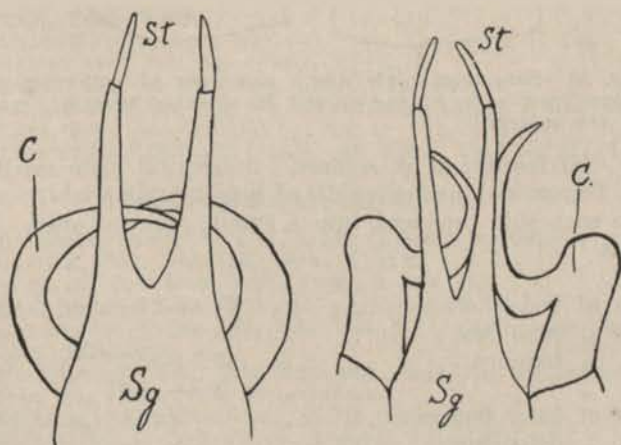


Fig. 19. End of ♂ abdomen of *Holochlora signata* (left) and *H. fracticerca* (right), ventral view, enlarged. C. Cerci. Sg. Subgenital plate. St. Styles.

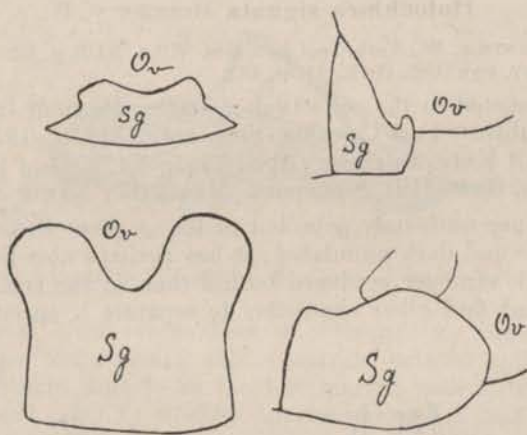


Fig. 20. Subgenital plate (Sg.) and base of ovipositor (Ov.) of *Holochlora fracticercus* ♀ (above) and *H. signata* (beneath), ventral and lateral view, enlarged.

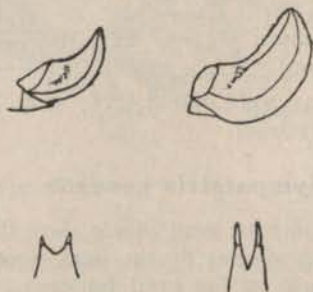


Fig. 21. *Sympaestria brevicauda* (left), and *S. acutelobata* (right). Lateral view of ♀ ovipositor (above), and ventral view of ♂ subgenital plate (beneath).—3 times enlarged.

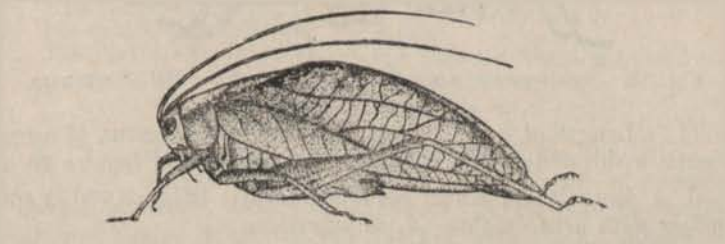


Fig. 22. *Sympaestria brevicauda* ♂, natural size. Del. Soehanam.

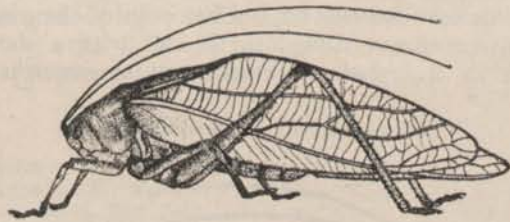


Fig. 23. *Sympaestria genualis* ♂, natural size. Del. Sochanam.

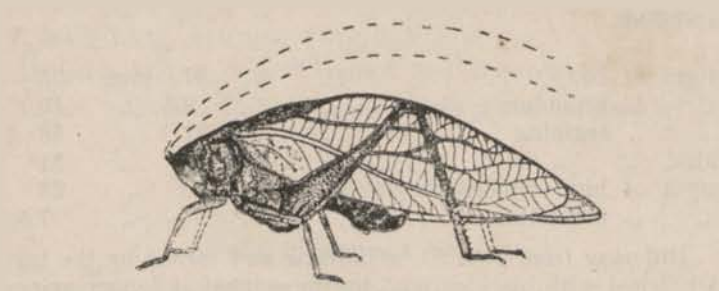


Fig. 24. *Sympaestria triramosa* ♀, natural size. Del. Soehanam.

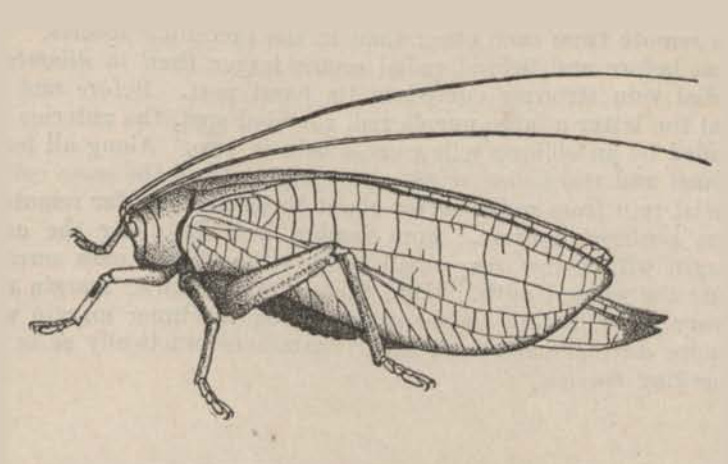


Fig. 25. *Craticma dilatatum* ♀, natural size. Del. Soedirman.

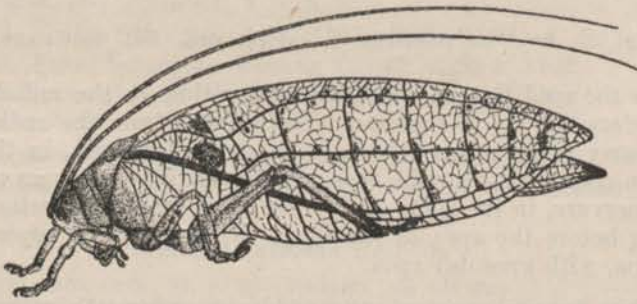


Fig. 26. *Cratioma cruentatum* ♀, natural size. Del. Soehanam.

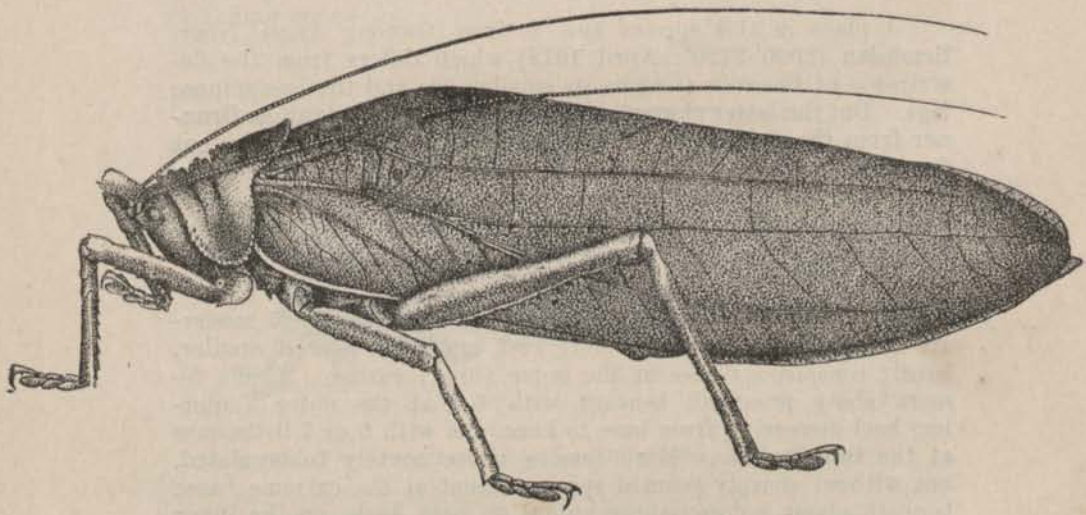


Fig. 27. *Cleandrus hercules* ♀, natural size. Del. Soedirman.

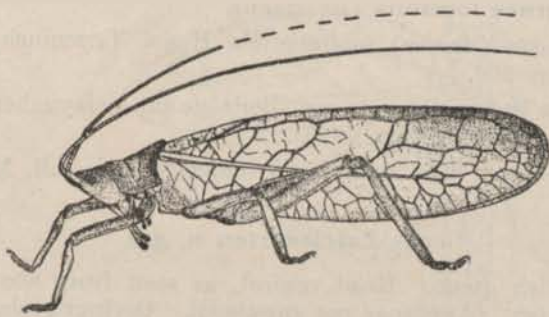


Fig. 28. *Phyllomimus punctiger* ♀, natural size. Del. Sochanam.

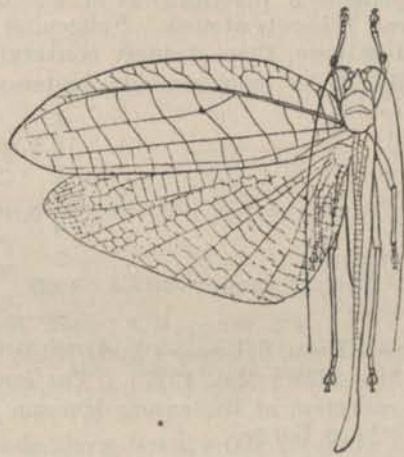


Fig. 29. *Zatricapron reticulatus*, natural size. Del. Soedirman.

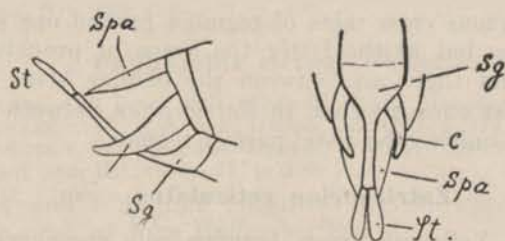


Fig. 30. End of ♂ abdomen of *Zatricapרון reticulatus*, lateral and ventral view, enlarged. Spa. Supraanal plate. C. Cerci. Sg. Subgenital plate. St. Styles.

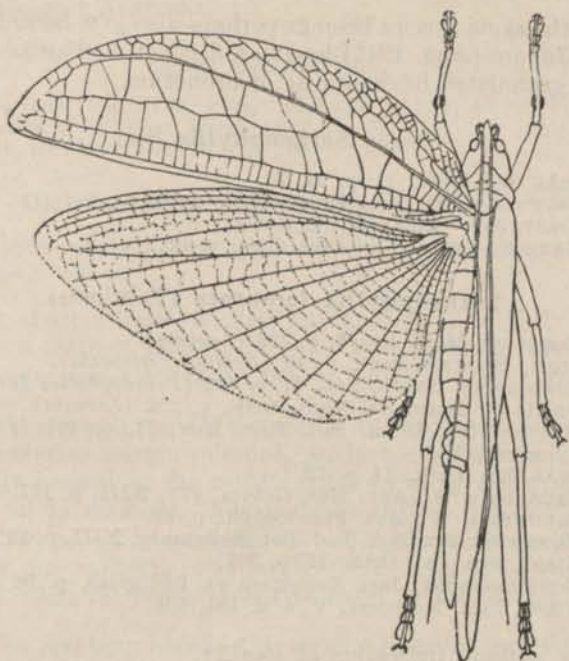


Fig. 31. *Heteraprium brunneri* ♀, from Digoel, natural size. Del. Soedirman.

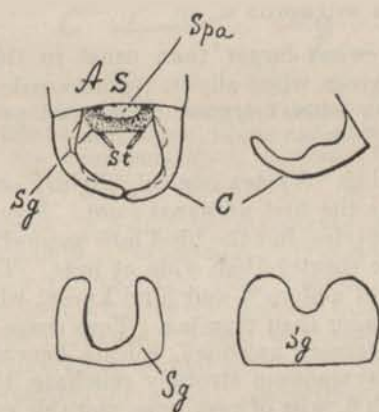


Fig. 32. Above: End of ♂ abdomen of *Xiphidiopsis cyclolabia*; left: dorsal view (A.s. Anal segment, Spa. Supraanal plate, C. Cercus, Sg. Subgenital plate, St. Styles); right: cercus, lateral view.—Beneath: ♀ Subgenital plate (Sg.) of *Xiphidiopsis cyclolabia* (left) and *Teratura simplex* (right).—Enlarged.

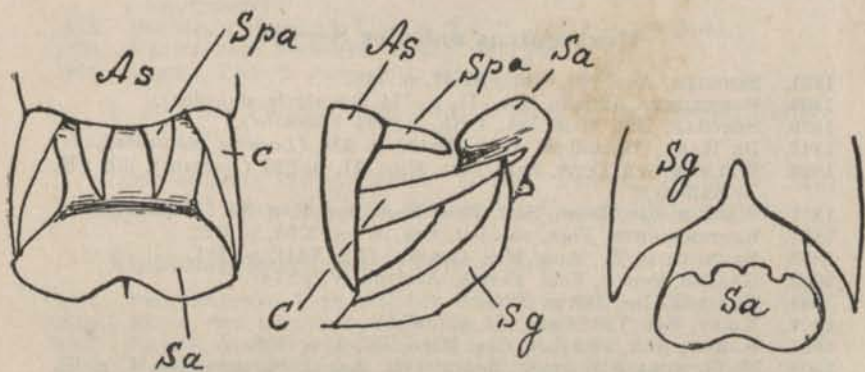
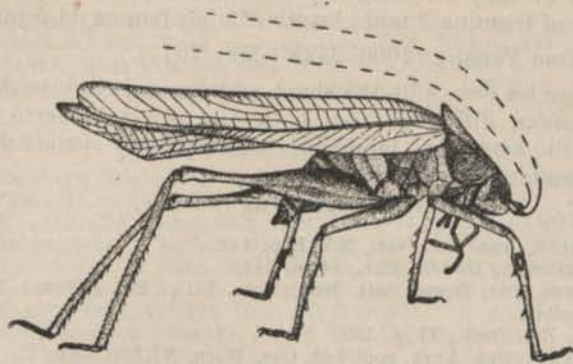


Fig. 33. *Xiphidiopsis mirabilis* ♂; above: total, twice enlarged.—
Beneath: End of abdomen, dorsal, lateral and ventral view, enlarged. A.s.
Anal segment. Spa. Supra-anal plate. C. Cerci. Sa. Subanal plate. Sg.
Subgenital plate.

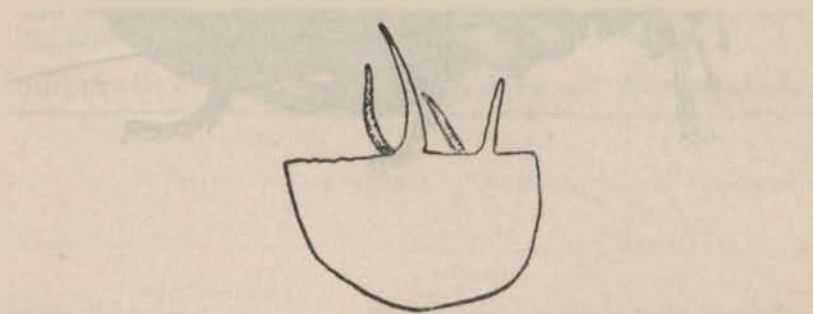


Fig. 34. Pronotum of a young *Eumegalon* (?), seen from the right side. Enlarged.

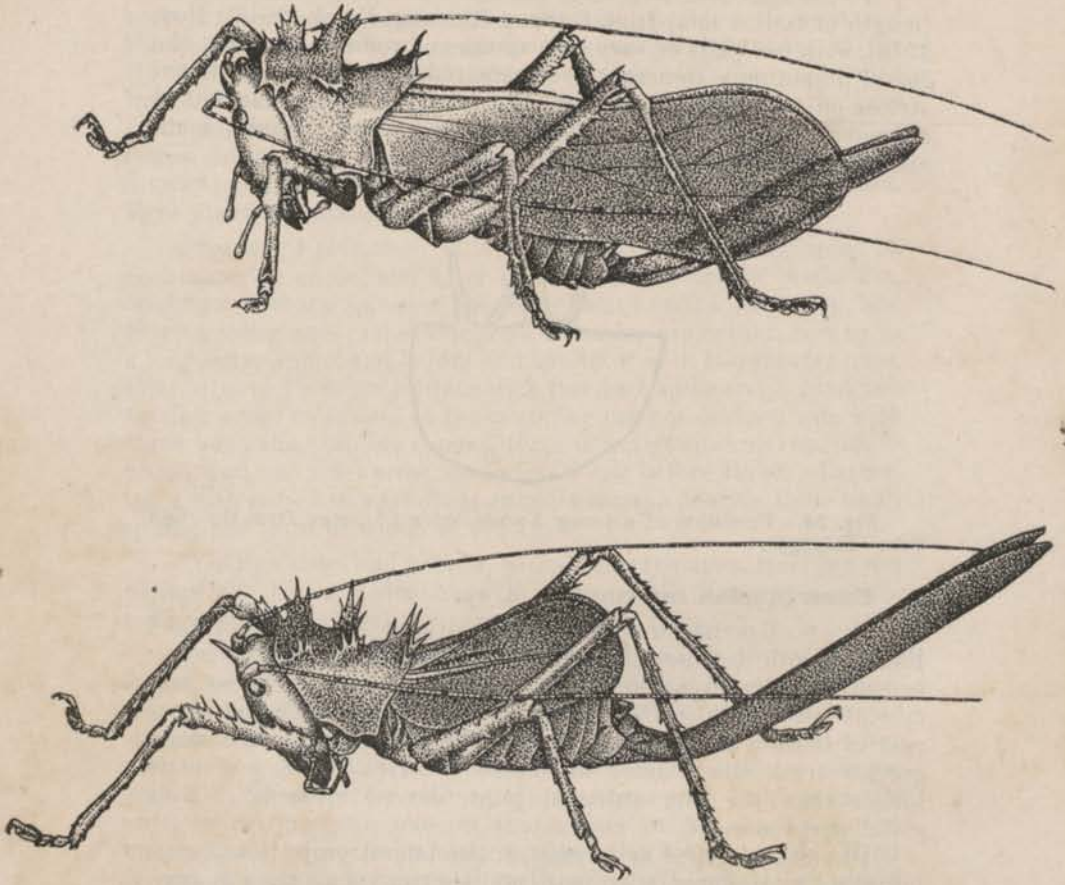
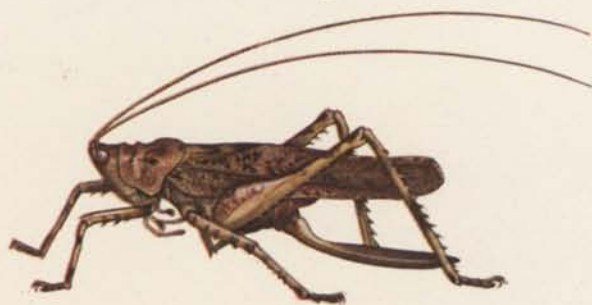


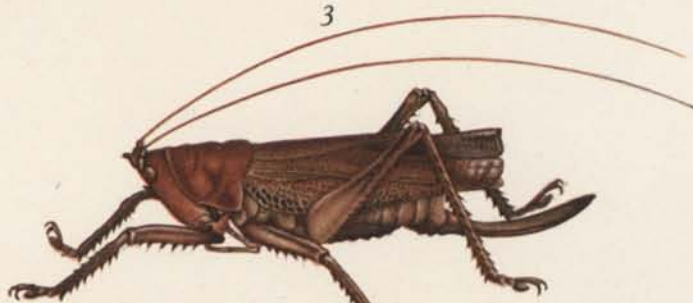
Fig. 35. ♀ of *Eumegalodon intermedius* (above) and *E. vaginatus* (beneath). Natural size. Del. Soedirman.



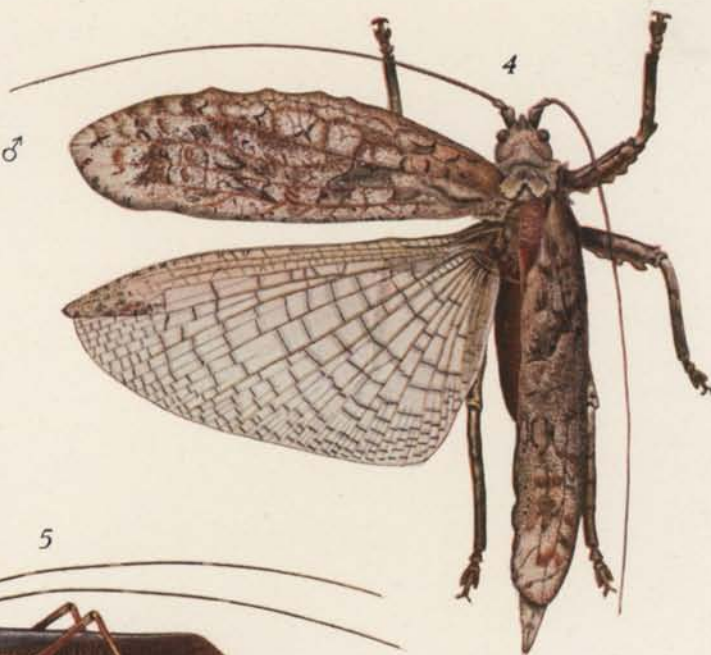
*Gryllacris
griffinii* ♂



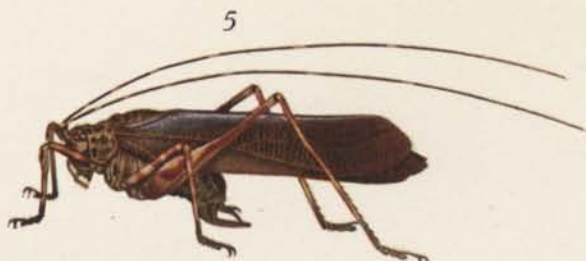
Subria moultoni ♀



Odontoconus robustus ♀



*Olcinia
excisa* ♀



Poecilopsyra octoseriata ♂

The subjoined photographic reproductions show one of Gerini's specimens and are useful for the purposes of comparison:—



(F) A circular coin: fairly bright yellow gold: diameter about 10 mm.: weight about 9.3 grains.

Found in Kelantan. [Pl. III, fig. IX.]

(G) A circular coin: fairly bright yellow gold: diameter about 11.2 mm.: weight about 9 grains.

Found in Kelantan. [Pl. III, fig. X.]

These two coins are also somewhat of an enigma. They are no doubt from the same source though from different dies.

The subjoined photographic reproductions show one of Gerini's specimens and are useful for the purposes of comparison:—



× 2



× 6



× 6



× 2



In 1919 the ruling Sultan was His Highness Sir Mohamed IV bin Almerhum Sultan Mohammed, K.C.M.G.



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Fig. 1. The germinating fruit of *Balanocarpus maximus*, $\frac{1}{2}$ nat. size.

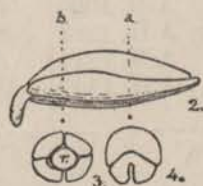


Fig. 2. The embryo of *Balanocarpus maximus*. exposed, seen obliquely from the side and from the placental face. Fig. 3, a section of it at *b*. and fig. 4, a section of it at *a*. $\frac{1}{2}$ nat. size.

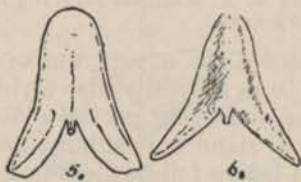


Fig. 5. The dorsal cotyledon from the outside, and fig. 6. the placental cotyledon from the face towards the dorsal cotyledon. $\frac{1}{2}$ nat. size.



Fig. 7. The cotyledons of *B. Heimii*, showing how unlike they are to those of *B. maximus*. On the left is the dorsal cotyledon, from the outside and on the right the placental cotyledon, from the face towards the dorsal cotyledon, $\frac{1}{2}$ nat. size. The arrow on the placental cotyledon points to the angle of the impression made on it by the dorsal cotyledon where the point 2 fits.

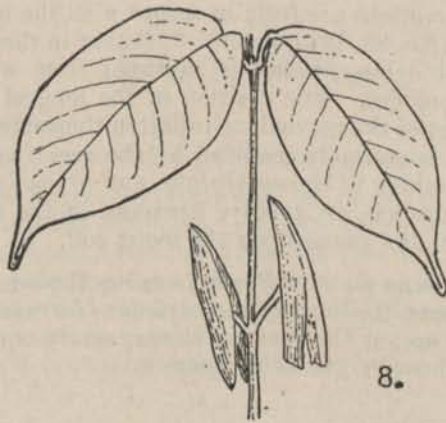


Fig. 8. The seedling of *B. maximus* carrying its cotyledons parallel and with its first pair of leaves.

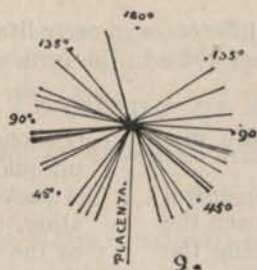
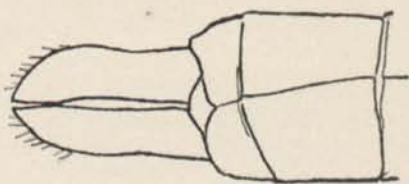
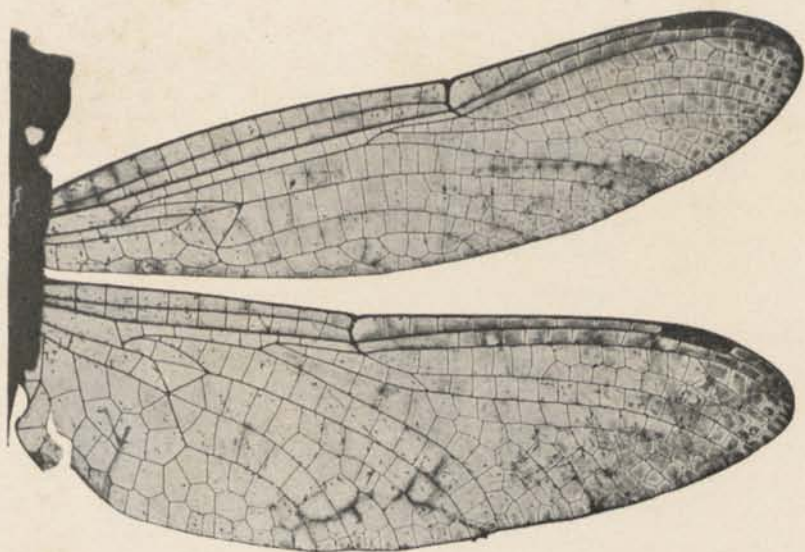


Fig. 9. The position of the long split by which the embryo of *B. maximus* escapes from the fruit-wall in relation to the placenta. The reader is to assume that he is looking at the apex of a fruit with the placenta downwards, and then the radiating lines indicate the position where the fruit-wall in thirty fruits was ruptured.



Fig. 10. The seedling of *B. Heimii* with its horizontal cotyledons and first five foliage leaves. $\frac{1}{2}$ nat. size.





Heel-pads of *Chotorhea chrysopogon*.



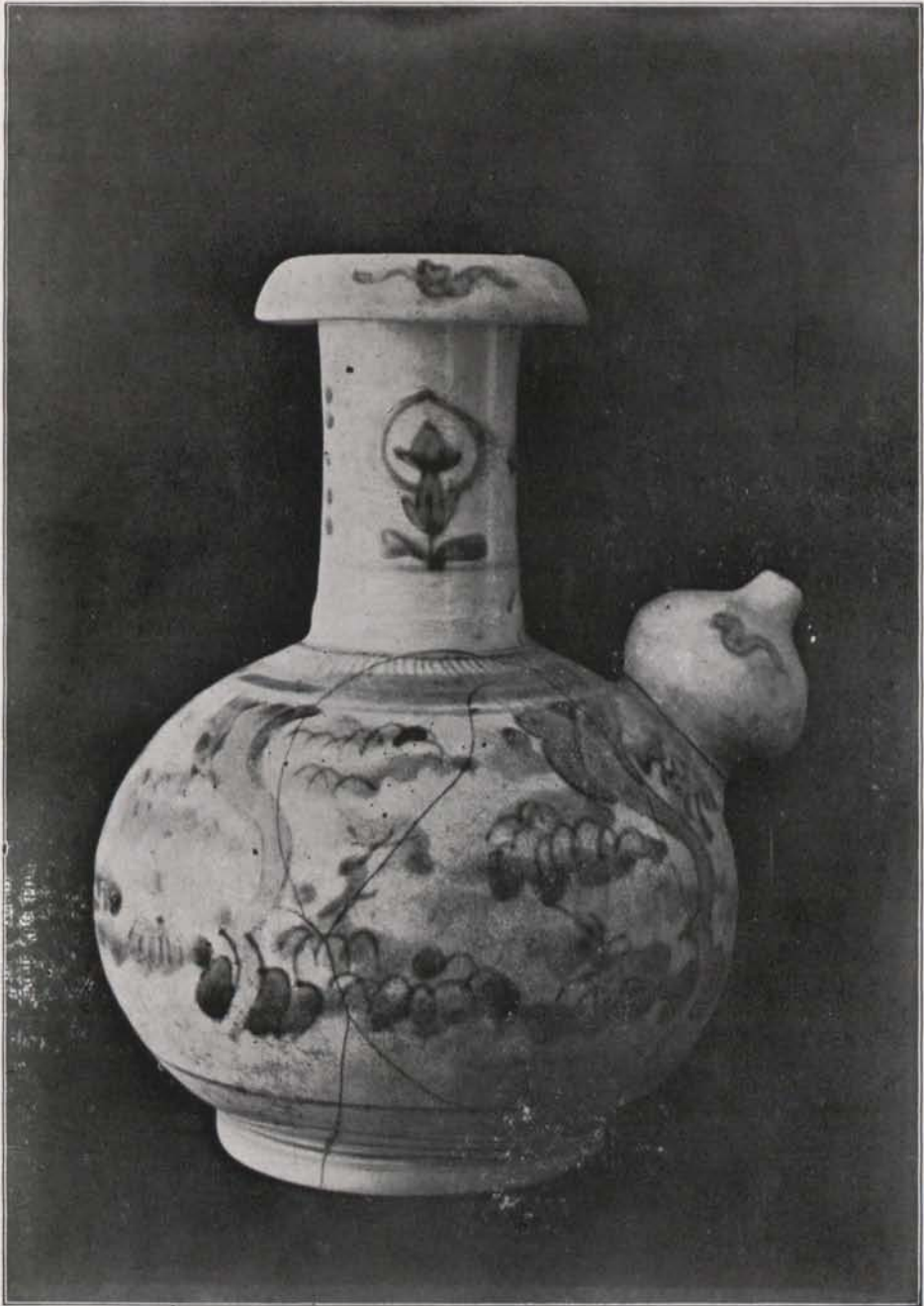
Spouted water-vessels from Kuala Pilah, Negri Sembilan,
(Perak Museum, Taiping)



Water-vessels from the West Coast of Sumatra.
(Batavian Society's Museum)



Water-pots from Aceh.
(Batavian Society's Museum)



Ming period Chinese vessel from the Dutch East Indies.
(Batavian Society's Museum)



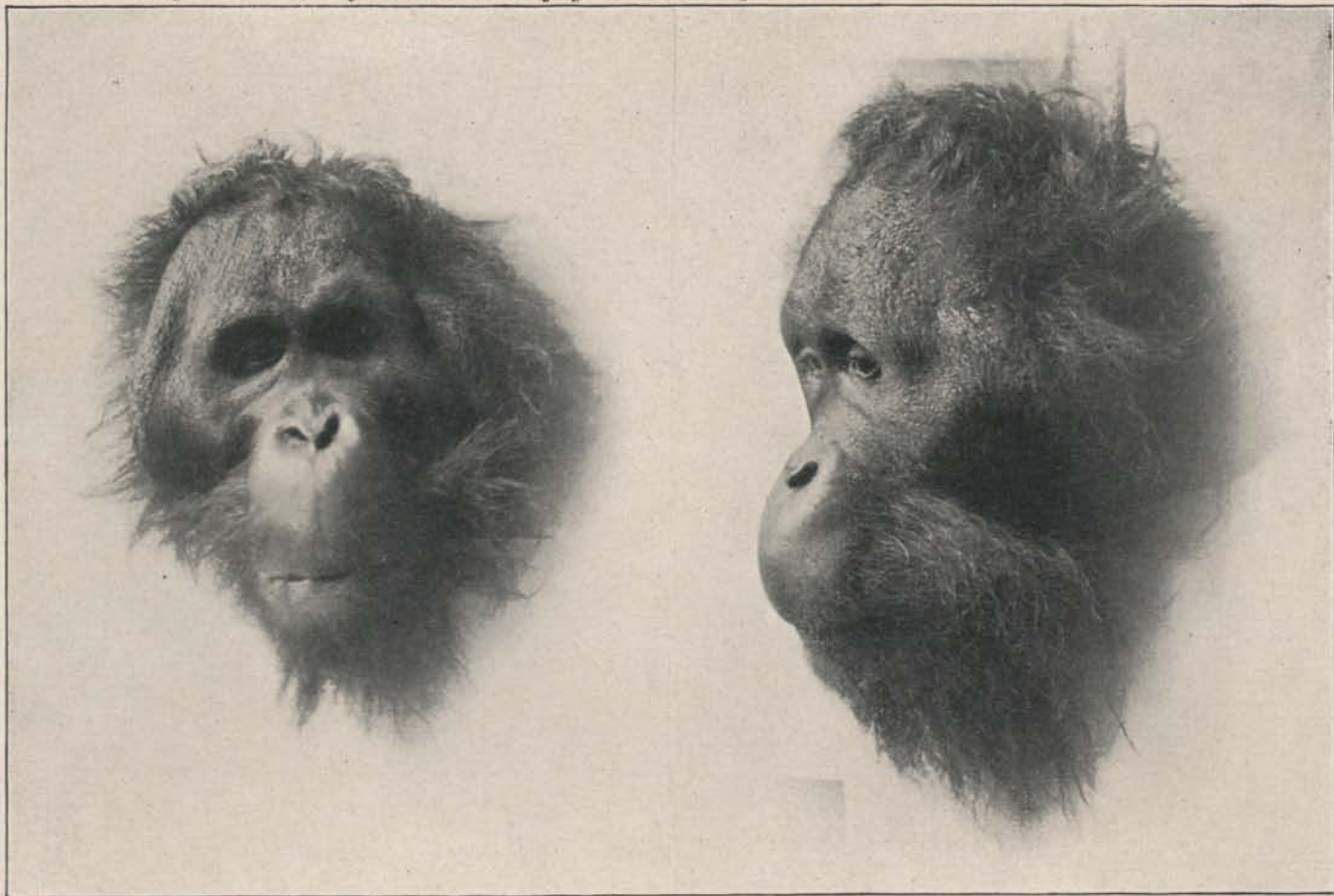
Ancient water-vessels from the Dutch East Indies. Both specimens come from Salayer Islands, and that on the right of the picture, which has a green glaze and dragon ornamentation, is obviously of Chinese make.

(Batavian Society's Museum)



Kendi (Gendi) in hand of a figure of Bhrkuti. (Tjandi Toempang, afd: Malang, res: Pasoeroean).

(Batavian Society's Museum)



Head of large Orang-Utan from Borneo.