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ACTA BOTANICA FENNICA

93

Rolf Grönblad (†) and Hannah Croasdale:
Desmids from Namibia (SW Africa)

HELSINKI—HELSINGFORS
1971

ACTA BOTANICA FENNICA

1—19 vide Acta Botanica Fennica 20—50.

20—49 vide Acta Botanica Fennica 50—82.

50. **Hans Luther:** Verbreitung und Ökologie der höheren Wasserpflanzen im Brackwasser der Ekenäs-Gegend in Südfinnland. II. Spezieller Teil. 370 S. (1951).

51. **M. R. Droop:** On the ecology of Flagellates from some brackish and fresh water rockpools of Finland. 52 pp. (1953).

52. **Hans Luther:** Über Vaucheria arrhyncha Heidinger und die Heterokonten-Ordnung Vaucheriales Bohlin. 24 S. (1953).

53. **Ernst Häyrén:** Wasser- und Uferpflanzen aus dem Päijänne-Gebiet. 42 S. (1954).

54. **Lars Fagerström:** Växtgeografiska studier i Strömfors-Pyttis skärgård i östra Nyland med speciellt beaktande av lövängarna, artantalet samt en del arters fördelning och invandring. 296 s. (1954).

55. **Hans Luther:** Über Krustenbewuchs an Steinen fliessender Gewässer, speziell in Südfinnland. 61 S. (1954).

56. **Ilmari Hustich:** Notes on the growth of Scotch Pine in Utsjoki in northernmost Finland. 13 pp. (1956).

57. **Henrik Skult:** Skogsbotaniska studier i Skärgårdshavet med speciell hänsyn till förhållandena i Korpo utskär. 244 s. (1956).

58. **Rolf Grönblad, Gerald A. Prowse** and **Arthur M. Scott:** Sudanese Desmids. 82 pp. (1958).

59. **Max von Schantz:** Über das ätherische Öl beim Kalmus, Acorus calamus L. Pharmakognostische Untersuchung. 138 S. (1958).

60. **Harald Lindberg:** Växter, kända från Norden, i Linnés herbarium. Plantae e septentrione cognitae in herbario Linnaei. 133 pp. (1958).

61. **Alvar Palmgren:** Studier över havsstrandens vegetation och flora på Åland. I. Vegetationen. 268 s. (1961).

62. **Hans Luther:** Veränderungen in der Gefässpflanzenflora der Meeresfelsen von Tvärminne. 100 S. (1961).

63. **Rolf Grönblad:** Sudanese Desmids II. 19 pp. (1962).

64. **Veikko Lappalainen:** The shore-line displacement on southern Lake Saimaa. 125 pp. (1962).

65. **J. J. Donner:** The zoning of the Post-Glacial pollen diagrams in Finland and the main changes in the forest composition. 40 pp. (1963).

66. **Rolf Grönblad, Arthur M. Scott** and **Hannah Croasdale:** Desmids from Uganda and Lake Victoria, collected by Dr. Edna M. Lind. 57 pp. (1964).

67. **Carl Eric Sonck:** Die Gefässpflanzenflora von Pielisjärvi und Lieksa, Nordkarelien 311 S. (1964).

68. **F. W. Klingstedt:** Über Farbenreaktionen von Flechten der Gattung *Usnea*. 23 S. (1965).

69. **Arthur M. Scott, Rolf Grönblad** and **Hannah Croasdale:** Desmids from the Amazon Basin, Brazil, collected by Dr. H. Sioli. 94 pp. (1965).

70. **Teuvo Ahti:** *Parmelia olivacea* and the allied non-isidiate and non-sorediate corticolous lichens in the Northern Hemisphere. 68 pp. (1966).

71. **Simo Juvonen:** Über die die Terpenbiosynthese beeinflussenden Faktoren in *Pinus silvestris* L. 92 S. (1966).

72. **Leena Hämet-Ahti:** Some races of *Juncus articulatus* L. in Finland. 22 pp. (1966).

73. **Max von Schantz** und **Simo Juvonen:** Chemotaxonomische Untersuchungen in der Gattung *Picea*. 51 S. (1966).

74. **Ilkka Kytövuori** and **Juha Suominen:** The flora of Ikkalanniemi (commune of Virrat, Central Finland), studied independently by two persons. 59 pp. (1967).

75. **Leena Hämet-Ahti:** *Tripleurospermum* (Compositae) in the northern parts of Scandinavia, Finland and Russia. 19 pp. (1967).

ACTA BOTANICA FENNICA 93
EDIDIT
SOCIETAS PRO FAUNA ET FLORA FENNICA

DESMIDS FROM NAMIBIA (SW AFRICA)

ROLF GRÖNBLAD (†) AND HANNAH CROASDALE

HELSINKI — HELSINGFORS
May 1971

Abstract

GRÖNBLAD, ROLF (†) & CROASDALE, HANNAH (Dept. Biol. Sci., Dartmouth Coll.): Desmids from Namibia (SW Africa). — Acta Bot. Fennica 93:1—40. 1971.

The desmids present in seven samples of algae from the Nkure-Nkuru region on the Okavango River in Namibia (South West Africa) are identified, described and discussed. 185 taxa are reported; the novelties are: *Closterium lunula* (Müll.) Nitzsch var. *maximum* Borge f. *crassissimum* Croasd. f. nov., *Cl. spetsbergense* Borge var. *laticeps* Grönbl. f. *maius* Croasd. f. nov., *Euastrum binale* (Turp.) Ehrbg. var. *juvae* Croasd. var. nov., *E. elegans* (Breb.) Kütz. var. *compactum* (Wolle) Krieg. f. *miriforme* Croasd. f. nov., *E. platycerum* Reinsch var. *obtusius* Grönbl. & Croasd. var. nov., *Cosmarium hellbergii* Grönbl. & Croasd. sp. nov., *Staurastrum cyclacanthum* West & West var. *africanum* Croasd. var. nov., *S. furcatum* (Ehrbg) Bréb. f. *richae* Croasd. f. nov. and *S. tumidum* Bréb. var. *bipapillatum* Croasd. var. nov.

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Contents

Foreword by *Hannah Croasdale* 3
Introduction by *Hans Luther* 3
Desmid flora of the samples 4
Taxonomical part 6
Literature 24
Explanation of plates 26
Plates I—X 30
New name for a desmid described in Acta Bot. Fennica 69 40
Holotypes 40

Foreword

by HANNAH CROASDALE

The present paper is the fourth that the junior author has attempted to complete from notes and sketches left by Dr. Rolf Grönblad at the time of his death in 1962. As in the earlier papers, when she has had to furnish descriptions and names of novelties she has given or included herself as author, and when her judgement varied from that expressed by Dr. Grönblad she has usually quoted his opinion with her reasons for differing. She is honored by having been entrusted with these manuscripts and has tried to maintain the high standard set by Dr. Grönblad.

What is left of the material upon which this paper is based is stored in the Botanical Museum of the University of Helsinki (H).

Introduction

by HANS LUTHER

As a continuation of the studies of African desmids (from Sudan, Uganda, Lake Victoria and Sierra Leone), undertaken by Dr Rolf Grönblad and Mr A. M. Scott, the later ones after their death finished by Dr Hannah Croasdale, Dr Grönblad got in contact with Dr J. Håkan Hellberg, then physician of the Finnish missionary area in Okavango, Namibia (South West Africa) and asked him to collect algal samples.

Dr Hellberg sent six samples (nr 1—6), all from the shore of the river Okavango (on some maps named Cubango, which is its name in Portuguese). All samples are from the immediate vicinity of the missionary hospital at Nkure-Nkuru (earlier spelt Kuring-Kuru) which is on the Namibian side of the border river Okavango, about 2 km downstream from Cuangar, the nearest Portuguese station on the Angola side of the river. The samples were in 1960 collected in small vials (about 5 ml) which immediately were mailed to Finland. They were taken in the dry season (May-Sept.) partly at low water level isolated from the river. More exact information about the site of each sample is not available.

According to information kindly provided by Dr Hellberg (now in Geneva) the Nkure-Nkuru area annually gets about 25—30 inches of rain, but the river Okavango is principally fed by water from highlands in the interior of

Angola. The water level variation in the river between dry and wet seasons is usually about 5 meters, the maximal variation 7—8 meters. The river is 200—300 m broad and in dry seasons 2—4 m deep and in normal years discharges its waters into the Okavango Swamps in Botswana. In years with heavy rains it partly flows to the Zambesi river, through the Cuando river swamp in the Caprivi strip.

In May, 1961, the same area was visited by Professor Mikko Juva, who at the request of Professor Paavo Kallio in Turku sent him by airmail a sample of algae from Nkure-Nkuru (nr 7). The intention of Prof. Kallio was to use the material for cultures of desmids, but the vitality of the algae was not good enough to allow this. He preserved the algae in formalin and handed them over to Dr Grönblad.

Desmid flora of the samples

A figure for a taxon is noted only when it originated from the sample in question.

Nr. 1

Gonatozygon monotaenium — *Euastrum binale* var. *binale* f. — *E. denticulatum* — *E. denticulatum* f. — *E. evolutum* var. *glaziowii* f. *africanum* Fig. 18 — *E. praemorsum* f. Fig. 16 — *Cosmarium ?monodii* Fig. 65 — *Staurastrum gracile* f. Fig. 131 — *S. quadricornutum*.

Other algae: *Ankistrodesmus falcatus* (Corda) Ralfs — *Scenedesmus acutiformis* Schroeder — *S. quadricauda* (Turp.) Bréb.

Nr. 2

Cosmarium bioculatum — *C. blyttii* — *C. capense* var. *nyassae* f. Fig. 61 — *C. margaritatum* Fig. 111 — *C. subauriculatum* var. *subauriculatum* Fig. 56 — *C. tenue* — *Staurastrum floriferum*.

Other algae: *Ankistrodesmus falcatus* (Corda) Ralfs — *Scenedesmus acutiformis* Schroeder — *Scenedesmus brasiliensis* Bohlin.

Nr. 3

Cosmarium sp. — *Staurastrum inflexum*.

Other algae: »One blue-green alga ccc» (RG).

Nr. 4

Closterium cornu — *Cl. venus* var. *debegenica* — *Euastrum denticulatum* — *E. denticulatum* f. — *E. evolutum* var. *integrius* — *E. platycerum* var. *obtusius* — *E. spinulosum* subsp. *africanum* var. *minus* — *Cosmarium capense* var. *nyassae* Fig. 60 — *C. cruciferum* Fig. 52 — *C. pachydermum* var. *indicum* Fig. 59 — *C. platydesmium* Fig. 79, 143 — *C. pseudoretusum* var. *africanum* — *C. subauriculatum* var. *bogoriense* Fig. 57, 140 — *C. subtumidum* var. *borgei* f. Fig. 76 — *Staurastrum manfeldtii* Fig. 125 — *S. polymorphum* var. *polymorphum* Fig. 127.

Other algae: *Scenedesmus quadricauda* (Turp.) Bréb. — *Spirogyra* (»very thick») (RG).

Nr. 5

Spirotaenia condensata — *Gonatozygon brebissonii* — *G. monotaenium* — *Closterium libellula* var. *intermedium* — *Cl. navicula* — *Euastrum denticulatum* — *E. denticulatum* f. — *E. divergens* var. *rhodesiense* f. Fig. 35 — *E. elegans* var. *compactum* f. *miriforme* Fig. 25 — *E. platycerum* var. *obtusius* Fig. 40, 135 — *E. spinulosum* subsp. *africanum* var. *minus* Fig. 44, 45 — *E. truncatiforme* Fig. 33 — *Micrasterias decemdentata* Fig. 47 — *Cosmarium beatum* f. Fig. 91, 92 — *C. binum* f. Fig. 102 — *C. bituberculatum* Fig. 87 — *C. blyttii* — *C. connatum* var. *connatum* Fig. 83 — *C. connatum* var. *depressum* Fig. 84, 144. — *C. controversum* Fig. 108 — *C. difficile* var. *sublaeve* f. Fig. 88 — *C. granatum* Fig. 73, 74 — *C. hammeri* — *C. hellbergii* Fig. 107 — *C. lundellii* var. *lundellii* f. Fig. 54 — *C. lundellii* var. *corruptum* Fig. 55 — *C. meneghinii* — *C. novae-semliae* — *C. pseudobroomei* var. *compressum* Fig. 110 — *C. pseudonitidulum* var. *angustissimum* Fig. 78 — *C. striolatum* var. *nordstedtii* Fig. 112 — *C. subcostatum* var. *beckii* — *C. trachypleurum* var. *spinosum* »f. 2» Fig. 96 — *C. ?venustum* var. *excavatum* f. Fig. 81 — *C. ?venustum* var. *minus* Fig. 82 — *C.* sp. — *Arthrodesmus ralfsii* var. *brebissonii* Fig. 114 — *Staurastrum dilatatum* var. *dilatatum* — *S. diptilium* var. *mossambicum* — *S. gracile* — *S. hexacerum* — *S. lapponicum* Fig. 119 — *S. leptocladum* var. *cornutum* — *S. orbiculare* var. *depressum* — *S. polymorphum* var. *cinctum* Fig. 130 — *S. tetracerum* — *Onychonema laeve* — *Spondylosium planum* — *Hyalotheca mucosa*.

Other algae: *Coelastrum microporum* Näg. — *Pediastrum boryanum* (Turp.) Menegh. — *P. tetras* (Ehrbg) Ralfs — *Scenedesmus armatus* (Chod.) G. M. Smith — *S. brasiliensis* Bohlin — *S. dimorphus* (Turp.) Kütz.

Nr. 6

Gonatozygon monotaenium — *Closterium venus* var. *debegenica* — *Euastrum attenuatum* var. *brasiliense* f. Fig. 30 — *E. spinulosum* Delp. subsp. *spinulosum* var. *burmense* Fig. 46 — *E. truncatiforme* Fig. 31 — *Cosmarium hammeri* — *C. humile* — *C. speciosum* — *C. subtumidum* var. *borgei* f. Fig. 75 — *Staurastrum dilatatum* var. *hibernicum* — *S. diptilium* var. *mossambicum* Fig. 122 — *S. quadricornutum* — *S. renardii* — *S. rugulosum*.

Nr. 7

Netrium digitus — *Gonatozygon monotaenium* — *Closterium acutum* — *Cl. cornu* — *Cl. cynthia* — *Cl. dianae* — *Cl. gracile* Fig. 8 — *Cl. incurvum* — *Cl. jenneri* f. Fig. 5 — *Cl. kuetzingii* — *Cl. lanceolatum* var. *parvum* Fig. 6 — *Cl. libellula* var. *intermedium* — *Cl. lunula* var. *maximum* Fig. 9 — *Cl. lunula* var. *maximum* f. *crassissimum* Fig. 10 — *Cl. malinvernianum* Fig. 4 — *Cl. navicula* — *Cl. nematodes* — *Cl. parvulum* var. *angustum* — *Cl. ralfsii* var. *hybridum* — *Cl. setaceum* — *Cl. spetsbergense* var. *laticeps* f. *maius* Fig. 11 — *Cl. subulatum* Fig. 7 — *Cl. turgidum* Fig. 12 — *Cl. venus* var. *debegenica* Fig. 3 — *Cl.* sp. Fig. 1, 2 — *Pleurotaenium ovatum* var. *tumidum* Fig. 13 — *Euastrum ansatum* Fig. 15 — *E. binale* var. *binale* f. *gutwinskii* — *E. binale* var. *juvae* Fig. 28 — *E. denticulatum* f. Fig. 27 — *E. divergens* var. *ornatum* Fig. 34, 136 — *E. dubium* — *E. elegans* var. *elegans* f. — *E. elegans* var. *compactum* f. *miriforme* — *E. evolutum* var. *glaziowii* f. *africanum* Fig. 17 — *E. evolutum* var. *integrius* Fig. 19, 20 — *E. hypochondrioides* f. Fig. 36, 37 — *E. luetkemuelleri* var. *carniolicum* f. Fig. 29 — *E. mononcylum* var. *germanicum* Fig. 38, 39 — *E. platycerum* var. *eximium* Fig. 41 — *E. pulcherrimum* var. *ornatum* Fig. 21, 22 — *E. sibiricum* f. *africanum* Fig. 26 — *E. sinuosum* Fig. 14 — *E. spinulosum* subsp. *africanum* var. *africanum* Fig. 42, 137 — *E. spinulosum* subsp. *africanum* var. *minus* Fig. 43 — *E. truncatiforme* Fig. 32 — *E. umbonatum* Fig. 23, 24 — *Micrasterias pinnatifida* var. *incudiformis* f. Fig. 49 — *M. thomasiana* — *M. zeylanica* f. Fig. 48 — *Cosmarium abbreviatum* var. *minus* — *C. angulosum* Fig. 85 — *C. askenasyi* f. Fig. 62, 139 — *C. binum* Fig. 101 — *C. conspersum* var. *latum* — *C. contractum* var. *contractum* f. Fig. 66 — *C. ?contractum* var. *cracoviense* Fig. 67 — *C. contractum* var. *ellipsoideum* — *C. cucurbita* f. Fig. 50 — *C. decoratum* f. Fig. 103, 104 — *C. depressum* var. *minutum* Fig. 72 — *C. diplosporum* Dig. 51 — *C. exiguum* Fig. 89 — *C. goniodes* — *C. hammeri* var. *protuberans* Fig. 68 — *C. hammeri* var. *schmidlei* — *C. hellbergii* Fig. 105, 106 — *C. impressulum* — *C. kjellmanii* var. *ornatum* Fig. 100, 145 — *C. laeve* Fig. 90 — *C. medioscrobiculatum* var. *inflatum* Fig. 63, 64 — *C. ?monodii* — *C. norimbergense* — *C. obsoletum* Fig. 53 — *C. obtusatum* var. *obtusatum* — *C. obtusatum* var. *undulatum* Fig. 80 — *C. pachydermum* var. *pachydermum* Fig. 58 — *C. phaseolus* var. *minus* Fig. 41a — *C. pseudamoenum* — *C. pseudobroomei* var. *pseudobroomei* Fig. 109, 146 — *C. pseudoconnatum* Fig. 86 — *C. pseudoretusiforme* — *C. pseudoretusum* var. *africanum* Fig. 69—71 — *C. punctulatum* var. *seriatum* f. Fig. 97 — *C. quinarium* f. Fig. 98 — *C. regnellii* — *C. striolatum* var. *nordstedtii* Fig. 113 — *C. subauriculatum* var. *subauriculatum* — *C. subauriculatum* var. *bogoriense* — *C. subprotumidum* var. *gregorii* — *C. subspeciosum* var. *validius* — *C. subtumidum* var. *minor* Fig. 77 — *C. taxichondrum* var. *haynaldii* f. Fig. 93 — *C. taxichondrum* var. *ocellatum* f. Fig. 94 — *C. trachypleurum* var. *spinosum* »f. 1» Fig. 95 — *C. vitiosum* Fig. 99 — *C.* sp. — *Xanthidium concinnum* var. *boldtianum* f. Fig. 115 — *Staurastrum alternans* Fig. 118 — *S. crenulatum* — *S. cyclacanthum* var. *africanum* Fig. 132 — *S. dejectum* var. *patens* — *S. dickiei* var. *rhomboideum* Fig. 116 — *S. disputatum* var. *sinense* — *S. floriferum* f. — *S. furcatum* f. *richae* Fig. 133 — *S. laeve* — *S. laeve* f. Fig. 121 — *S. leptocladum* var. *cornutum* — *S. mucronatum* — *S. orbiculare* var. *depressum* — *S. orbiculare* var.

New name for a desmid described in Acta Bot. Fennica 69

This is a correction for the article: SCOTT, A. M., GRÖNBLAD, R., & CROASDALE, H., 1965: Desmids from the Amazon Basin, Brazil, collected by Dr. H. SIOLI. — Acta Bot. Fennica 69: 1—93.

It has been pointed out by Dr. Paul Silva (of the University of California at Berkeley, Cal., U.S.A.) that the name *Xanthidium multispinosum* Grönbl. & Croasd. (l.c., p. 47, fig. 143, 144) is preoccupied by *X. multispinosum* Möbius, Ber. Komm. Wiss. Unters. Deutsch. Meere Kiel 5: 124, 1887. Accordingly it is proposed to rename the junior homonym *Xanthidium echinatum* Croasd. sp. nov.

Holotypes

In the three manuscripts completed by H. Croasdale from the notes of Dr. R. Grönblad and Mr. A. M. Scott the junior author failed to indicate the holotypes of the novelties. These are now given below: In the cases where only one specimen was drawn the figure is the holotype. In the case where more than one specimen was figured the holotype is as follows:

GRÖNBLAD, R., SCOTT, A. M., & CROASDALE, H. 1964: Desmids from Uganda and Lake Victoria, collected by Dr. Edna M. Lind. — Acta Bot. Fennica 66: 1—57, 12 pl.

Cosmarium sinostegos Schaarschm. var. *granulatum* Croasd. Fig. 72, 73.

Arthrodesmus mucronulatus Nordst. f. *depauperatus* Grönbl. Fig. 108.

SCOTT, A. M., GRÖNBLAD, R. & CROASDALE, H. 1965: Desmids from the Amazon Basin, Brazil, collected by Dr. H. Sioli. — Acta Bot. Fennica 69: 1—93, 19 pl.

Pleurotaenium tridentulum (Wolle) W. West var. *tenuissimum* Grönbl. & Croasd. Fig. 34.

Euastrum Foersteri Scott & Croasd. Fig. 70.

» *Siolii* Scott & Croasd. Fig. 72.

Micrasterias Ledouxii Scott & Croasd. Fig. 92.

» *Siolii* Scott & Croasd. f. *simplicior* Croasd. Fig. 88.

Xanthidium echinatum Grönbl. & Croasd. (corrected from *X. multispinosum* Grönbl. & Croasd., see p. 40 of the present paper) Fig. 144.

» *Siolii* Grönbl. & Croasd. Fig. 138.

Arthrodesmus aperiens Scott & Croasd. Fig. 145.

» *aperiens* Scott & Croasd. f. *latior* Scott & Croasd. Fig. 148.

Staurastrum Donnellii Wolle var. *simplex* Croasd. & Scott Fig. 185.

» *quadrangulare* Bréb. var. *prolificum* Croasd. Fig. 176.

» *trifidum* Nordst. var. *porrectum* Croasd. & Scott Fig. 174.

GRÖNBLAD, R., SCOTT, A. M. & CROASDALE, H. 1968: Desmids from Sierra Leone, Tropical West Africa. — Acta Bot. Fennica 78: 1—41, 10 pl.

Micrasterias mahabuleshwarensis Hobs. var. *semireducta* Scott & Croasd. Fig. 60.

Actinotaenium Wollei (Grönbl.) Teil. var. *latius* Croasd. Fig. 70, 71.

Cosmarium Wenmanae Croasd. Fig. 75.

76. Pentti Alhonen: Palaeolimnological investigations of three inland lakes in Southwestern Finland. 59 pp. (1967).

77. Carl-Johan Widén, Jaakko Sarvela and Teuvo Ahti: The *Dryopteris spinulosa* complex in Finland. 24 pp. (1967).

78. Rolf Grönblad, Arthur M. Scott and Hannah Croasdale: Desmids from Sierra Leone, tropical West Africa. 41 pp. (1968).

79. Orvokki Ravanko: Macroscopic green, brown, and red algae in the southwestern archipelago of Finland. 50 pp. (1968).

80. Yrjö Vasari and Annikki Vasari: Late- and Post-glacial macrophytic vegetation in the lochs of Northern Scotland. 120 pp. (1968).

81. Liisa Kaarina Simola: Comparative studies on the amino acid pools of three *Lathyrus* species. 62 pp. (1968).

82. Gábor Uherkovich: Zur Chlorococcalen-Flora Finnlands. I. Ekenäs-Tvärminne-Gegend. 1. 26 S. (1968).

83. Åke Niemi: On the railway vegetation and flora between Esbo and Ingå, S. Finland. 28 pp. (1969).

84. Åke Niemi: Influence of the Soviet tenancy on the flora of the Porkala area. 52 pp. (1969).

85. Liisa Kaarina Simola: Comparative studies on the sugar pools of three *Lathyrus* species. 16 pp. (1969).

86. Liisa Kaarina Simola: Effect of different surcose concentrations and gibberellic acid on anatomy of *Bidens radiata* Thuill. and *B. pilosa* L. 26 pp. (1969).

87. Irmeli Vuorela: The indication of farming in pollen diagrams from southern Finland. 40 pp. (1970).

88. Marjatta Aalto: Potamogetonaceae fruits. I. Recent and subfossil endocarps of the Fennoscandian species. 85 pp. (1970).

89. Pekka Isoviita: Dillenius's 'Historia muscorum' as the basis of hepatic nomenclature, and S. O. Lindberg's collection of Dillenian bryophytes. 28 pp. (1970).

90. Esa Kukkonen und Risto Tynni: Die Entwicklung des Sees Pyhäjärvi in Südfinnland im Lichte von Sediment- und Diatomeenuntersuchungen. 30 S. (1970).

91. Carl-Johan Widén, Veikko Sorsa and Jaakko Sarvela: *Dryopteris dilatata* s.lat. in Europe and the Island of Madeira. A chromatographic and cytological study. 30 pp. (1970).

92. Pentti Alhonen: The stages of the Baltic Sea as indicated by the diatom stratigraphy. 18 pp. (1971).

93. Rolf Grönblad and Hannah Croasdale: Desmids from Namibia (SW Africa). 40 pp. (1971).