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FRESHWATER DIATOMS FROM GHANA

BY

NIELS FOGED

København 1966
Kommissionær: Ejnar Munksgaard

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CONTENTS

Synopsis

150 freshwater samples from 67 different localities in Ghana have been analyzed for contents of diatoms. The occurrence of 685 different forms of diatoms was demonstrated, belonging to 551 species and 43 genera. 135 species, 5 varieties, and 5 forms have not previously been described.

25 plates with 385 drawings of 336 different forms of diatoms have been made on the basis of the material investigated.

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PREFACE

The material which has been worked up in the present paper was collected in Ghana during the period 16/2–25/3 1961. I offer my respectful thanks to the Danish Ministry of Education for granting me leave from school work for the travels in the period 14/2–31/3 1961. Furthermore, I am greatly indebted to the Danish State Research Foundation for grants to cover the travelling expenses as well as the working up of the material brought home. The condition of success of the travels was the contacts established to the University of Ghana by the Veterinary Officer in Tamale at the time, KAY C. SCHRØDER, and the Resident Tutor at the University of Ghana at the time, POUL BERTELSEN, M.A. Econ. The Director of the Department of Botany of the University, Professor F.W. SANSOME, Ph.D., not only placed laboratory and transport facilities at my disposal during my stay in Ghana, but entrusted it to his collaborator at the Department, Dr. G.W. LAWSON, Botanist, to plan a journey for me all over the country so that all more important vegetational areas would be visited. This journey was made in one of the cars of the Department with Dr. LAWSON as leader, with the permanent driver in charge of the car, and with a young Ghanese as boy and cook. Many other people contributed to securing that the journey was turned to advantage, first of all the other collaborators at the Department of Botany, but also many other university men, Africans as well as people "from abroad". I am very much obliged to all of them as well as to the staff at the enterprises attached to the East Asiatic Company in Ghana, who in various ways lent assistance and extended hospitality to me out there, especially the Managers OLE ANDREASEN and BENT ANDERSEN, without whose assistance many practical problems would have been much more complicated and troublesome to a stranger.

Finally I offer my best thanks

To the Royal Danish Academy of Sciences and Letters
For inclusion of the paper in the Biologiske Skrifter of the Academy,
To the Rask-Ørsted Foundation
For defraying the expenses for translation into English and Latin,
To Lecturer GUNNAR ANDERSEN, M.A.,
For latinizing the diagnoses of new species, and
To the translator, NIELS HAISLUND, M.A.,
For translating the paper into English.

Odense, September 1964. NIELS FOGED

INTRODUCTION

The freshwater flora of diatoms in Ghana (The Gold Coast) has not previously been investigated, but there are a few, though not very comprehensive papers on the adjoining countries. On the countries in the west thus E. O'MEARA 1876, LEUDIGER-FORTMOREL 1898, V. ZANON 1941 a, P. GUERMEUR 1954, N. WOODHEAD & R.R. TWEED 1959, 1961, and K. MÖLDER 1962.

The flora of diatoms north of Ghana, in the Soudan and Sahara, is almost unknown. Papers by P. PETIT & H. COURTET 1906, M. AMOSSÉ 1935, R.F. BASTOW 1960, F.E. ROUND 1960, 1961, and P. MANGUIN 1962 deal with southern Sahara and Soudan and also deal with the deposits of kieselguhr found there.

The flora of diatoms in the countries immediately east of Ghana is no better known, as the only publications available are those by LEUDIGER-FORTMOREL 1898, F. HUSTEDT 1910, and F. MILLS 1932.

About the somewhat more distant areas in the eastern and southern parts of tropical Africa somewhat more is known, even though from there, too, it is mainly a question of minor papers, which often deal with the plankton flora only. The following may be mentioned: O. MÜLLER 1895, 1903, 1904, 1905, 1911, C.H. OSTENFELD 1908, 1909, F. HUSTEDT 1922, 1949 a, B.J. CHOLNOKY 1960, and K. MÖLDER 1961.

The part of Africa which at present is diatomologically best known is South Africa, as the flora of diatoms there since 1953 has been the object of intensive and fertile research headed by B.J. CHOLNOKY.

As to the African flora of diatoms north of Sahara few investigations have been published. The most important work from there is F. HUSTEDT 1953.

To sum up, it may be said that the flora of freshwater diatoms in Africa has been little investigated. The material for most investigations hitherto has been collected for other purposes. In many of the papers published so far the often very scanty material of illustrations is of rather a mediocre quality. This unfortunately not least applies to some recent works, which therefore can be of slight or no value for other investigators, as it is often impossible to use the drawings in question for an only fairly certain determination or comparison. For areas the flora of which is so little known as this, it is of the utmost importance that the drawings published are so precise as altogether possible if they are to be of value for further research.

CLIMATE, VEGETATION, AND SOIL

The area of Ghana is 238,000 square km. The country stretches from 4°44′ lat. N. (Cape Three Points on the Gulf of Guinea) to 11°11′ lat. N., and from 3° long. W. to 1°12′ long. E.

The climate is tropical, the country being situated in the intertropical convergence zone. The strongest meteorological elements are the maritime air masses (monsoons), which during the rainy seasons pour into the country, and the wind (harmattan) which during the dry seasons blows from the zone of high pressure over Sahara and the Soudan down over the country towards the Gulf of Guinea. Climate and weather are mainly determined by these two oppositely directed air currents. Because of the course of the coast line in the direction WSW. to ENE. from Cape Three Points to the eastern frontier of the country, we find not only the normal tropical sequence of zones as regards climate and vegetation from south to north throughout the country, but in the southern part there is also a very considerable difference between west and east. The climatic differences are most pronounced as regards precipitation and air humidity, whereas the average temperatures there as elsewhere in the country are less variable.

It is the distribution of the precipitation on the seasons and the amount of it which are especially determinative of the distribution of the vegetational types (Wills 1962, Tables 12 and 26).

Along the coast and in the areas near the coast from Takoradi in the west to the frontier towards Togoland in the east the vegetation is very variable. In the following section about localities and samples it is denoted as Coastal Scrub and Coastal Zone (A). Along the coast itself, in the lagoon region proper, there is a beach and lagoon vegetation where the edaphic conditions are of particular importance for the local development of the vegetation. Within this narrow—and in some cases severed—zone there is between Takoradi and Accra a vegetational type which is denoted as Coastal Thicket. East of Accra this is replaced by a more drought-stricken type: Coastal Grassland, which towards the east continues to the region around the delta of the river Volta. The precipitation in this area (A) is about 90–80 cm. a year.

West of Takoradi a forest zone reaches right down to the coast. From there it continues about 250–275 km. northwards into the country to the region immediately south of the town Wenchi. The forested area from there narrows towards the southeast along a line to the region N.–NE. of Accra. Between the localities Tafo and Ajena the dominant vegetational type is Guinea savannah, but northeast of Ajena—in the mountainous regions in the east towards Togoland—the greater precipitation again conditions a forested region.

There are two main types of forest in Ghana: Rain Forest (B) and Semideciduous Forest (C and E). The Rain Forest is limited to a minor part of the country, the southwesternmost part, where the annual precipitation on an average amounts to 300–175 cm. 50–75 km. from the coast it is replaced by a Semideciduous Forest, which can hold its own in regions with an average annual precipitation of 175 to 125 cm.

In areas with less than 125 cm. annual precipitation—this applies to most of the country, the whole of the central and northern part—spreads the Guinea savannah, mostly very rich in trees (D). Farthest northeast, where the annual precipitation can drop to 50–100 cm., there are smaller areas with a type of savannah poorer in trees, the Soudan savannah.

Along the rivers, especially the perennial ones, forested areas of very different extent and kind are often found.

There is a certain coincidence between vegetational areas and geological conditions. The Guinea savannah area in the central and northern regions of the country thus roughly coincides with the distribution of the Early Palaeozoic Voltaian formation, the sandstone, shale, mudstone, conglomerates, and tillite of which form a large plateau with an average height of about 200–300 m. above sea level. The deposits of this formation are not or only slightly folded.

In the forested regions in the southwest and east there are mainly Pre-Cambrian rocks, which are often highly transformed. Most widely distributed are quartzites, phyllites, schist, as well as arkose and sandstone. They are greatly folded, which conditions the much more undulating and mountainous forms of terrain there.

In the triangle Ajena-Accra-Keta in the southeast, where the Guinea savannah approaches the coast, there is an area with Tertiary deposits, mainly limonite sandstone, sandy clay, and gravel, which in the regions near the coast, at Ada-Keta, are overlain by quite young, recent deposits: clay, sand, and gravel.

The regions farthest north, thus a fairly large area in the northwest and the Soudan savannah area in the northeast, are mainly based on Pre-Cambrian granite.

Everywhere where there has been no deposition of gravel, sand, and clay from rivers or stagnant water in recent times, the surface consists of some laterite type. These types form a weathering crust, the mostly reddish or brownish colours are very prominent, especially in the dry season when the vegetational cover is smallest. This crust can be of a very changing thickness, and in many places it is stated to reach a depth of 20–30 m.

At the formation of laterite the soluble original components of the rocks, first of all the alkalis, but also some SiO_2, have disappeared, and what is left is a more or less firm crust with a considerable content of hydroxides.

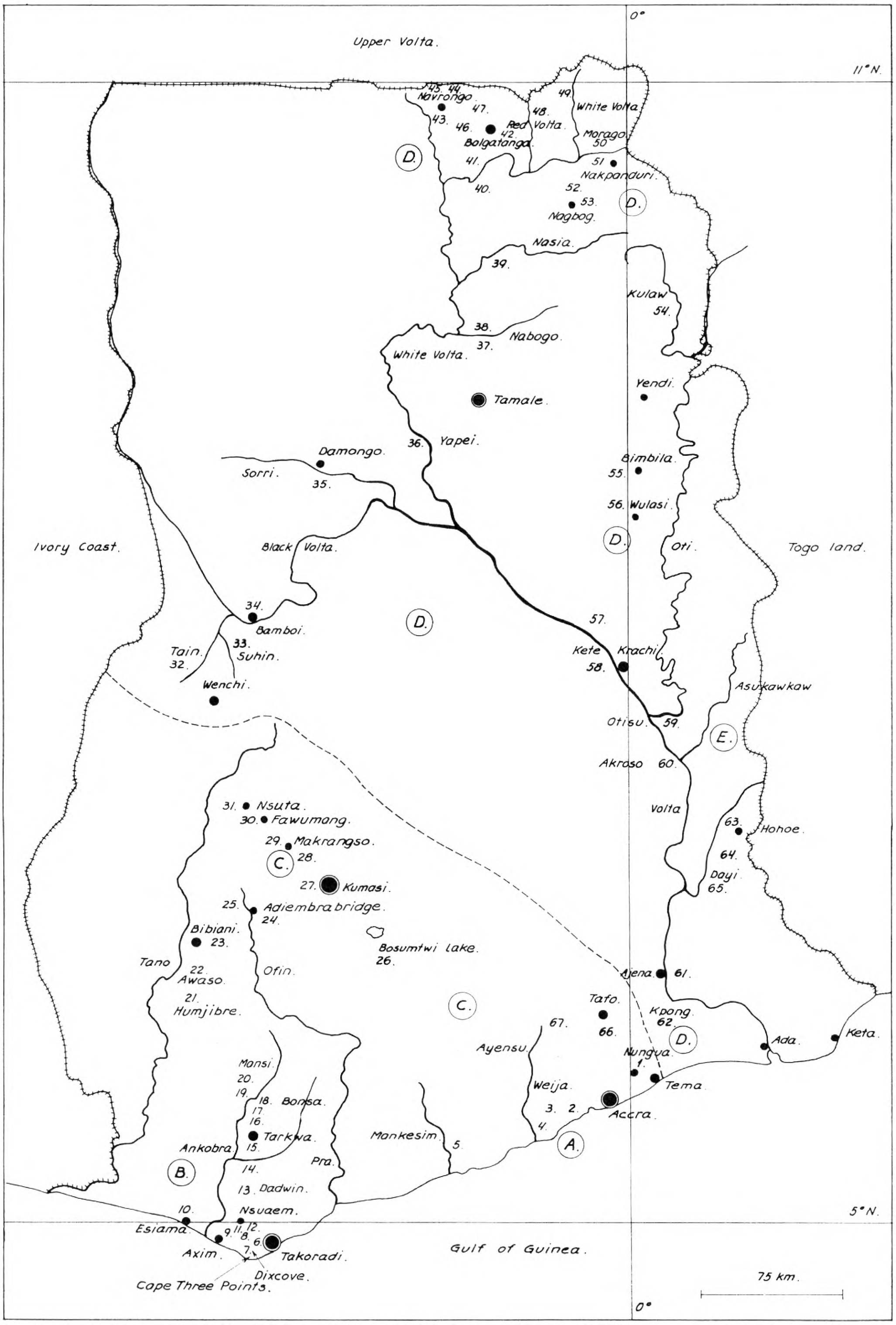
We have available some measurements of pH at the surface of the ground and from this down to depths of 2–3 m. from forested regions as well as a surface richer in humus, and from savannah regions with soils poor in humus (WILLS 1962, Tables 4 and 5). It appears from these that pH at the surface of the ground in forest as well as savannah usually varies between 5.5 and 7.0. Mostly pH seems to have values between 6.0 and 6.5.

The line Wenchi–Ajena (NW.–SE.) constitutes an approximate boundary between areas rich and areas poor in precipitation, between forest and savannah, and between Pre-Cambrian deposits and the Voltaian formation. It also denotes an orographical boundary, a more or less pronounced escarpment, the divide between the Volta river system and the other much smaller river systems running towards the southwest. The flow of water in all rivers, even in the rain forest, is highly alternating from rainy season to dry season, so that only the main rivers and the larger tributaries are water-bearing the whole year, while the smaller tributaries either dry up completely in the dry season or are reduced to larger or smaller pools in the often deeply cut-down river valleys.

The only large freshwater lake proper in the country is Bosumtwi Lake, southeast of Kumasi in the Ashanti country. It is nearly circular, with a size stated to be from 35 to 100 square km. Its banks are very steep, the highest point at the edge being about 500 m. above the surface of the water. The maximum depth is said to be about 70 m. and the bottom of the lake is supposed to go down to some 10 m. above sea level. There is no inflow proper, nor any outlet. The lake and its nearest surroundings are the only region in Ghana which is without any direct outlet to the sea. Still it is a pronounced freshwater lake. Its surface is stated at present to rise by about 30 cm. per year. Several terraces at its edge suggest a previously higher water level, presumably during the pluvial periods of the Quaternary Era. It is supposed to be a caldera (explosion crater). The natural conditions are still little known, as more detailed investigations have been hampered by the aversion of the neighbouring, rather dense population to them. The lake is considered to be sacred and is worshipped as such.

In other places in the country there are smaller, generally very shallow lakes, pools and marshy areas, which in the dry season often dry up completely. New water biotopes are in process of formation in connexion with the digging of ponds for use at irrigation, watering of cattle, and supply of water for the population. Such ponds are especially found in the southern, densely populated part of the country, or farthest north in the also rather densely populated Bolgatanga region.

In the coastal area there are salt- and brackish water lagoons, a number of which are of rather a considerable size.



Map of Ghana.

The figures 1–67 denote the localities from which material is mentioned in the paper. A–E: vegetation areas.

LOCALITIES AND SAMPLES

In the following list of the localities these are placed in five groups according to area of the macro-vegetation. The list is arranged as follows: the areas near the coast (A. Coastal Scrub and Coastal Zone), Rain Forest (B), Semideciduous Forest (C), Guinea Savannah (D), and finally Semideciduous Forest (E) in the eastern part of the country.

The distribution of localities and samples then will be as follows:

	Localities Nos.	Samples (Number)
A. Coastal Scrub and Coastal Zone	1–5	14
B. Rain Forest	6–17	32
C. Semideciduous Forest (West)	18–31	33
D. Guinea Savannah	32–62	60
E. Semideciduous Forest (East)........	63–67	11
In all...	67	150

A brief characterization is given of each locality and sample. The number of forms of diatoms and the number of genera found to occur in the sample are counted for each sample. The genera represented by most species in the sample are also mentioned, in the way that the genera with most species occurring are mentioned first. The forms from the sample which have been pictured are indicated by numbers of plates and figures.

The situation of all localities is indicated on the map fig. 1 by the number of the locality.

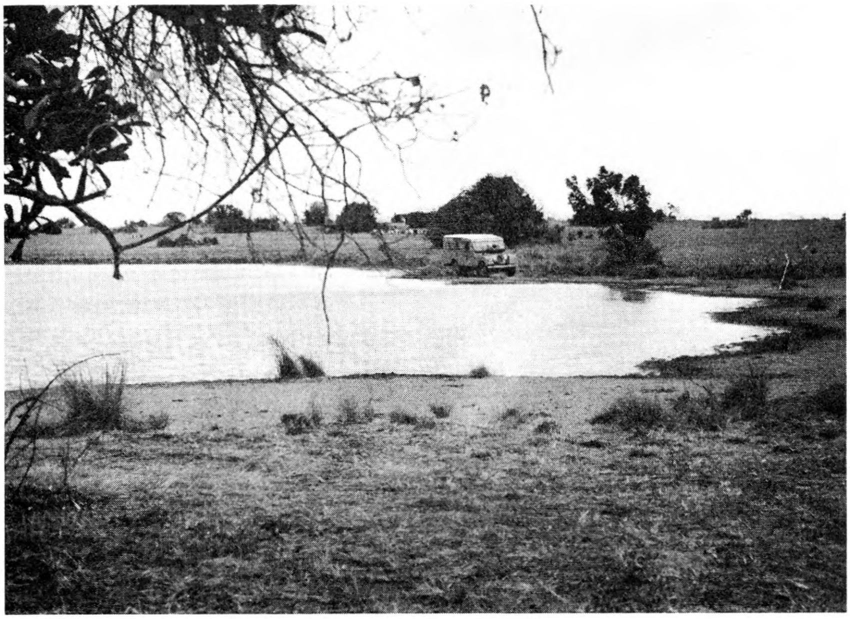
A. Coastal Scrub and Coastal Zone

Locality No. 1 (20.II.1961).

Nungua University Farm, northeast of Accra.

a. Cattle pool: shallow, natural depression filled with water, 200×50 m. Greenish, opaque water, which was highly polluted by cattle grazing in the neighbourhood.

Sample No. 33: withered stems of *Juncus*. 58 species from 15 genera (*Navicula, Nitzschia, Pinnularia*).



Cattle pool at Nungua Farm (University of Ghana), east of Accra. Coastal scrub and grassland with *Euphorbia* shrubs and trees. – Loc. No. 1. (20.II.1961). (All the pictures taken by Niels Foged in 1961).

Navicula nunguaensis X: 5, *N. hungarica* XV: 14, *Gomphonema wulasiense* var. *nunguaensis* XXI: 9, *Nitzschia nunguaensis* XXI: 16, *Pinnularia dubitabilis* XVIII: 8.

b. Large Pond. Artificial, made by the construction of a dam across a shallow valley.

Sample No. 34: small green lump of algae and scrapings from the soil, both from the edge of the pond. 48 species from 17 genera (*Navicula, Nitzschia, Pinnularia*). Common: *Diploneis ovalis, Gyrosigma spencerii, Nitzschia sigma.*
Navicula mutica var. *cohnii* XI: 19.

Sample No. 35: crusts on cement wall at the locks in the dam.
Navicula demissa IX: 5.

Sample No. 36: scrapings from stones and slimy coating from the bank of the pond near the locks. Zone of *Phragmites* and reed swamp of *Typha*. 46 species from 17 genera (*Navicula, Nitzschia*).

Sample No. 37: foam and coating on the sandy beach near No. 36. 47 species from 20 genera (*Navicula, Nitzschia, Pinnularia*). Very common: *Diploneis ovalis, Melosira granulata* var. *angustissima.*
Navicula mutica var. *cohnii* forma XI: 13, *N. auriculata* XI: 1.

c. Fishpond, artificial, near Large Pond.

Sample No. 39: coatings on stems and leaves of *Phragmites*. 13 species from 9 genera (*Nitzschia*, *Pinnularia*).
Pinnularis nunguaensis XVII: 1, *P. nunguaensis* forma XVII: 2, *Caloneis macedonica* VI: 3.

Locality No. 2 (25.II.1961).

Weija Waterworks, west northwest of Accra.

Large basin: formed by the construction of a dam across a shallow river valley.

Sample No. 69: scrapings from the cement sides of the basin. 58 species from 21 genera (*Navicula*, *Neidium*, *Pinnularia*, *Surirella*).

Sample No. 70: *Azolla* sp. and scrapings from the ground beside the edge of the basin.
79 species from 19 genera (*Gomphonema*, *Navicula*, *Nitzschia*, *Pinnularia*). Very common: *Achnanthes hungarica* (from *Azolla*), *Pleurosigma subsalsum*, *Thalassiosira fluviatilis*.
Eunotia tschirchiana I: 18, 19. *E. bisulcatum* var. *baicalensis* VI: 9, *Navicula insociabilis* XI: 2, *Gomphonema farakulumense* XXI: 10.

Sample No. 72: scrapings from the edge of the basin. 45 species from 14 genera (*Navicula*, *Nitzschia*, *Gomphonema*, *Pinnularia*). With *Gomphonema wulasiense* var. *voltaensis* and var. *nunguaensis*.

Locality No. 3 (25.II.1961).

The Densu river at a village south of Weija.

Sample No. 73: Scrapings from rock surface beside the river bank. The water in the river completely covered by leaf rosettes from *Pistia* sp. 99 species from 19 genera (*Navicula*, *Nitzschia*, *Pinnularia*, *Eunotia*, *Gomphonema*). Fairly common: *Pleurosigma subsalsum*.
Navicula densuensis XII: 7, *Nitzschia densuensis* XXIV: 9, *Caloneis vehemens* VI: 1, *Navicula omissa* IX: 6, *N. seminulum* X: 9, *N. pseudofaceta* X: 18, *Pinnularia braunii* XVI: 15, *Nitzschia paleaeformis* XXIII: 12, *N. obtusa* var. *scalpelliformis* XXIV: 4.

Locality No. 4 (7.III.1961).

a. Pond in the river bed near the Ayensu river, about 45–50 km. west of Accra.

Sample No. 112: scrapings from branches in the pond. Water undoubtedly polluted from neighbouring village. 59 species from 20 genera (*Navicula*, *Nitzschia*,

Weija Waterworks, northwest of Accra. Pond. Coco-palms. Coastal scrubs and grassland. – Loc. No. 2. (25.II.1961).

The Densu river west of Accra. Pool in the river bed, which is covered by leaf rosettes of *Pistia*. – Loc. No. 3. (25.II.1961).

Pinnularia). Fairly common: *Bacillaria paradoxa, Thalassiosira fluviatilis,* and *Navicula perotetti.*
Cyclotella meneghiniana I: 4, *Navicula quadripartita* XIV: 3, *Nitzschia mankesimensis* XXI: 17, *N. lawsonii* XXII: 13.

b. The Ayensu river, east of the village Mankesim, 65–70 km. west of Accra.

Sample No. 107: scrapings from largish tree trunk in running water in the river. 36 species from 16 genera (*Navicula, Nitzschia*).
Common: *Nitzschia punctata* var. *coarctata.* Fairly common: *Biddulphia levis.* Also in this sample: *Thalassiosira fluviatilis.*
Amphora ayensuensis XIX: 7, *Pinnularia* sp. XVIII: 9.

Sample No. 108: scrapings from clay on the river bank. 54 species from 19 genera (*Navicula, Nitzschia*). With *Biddulphia levis, Thalassiosira fluviatilis,* and *Navicula perotetti.*

Locality No. 5 (7.III.1961).

The Amisa river near the village Mankesim.

Sample No. 111: scrapings from clayey bottom and branches in slowly running water. The clayey bottom covered by fine air bubbles, but no visible layer of algae. 54 species from 17 genera (*Navicula, Nitzschia, Pinnularia*).
Pinnularia mankesimensis XVIII: 10, *Nitzschia amisaensis* XXI: 15.

B. Rain Forest

Locality No. 6 (8.III.1961).

a. River 1 west of Takoradi with clear, running water.

Sample No. 114: scrapings from stones in the river bed and from cement wall on bridge across the river. 39 species from 14 genera (*Navicula, Nitzschia, Amphora*). Common: *Cymbella cesatii.*
Cymbella takoradiensis XX: 5, *Nitzschia apowaensis* XXIV: 7, *N. towutensis* XXIV: 11, *Navicula mutica* var. *cohnii* X: 30, *N. inserta* var. *undulata* XI: 20, *N. costulata* XV: 15, *Nitzschia syrachii* XXII: 12.

b. River 2 west of Takoradi with fairly clear, running water.

Sample No. 115: scrapings from stones in the river bed. 66 species from 21 genera (*Navicula, Nitzschia*). Common: *Achnanthes ankobraensis.* In the sample: *Terpsinoë musica.*

Sample No. 116 a: withered leaves with coatings from the bottom of the river. 58 species from 22 genera (*Navicula, Nitzschia, Achnanthes*).
With *Biddulphia levis* and *Tropidoneis* sp.

River west of Takoradi in Rain Forest. Bamboo and oil palms. – Loc. No. 6 a. (8.III.1961).

River west of Takoradi. Oil palms, etc. – Loc. No. 6 b. (8.III.1961).

Sample No. 116 b: moss from cement wall in bridge across the river. 47 species from 13 genera (*Navicula, Nitzschia, Achnanthes, Eunotia, Gomphonema*). Common: *Achnanthes lanceolata* and var. *rostrata*. Rather common: *Navicula seminuloides, N. submolesta*. Also with *Biddulphia levis*.
Navicula butreensis IX: 11.

Locality No. 7 (8.III.1961).

Minor pond in Dixcove Rubber Plantation.

Sample No. 118: Floating masses of algae between *Nymphaea* sp. 30 species from 14 genera (*Navicula, Pinnularia, Nitzschia*). Common: *Navicula towutiensis*.
Navicula towutiensis XII: 15.

Locality No. 8 (8.III.1961).

a. Minor stream in the rain forest between Takoradi and Axim.

Sample No. 119: scrapings from dead branches from the stream. 50 species from 20 genera (*Navicula, Nitzschia, Pinnularia, Eunotia*).
Very common: *Achnanthes minutissima*. Furthermore: *Caloneis schroederi, Nitzschia perversa*, and *Tropidoneis* sp.
Surirella takoradiensis XXV: 4, *Navicula feuerborni* fo. *africana* XVI: 2, *Caloneis schroederi* VI: 2.

b. Small river between Takoradi and Axim with fairly clear and fast running water.

Sample No. 121: scrapings from stones in the river. 44 species from 15 genera (*Navicula, Nitzschia, Pinnularia, Neidium, Gomphonema*).
Navicula finitum XII: 2, *N. constans* var. *symmetrica* XIV: 7.

Sample No. 122: green algae and mosses from the river bed. 62 species from 20 genera (*Navicula, Nitzschia, Pinnularia, Gomphonema, Eunotia*).
Navicula bansoensis XIV: 4, *N. feuerborni* XVI: 1, *Pinnularia takoradiensis* XVI: 13.

Sample No. 123: scrapings from stones in the river bed. 88 species from 25 genera (*Navicula, Nitzschia, Gomphonema, Stauroneis, Surirella*).
Nitzschia abraensis XXII: 7, *N. ghanaensis* XXIV: 15, *Navicula submolesta* X: 4, *N. exiguiformis* (?) XIV: 14.

Sample No. 124: mosses from stones in the river bed. 37 species from 20 genera (*Navicula, Nitzschia, Pinnularia, Achnanthes*).
Navicula abraensis XV: 12.

Sample No. 125: green algae from the river bed. 79 species from 20 genera (*Navicula, Nitzschia, Pinnularia*). *Navicula perotetti* is not rare, and *Tropidoneis lepidoptera* var. *proboscidea* has also been found in this sample.
Eunotia tarkwaensis II: 5.

Locality No. 9 (8.III.1961).

River near Axim (east of the town).

Sample No. 127: scrapings from stones, and green algae from the river bed. 79 species from 23 genera (*Navicula, Nitzschia, Cymbella, Gomphonema, Neidium, Pinnularia, Surirella*).

Locality No. 10 (8.III.1961).

Pool in meadow between Esiama and Nkrofo.

Sample No. 131: *Chara* sp. from rather a dense growth in the pool. Only 13 species from 8 genera. *Navicula cryptocephala* common.
Eunotia trigibba I: 20, *E. similis* III: 10.

Locality No. 11 (9.III.1961).

a. Small stream between Abra and Tomento, west of Takoradi.

Sample No. 132: scrapings from stones from the bottom of the river and from the sides of a cement bridge. 44 species from 21 genera (*Navicula, Nitzschia, Achnanthes, Pinnularia*).

b. Small stream in bamboo scrub between Abra and Tomento.

Sample No. 133: green algae and scrapings from stones in the river bed. 70 species from 22 genera (*Navicula, Nitzschia, Pinnularia, Surirella, Synedra, Gomphonema, Achnanthes*).
Eunotia asymmetrica I: 14, *Pinnularia tomentoensis* XIX: 3.

Sample No. 135: green algae from clear, almost stagnant water by the river bed. 76 species from 25 genera (*Navicula, Eunotia, Nitzschia, Pinnularia, Gomphonema, Cymbella*). Very common: *Cymbella kolbei*. Fairly common: *Anomoeoneis exilis* var. *lanceolata*. *Stauroneis nobilis* var. *alabamae* has also been found in this sample.
Nitzschia vedelii XXII: 5, *N. subvitrea* var. *capensis* XXIII: 2.

c. Fairly large stream between Abra and Tomento. The water almost clear and almost stagnant.

Sample No. 136: scrapings from a large tree trunk (old, rotting) in the river bed. 72 species from 26 genera (*Navicula, Nitzschia, Pinnularia, Caloneis, Amphora*).
Frustulia weinholdi fo. *ghanaensis* V: 1, *Navicula aketechiensis* X: 33, *Nitzschia aketechiensis* XXII: 2, *N. pretoriensis* XXII: 1, *Navicula consentanea* X: 7, *N. rotunda* X: 16, *N. obstinata* XI: 5, *Amphora luciae* XIX: 9, *Nitzschia irresoluta* fo. *minor* XXIV: 10.

Locality No. 12 (9.III.1961).

Streams between the villages Agona and Nsuaem.

a. Small stream in bamboo scrub.

Sample No. 141: scrapings from the bottom of the stream. 77 species from 23 genera (*Navicula, Nitzschia, Pinnularia, Eunotia, Achnanthes*). Common: *Frustulia weinholdi, Nitzschia sigma, Navicula lagerheimii.* Fairly common: *Tropidoneis lepidoptera* var. *proboscidea.* Furthermore found: *Amphiprora gigantea. Neidium agonaense* VI: 11, *N. nsuaemense* VI: 12, *Surirella agonaensis* XXV: 3, *Navicula vitabunda* IX: 13, *N. longicephala* XVI: 8.

b. Small stream, stagnant water.

Sample No. 142: *Cyanophyceae* coatings. 96 species from 21 genera (*Navicula, Nitzschia, Pinnularia, Stauroneis, Eunotia*). Common: *Navicula cryptocephala* var. *intermedia.*
Pinnularia nsuaemensis XVI: 14, *N. zanoni* XV: 2.

c. Small stream with slowly flowing, clear water.

Sample No. 143: green algae and scrapings from the bottom of the river. 86 species from 21 genera (*Eunotia, Navicula, Pinnularia, Surirella, Gomphonema*).
Fairly common: *Anomoeoneis exilis* and var. *lanceolata.*

Sample No. 144: green algae from the river bed. 97 species from 24 genera (*Navicula, Nitzschia, Pinnularia, Eunotia, Gomphonema, Surirella, Stauroneis*).
Stauroneis slateri VII: 3, *Nitzschia bansoensis* XXII: 4, *Surirella esamangensis* XXV: 2, *Navicula manguini* XV: 3, *N. pseudolagerstedtii* XVI: 6, *Amphora fontinalis* XIX: 10.

d. Small stream without running water.

Sample No. 145: scrapings from cement side of bridge across the stream. 70 species from 22 genera (*Navicula, Nitzschia, Pinnularia, Eunotia, Surirella*). Common: *Navicula contenta* fo. *biceps.*
Eunotia oliffii III: 5, *Navicula quadripartita* XIV: 1, *Pinnularia* sp. XVIII: 6, *Nitzschia lorenziana* var. *subtilis* XXIV: 6.

Locality No. 13 (9.III.1961).

Streams in or near the village Dadwin.

a. Stream in Dadwin with stagnant, very turbid water in pools in the river bed.

Sample No. 147: coatings on withered palm leaves in pools. 52 species from 22 genera (*Navicula, Nitzschia, Surirella, Gomphonema*). Very common: *Navicula rhynchocephala.*
Cymbella dadwinensis XX: 3.

Sample No. 149: scrapings from sides of cement bridge across the stream. 55 species from 20 genera (*Navicula, Nitzschia, Pinnularia, Stauroneis, Gomphonema*). Common: *Navicula submolesta* and *N. invicta.*
Nitzschia dadwinensis XXIII: 10, *Navicula invicta* VIII: 19, *N. submolesta* (?) X: 2.

b. Very small stream near Dadwin with "milky", stagnant water in pools.

Sample No. 150: green algae and scrapings from cement sides of bridge. 83 species from 24 genera (*Navicula, Nitzschia, Pinnularia, Surirella, Gomphonema*). Common: *Bacillaria paradoxa.* Also *Ceratoneis arcus.*
Pinnularia polyonca XVIII: 1, *P. suchlandti* XIX: 5.

Locality No. 14 (9.III.1961).

The Bonsa river.

Tributary to the Ankobra river. Large river abounding in water, with rocky bottom and sides, south of the town Tarkwa.

Sample No. 151: scrapings from old tree trunks in the river. 74 species from 25 genera (*Navicula, Eunotia, Nitzschia, Gomphonema, Surirella*). In this sample: *Neidium ladogense* var. *densestriata.*
Eunotia bonsaensis III: 7, *Neidium affine* var. *bonsaensis* VI: 5, *Surirella bonsaensis* XXV: 1, *Eunotia epithemioides* II: 8, *Stauroneis wislouchii* VII: 10, *Pinnularia mesolepta* XVI: 16.

Sample No. 152: scrapings from surface of rock beside the river bank. 84 species from 21 genera (*Navicula, Nitzschia, Eunotia, Achnanthes, Pinnularia, Gomphonema, Stauroneis, Surirella*). Very common: *Navicula cryptocephala, Cocconeis ankobraensis.*
Eunotia tarkwaensis II: 7, *Pinnularia acoricola*? XVII: 11, *P. obscura* XVIII: 7.

Locality No. 15 (9.III.1961).

Pools in marshy area about 9 km. south of the town Tarkwa.

a. Pool 1 with *Nymphaea* sp.

Sample No. 153: floating masses of algae. 45 species from 14 genera (*Navicula, Pinnularia, Eunotia, Nitzschia*). Common: *Anomoeoneis exilis.*
Pinnularia braunii XVI: 11.

b. Pool 2 with *Nymphaea* sp.

Sample No. 154: floating masses of algae. 34 species from 15 genera (*Navicula, Eunotia, Pinnularia*). Very common: *Anomoeoneis exilis* and *Frustulia rhomboides* var. *saxonica.*
Cymbella raytonensis XX: 10.

River north of Tarkwa in Rain Forest. *Musanga* branch on the left in the river. – Loc. No. 17. (10.III.1961).

Locality No. 16 (10.III.1961).

Roadside ditch, 3–4 km. north of the town Tarkwa, with fast running, fairly clear water.

Sample No. 155: coatings on vegetation in the ditch. 57 species from 18 genera (*Navicula, Nitzschia, Pinnularia, Eunotia*). Fairly common: *Navicula ammophila, Nitzschia closterium,* and *Anomoeoneis exilis.*
Pinnularia acoricola (?) XVII: 6.

Locality No. 17 (10.III.1961).

The Huni river, 12–13 km. from the town Tarkwa, with fast running, clear water.

Sample No. 157: scrapings from stones in the river bed. 75 species from 20 genera (*Navicula, Nitzschia, Surirella, Achnanthes, Gomphonema, Pinnularia, Cocconeis*). Very common: *Navicula salinarum.*
Navicula huniensis X: 1, *N. ingoldii* XII: 3, *Nitzschia huniensis* XXIV: 17, *Navicula submolesta* X: 3, *N. iniqua* X: 24, *N. decussis* XVI: 5.

Sample No. 158: scrapings from rock in the river bed near the place where No. 157 was taken. 57 species from 20 genera (*Navicula, Nitzschia, Gomphonema, Cymbella, Achnanthes, Eunotia*).

C. Semideciduous Forest (West)

Locality No. 18 (10.III.1961).

Small streams 15–35 km. north of the town Tarkwa.

a. Smallish stream 15–20 km. north of Tarkwa. The water slightly "milky".

Sample No. 159: green algae from stones in the stream. 85 species from 22 genera (*Navicula, Nitzschia, Gomphonema, Pinnularia, Surirella*). Fairly common: *Navicula grimmei* var. *rostellata*.
Caloneis voltaensis var. *tarkwaensis* V: 5, *Navicula perlucida* VIII: 18, *N. lagerheimii* XI: 9, *N. ancisa* (?) XI:16.

Sample No. 160: crusts of *Cyanophyceae* on stones in the stream. 64 species from 16 genera (*Navicula, Nitzschia, Gomphonema, Achnanthes, Cymbella*).

b. Small stream 25 km. north of Tarkwa. Slightly "milky" water.

Sample No. 161: green algae from bottom and sides. 41 species from 19 genera (*Navicula, Nitzschia*). Very common: *Navicula confervacea*. In this sample also *Bacillaria paradoxa* and *Tropidoneis* sp.
Diploneis pseudovalis IV: 9, *Navicula confervacea* XII: 6.

c. Small ditch 30–35 km. north of Tarkwa. Stagnant water.

Sample No. 163: coatings on leaves in the ditch. 54 species from 20 genera (*Navicula, Nitzschia, Pinnularia, Surirella, Gomphonema*).
Neidium hercynicum fo. *bogosoensis* VI: 6, *Pinnularia bogosoensis* XIX: 1, *Cocconeis feuerborni* IV: 11, *Navicula bannajensis* (?) XII: 4, *N. quadripartita* XIV: 2, *N. bicephala* XVI: 7.

Locality No. 19 (10.III.1961).

a. The river Mansi, about 45 km. north of the town Tarkwa. Abounding in fast running, clear water.

Sample No. 165: scrapings from stones on the bottom of the river. 78 species from 21 genera (*Navicula, Nitzschia, Achnanthes, Cymbella, Eunotia, Gomphonema*).
Eunotia lawsonii III: 12, *Navicula bawdiaensis* X: 26, *Pinnularia mansiensis* XVIII: 5, *Navicula thienemanni* IX: 8, *N. nyassensis* IX: 14, *N. seminuloides* X: 14, *N. minima* X: 22.

Sample No. 166: scrapings from old, rotten tree trunk in the river. 69 species from 23 genera (*Navicula, Achnanthes, Amphora, Cymbella, Eunotia*). Common: *Achnanthes ankobraensis*. Also with *Biddulphia levis*.
Achnanthes mansiensis IV: 3, *Cymbella ankobraensis* XIX: 11, *Eunotia mansiensis* II: 4, *Cymbella theronii* XX: 6, *Navicula mansiensis* XI: 3.

The Mansi river north of Tarkwa in Semideciduous Forest. – Loc. No. 19 a. (10.III.1961).

b. Small tributary to the Mansi river. No running water. Small pools in the river bed with turbid water.

Sample No. 167: floating cakes of *Cyanophyceae* and scrapings from old tree trunk in pool. 56 species from 19 genera (*Achnanthes, Gomphonema*).

Locality No. 20 (10.III.1961).

Marsh near the Ankobra river, about 7 km. west of the town Bawdia. Dried-up bottom of pool.

Sample No. 168: scrapings from clayey surface at the bottom of the pool. 63 species from 21 genera (*Navicula, Nitzschia, Pinnularia*). With *Stauroneis schinzii*.

Cocconeis ankobraensis IV: 8, *Amphora mansiensis* XX: 1, *Eunotia rabenhorsti* fo. *monodon* I: 15, *Caloneis incognita* V: 2, 6.

Locality No. 21 (10.III.1961).

River near the town Humjibre. Little and only slowly flowing water.

Sample No. 170: scrapings from the bottom of the river. 58 species from 19 genera (*Navicula, Nitzschia, Achnanthes, Amphora*). In this sample *Bacillaria paradoxa*

and *Thalassiosira fluviatilis*. Fairly common: *Achnanthes pinnata*, *Navicula pupula* var. *elliptica* and *N. exigua* var. *signata*.
Achnanthes pinnata III: 15.

Sample No. 171: green algae from the bottom of the river. 58 species from 20 genera (*Navicula, Nitzschia, Pinnularia*). In this sample *Biddulphia levis, Thalassiosira fluviatilis, Nitzschia closterium, Hantzschia distincte-punctata*.
Navicula humjibreensis XV: 8, *N. schweickerdti* XI: 6, *N. exigua* var. *signata* XIV: 10, *Cymbella aspera* var. *bengalensis* XX: 8, *Cyclotella meneghiniana* I: 8, *Cocconeis schröderii* IV: 7, *Hantzschia distincte-punctata* XXII: 3.

Locality No. 22 (11.III.1961).

a. Fairly large river, 3–4 km. north of the town Awaso. The water very turbid, stagnant.

Sample No. 172: scrapings from the bottom. 57 species from 19 genera (*Navicula, Nitzschia, Achnanthes, Amphora*).
Navicula ankobraensis VIII: 10, *Achnanthes pinnata* III: 14.

b. Small river, 6–7 km. north of Awaso. No running water.

Sample No. 173: scrapings from dead branch in the river bed and from cement side of bridge across the river. 69 species from 20 genera (*Navicula, Nitzschia*). Fairly common: *Cocconeis subdirupta*. Furthermore: *Bacillaria paradoxa, Thalassiosira fluviatilis, Gomphocymbella ruttneri*.
Navicula asanwinsoensis XIV: 15, *N. bannajensis* XII: 5, *N. dugaensis* X: 27, *Cocconeis subdirupta* IV: 4, *Nitzschia ovalis* XXI: 12.

c. Small river, 10–11 km. north of Awaso. No running water.

Sample No. 175: scrapings and moss from cement side of bridge across the river. 74 species from 19 genera (*Navicula, Nitzschia, Gomphonema, Pinnularia, Surirella*). In this sample *Terpsinoë musica, Gomphocymbella ruttneri*.

Locality No. 23 (11.III.1961).

a. Small stream about 3 km. north of the town Bibiani. Little and very slowly flowing water.

Sample No. 178: Flakes of *Cyanophyceae*. 34 species from 14 genera (*Navicula, Nitzschia*). Common: *Neidium gracile*. Also with *Diatomella balfouriana*.
Neidium gracile fo. *aequalis* VII: 1.

b. Small stream about 4 km. north of Bibiani. No running water. Small pools in the river bed, with *Typha* sp. and *Nymphaea* sp.

Sample No. 180: green algae from stems and leaves. 38 species from 12 genera (*Navicula, Pinnularia, Gomphonema, Nitzschia, Achnanthes*). With *Frustulia weinholdi*.
Navicula tranciloba X: 19.

Sample No. 181: green algae from withered leaves and stems of *Typha* and *Nymphaea* in another pool near the place where No. 180 was found. 41 species from 17 genera (*Navicula, Pinnularia, Amphora, Gomphonema*).
Stauroneis subdahomensis VII: 9. *S. tropicalis* var. *undulata* VII: 16, *Pinnularia gibba* var. *sancta* XVII: 9, *Nitzschia closterium* XXIV: 14.

Locality No. 24 (11.III.1961).

Small stream 31–32 km. northeast of Bibiani. Little and slowly flowing water.

Sample No. 185: flakes of *Cyanophyceae*. 58 species from 21 genera (*Pinnularia, Nitzschia, Achnanthes, Amphora*). Very common: *Navicula cryptocephala*. Here also *Thalassiosira fluviatilis*.
Pinnularia agogoensis XVII: 7.

Locality No. 25 (11.III.1961).

The Ofin river at Adiembra bridge. Little or slowly flowing water.

Sample No. 186: Flakes of *Cyanophyceae*. 51 species from 16 genera (*Navicula, Achnanthes, Gomphonema, Pinnularia*). Common: *Cocconeis diminuta*. In this sample also *Cymatopleura solea* and *Thalassiosira fluviatilis*.
Nitzschia adiembraensis XXIV: 2, *N. ofinensis* XXIV: 12, *N. palea* var. *dubia* XXIII: 11, *Navicula seminuloides* X: 13, *N. lagerheimii* var. *intermedia* XI: 8.

Locality No. 26 (11.III.1961).

Bosumtwi Lake (see p. 8).

Sample No. 188: scrapings from tree trunk floating near the edge of the lake. 14 species from 8 genera (*Navicula, Nitzschia*).
Navicula carstensenii XIV: 11.

Sample No. 189: green algae floating near the edge of the lake. 31 species from 13 genera (*Navicula, Nitzschia*).
Nitzschia bosumtwiensis XXIII: 13.

Sample No. 190: scrapings of dead branches found on the bottom of shallow water near the edge of the lake. 20 species from 10 genera (*Navicula, Nitzschia*).

Sample No. 192: coatings on sand from shallow water at the edge of the lake. 35 species from 20 genera (*Navicula, Nitzschia*). Very common: *Achnanthes exigua*. Common: *Navicula pupula*.

Bosumtwi Lake southeast of Kumasi. Plank boats at the beach. – Loc. No. 26. (11.III.1961).

Navicula bosumtwiensis IX: 19, *N. lawsonii* X: 6, *Anomoeoneis sphaerophora* var. *güntheri* VIII: 2, *A. sphaerophora* forma VIII: 3.

Sample No. 193: rootlets of *Bambusa*, *Typha*, and *Scirpus* from shallow water at the edge of the lake. 19 species from 9 genera (*Navicula*, *Nitzschia*, *Cymbella*). Very common: *Gomphonema lanceolatum* var. *insignis*. Common: *Anomoeoneis sphaerophora* (+ var.), *Navicula subrhynchocephala*, *N. pupula* var. *capitata*, and *Nitzschia frustulum* var. *perpusilla*.
Cymbella mülleri XX: 11.

Sample No. 194: small pool on flat (terrace) at the edge of the lake. Withered leaves with coatings. Slight oozing out of water in the side of the pool. 69 species from 23 genera (*Navicula*, *Nitzschia*, *Pinnularia*, *Gomphonema*, *Stauroneis*). With *Diatomella balfouriana*, *Meridion circulare*, and *Ceratoneis arcus*.
Navicula abonuensis XI: 4, *Caloneis bosumtwiensis* XVII: 4, *Nitzschia abonuensis* XXII: 8, *Fragilaria leptostauron* forma I: 10, *Stauroneis borrichii* VII: 8, *Navicula tantula* (?) X: 11.

Locality No. 27 (12.III.1961).

a. Roadside ditch 4–5 km. west of the town Kumasi. Little and slowly flowing water.

Sample No. 195: filter of green algae from the ditch. 33 species from 12 genera (*Eunotia*, *Pinnularia*, *Navicula*, *Neidium*, *Nitzschia*, *Gomphonema*). Common:

Frustulia rhomboides var. *saxonica, Navicula cryptocephala* var. *veneta, Pinnularia microstauron, P. braunii* var. *amphicephala.* In this sample also *Meridion circulare.*
Pinnularia interrupta fo. *jaculata* XVI: 10.

b. Small stream 13–14 km. northwest of Kumasi with fairly fast running water.

Sample No. 196: filaments of green algae from the stream. 80 species from 21 genera (*Navicula, Nitzschia, Pinnularia, Achnanthes, Surirella*). Very common: *Achnanthes exigua.*
Neidium kumasiense VI: 8, *Navicula sepasiensis* XV: 4, *Nitzschia obtusa* var. *scalpelliformis* XXIV: 3.

Locality No. 28 (12.III.1961).

The Oda river, about 19–20 km. northwest of Kumasi. Fairly abounding in clear, running water.

Sample No. 198: scrapings from the bottom of the river. 83 species from 21 genera (*Navicula, Nitzschia, Pinnularia, Achnanthes, Gomphonema, Surirella*).
Pinnularia odaensis XVII: 8.

Sample No. 199: scrapings from old, rotten tree trunk and from stones in the river bed. 75 species from 20 genera (*Navicula, Nitzschia, Pinnularia, Gomphonema*).

Locality No. 29 (12.III.1961).

The Apropong river, tributary to the Ofin, near the village Makrangso, 28–30 km. northwest of Kumasi. No running water in the river bed, but many small pools with highly polluted water.

Sample No. 203: withered leaves with coatings from pool in the river bed. 80 species from 18 genera (*Navicula, Nitzschia, Achnanthes, Pinnularia, Gomphonema*).
Nitzschia apropongensis XXIV: 13, *Achnanthes kraueselii* IV: 6, *Cocconeis* sp. IV: 13, *Stauroneis crucicula* VII: 6, *Navicula seminulum* X: 10, *N.* sp. X: 15, *N. pseudographa* XI: 12, *Gomphonema brasiliense* XXI: 4, *Nitzschia ignorata* XXIV: 5.

Locality No. 30 (12.III.1961).

Small stream near the village Fawumang, about 45 km. northwest of Kumasi.

Sample No. 204: green algae from the stream. 83 species from 18 genera (*Navicula, Nitzschia, Pinnularia, Achnanthes, Stauroneis, Gomphonema, Surirella*).
Navicula fawumangensis XI: 17, *N. carloffii* XV: 6, *Pinnularia lawsonii* XVIII: 3, *Nitzschia svedstrupii* XXII: 14, *Surirella delicatissima* var. *ghanaensis* XXV: 9, *Navicula seminulum* X: 8, *N. pseudographa* X: 28, *N. fauta* (?) XV: 11.

Sample No. 205: green algae, etc., from the same stream near the place where No. 204 was taken. 51 species from 17 genera (*Navicula, Gomphonema, Nitzschia, Stauroneis*).
Navicula chadwickii XII: 8, *N. isertii* XII: 16, *Nitzschia ankobraensis* XXI: 13.

Locality No. 31 (12.III.1961).

a. Smallish river course near the village Nsuta, 50–55 km. northwest of Kumasi. No running water, but some pools in the river bed.

Sample No. 207: scrapings from soil beside and in a pool. 66 species from 20 genera (*Navicula, Amphora, Achnanthes, Gomphonema, Nitzschia, Pinnularia*). Common: *Synedra ulna* + var. In this sample also *Biddulphia levis, Thalassiosira fluviatilis*.
Navicula nsutaensis XI: 18, *N. bertelsenii* XI: 23, *N. abuensis* XII: 10, *N. moerckii* XV: 5, *N. esamangensis* VIII: 20, *Amphora abuensis* XIX: 6, *A. crameri* XIX: 8, *Diploneis subovalis* IV: 10, *Stauroneis crucicula* VII: 7.

b. Smallish river on the provincial border near the village Abesewa, 55–60 km. northwest of Kumasi. Rather fast running, fairly clear water.

Sample No. 210: green algae from running water in the river bed. 57 species from 19 genera (*Navicula, Nitzschia*). In this sample also *Cymatopleura solea* var. *rugosa* and *Surirella anassae*.
Navicula contenta fo. *biceps* VIII: 15, *N. ventralis* IX: 9, *Nitzschia tarda* XXIII: 1, *N. plicatula* XXIII: 3.

D. Guinea Savannah

Locality No. 32 (13.III.1961).

The Tain river, the Volta river system, between the villages Wenchi and Nsawkaw, 13 km. northwest of Wenchi. River fairly abounding in clear, fast running water.

Sample No. 215: scrapings from large, old, rotten tree trunk in the river. 51 species from 18 genera (*Navicula, Achnanthes, Caloneis, Cymbella, Eunotia, Gomphonema*). In this sample also *Biddulphia levis, Eunotia didyma* var. *claviculata* and var. *tuberosa*.
Navicula kriegeri IX: 4, *Cymbella tainensis* XX: 4, *Caloneis fasciata* V: 7, *Neidium minutissimum* VI: 10.

Sample No. 216: scrapings from cement conduit below bridge across the river near the place where No. 215 was taken. 61 species from 22 genera (*Navicula, Eunotia, Nitzschia, Pinnularia*). In this sample *Biddulphia levis, Eunotia didyma* var. *recurvata*, var. *claviculata*, and var. *tuberosa*.
Eunotia tanosoensis II: 9, *Nitzschia tainensis* XXIII: 14, *Cocconeis* sp. IV: 12.

Sample No. 217: *Lemna* sp. and scrapings from dead branch from the bottom of the river. 71 species from 21 genera (*Navicula, Nitzschia, Pinnularia, Eunotia, Surirella, Synedra*). With *Licmophora remulus, Synedra tabulata,* and *Gomphocymbella ruttneri.*
Navicula tainensis XV: 9, *N. schadei* IX: 10, *N. ammophila* XV: 13, *Eunotia didyma* fo. *genuina* II: 2, *E. didyma* var. *tuberosa* II: 3, *Stauroneis crucicula* VII: 5.

Locality No. 33 (13.III.1961).

The Suhin river, tributary to the Tain, at the village Subinso, about 20 km. northwest of Wenchi. River abounding in clear, running water.

Sample No. 218: scrapings from dead branches and from stones in running water in the river. 49 species from 18 genera (*Navicula, Achnanthes, Pinnularia, Surirella, Eunotia*).
Navicula subinsoensis XII: 13, *N. akimensis* XIII: 2, *N. suhinensis* XIV: 9, *Pinnularia suhinensis* XVII: 5, *Surirella takoradiensis* var. *suhinensis* XXV: 5, *Synedra rumpens* var. *fragilarioides* I: 13, *Achnanthes subhudsonis* IV: 1, *Navicula suecorum* XI: 7, *N. constans* var. *symmetrica* XIV: 6, *N. paludosa* XVI: 4.

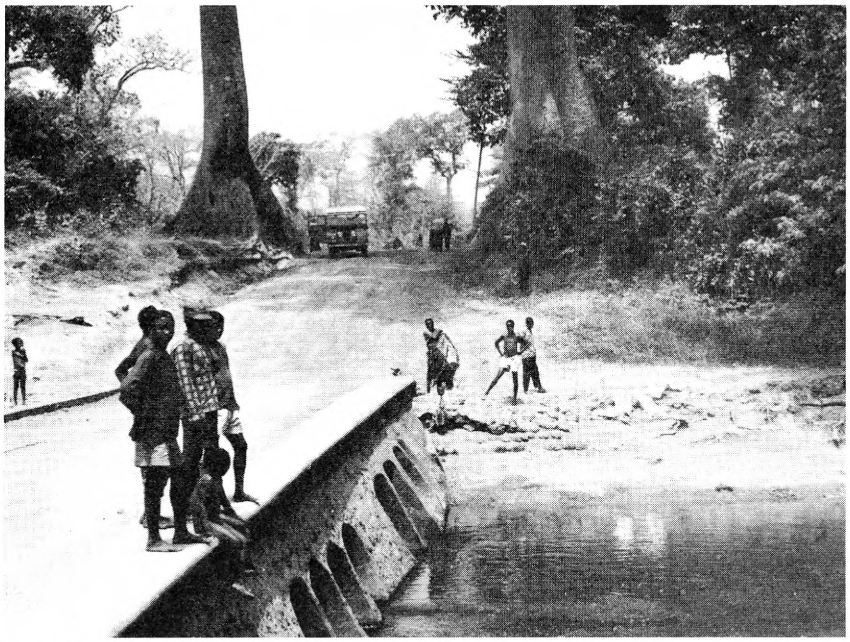
Sample No. 219: scrapings from branches and stones in the river bed near the place where No. 218 was taken. 48 species from 19 genera (*Navicula, Achnantes, Pinnularia, Eunotia, Gomphonema*).
Achnanthes subhudsonis IV: 2, *Navicula constans* var. *symmetrica* XIV: 8.

Locality No. 34 (13.III.1961).

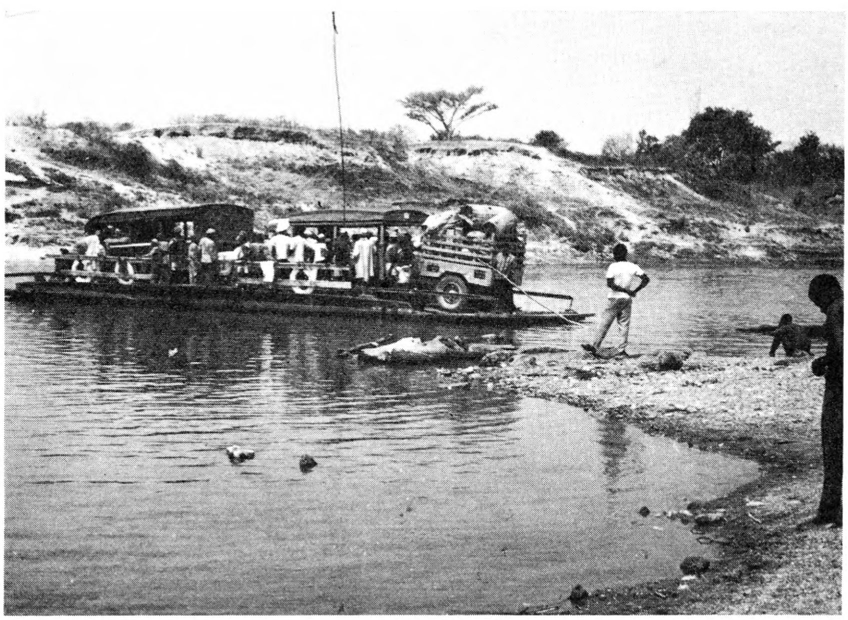
The Black Volta river, the main river of the Volta river system, near the village Bamboi (at the Bamboi ferry). The river there is 50–100 m. broad, in the dry season at most 2–3 m. deep, with a very strong current, slightly brownish water.

Sample No. 220: coatings on *Potamogeton* sp. from clayey bottom in the river. 77 species from 23 genera (*Navicula, Nitzschia, Cymbella, Pinnularia, Caloneis, Stauroneis*).
Navicula bamboiensis X: 29, *N. langoraensis* X: 32, *N. laingii* XII: 1, *N. monradii* XII: 11, *N. ashantiensis* XIII: 5, *N. halophila* forma III: 6, *N. auriculata* X: 31, *N. kwamkuji* VIII: 11, *N. helensis* IX: 3, *N. seminuloides* X: 17, *N. exiguiformis* XIV: 13, *Caloneis desertorum* V: 10, *C. beccariana* VI: 4.

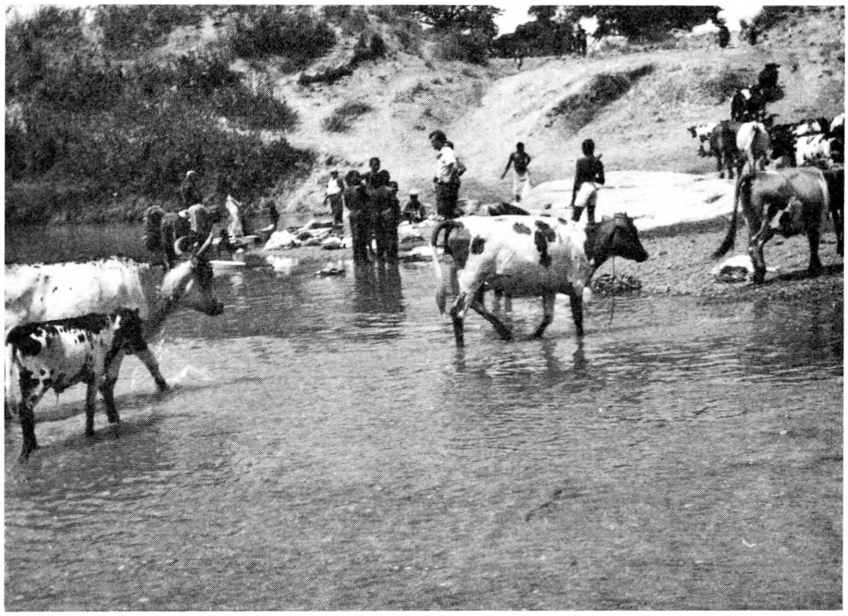
Sample No. 221: like No. 220 and taken near this sample. 77 species from 21 genera (*Navicula, Nitzschia, Caloneis, Cymbella, Pinnularia, Stauroneis, Gomphonema*).
Stauroneis crucicula VII: 4, *Navicula tridentula* VIII: 13, *Gomphonema africana* XXI: 6.



The Tain river south of Wenchi in Semideciduous Forest. At the roadside the bases of two large *Ceiba* trees are seen. – Loc. No. 32. (11.III.1961).



The Black Volta south of Bamboi in Guinea savannah and woodland on the border between the Southern and the Northern Region. Ferry in charge of the main road traffic. – Loc. No. 34. (13.III.1961).



The White Volta near the town Yapei (also called Tamale Port). Washing- and cattle watering-place. – Loc. No. 36. (16.III.1961).

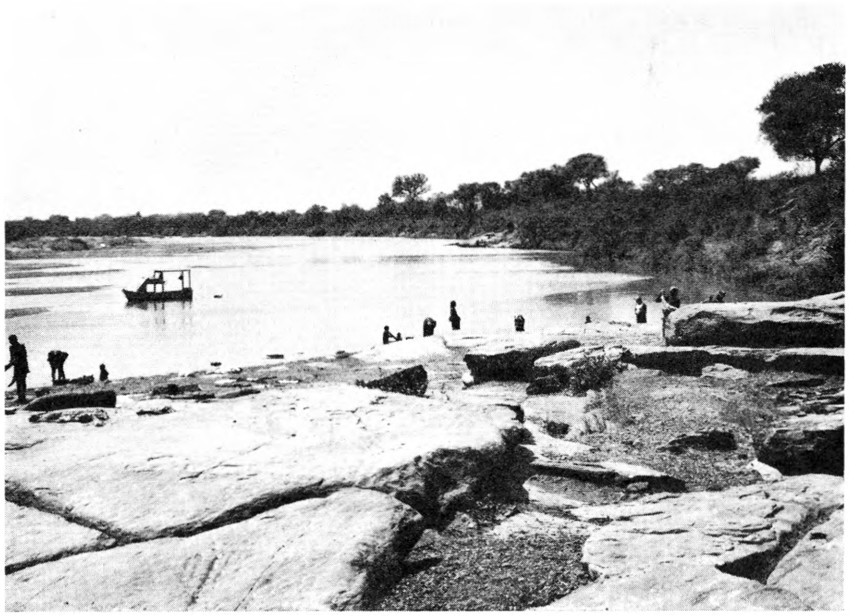
Locality No. 35 (16.III.1961).

a. The Sorri river, tributary to the Black Volta, about 15–16 km. south of the village Damongo. The river bed without running water, but with some turbid pools.

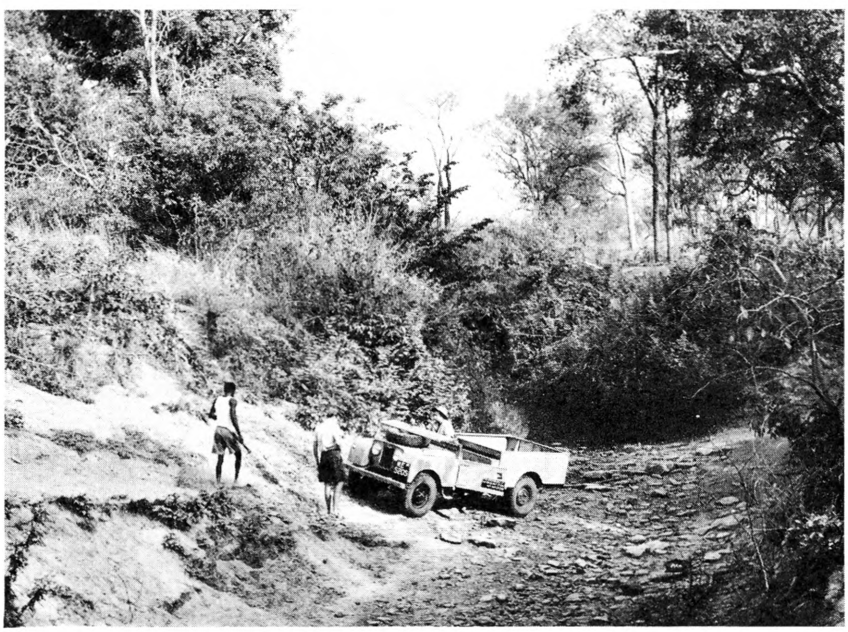
Sample No. 223: scrapings of clay from edge of pool in the river bed. 59 species from 19 genera (*Navicula*, *Surirella*, *Nitzschia*, *Eunotia*, *Gomphonema*, *Pinnularia*).
Eunotia sorriensis III: 8, *Navicula damongensis* XI: 14, *Surirella sorriensis* XXV: 8, *Navicula halophila* VIII: 4, *N. bella* (?) VIII: 17, *Nitzschia spiculoides* XXIII: 7.

b. Largish lake (?), several hundred m. long, 30–40 m. broad, apparently very deep (in cleftlike valley), the water turbid. With lung fishes, mormyridae, crocodiles, etc. 15–16 km. south of Damongo.

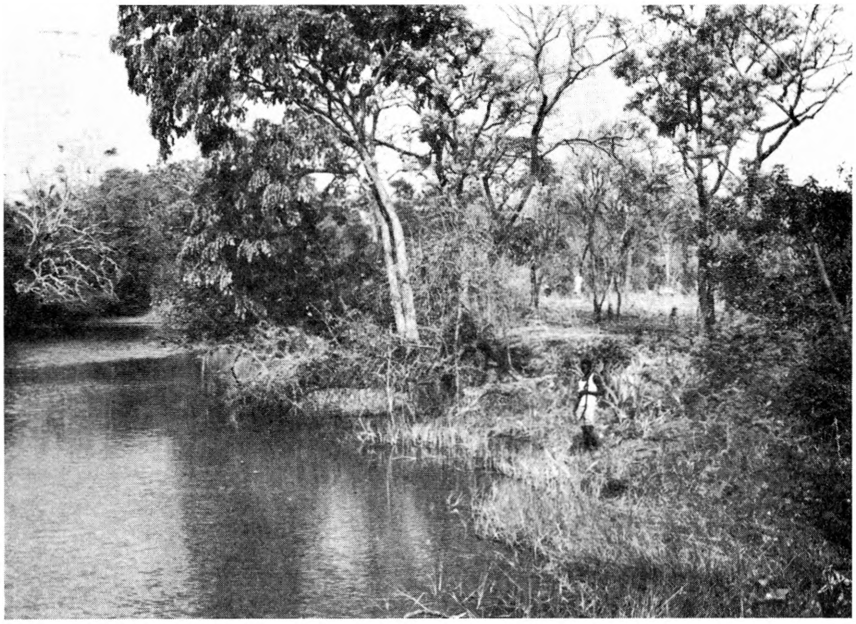
Sample No. 227: coatings on *Phragmites* in reed swamp at the edge of the lake; drinking-place for large mammals (lions, elephants). 14 species from 10 genera (*Navicula*, *Pinnularia*, *Surirella*, *Melosira*).
Navicula sorriensis XII: 12.



The White Volta at the town Yapei in Guinea savannah and woodland. – Loc. No. 36. (16.III.1961).



The reserve south of Damongo with savannah and woodland. The Sorri river, tributary to the Black Volta. River bed with small pools. – Loc. No. 35 a. (16.III.1961).



Edge of lake with drinking-place for lions and elephants. The reserve south of Damongo with savannah and woodland. – Loc. No. 35 b. (16.III.1961).

Locality No. 36 (16.III.1961).

The White Volta river, the largest tributary to the Black Volta, at Yapei, also called Tamale Port, southwest of the town Tamale.

Sample No. 232: sand in slowly flowing water at washing-place.
Cyclotella pseudostelligera I: 2, *Navicula tridentulaeformis* VIII: 14.

Locality No. 37 (17.III.1961).

The Nabogo river, tributary to the White Volta, at the village Nabogo, north of Tamale. Turbid, polluted water at washing-place.

Sample No. 234: green algae and coatings on the bottom at the washing-place in slowly running water. 53 species from 18 genera (*Navicula, Nitzschia, Pinnularia, Gomphonema, Neidium, Stauroneis*). With *Melosira herzogi*.
Eunotia vumbae III: 9, *Navicula halophila* fo. *nabogoensis* VIII: 9, *N. platycephala* IX: 17.

Locality No. 38 (17.III.1961).

Largish swampy area about 35 km. north of the town Pong Tamale. Fairly large expanses of open water or with a growth of *Utricularia* sp. and blue water-lilies and *Typha* sp.

Lake between the villages Disiga and Nasia, north of Tamale. Reed swamp at the edge of the lake, with *Utricularia* sp. and blue water-lilies. – Loc. No. 38 (17.III.1961).

Sample No. 236: coatings on *Utricularia* and *Typha*. 20 species from 11 genera (*Navicula, Stauroneis, Gomphonema, Eunotia*).

Sample No. 237: like No. 236, but taken in another place in the swamp. 31 species from 16 genera (*Eunotia, Gomphonema, Pinnularia, Melosira*).

Sample No. 238: like No. 236 from a third place in the reed swamp. 41 species from 12 genera (*Pinnularia, Eunotia, Navicula, Stauroneis, Gomphonema*).

Sample No. 239: like No. 236, but from a fourth place in the same swamp. 42 species from 14 genera (*Navicula, Pinnularia, Gomphonema, Nitzschia, Eunotia*). *Eunotia rhomboidea* I: 16.

Locality No. 39 (17.III.1961).

The Nasia river, tributary to the White Volta, at the village Nasia, about halfway between the towns Tamale and Bolgatanga. No running water in the river, but some pools.

Sample No. 240: coatings on vegetation in pool. 39 species from 13 genera (*Navicula, Melosira, Gomphonema, Surirella, Nitzschia*).

Melosira ikapöensis var. *minor* I: 5, *M. herzogi* I: 6, *Eunotia flexuosa* III: 2.

Sample No. 241: coatings on vegetation in pool near the place where No. 240 was taken. 49 species from 19 genera (*Navicula*, *Eunotia*, *Gomphonema*, *Synedra*). With *Licmophora remulus*.
Eunotia lunaris III: 3.

Locality No. 40 (17.III.1961).

The White Volta river between the villages Pwalagu and Kolugo, about 23 km. south of Bolgatanga. No running water in the river bed, but pools of various sizes.

Sample No. 242: scrapings of sand from the bottom and from coatings on vegetation in large pool. 55 species from 18 genera (*Navicula*, *Cymbella*, *Gomphonema*, *Neidium*, *Nitzschia*, *Pinnularia*, *Surirella*).

Locality No. 41 (17.III.1961).

Largish marshy area with dense grass vegetation near the village Kolugo, a little north of the White Volta river and above the river valley.

Sample No. 243: brown coatings on vegetation in the marsh. 37 species from 16 genera (*Pinnularia*, *Navicula*, *Melosira*, *Gomphonema*, *Eunotia*).
Navicula platycephala forma IX: 18, *Pinnularia gibba* var. *subundulata* XVIII: 2.

Sample No. 244: like No. 243 and near the place where this was taken. 37 species from 17 genera (*Pinnularia*, *Navicula*, *Gomphonema*, *Eunotia*).
Pinnularia bogosoensis forma XIX: 2, *P. parva* var. *lagerstedtii* fo. *interrupta* XVII: 3, *Eunotia gracilis* III: 1, *Pinnularia montana* XVII: 10, *Navicula kolugoensis* XII: 9.

Locality No. 42 (18.III.1961).

Large artificial pond near Bolgatanga, belonging to the Bolgatanga waterworks.

Sample No. 245: scrapings from the edge of the pond. 19 species from 11 genera (*Gomphonema*, *Navicula*, *Neidium*, *Stauroneis*, *Cymbella*, *Synedra*).

Locality No. 43 (18.III.1961).

Area belonging to the Tono Agricultural Station at the town Navrongo near the northern frontier of the country.

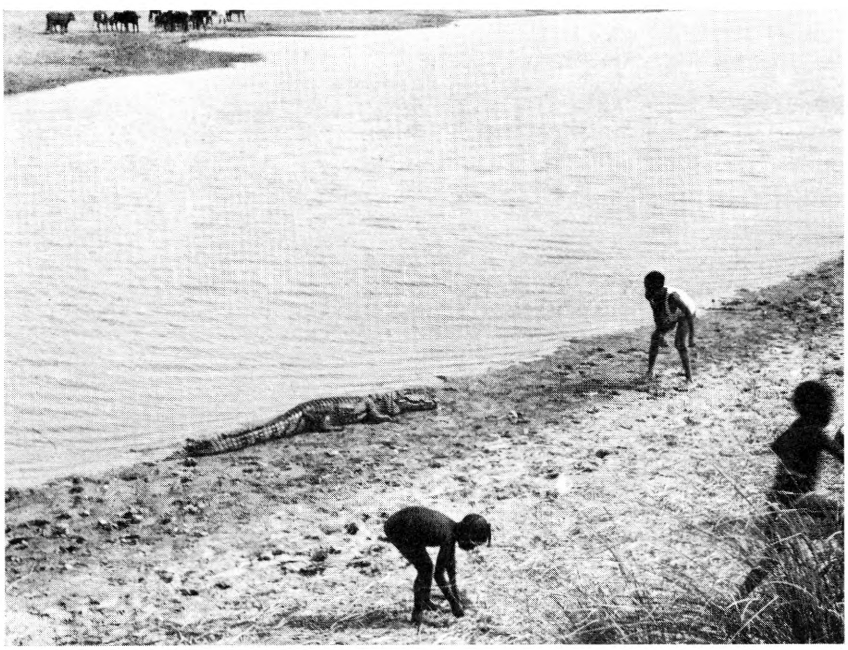
a. Pond No. 17 (dammed in 1959), about 3 m. deep.

Sample No. 246: scrapings of clay at the edge of the pond. 30 species from 10 genera (*Navicula*, *Nitzschia*, *Pinnularia*, *Surirella*).

b. Minor pool in irrigated area near the place where No. 246 was taken.

Sample No. 248: scrapings of clay from the edge of the pool. 27 species from 8 genera (*Navicula*, *Nitzschia*).

The Nasia river, tributary to the White Volta, approximately halfway between Tamale and Bolgatanga. – Loc. No. 39. (17.III.1961).



Waterwork pond at Bolgatanga in savannah and woodland. Cattle and crocodile at the edge of the pond. – Loc. No. 42. (18.III.1961).

Locality No. 44 (18.III.1961)

Area with ponds (artificial) some km. northeast of Navrongo.

a. Pond No. 14, on the west side of the road through the area.

Sample No. 249: scrapings from the ground at the edge of the pond. 39 species from 14 genera (*Navicula, Surirella, Nitzschia, Neidium*).
Nitzschia navrongensis XXIII: 6, *Stauroneis schinzii* VII: 14, *Hantzschia amphioxys* var. *africana* XXI: 14.

b. Fishpond near Pond No. 14.

Sample No. 250: scrapings from stones and clay at the edge of the pond. 43 species from 15 genera (*Navicula, Pinnularia, Nitzschia, Gomphonema, Neidium*).

c. Pond No. 15, near No. 14, but on the east side of the road.

Sample No. 251: scrapings from clay at the edge of the pond. 51 species from 14 genera (*Navicula, Nitzschia, Pinnularia, Surirella, Stauroneis, Neidium*).

Locality No. 45 (18.III.1961).

Experimental and irrigation area north of Navrongo. Pond No. 46 (dammed in 1960).

Sample No. 252: scrapings from clay at the edge of the pond. 35 species from 14 genera (*Nitzschia, Navicula, Stauroneis, Gomphonema*).
Nitzschia tonoensis XXIII: 5, *Synedra montana* I: 11, *Stauroneis spicula* VIII: 1.

Locality No. 46 (19.III.1961).

Ponds in the neighbourhood of Navrongo.

a. Watering-pond south-east of the town. Turbid water.

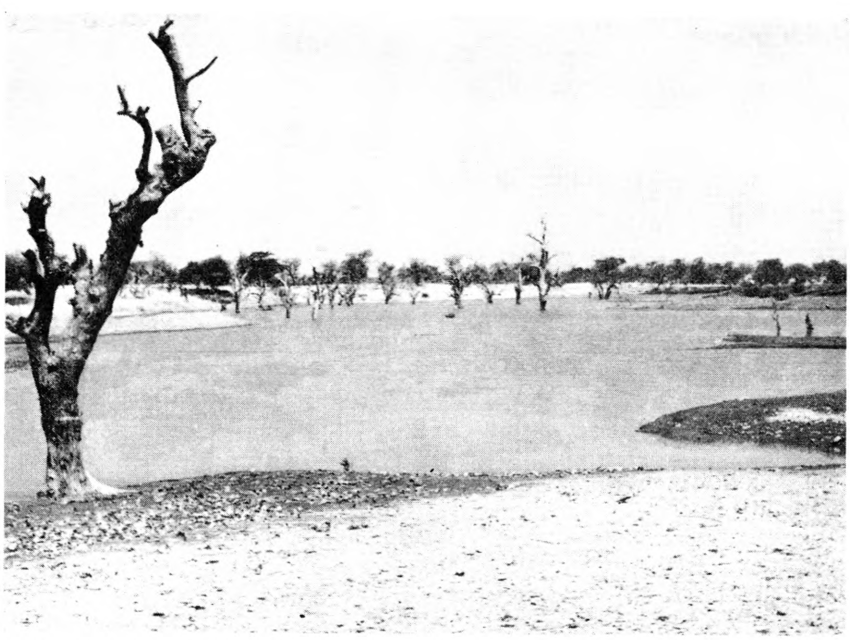
Sample No. 254: scrapings from clay at the edge of the pond. 60 species from 15 genera (*Navicula, Pinnularia, Nitzschia, Stauroneis, Neidium*).
Navicula abelioensis XI: 22, *Nitzschia chuchiligaensis* XXIV: 8, *Navicula navrongensis* XI: 11.

b. Pond in irrigation area southeast of Navrongo.

Sample No. 256: coatings on vegetation and scrapings from clay at the edge of the pond, 45 species from 14 genera (*Navicula, Nitzschia, Pinnularia*). With *Meridion circulare*.
Nitzschia palea XXIII: 8.

Sample No. 258: like No. 256 and taken near the place of this. 48 species from 13 genera (*Navicula, Nitzschia, Gomphonema, Cymbella*). With *Rhizosolenia eriensis*.
Stauroneis navrongensis VII: 12, *Navicula halophila* fo. *tenuirostris* VIII: 7.

Sacred crocodile pond at the village Paga near the border of the Upper Volta state. Characteristic cultivated savannah land. – Near Loc. No. 45. (18.III.1961).



Pond at the village Asong, east of Bolgatanga in savannah and woodland. The trees withered after the damming of the water. – Loc. No. 47 a. (20.III.1961).

Locality No. 47 (20.III.1961).

a. Largish artificial pond 8–9 km. east of Bolgatanga.

Sample No. 259: scrapings of clay from the edge of the pond. 35 species from 16 genera (*Navicula, Nitzschia, Pinnularia, Surirella, Caloneis, Cymbella*).

b. Oasis with smallish stream about 13–14 km. east of Bolgatanga. Clear running water in the stream.

Sample No. 260: Clay slurry and scrapings from stones in the stream. 54 species from 19 genera (*Navicula, Nitzschia, Caloneis, Gomphonema*).
Caloneis aequatorialis V: 8, *C. sansomei* V: 9, *Stauroneis borrichii* VII: 11, *Navicula grimmei* XI: 15.

Locality No. 48 (20.III.1961).

The Red Volta river, tributary to the White Volta, about 5 km. east of the village Nangodi. Rocky bottom. No running water, but some pools.

Sample No. 262: scrapings from stones and rocky surface in the river bed. 34 species from 15 genera (*Navicula, Gomphonema, Surirella, Nitzschia*).
Navicula navrongensis XI: 10.

Locality No. 49 (20.III.1961).

The White Volta river between the villages Saka and Bazua. No running water, but very large pools, where the population caught fish and collected bivalves.

Sample No. 265: scrapings and green algae from cement wall in bridge across the river. 68 species from 20 genera (*Navicula, Gomphonema, Nitzschia, Cymbella*).

Sample No. 266: like No. 265 and taken near the same place. 38 species from 16 genera (*Navicula, Melosira, Cymbella, Gomphonema, Surirella, Synedra*).
Nitzschia sakaensis XXIV: 16.

Locality No. 50 (20.III.1961).

The Morago river, the White Volta river system, on the plain north of the escarpment 4–5 km. north of the town Nakpanduri. No running water, but many smallish pools with turbid water, which was highly polluted by stray cattle.

Sample No. 268: coatings on vegetation in highly polluted pool. 49 species from 19 genera (*Navicula, Surirella, Gomphonema, Nitzschia, Cymbella,Eunotia*).
Navicula halophila fo. *subcapitata* VIII: 8, *Cymbella moragoensis* XX: 9.

The Red Volta, east of Navrongo. Dr. G.W. Lawson among boulders in the dried-up river bed. – Loc. No. 48. (20.III.1961).

Locality No. 51 (21.III.1961).

Small stream in meadowy area 6–7 km. west of Nakpanduri, used for the watering of cattle, but the water not very much polluted, running.

Sample No. 271: brown coatings on small flowering *Utricularia* species. 14 species from 8 genera (*Navicula, Eunotia, Melosira*). *Surirella delicatissima* var. *africana* is common.

Locality No. 52 (21.III.1961).

Much polluted small stream immediately west of the village Sakogu, 12 km. southwest of Nakpanduri.

Sample No. 273: crusts of *Cyanophyceae* from the stream. 21 species from 12 genera (*Navicula, Eunotia, Melosira, Pinnularia*).

Locality No. 53 (21.III.1961).

Small stream south of the village Nagbog, 22–23 km. southwest of Nakpanduri. No running water. Small pool with dirty, turbid water.

Sample No. 279: scrapings from the ground at the edge of the pool. 49 species from 16 genera (*Navicula, Pinnularia, Nitzschia, Eunotia*).

Navicula nagbogensis XV: 1, *Nitzschia nagbogensis* XXII: 6, *Surirella nagbogensis* XXV: 7, *Eunotia rhomboidea* I: 17, *Pinnularia rivularis* (?) XIX: 4.

Locality No. 54 (22.III.1961).

The Kulaw river, tributary to the Oti river, between the villages Wapuli and Benja, 30–35 km. northeast of the town Yendi. No running water in the dry season, but very large, narrow pools (the largest are several hundred metres in length). The water very turbid.

Sample No. 282: coatings on stones and dead branch in pool. 51 species from 20 genera (*Navicula, Pinnularia, Eunotia, Nitzschia, Surirella*).
Eunotia asterionelloides III: 13.

Locality No. 55 (23.III.1961).

Waterwork pond, 4–5 km. west of the village Bimbila. 2–3 m. deep. Turbid water.

(Sample No. 284: scrapings from clayey expanse at the edge of the pool.
Navicula platycephala IX: 16).

Sample No. 285: scrapings from clayey expanse at the edge of the pool, near the place where No. 284 was taken. 23 species from 12 genera (*Navicula, Gomphonema, Stauroneis, Surirella*).
Stauroneis obtusa VII: 13.

Locality No. 56 (23.III.1961).

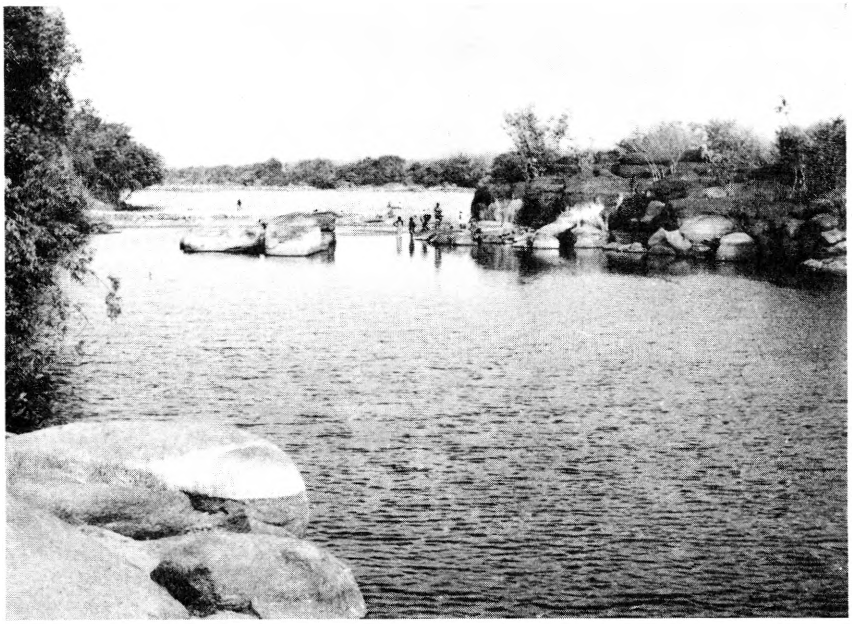
Pond immediately south of the village Wulasi, 22–23 km. south of Bimbila. The water highly polluted, used for washing, bathing, and irrigation.

Sample No. 287: green algae from soil at the edge of the pond. 37 species from 9 genera (*Eunotia, Navicula, Gomphonema, Pinnularia, Nitzschia*).
Gomphonema wulasiense XXI: 7, *Eunotia garussica* III: 4, *E. diodon* III: 6, *E. hugenottarum* III: 11.

Locality No. 57 (23.III.1961).

Small tributary to the Volta river between the village Chindiri and the town Kete Krachi, about 20 km. north of the latter. Dried-up in the dry season, apart from some smallish pools with highly polluted water.

Sample No. 291: cakes of algae in turbid water. 23 species from 8 genera (*Navicula, Nitzschia, Cymbella*). Common: *Nitzschia mamataensis*. Fairly common: *Cymbella mülleri*.
Nitzschia mamataensis XXII: 10.



The Volta river at Kete Krachi. Ferry at main road. – Loc. No. 58 c. (23.III.1961).

Locality No. 58 (23.III.1961).

The Volta river at the town Kete Krachi. In this place a deep stream abounding in water and with a rapid current. Almost clear water.

a. Lagoon with deep water at the edge of the river.

Sample No. 292: green algae on the rocky side of the lagoon. 42 species from 16 genera (*Navicula, Nitzschia, Achnanthes*). With *Licmophora remulus*.

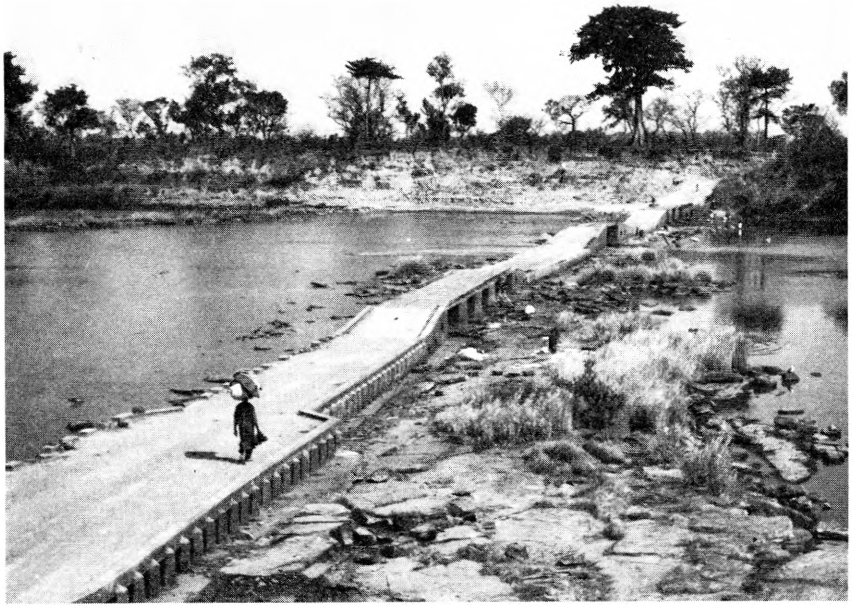
Sample No. 293: vegetation with coatings. 71 species from 21 genera (*Navicula, Nitzschia, Cymbella, Surirella, Gomphonema*). *Gomphonema wulasiense* var. *voltaensis* XXI: 8, *Nitzschia voltaensis* XXII: 11, *N. krachiensis* XXIV: 1, *Navicula nyassensis* IX: 15.

b. Main course of the river, the east bank.

Sample No. 294: crusts of *Cyanophyceae* on rock surface in fast running water. 62 species from 21 genera (*Navicula, Cymbella, Gomphonema, Nitzschia*). Fairly common: *Navicula kwamkuji, Gomphonema africanum*. Also with *Navicula perotetti* var. *enervis, Navicula ajenaensis* IX: 1, *Gomphonema suhmii* XXI: 1, *Navicula seminuloides* X: 12, *N. omegopsis* XIII: 1.

c. Main course of the river, the west bank.

Sample No. 295: green algae on rocky surface at the edge of the river. 53 species from 17 genera (*Navicula, Cymbella, Gomphonema, Nitzschia, Achnanthes*).



The Oti river, tributary to the Volta river, at the village Otisu, south of Kete Krachi. – Loc. No. 59. (24.III.1961).

Navicula meyeri XIV: 12, *Nitzschia sansomei* XXIII: 4, *Navicula standeri* VIII: 12, *Gomphonema suhmii* XXI: 2, *G. lingulatum* XXI: 3.

Sample No. 296: *Ceratophyllum* sp. with coatings from shallow water at the edge of the river. 64 species from 19 genera (*Navicula, Nitzschia, Gomphonema, Cymbella*).
Navicula voltaensis VIII: 16, *Nitzschia schiellerupii* XXII: 9, *Cyclotella stelligera* I: 3, *C. kützingiana* fo. *minor* I: 7, *Eunotia tarkwaensis* II: 6.

Locality No. 59 (24.III.1961).

The Oti river, tributary to the Volta, at the village Otisu, about 20 km. southeast of Keti Krachi. River fairly abounding in clear water.

Sample No. 297: scrapings from rock surface at the edge of the river. The water nearly stagnant there. 29 species from 16 genera (*Navicula, Gomphonema, Cymbella, Melosira, Synedra*). Fairly common: *Cymbella theronii.*

Sample No. 298: scrapings from rock surface in slowly flowing water in the river bed. 41 species from 14 genera (*Navicula, Nitzschia, Cymbella, Gomphonema, Melosira, Pinnularia*).
Pinnularia otiensis XVIII: 4.

Locality No. 60 (24.III.1961).

The Asukawkaw river, major tributary to the Volta, at the village Akroso, 50–55 km. southeast of Kete Krachi. Fast running water, clear.

Sample No. 299: Scrapings from stones in rapid current in the river bed. 54 species from 18 genera (*Navicula, Nitzschia, Amphora, Achnanthes, Cymbella*). *Gomphocymbella ruttneri* very common here.
Stauroneis akrosoensis VII: 2, *Navicula grundtvigii* XIII: 6, *Caloneis incognita* V: 3, *Navicula modica* IX: 7, *N. subminuscula* X: 21, *Gomphocymbella ruttneri* XX: 7.

Sample No. 300: scrapings from stones in less rapid current in the river bed near the place where No. 299 was taken. 58 species from 18 genera (*Navicula, Achnanthes, Nitzschia, Gomphonema, Pinnularia, Caloneis*). With *Scoliopleura tumida* and *Tropidoneis* sp.

Locality No. 61 (1.III.1961).

The Volta river near and at the Volta River Project dam. River highly abounding in fast running, clear water.

a. The Volta river, 4–5 km. north of the project dam.

Sample No. 92: coatings of algae on sandy loam at the edge of the river. 40 species from 16 genera (*Navicula, Nitzschia, Gomphonema, Cymbella*). Common: *Navicula cryptocephala*.
Caloneis voltaensis V: 4, *Neidium alpinum* VI: 13, *Nitzschia obsidialis* XXIII: 9.

b. Small stream with very little running water on slope near the place where No. 92 was taken.

Sample No. 93: scrapings from the bottom of the stream. 31 species from 13 genera (*Nitzschia, Navicula, Pinnularia, Caloneis*).

c. The Volta river at the project dam.

Sample No. 94: scrapings from stones in fast running water in the river. 45 species from 18 genera (*Navicula, Gomphonema, Nitzschia, Cymbella*).

Sample No. 95: scrapings from rock surface at the edge of the river near the place where No. 94 was taken. 37 species from 14 genera (*Navicula, Cyclotella, Gomphonema, Achnanthes, Cymbella*).
Navicula sansomei IX: 12, *N. syrachii* XI: 24, *N. ajenaensis* IX: 2, *Cyclotella stelligeroides* I: 1, *Synedra rumpens* var. *fragilarioides* I: 12.

Locality No. 62 (1.III.1961).

The University farm at Kpong west of the Volta river.

a. Small stream with almost stagnant water.

Sample No. 101: scrapings from bottom and vegetation. 53 species from 17 genera (*Navicula, Nitzschia, Pinnularia, Gomphonema*). With *Bacillaria paradoxa* and *Gyrosigma wandsbeckii*.
Navicula kpongensis XII: 14, *N. fauta* (?) XV: 10.

b. Large, artificial watering basin, the water of which is used for irrigation and the watering of cattle of the University farm.

Sample No. 102: crusts of algae on the cement sides of the basin at the pumping place. 60 species from 19 genera (*Navicula, Nitzschia, Pinnularia, Caloneis, Achnanthes, Surirella*).
Navicula adampeensis XIII: 4.

c. Trench in *Phragmites* swamp. Dried-up in the dry season.

Sample No. 106: scrapings from soil at the bottom of the trench. 50 species from 15 genera (*Navicula, Nitzschia, Pinnularia, Neidium, Gomphonema*).
Navicula dodowaensis XV: 7, *Surirella dodowaensis* XXV: 6.

E. Semideciduous Forest (East)

Locality No. 63 (24.III.1961).

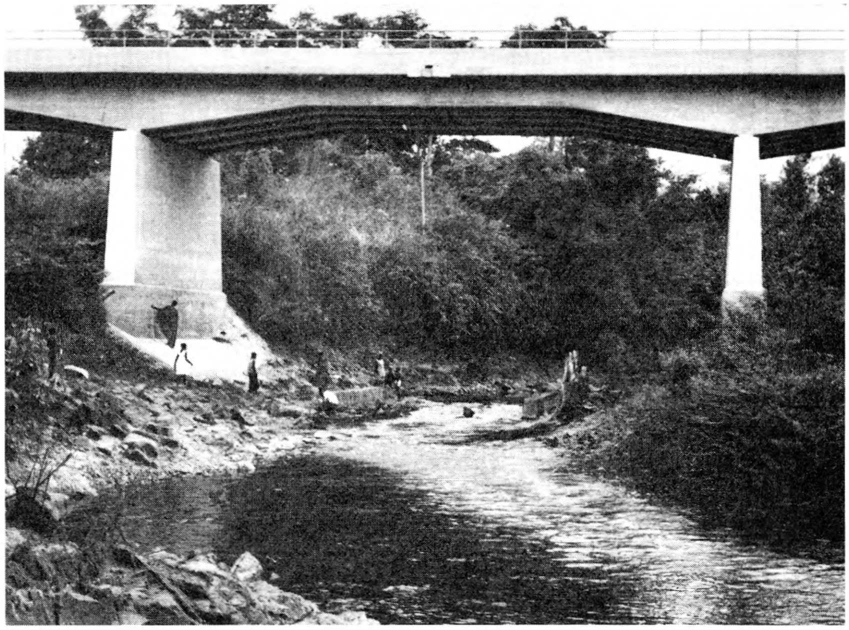
Small river (tributary to the Dayi river, the Volta river system) at the village Hohoe. Clear, running water.

Sample No. 301: scrapings from old, rotten tree trunk and stones in fast running water in the river bed. 34 species from 14 genera (*Navicula, Gomphonema, Achnanthes*).
Navicula pseudagrestis X: 23.

Locality No. 64 (24.III.1961).

a. Stream from the waterfall between Duga and Wuinta. The bottom of the river with very coarse gravel or pebbles and running, clear water.

Sample No. 305: scrapings from stones in running water. 46 species from 16 genera (*Navicula, Pinnularia, Achnanthes, Surirella*). Common: *Gomphonema brasiliense*.
Navicula dugaensis X: 25, *N. feuerborni* fo. *africana* XVI: 3, *Pinnularia molaris* XVI: 9, *Gomphonema brasiliense* XXI: 5.



The Dayi river, tributary to the Volta river, south of Kpandu, in Semideciduous Forest. – Loc. No. 65. (25.II.1961).

b. Small mountain river at the road between the villages Wuinta and Amedzofe, with clear, running water.

Sample No. 306: green algae in the river. 43 species from 16 genera (*Eunotia, Navicula, Pinnularia, Surirella, Gomphonema*).
Eunotia monodon var. *bidens* II: 1, *Achnanthes kraeuselii* IV: 5.

Sample No. 307: Moss from stones in the river bank near the place where No. 306 was taken. 38 species from 16 genera (*Pinnularia, Gomphonema, Eunotia, Navicula, Surirella*).
Stauroneis kriegeri VII: 15.

Locality No. 65 (25.III.1961).

The Dayi river, tributary to the Volta, about 18–19 km. south of the town Kpandu. Fairly large river bed with little running, clear water.

Sample No. 308: Green algae. 60 species from 20 genera (*Navicula, Nitzschia, Achnantes, Gomphonema, Stauroneis, Surirella, Synedra*).
Navicula densa XIII: 3.

Sample No. 309: like No. 308 near the place of this sample. 76 species from 19 genera (*Navicula, Nitzschia, Pinnularia, Surirella, Stauroneis, Achnanthes*).
Neidium dayiensis VI: 7, *Navicula exiguiformis* (?) XIV: 5.

Locality No. 66 (16.II.1961).

Waterwork pond at the Tafo Cocoa Research Station.

Sample No. 4: scrapings from clay at the edge of the pond. 32 species from 14 genera (*Navicula, Pinnularia, Gomphonema, Nitzschia*).
Pinnularia mesolepta (?) XVI: 12.

Sample No. 6: like No. 4, taken near this sample. 56 species from 18 genera (*Navicula, Pinnularia, Gomphonema, Nitzschia*).
Pinnularia tafoensis XVIII: 11.

Sample No. 7: like No. 4, taken near this sample. 50 species from 14 genera (*Pinnularia, Nitzschia, Achnanthes, Gomphonema*).
Fragilaria pinnatoides I: 9.

Locality No. 67 (28.II.1961).

a. The Dobora river between the town Nsawam and the village Asuboi, about 35 km. north northwest of Accra. No running water in the dry season, but pools with *Nymphaea* in the river bed.

Sample No. 78: green algae from pool. 47 species from 14 genera (*Navicula, Nitzschia, Gomphonema*). With *Pleurosigma subsalsum, Bacillaria paradoxa,* and *Thalassiosira fluviatilis.*
Navicula vanidica X: 20, *Gomphonema farakulumense* forma XXI: 11.

b. Minor river through the town Nsawam with some, slowly flowing water.

Sample No. 81: coatings on algae at the river bank. 48 species from 19 genera (*Navicula, Nitzschia, Achnanthes, Amphora, Pinnularia*). With *Biddulphia levis, Bacillaria paradoxa, Thalassiosira fluviatilis, Gyrosigma distortum* var. *parkeri*.
Navicula nsutaensis XI: 21, *Amphora ovalis* forma (?) XX: 2.

TAXONOMIC SECTION

At the following listing of the diatom forms observed the systematic classification and arrangement in Hustedt 1930–63, I–III, and Hustedt 1930 has, as far as possible, been used.

For each form found in the material its occurrence is indicated with use of the numbers of localities indicated in Localities and Samples (p. 10–46), which may all be found on the map pag. 9.

No chemical analyses or determination of pH from the localities examined are available. Ecological data are restricted to information as to what species are especially halophilous, mesohalobous, or polyhalobous. In the case of most species information about geographical distribution is restricted to information about demonstration of the species in question in other regions in tropical Africa, mainly as established by Hustedt 1949 a (Congo) and Mölder 1962 (Sierra Leone).

English diagnoses of new species and varieties are communicated together with information about drawings and occurrence of the forms in question as placed among the other species in the systematic succession. The specimens used for drawing and description of new species, varieties and forms are all to be found in the Foged Collection, Odense. The no. of the slide is given at each diagnosis. The Latin diagnoses are all gathered in New species (pag. 128–152) with observance of the systematic succession. Index to Species (pag. 153–161) is an alphabetical list of all the forms mentioned with reference to page in the Taxonomic Section (pag. 47–127) and in Latin diagnoses (pag. 128–152). Synonyms indicated have in the Index to Species been marked by ″ and novae species by *.

As in my previous works a large number of drawings have been used, which have all been made from specimens of diatoms in the Ghanese material examined. They are found in Plates (p. 171–220). The purpose is partly to offer a certain documentation with the restriction that will always be due to the imperfection of drawing and the inevitably subjective character, in spite of careful application of a drawing apparatus (OPL), partly to give other workers, who may have another view especially of the large number of "critical" species a possibility of appraising these.

A. Centrales

Melosira Agardh.

Melosira ambigua (Grun.) O. Müller. Hustedt 1930–62, I, p. 256, fig. 108.
Loc. Nos. 1, 3, 15.
Very common in lakes in East Africa (Hustedt 1949 a, p. 53).
— *distans* (Ehr.) Kütz. Ibid. p. 262, figs. 110 a–f.
Loc. Nos. 1, 26, 27, 31, 32, 39, 40, 49, 58.
Not rare in Sierra Leone (Mölder 1962, p. 28).
— — var. *alpigena* Grun. Ibid. p. 263, fig. 110 g.
Loc. Nos. 54, 59, 62.
— — var. *africana* O. Müller. Ibid. p. 263, fig. 110 h.
(Syn.: *M. pfaffiana* Reinsch).
Loc. No. 58.
Found, but rarely, in tropical Central Africa (O. Müller 1904, p. 293. Hustedt 1949, p. 54). Rather common in Sierra Leone (Mölder 1962, p. 28).
— *granulata* (Ehr.) Ralfs. Ibid. p. 248, fig. 104.
Loc. Nos. 1–4, 6–23, 26, 28–31, 33–56, 58–66.
Very frequent in East African lakes (Hustedt 1949 a, p. 53). Also found in Sierra Leone (Mölder 1962, p. 28), where the valves of the species are more robust and larger than usual. The point structure on the valves in the Ghanese material is often somewhat deviating from the structure on valves from Europe and elsewhere.
— — var. *angustissima* Müller. Ibid. p. 250, fig. 104 d.
Loc. Nos. 1–3, 6, 8–19, 21, 22, 24, 26–28, 31, 33, 36–41, 43–50, 66, 67.
Very common in lakes in East Africa (Hustedt 1949 a, p. 53) and in Sierra Leone (Mölder 1962, p. 28).
— *herzogi* Lemmermann. Hustedt 1952 a, p. 367, figs. 6, 7.
Loc. Nos. 37, 39.
First found by Lemmermann 1910 in plankton from South America (Paraguay). According to Hustedt 1952 a, p. 367, the species is widely distributed in tropical and subtropical South America, "und gehört zu den charakteristischen Endemismen jener Gewässer, die auch in manchen Seen der Amazonas-Gebietes sehr häufig ist." According to Cleve-Euler 1951, p. 29, this characteristic species has also been found (very rarely) in the lake Mälaren in Sweden, June 1910. Hustedt 1952 a, p. 367, rejects this finding in Sweden on the ground that the species probably occurs only in South America.
The finds from Ghana, where the species is common in two samples (No. 240, 17.III.1961, Loc. No. 39, from the Nasia river in North Ghana, and No. 282, 22.III.1961, Loc. No. 54, from the Kulaw river in Mid West Ghana) would seem to indicate that the species has a much wider distribution than originally supposed. There can be no doubt that the species is autochtonous in Ghana. Scattered finds in Europe, which may be due to transportation by migratory birds, therefore can no more be precluded, especially considering that the valves are very hyaline and consequently easily overlooked, even if they should escape destruction at the preparation of slides.
Plate I, fig. 6: cell 16.7×6.5 μ. Fine dots in about 40 longitudinal striae in 10 μ (not indicated on the drawing). (Sample No. 240, Loc. No. 39).
— *ikapöensis* O. Müller var. *minor* Cholnoky. Cholnoky 1959, p. 33.
Loc. No. 39.
Plate I, fig. 5: height of cell 2.4–2.6 μ, breadth 6.0 μ.
Sample No. 240, Loc. No. 39.

This very small form of *Melosira* is very rare in the material, but it seems to be in agreement with the South African variety (CHOLNOKY 1959, p. 33).

Melosira islandica O. Müller. HUSTEDT 1930–62, I, p. 252, fig. 106 a.
Loc. No. 26.
Not rare in Sierra Leone (MÖLDER 1962, p. 28).

— — subspec. *helvetica* O. Müller. Ibid. p. 254, fig. 107.
Loc. Nos. 1, 4, 8, 9, 10, 15, 17, 18, 22, 31, 32, 35, 38, 39, 41–44, 46, 48, 49, 65.
Not rare in Sierra Leone (MÖLDER 1962, p. 28).

— *nummuloides* (Dillw.) Ag. Ibid. p. 221, fig. 95.
Loc. No. 11.
Mesohalobous.

— *roeseana* Rabenh. Ibid. p. 266, fig. 112.
Loc. Nos. 4, 5, 8, 13, 15, 17, 19, 22, 27, 28, 30, 32, 65–67.
According to HUSTEDT 1949 a, p. 54, this species is rare in tropical East Africa, and this also applies to Sierra Leone (MÖLDER 1962, p. 29). Its frequent occurrence in Ghana suggests a wider distribution in Africa.

Cyclotella Kütz.

Cyclotella comta (Ehr.) Kütz. HUSTEDT 1930–62, I, p. 354, fig. 183.
Loc. Nos. 2, 11, 32, 62.
Not common in the Tropics (HUSTEDT 1949 a, p. 56).

— *kützingiana* Thwaites. Ibid. p. 338, fig. 171.
Loc. Nos. 1, 2, 6, 11, 12, 19, 24, 31, 49, 58–61, 64–66.

— — fo. *minor* Hust. HUSTEDT 1946–50, p. 446, fig. 9.
Loc. No. 58.
Plate I, fig. 7: Valve diam.: 4.7 μ. (Sample No. 296, Loc. No. 58).
Shape and structure approximately as in *C. woltereck*i Hust. (HUSTEDT 1942, p. 16, figs. 11–13), but I:7 lacks the marginal spines characteristic of *C. woltereck*i.

— — var. *planetophora* Fricke. HUSTEDT 1930–62, I, p. 339, fig. 171 c.
Loc. No. 11.
Found, but rarely, in Sierra Leone (MÖLDER 1962, p. 29).

— — var. *radiosa* Fricke. Ibid. p. 338, fig. 171 b.
Loc. No. 14.

— *meneghiniana* Kütz. Ibid. p. 341, fig. 174.
Loc. Nos. 1–6, 14–32, 34, 35, 38, 41, 48, 49, 58–62, 64–67.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 56), and in Sierra Leone (MÖLDER 1962, p. 29).
Plate I, fig. 4: Valve diam.: 8.2 μ. About 10 striae in 10 μ.
A small specimen. (Sample No. 112, Loc. No. 4).
Plate I, fig. 8: Valve diam.: 17 μ. 12–13 striae in 10 μ.
Halophilous.
Radial punctuation of the central field, approximately as in KRASSKE 1939, p. 553.

— *ocellata* Pant. Ibid. p. 340, fig. 173.
Loc. Nos. 2–4, 8–13, 16, 17, 19, 20, 26, 28, 31, 34, 38, 49, 52, 53, 58, 61, 64.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 56), and also rare in Sierra Leone (MÖLDER 1962, p. 29).

— *pseudostelligera* Hust. HUSTEDT 1939, p. 581, figs. 1, 2. 1946–50, p. 445, fig. 8.
Loc. Nos. 2, 6, 33, 36, 58, 62, 66.
Plate I, fig. 2: Valve diam.: 6.7 μ. (Sample No. 232, Loc. No. 36).

Cyclotella stelligera Cleve & Grun. Hustedt 1930–62, I, p. 339, fig. 172.
Loc. Nos. 1, 2, 14, 33, 36, 37, 40, 49, 58, 61, 62.
According to Hustedt 1949 a, p. 55, widely distributed in the tropics, where this species should be much more frequent than the other *C.* species.
Plate I, fig. 3: Valve diam.: 9.4 μ. About 18 striae in 10 μ, and about 10 marginal spines in 10 μ. (Sample No. 296, Loc. No. 58).
Almost identical with Guermeur 1954, I: 5.

— *stelligeroides* Hust. Hustedt 1945, p. 899, 42: 68, 69.
Loc. No. 61.
Closely related to *C. stelligera* var. *tenuis* Hust. (Hustedt 1937–39, p. 143, 9: 5).
Plate I, fig. 1: Valve diam.: 4.7 μ. (Sample No. 95, Loc. No. 61).
Some shorter striae are inserted, but there are no marginal spines as in *C. stelligera.*

Stephanodiscus Ehr.

Stephanodiscus astraea (Ehr.) Grun. Hustedt 1930–62, I, p. 368, figs. 193 a–c.
Loc. Nos. 1, 2, 6, 8, 9, 11–13, 16, 18, 19, 22, 23, 26, 28, 31–33, 36–38, 41, 44, 46, 49, 52, 53, 58, 59, 64–67.
Very common in East African lakes, less common in the Congo area (Hustedt 1949 a, p. 57). Also occurring in Sierra Leone (Mölder 1962, p. 29).

— — var. *minutula* (Kütz.) Grun. Ibid. p. 369, figs. 193 d, e.
Loc. Nos. 1, 4, 7, 8, 10–20, 22, 24, 26–28, 32, 34, 38, 39, 41, 43, 45, 47–50, 53–55, 58, 59, 61, 62, 65.
Rare in Sierra Leone (Mölder 1962, p. 29).

— *hantzschii* Grun. Ibid. p. 370, fig. 194.
Loc. Nos. 1, 2, 34, 49.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 58).

Thalassiosira Cleve.

Thalassiosira fluviatilis Hust. Hustedt 1930–62, I, p. 329, fig. 165.
Loc. Nos. 2, 4, 21, 22, 24, 25, 28, 31, 67.
Halophilous-mesohalobous.

Coscinodiscus Ehr.

Coscinodiscus sp.
Loc. Nos. 6, 11–13, 15, 17, 18, 26, 28, 35, 39, 41, 54, 58, 66.
Polyhalobous.
The species *C. rudolfi* Bachmann and *C. rothii* var. *subsalsa* (Juhl-Dannf.) Hust. have been found, but are rare in the East African lakes (Hustedt 1949 a, p. 58). In Sierra Leone *C. lacustris* Grun. has been found (Mölder 1962, p. 29).

Rhizosolenia Ehr.

Rhizosolenia eriensis H. L. Smith. Hustedt 1930–62, I, p. 595, fig. 341.
Loc. No. 46.

Biddulphia S. F. Gray.

Biddulphia levis Ehr. Hustedt 1930–62, I, p. 852, figs. 506, 507.
Loc. Nos. 4, 6, 14, 19, 21, 31, 32, 67.
Polyhalobous.

The species, which may be fairly common in slightly haline localities near the coast, is rather common in Natal, South Africa (CHOLNOKY 1960, p. 27).

Biddulphia sp.
Loc. Nos. 6, 17.
Polyhalobous.

Terpsinoë Ehr.

Terpsinoë musica Ehr. HUSTEDT 1930–62, I, p. 898, fig. 540.
Loc. Nos. 6, 8, 19, 22.
Polyhalobous.

B. Pennales

I. Araphideae

Tabellaria Ehr.

Tabellaria fenestrata (Lyngbye) Kütz. HUSTEDT 1930–62, II, p. 26, fig. 554.
Loc. No. 54.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 59).

— *flocculosa* (Roth) Kütz. Ibid. p. 28, fig. 538.
Loc. Nos. 1, 11, 13, 26, 32, 34, 38, 39, 45, 49, 52, 58, 61, 62.
Little distributed in the tropics and according to HUSTEDT (1949 a, p. 59) still rarer than *T. fenestrata*. Rare in Sierra Leone. The cells of the species found there are extraordinarily large (MÖLDER 1962, p. 29).

Licmophora Agardh.

Licmophora remulus Grun. HUSTEDT 1930–62, II, p. 57, fig. 580.
Loc. Nos. 32, 58.
Polyhalobous.

Meridion Agardh.

Meridion circulare (Grev.) Agardh. HUSTEDT 1930–62, I, p. 93, figs. 627 a–f.
Loc. Nos. 26, 27, 28, 46.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 60).

Diatoma De Candolle.

The elsewhere widely distributed species *D. vulgare* Bory, *D. elongatum* (Lyngbye) Ag., and *D. hiemale* (Lyngbye) Hérib. have been found, but are of rare occurrence in the Congo area (HUSTEDT 1949 a, p. 60). So far no *D.* species have been found in Ghana, nor in Sierra Leone (MÖLDER 1962).

Opephora P. Petit.

Opephora martyi Hérib. var. *capitata* (Hérib.) Hust. HUSTEDT 1946–50, 46: 33.
Loc. Nos. 6, 8.

Fragilaria Lyngbye.

Fragilaria bidens Heiberg. HUSTEDT 1930–62, II, p. 147, fig. 661.
Loc. No. 58.
Very rare in Sierra Leone (MÖLDER 1962, p. 30).

Fragilaria capucina Desmaz. Ibid. p. 144, figs. 659 a–e.
Loc. Nos. 11, 17, 26, 32, 37, 41, 42, 44, 45, 46, 54, 58, 59, 64, 66.
Rare in Sierra Leone (MÖLDER 1962, p. 30).

— — var. *lanceolata* Grun. Ibid. p. 144, figs. 659 f, g.
Loc. No. 45.

— *construens* (Ehr.) Grun. Ibid. p. 156, fig. 669.
Loc. Nos. 11, 21, 22, 26, 38.
Widely distributed in the Tropics, but hitherto found rarely in the Tropics in Africa (HUSTEDT 1949 a, p. 61. MÖLDER 1962, p. 30).

— *inflata* (Heid.) Hust. Ibid. p. 155, figs. 669 a, d, f–i.
Loc. No. 1.

— *intermedia* Grun. Ibid. p. 152, fig. 666.
Loc. Nos. 14, 17, 26.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 62), but very common in Sierra Leone (MÖLDER 1962, p. 30).

— *lapponica* Grun. Ibid. p. 170, fig. 678.
Loc. No. 26.

— *leptostauron* (Ehr.) Hust. var. *dubia* Grun. forma.
Loc. No. 26.
Rare in Sierra Leone (MÖLDER 1962, p. 30).
Plate I, fig. 10: 29.3×7.3 μ. 12 striae in 10 μ. (Sample No. 194, Loc. No. 26).

— *pinnata* Ehr. HUSTEDT 1930–62, II, p. 160, figs. 671 a–i.
Loc. Nos. 18, 58, 61.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 61).

— *pinnatoides* Cholnoky. CHOLNOKY 1960 a, p. 43, fig. 136.
Loc. No. 66.
Plate I, fig. 9: 18.9×3.4 μ. 12 striae in 10 μ. (Sample No. 7, Loc. No. 66).
Previously found only in South Africa (CHOLNOKY 1960 a, p. 43).

— *vaucheriae* Boye Petersen. BOYE PETERSEN 1938, p. 167, fig. 1.
Loc. No. 2.

— *virescens* Ralfs. HUSTEDT 1930–62, II, p. 162, fig. 672 A, a, b.
Loc. No. 64.

— — var. *capitata* Østrup. Ibid. p. 163, fig. 672 A, d.
Loc. No. 64.
MÖLDER (1962, p. 30) has found the varieties *elliptica* Hust., *mesolepta* Schönf. and *subsalina* Grun. in Sierra Leone, but they are all very rare there.

Ceratoneis Ehr.

Ceratoneis arcus (Ehr.) Kütz. HUSTEDT 1930–62, II, p. 179, figs. 684 a, b.
Loc. Nos. 13, 26.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 63). Fairly rare in Sierra Leone (MÖLDER 1962, p. 29).

Synedra Ehr.

Synedra acus Kütz. HUSTEDT 1930–62, II, p. 201, fig. 693 a.
Loc. No. 3.
Fairly rare in Sierra Leone (MÖLDER 1962, p. 30).

— *montana* Krasske. Ibid. p. 204, fig. 694.
Loc. Nos. 46, 47, 55.
Plate I, fig. 11: 60×2.7 μ. 15–16 striae in 10 μ. (Sample No. 256, Loc. No. 46).

According to Hustedt 1930–62, p. 204, the species has only been found in the Alps. The best characteristic of the species is the expanded central part of the valve, which has a slight constriction at the poles of the transapical axis.

Synedra pulchella (Ralfs) Kütz. Ibid. p. 191, fig. 688 a.
Loc. Nos. 1, 3.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 63), and also rare in Sierra Leone (Mölder 1962, p. 30).
Mesohalobous.

— *rumpens* Kütz. Ibid. p. 207, figs. 697 a, b.
Loc. No. 59.
Not rare in Sierra Leone (Mölder 1962, p. 30).

— — var. *fragilarioides* Grun. Ibid. p. 208, fig. 697 c.
Loc. Nos. 1, 2, 8, 11, 14, 17–19, 27, 30, 33–35, 37, 39, 46, 49, 50, 58, 61–63, 65, 66.
Plate I, fig. 12: $56.6 \times 3.4\ \mu$. 15 striae in $10\ \mu$. (Sample No. 95, Loc. No. 27).
Plate I, fig. 13: $31.3 \times 4.0\ \mu$. 12 striae in $10\ \mu$. (Sample No. 218, Loc. No. 33).
This variety shows a considerable similarity to *S. goulardi* Bréb., which i.a. has been found in tropical West Africa (Guermeur 1954, p. 27). The specimens found in Ghana are all considerably smaller than the dimensions stated for *S. goulardi* and therefore have with some doubt been referred to *S. rumpens* var. *fragilarioides*. According to Hustedt (1949 a, p. 65) this variety is especially common in the tropics. However, it is rare both in the East African lakes (Hustedt 1949 a, p. 65) and in Sierra Leone (Mölder 1962, p. 30).

— *tabulata* (Ag.) Ehr. Ibid. p. 218, figs. 710 a–d.
Loc. Nos. 1, 32, 39.
Rare in Sierra Leone (Mölder 1962, p. 30).
Mesohalobous.

— var. *fasciculata* (Kütz.) Grun. Ibid. p. 218, figs. 710 i–e.
Loc. No. 39.
Mesohalobous.

— *ulna* (Nitzsch) Ehr. Ibid. p. 195, figs. 691 A, a–c.
Loc. Nos. 1–9, 11–28, 31–37, 39–42, 44, 46–50, 54, 57–67.
Not common in lakes in East Africa (Hustedt 1949 a, p. 64), but very common in Sierra Leone (Mölder 1962, p. 31).

— — var. *aequalis* (Kütz.) Hust. Ibid. p. 199, figs. 691 A, d.
Loc. Nos. 3, 6–9, 11–15, 17–19, 22–24, 28, 30–32, 46, 49, 58, 62–65, 67.
Rare in Sierra Leone (Mölder 1962, p. 31).

— — var. *biceps* (Kütz.) von Schönfeldt. Ibid. p. 200, fig. 691 A, g.
Loc. No. 11.
Rare in lakes in East Africa (Hustedt 1949 a, p. 64), and very rare in Sierra Leone (Mölder, p. 31).

— — var. *danica* (Kütz.) Grun. Ibid. p. 200, fig. 691 A, f.
Loc. Nos. 8, 11, 13, 14, 18, 19, 21, 23, 28, 30, 32, 34–37, 39–42, 44, 46, 47, 49, 54, 58, 59, 62, 66, 67.
Rare in lakes in East Africa (Hustedt 1949 a, p. 64).

— — var. *oxyrhynchus* (Kütz.) Van Heurck. Ibid. p. 198, fig. 691 B, q.
Loc. Nos. 11, 14, 19, 31, 32, 49, 58–61, 63, 65, 66.
Rare in Sierra Leone (Mölder 1962, p. 31).

— — var. *spatulifera* Grun. forma.
Loc. No. 53.

Asterionella Hass.

No species of this genus has been shown to occur in Ghana. *A. formosa* Hass. has been found, but very rarely, in the Congo area (HUSTEDT 1949 a, p. 65) as well as in Sierra Leone (MÖLDER 1962, p. 31).

Eunotia Ehr.

Eunotia alpina (Naeg.) Hust. HUSTEDT 1930–62, II, p. 304, fig. 770.
Loc. Nos. 12, 38.
Rare in Sierra Leone (MÖLDER 1962, p. 31).

— *arcus* Ehr. Ibid. p. 282, figs. 748 a–c.
Loc. Nos. 2, 6, 11, 12, 58.
Rare in Sierra Leone (MÖLDER 1962, p. 31).

— *asterionelloides* Hust. HUSTEDT 1952 a, p. 138, figs. 18, 19.
Loc. No. 54.
Plate III, fig. 13: 26.0×2.3 μ. 15 striae in 10 μ. (Sample No. 282, Loc. No. 54).
First found by HUSTEDT (1952 a, p. 158) in fresh water in the Amazonas region in South America. It forms colonies like *Asterionella* and *Diatoma*. The *Asterionella africana* described by CHOLNOKY (1958 a, p. 103, figs. 2–5) resembles the present species very much.

— *asymmetrica* Cholnoky. CHOLNOKY 1954 d, p. 209, fig. 21.
Loc. No. 11.
Plate I, fig. 14: 26.1×5.6 μ. 8 striae in 10 μ. (Sample No. 133, Loc. No. 11).
A similar asymmetrical *E.* form is *E. tenella* (Grun.) Hust. var. *capensis* Cholnoky (CHOLNOKY 1959, p. 25) from South Africa, which is identical with the widely distributed (cosmopolitan?) *E. rhomboidea* Hust. (CHOLNOKY 1960 b, p. 249). Other species of *E.* are often found with asymmetrically developed valves. Thus *E. faba* (Ehr.) Grun. in many places is found more frequently with asymmetrical than with isopolar valves.

— *bonsaensis* no. spec. Plate III, fig. 7.
Valves with a straight ventral margin and a convex dorsal margin; strongly decreasing in breadth from the middle towards the bluntly rounded ends, 32 μ long, 8–9 μ broad. Branches of raphes very short; they take a course very close to the ventral margin at the ends of the valves and reach little on to the surface of the valve. 12 transapical striae in 10 μ in the middle of the valve, a little denser towards the apices. Pseudoraphe found in the ventral margin and not visible from the surface of the valve.
Type locality: West Ghana. Fresh water (the Bonsa River, Loc. No. 14). Illustration slide: Ghana No. 151/1961.
Plate III, fig. 7: 32×8.2 μ. 12 striae in 10 μ. (Sample No. 151, Loc. No. 14).
Loc. Nos. 8, 14, 28, 58, 65.

— *didyma* Grun. var. *claviculata* Hust. A. SCHMIDT. Atlas 285: 16.
Loc. No. 32.
The species and its many varieties have previously mainly been found in tropical Asia (HUSTEDT 1937–39, p. 175) and tropical South America. None of the forms are common in Ghana, where they have only been found in two localities (Nos. 2 and 32), which are situated far apart.

— — fo. *genuina* Hust. Ibid. 285: 19–22.
Loc. No. 32.
Plate II, fig. 2: 67×12 μ. 9–10 striae in 10 μ. (Sample No. 217, Loc. No. 32).
Deviating from typical specimens by having a straight ventral margin in the middle of the valve. The usual is a concave ventral margin.

Eunotia didyma var. *tuberosa* Hust. Ibid. 285: 10.
Loc. Nos. 2, 32.
Plate II, fig. 3: 93×16 μ. 9 striae in 10 μ. (Sample No. 217, Loc. No. 32).
Known from East Africa (Zanon 1941, I: 11).

— *diodon* Ehr. Hustedt 1930–62, II, p. 276, fig. 742.
Loc. Nos. 15, 56.
Plate III, fig. 6: 34×5.8 μ. 12 striae in 10 μ. (Sample No. 287, Loc. No. 56).
Fairly rare in Sierra Leone (Mölder 1962, p. 31).

— *dissimilis* Hust. Hustedt 1937–39, p. 164, 11: 10, 11. A. Schmidt. Atlas 382: 101, 102.
Loc. Nos. 3, 54, 58.
Freshwater species resembling *E. praerupta* Ehr. So far shown to occur in Java (Hustedt 1937–39, p. 165).

— *epithemioides* Hust. A. Schmidt. Atlas 287: 16–19. Hustedt 1937–39, p. 174–75.
Loc. Nos. 8, 14, 16–20, 34, 60–63, 65, 67.
Plate II, fig. 8: 41.3×10.0 μ. 9–12 striae in 10 μ. (Sample No. 151, Loc. No. 14).
A few previous findings in Africa (first in lagoon in the Cameroons, later found in Lake Edward (Hustedt 1949 a, p. 70)). More common in Southeast Asia (Hustedt 1937–39, p. 174–75). It has especially been found in alkaline springs and waterfalls and ecologically resembles *E. tschirschiana* O. Müller.

— *faba* (Ehr.) Grun. Hustedt 1930–62, II, p. 301, fig. 767.
Loc. No. 8.
Very rare in the Congo territory (Hustedt 1949 a, p. 70), but very common in Sierra Leone (Mölder 1962, p. 31).

— *fallax* A. Cleve. Ibid. p. 288, fig. 753 a.
Loc. Nos. 12, 13.
Rather common in Sierra Leone (Mölder 1962, p. 31).

— *flexuosa* (Bréb) Kütz. Ibid. p. 312, fig. 778.
Loc. Nos. 3, 8, 15, 35, 38, 39, 41, 44, 55, 56.
Rather common in Sierra Leone (Mölder 1962, p. 31), but very rare in the Congo territory (Hustedt 1949 a, p. 71).
Plate III, fig. 2: 106.7×3.9 μ. (The diameter of capitae is about 6.0 μ). 15 striae in 10 μ. III: 2 perhaps is closely related to *E. mesiana* Cholnoky (Cholnoky 1955 b, p. 166, figs. 35, 36), where, however, it is said to be possible to see the dots in the striae distinctly by phase contrast.

— *garussica* Cholnoky. Cholnoky 1954 d, p. 210, fig. 29.
Loc. Nos. 25, 32, 41, 56.
Found in many localities in South Africa (Cholnoky), and is also rather common in Sierra Leone (Mölder 1962, p. 32).
Plate III, fig. 4: 40×8.7 μ. 12 striae in 10 μ. (Sample No. 287, Loc. No. 56).

— *gracilis* (Ehr.) Rabenh. Hustedt 1930–62, II, p. 308, fig. 775.
Loc. Nos. 18, 19, 23, 26, 27, 38, 41, 64.
Rather common in Sierra Leone (Mölder 1962, p. 30).
Plate III, fig. 1: 105×6 μ. 15 striae in 10 μ. (Sample No. 244, Loc. No. 41).

— *hugenottarum* Cholnoky. Cholnoky 1959, p. 22, figs. 130–135.
Loc. Nos. 44, 56.
Plate III, fig. 11: 16.0×3.4 μ. 15–16 striae in 10 μ. (Sample No. 287, Loc. No. 56).
First shown in South Africa (Cholnoky 1959, p. 22).

— *lawsonii* nov. spec. Plate III, fig. 12.
Valves with approximately straight ventral margin and very slightly convex dorsal margin, sides almost parallel, and valves not decreasing in breadth towards the apices, 20–23 μ

in length, 4 μ in breadth. Raphe branches very close to the ventral margin of the valve near the apices; they reach very little on to the surface of the valve. 12 transapical striae in 10 μ, only a little increasing in density towards the apices. Pseudoraphe not visible from the surface of the valve. The species is closely related to *E. tenella* (Grun.) Hust., but differs by having a greater distance between the striae. Loc. No. 19.

Plate III, fig. 12: 21.3×4.0 μ. 12 striae in 10 μ. (Sample No. 165, Loc. No. 19).

Illustration slide: Ghana No. 165/1961.

Type locality: West-Ghana. Fresh water (Mansi river, Loc. No. 19). Dedicated to the botanist, Dr. G. W. Lawson, University of Ghana.

Eunotia lunaris (Ehr.) Grun. Hustedt 1949 a, p. 70, 2: 11–15. 1930–62, II, p. 302, fig. 769.
Loc. Nos. 3, 8, 11, 12, 15, 16, 21, 23, 38, 39, 55, 67.
Not rare in the Congo territory (Hustedt 1949 a, p. 70), and common in Sierra Leone (Mölder 1962, p. 32).
Plate III, fig. 3: 90×3.7 μ. 12 striae in 10 μ. (Sample No. 241, Loc. No. 39).
The form pictured is characteristic by the recurrent fissures at the raphe ends.

— — var. *subarcuata* (Naeg.) Grun. Hustedt 1930–62, p. 304, figs. 769 f–h.
Loc. Nos. 2, 12, 15, 16, 23, 38, 39, 56.
Rather common in Sierra Leone (Mölder 1962, p. 32).

— *mansiensis* nov. spec. Plate II, fig. 4.
Valves with a slightly concave ventral margin and a convex dorsal margin. Breadth of the valve greatly decreasing from the middle towards the obtusely rounded apices; 45–50 μ long, 8–9 μ broad. Fairly long raphe branches, which from the ventral margin reach little on to the surface of the valve. 12 transapical striae in 10 μ, only a little denser towards the apices. Pseudoraphe close to the ventral margin and forming a very narrow zone.
Loc. No. 19.
Plate II, fig. 4: 48.3×8.7 μ. 12 striae in 10 μ. (Sample No. 166, Loc. No. 19).
Illustration slide: Ghana No. 166/1961.
Type locality: West-Ghana. Fresh water (Mansi river, Loc. No. 19).

— *monodon* Ehr. Hustedt 1930–62, II, p. 305, figs. 772 a, b. Zanon 1941, 1: 34.
Loc. Nos. 4, 12, 13, 54.
Rather common in Sierra Leone (Mölder 1962, p. 32).

— — var. *bidens* (Greg.) W. Smith. Ibid. p. 306, fig. 772 d.
Loc. No. 64.
Rare in Sierra Leone (Mölder 1962, p. 32).
Plate II, fig. 1: 68×9.3 μ. 13–14 striae in 10 μ. (Sample No. 306, Loc. No. 64).

— — var. *tropica* Hust. Hustedt 1937–39, p. 171. A. Schmidt. Atlas 381: 3–8.
Loc. No. 51.
Rather common in Sierra Leone (Mölder 1962, p. 32).

— *oliffii* Cholnoky. Cholnoky 1956, p. 66, figs. 39–45. 1957 a, figs. 69–73.
Loc. Nos. 12, 28.
Hitherto only shown to occur in South Africa (Cholnoky 1956, p. 66).
Plate III, fig. 5: 40×7.0 μ. 13 striae in 10 μ. (Sample No. 145, Loc. No. 12).

— *parallela* Ehr. Hustedt 1930–62, II, p. 302, fig. 768.
Loc. Nos. 27, 54.
Fairly rare in Sierra Leone (Mölder 1962, p. 32).

— *pectinalis* (Dillw.?. Kütz.). Rabenh. Ibid. p. 296, figs. 763 a, k.
Loc. Nos. 1, 8, 11, 12, 18, 24, 33, 38–40, 46, 53, 54, 58, 62, 64, 65.
Rare in lakes in East Africa (Hustedt 1949 a, p. 70). Rather common in Sierra Leone (Mölder 1962, p. 32).

Eunotia pectinalis var. *minor* (Kütz.) Rabenh. Ibid. p. 298, figs. 763 d–f.
Loc. Nos. 8, 11, 12, 15, 17, 60, 64.
Very rare in the Congo territory (Hustedt 1949 a, p. 70), but very common in Sierra Leone (Mölder 1962, p. 32).
— — — fo. *impressa* (Ehr.) Hustedt Ibid. p. 298, figs. 763 g, h.
Loc. Nos. 15, 27, 35, 39, 55, 64.
Rather common in Sierra Leone (Mölder 1962, p. 32).
— — — fo. *intermedia* Krasske. Ibid. p. 298, figs. 763 l–o.
Loc. Nos. 2, 26.
Rare in Sierra Leone (Mölder 1962, p. 32).
— — var. *ventralis* (Ehr.) Hust. Ibid. p. 297, figs. 763 b, c.
Loc. Nos. 1, 3, 6, 8, 9, 12–14, 17–20, 22, 24, 25, 28, 30, 44, 46, 53, 64, 67.
Very rare in the Congo territory (Hustedt 1949 a, p. 70).
— — var. *undulata* Ralfs. A. Schmidt. Atlas 271: 26–28. 289: 26–34.
Loc. Nos. 1, 6, 12, 14, 19.
Rare in Sierra Leone (Mölder 1962, p. 32).
— *praerupta* Ehr. Hustedt 1930–62, II, p. 280, figs. 747 A, a–e.
Loc. Nos. 3, 4, 6, 8, 11, 12, 14, 16, 17, 28, 38, 39, 43.
Very rare in the Congo territory (Hustedt 1949 a, p. 67), but not rare in Sierra Leone (Mölder 1962, p. 32).
— — var. *bidens* (W. Smith) Grun. Ibid. p. 281, figs. 747 A, i–m.
Loc. Nos. 4, 12.
Rare in the Congo territory (Hustedt 1949 a, p. 67).
— *rabenhorsti* Cleve et Grun. fo. *monodon* Cleve et Grun. A. Schmidt. Atlas 285: 7, 8. Hustedt 1949 a, p. 68, 2: 1–3.
Loc. Nos. 12, 13, 16, 18–20, 22, 28, 30.
Rare in the Congo territory (Hustedt 1949 a, p. 60), and fairly rare in Sierra Leone (Mölder 1962, p. 33).
Plate I, fig. 15: 21.3×8.0 μ. 12 striae in 10 μ. (Sample No. 168, Loc. No. 20).
— *rhomboidea* Hust. Hustedt 1946–50, p. 435, 36: 34–41.
Loc. Nos. 8, 11, 12, 14, 17, 22, 27, 38, 39, 51–54, 56, 64.
Plate I, fig. 16: 12.6×6.2 μ. 15 striae in 10 μ. (Sample No. 279, Loc. No. 53). In girdle view.
Plate I, fig. 17: 12.6×3.0 μ. 15 striae in 10 μ. (Sample No. 279, Loc. No. 53). In valve view.
Recorded from South Africa (Cholnoky 1959, p. 25, figs. 143–150, here called *E. tenella* (Grun.) Hust. var. *capensis* Cholnoky; and 1960 b, p. 249).
— *similis* Hust. Cholnoky 1954 b, fig. 24. Hustedt 1937–39, p. 165. A. Schmidt. Atlas 382: 11–24.
Loc. No. 10.
Previously reported from Southeast Asia (Hustedt 1937–39, p. 165) and South Africa (Cholnoky 1954 b).
Plate III, fig. 10: 26.7×4.7 μ. 14 striae in 10 μ. (Sample No. 131, Loc. No. 10).
— *sorriensis* nov. spec. Plate III, fig. 8.
Valves with a slightly concave ventral margin and a convex dorsal margin; evenly and slightly tapering from the middle of the valve towards the apices, which are obtusely rounded, 30 μ long, 4–5 μ broad. Raphe branches short and near the apices running from the ventral margin a little on to the side of the valve. Transapical striae 15–16 in 10 μ in the middle, only a little denser towards the apices. Pseudoraphe not visible from the surface of the valve.
Loc. Nos. 3, 11, 12, 27, 35, 52, 56, 60.

Plate III, fig. 8: 30×4.7 μ. 15–16 striae in 10 μ. (Sample No. 223, Loc. No. 35).
Illustration slide: Ghana No. 223/1961.
Type locality: Central Ghana. Freshwater (Sorri river, Loc. No. 35).

Eunotia subaequalis Hust. HUSTEDT 1937–39, p. 170; 12: 1–4. CHOLNOKY 1954 d, figs. 42–49. A. SCHMIDT. Atlas 382: 5–10.
Loc. Nos. 11, 13.
Very rare in Sierra Leone (MÖLDER 1962, p. 33).

— *sudetica* O. Müller. HUSTEDT 1930–62, II, p. 299, figs. 764 a, b.
Loc. Nos. 2, 3, 6, 8, 12, 13, 14, 17–20, 22, 23, 26, 30, 32–34, 49, 50, 53, 62, 64, 67.
Rather common in Sierra Leone (MÖLDER 1962, p. 33).

— *tanosoensis* nov. spec. Plate II, fig. 9.
Valves with a concave ventral margin and a convex dorsal margin. Apices retroflected towards the dorsal side. 33–38 μ long, 7–8 μ broad. Very short raphe branches situated near the apices and only reaching a little on to the surface of the valve. 8–10 transapical striae in 10 μ in the middle of the valve, denser towards the apices. Pseudoraphe close to the ventral margin.
Loc. No. 32.
Plate II, fig. 9: 35.3×7.3 μ. 9 striae in 10 μ. (Sample No. 216 (1), Loc. No. 32).
Illustration slide: Ghana No. 216 (1)/1961.
Type locality: West Ghana. Fresh water (the Tain river, Loc. No. 32).
This taxon is similar to *E. siolii* Hust. and *E. fastigiata* Hust.

— *tarkwaensis* nov. spec. Plate II, fig. 7.
Valves with a straight or very slightly convex ventral margin and a highly convex dorsal margin. Evenly decreasing in breadth from the middle of the valve towards the obtusely rounded apices, 15–26 μ long, 5–10 μ broad. Raphe branches fairly close to the apices on the ventral side, only a little prolonged on to the surface of the valve. 9–10 transapical striae in 10 μ in the middle of the valve, increasing to 15–20 in 10 μ towards the apices. Pseudoraphe in the ventral margin, not visible from the surface of the valve.
Loc. Nos. 14, 58.
Plate II, fig. 7: 25.3×9.4 μ. 9 striae in 10 μ. (Sample No. 152, Loc. No. 14).
Illustration slide: Ghana No. 152/1961.
Type locality: Southwest Ghana. Fresh water (Bonsa river at the village Tarkwa, Loc. No. 14).
Closely related to *E. faba* (Ehr.) Grun., but *E. tarkwaensis* has considerably fewer striae in 10 μ than *E. faba*.
Plate II, fig. 5: 15.3×4.8 μ. 11–12 striae in 10 μ. (Sample No. 152, Loc. No. 14).
Plate II, fig. 6: 18.0×5.3 μ. 12 striae in 10 μ. (Sample No. 296, Loc. No. 58).
II: 5 and II: 6 are both very small specimens of this species.

— *tenella* (Grun.) Hust. HUSTEDT 1930–62, II, p. 284, fig. 749.
Loc. Nos. 12, 17, 35, 37, 38, 45, 51, 52, 54, 56, 64.
Not rare in the Congo territory (HUSTEDT 1949 a, p. 69). Rather common in Sierra Leone (MÖLDER 1962, p. 33).

— *trigibba* Hust. CHOLNOKY 1957 b, p. 349, figs. 40, 41.
Loc. No. 10.
Very rare in Sierra Leone (MÖLDER 1962, p. 33).
Plate I, fig. 20: 25.3×9.3 μ. 15 striae in 10 μ. (Sample No. 131, Loc. No. 10).

— *tschirchiana* O. Müller. A. SCHMIDT. Atlas 382: 98–100. HUSTEDT 1937–39, p. 173, 12: 23–29. 1949 a, p. 70. 1945, p. 904.
Loc. Nos. 2, 3, 6, 8, 9, 12–15, 17, 33, 38, 44, 46, 47, 50, 56, 59, 60, 64, 66, 67.
Somewhat similar to *E. epithemioides* Hust.

Widely distributed in Southeast Asia (HUSTEDT 1937–39, p. 173), but rare in the Congo territory (HUSTEDT 1949 a, p. 70), and very rare in Sierra Leone (MÖLDER 1962, p. 33). In Ghana it is widely distributed, and in many localities very common.

Plate I, fig. 18: 83×10 μ. 6–7 striae in 10 μ. (Sample No. 70, Loc. No. 2).

Plate I, fig. 19: 72×8.7 μ. 11–12 striae in 10 μ. (Sample No. 70, Loc. No. 2).

Eunotia veneris (Kütz.) O. Müller. HUSTEDT 1930–62, II, p. 300, fig. 766.

Loc. Nos. 2, 3, 8, 11, 13, 18, 28, 38, 39, 67.

Very common in Sierra Leone (MÖLDER 1962, p. 33).

— *vumbae* Cholnoky. CHOLNOKY 1956, p. 70, figs. 58–60.

Syn.: *E. rabenhorsti* Cleve et Grun. var. *africana* Hust. (HUSTEDT 1949 a, p. 69, 2: 7–9).

Loc. No. 37.

Plate III, fig. 9: 30.6×7.3 μ. About 9 striae in 10 μ. (Sample No. 234, Loc. No. 37).

Previously only recorded from South Africa (CHOLNOKY 1956, p. 70).

II. Achnanthaceae

Cocconeis Ehr.

Cocconeis ankobraensis nov. spec. Plate IV, fig. 8.

Valves elliptical, 20–25 μ long, 8–10 μ broad. Rapheless valve with radial, vigorous, coarsely punctate transapical striae, 14–15 in 10 μ. Pseudoraphe rather narrow. Raphe valve with 15 radial, prominent, coarsely punctate transapical striae in 10 μ. Rather broad axial area, which from the middle of the valve, which is without any specially indicated central area, is evenly tapering towards the apices. Raphe branches straight, thin, without special appendices in the middle of the valve or towards the apices.

Loc. Nos. 6, 12, 14, 15, 17, 19, 20, 22, 23, 28, 33, 60, 63, 65.

Plate IV, fig. 8: 23.3×9.0 μ. 14–15 striae in 10 μ. (a: rapheless valve, b: raphe valve). (Sample No. 168, Loc. No. 20).

Illustration slide: Ghana No. 168/1961.

Type locality: Southwest Ghana. Fresh water (the Ankobra river, Loc. No. 20).

— *diminuta* Pantocsek. HUSTEDT 1930–62 II, p. 346, fig. 800.

Loc. Nos. 14, 18, 19, 22, 25, 26, 34.

Very rare in Sierra Leone (MÖLDER 1962, p. 34).

— *disculus* (Schum.) Cleve. Ibid. p. 345, fig. 799.

Loc. No. 17.

Very common in Sierra Leone (MÖLDER 1962, p. 34).

— *feuerborni* Hust. HUSTEDT 1937–39, p. 188, 13: 1, 2. A. SCHMIDT. Atlas 407: 44–48.

Loc. Nos. 8, 9, 11, 12, 18.

Plate IV, fig. 11 a: 20.3×10.7 μ. 22 striae in 10 μ. Rapheless valve. b: 21.3×10.8 μ. 24–25 striae in 10 μ. Raphe valve. (Sample No. 163, Loc. No. 18).

— *placentula* Ehr. HUSTEDT 1930–62, II, p. 347, figs. 802 a, b.

Loc. Nos. 3, 17, 21, 67.

Not common in the Congo territory (HUSTEDT 1949 a, p. 73), and fairly rare in Sierra Leone (MÖLDER 1962, p. 34).

— — var. *euglypta* (Ehr.) Cleve. Ibid. p. 349, fig. 802 d.

Loc. Nos. 31, 41, 63, 64, 65.

Rare in the Congo territory (HUSTEDT 1949 a, p. 73), and very rare in Sierra Leone (MÖLDER 1962, p. 34).

— *schröderii* nov. spec. Plate IV, fig. 7.

Valves elliptical, 15–20 μ long, 10–12 μ broad. Rapheless valve with distinct, radial, coarsely dotted transapical striae, 12 in 10 μ. Pseudoraphe very narrow. Raphe valve with radial, very finely punctate transapical striae, 18 in 10 μ. Very narrow axial area, which is very little expanded in the middle of the valve. Raphe branches straight, thin. Loc. No. 21.

Plate IV, fig. 7: 18.7×10.7 μ. a: rapheless valve, 12 striae in 10 μ. b: raphe valve, 18 striae in 10 μ. (Sample No. 171, Loc. No. 21).

Illustration slide: Ghana No. 171/1961.

Type locality: Southwest Ghana. Fresh water (a tributary of the Ankobra river, near the village Humjibre, Loc. No. 21).

Dedicated to the Danish Veterinary Officer KAJ SCHRÖDER, who established the contact to the University of Ghana the result of which was the travels during which the material for the present paper was collected.

The species resembles *C. disculus* (Schum.) Cleve somewhat, but it is rather deviating, i.a. as regards the number of striae.

Cocconeis scutellum Ehr. var. *parva* Grun. HUSTEDT 1930–62, II, p. 338, fig. 791.
Loc. No. 32.
Mesohalobous.

— *subdirupta* Cholnoky. CHOLNOKY 1959, p. 16, figs. 102–104. 1960, p. 30, figs. 75–78.
Loc. Nos. 2, 4–6, 8, 9, 11–14, 17–24, 26–34, 41, 58.
Previously only reported from South Africa (CHOLNOKY 1959, p. 16. 1960, p. 30).
Plate IV, fig. 4 a, b: 10.7×6.0 μ. 21 striae in 10 μ, both on rapheless and raphe valve. (Sample No. 173, Loc. No. 23).

— sp.
Plate IV, fig. 12: 18.7×11.3 μ. 12 striae in 10 μ. (Sample No. 216, Loc. No. 32).
Plate IV, fig. 13: 18.6×12.0 μ. 12 striae in 10 μ. (Sample No. 203, Loc. No. 29).
Only rapheless valves have been found, which have some resemblance to rapheless valves of *C. disculus*, but the number of striae is rather deviating, so there is hardly any identity.

Achnanthes Bory.

Achnanthes coarctata (Bréb.) Grun. HUSTEDT 1930–62, II, p. 419, figs. 872 a, b.
Loc. Nos. 6, 11.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 76).

— *exigua* Grun. Ibid. p. 386, figs. 832 a, b.
Loc. Nos. 1–4, 6, 8, 9, 11, 12, 14, 17–19, 21–36, 40, 44, 47, 49–52, 55, 57, 58, 60–62, 64–47.
Somewhat rare in Sierra Leone (MÖLDER 1962, p. 34). Much distributed, but not very frequent in the Congo area (HUSTEDT 1949 a, p. 75). In the Congo area as well as Sierra Leone var. *heterovalvata* Krasske is more frequient than the species.

— — var. *constricta* Torka. Ibid. p. 386, fig. 832 g.
Loc. Nos. 11, 29, 64.
Rare in hot springs in East Africa (HUSTEDT 1949 a, p. 75).

— *hungarica* Grun. Ibid. p. 383, fig. 829.
Loc. Nos. 2–4, 23, 24, 32, 44.
Widely distributed but never common in the Congo territory (HUSTEDT 1949 a, p. 74).

— *inflata* (Kütz.) Grun. Ibid. p. 421, fig. 873.
Loc. Nos. 2, 4, 5, 6, 8, 12–14, 17, 19, 20, 22–24, 27–29, 62, 64–67.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 76).

— *kraeuselii* Cholnoky. CHOLNOKY 1954 c, p. 271, figs. 5–10.
Loc. Nos. 6, 14, 29, 64.
Previously recorded from South Africa (CHOLNOKY 1954 c, p. 271).
Plate IV, fig. 5: 9.3×3.6 μ. About 21 striae in 10 μ. (Sample No. 306, Loc. No. 64).
Plate IV, fig. 6: 14.7×5.0 μ. About 21 striae in 10 μ. (Sample No. 203, Loc. No. 29).

Differs from the closely related *A. subhudsonis* Hust. by having distinctly punctate striae, which are radial on both valves, whereas the rapheless valve of *A. subhudsonis* has striae at right angles to the pseudoraphe.

Achnanthes lanceolata (Bréb.) Grun. HUSTEDT 1930–62, II, p. 408, figs. 863 a–d.
Loc. Nos. 1, 2, 4–6, 8, 9, 11–14, 16–37, 40, 41, 49, 50, 58–67.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 75), and in Sierra Leone (MÖLDER 1962, p. 34).

— — var. *elliptica* Cleve. Ibid. p. 410, figs. 863 n, o.
Loc. Nos. 22, 34.
Rather common in Sierra Leone (MÖLDER 1962, p. 34).

— — var. *rostrata* (Østrup) Hust. Ibid. p. 410, figs. 863 i–m.
Loc. Nos. 1, 2, 4–6, 8, 11–14, 16–22, 24, 25, 27–34, 36, 39–41, 49, 58–67.
Fairly rare in lakes in East Africa (HUSTEDT 1949 a, p. 75), but rather common in Sierra Leone (MÖLDER 1962, p. 34).

— *linearis* (W. Smith) Grun. Ibid. p. 378, figs. 381 a, b.
Loc. No. 14.
Very common in Sierra Leone (MÖLDER 1962, p. 34).

— *mansiensis* nov. spec. Plate IV, fig. 3.
Valves linear-elliptical with obtusely rounded apices, 18 μ long, 6–7 μ broad. Rapheless valve with a narrow pseudoraphe, without any specially indicated central area. Transapical striae radial, finely punctate, about 24 in 10 μ. Raphe valve with filiform, straight raphe, narrow axial area with specially indicated central area. Transapical striae radial, finely punctate, about 24 in 10 μ, somewhat denser towards the apices.
Loc. No. 19.
Plate IV, fig. 3: 18.0×6.7 μ. 24 striae in 10 μ. (Sample No. 166, Loc. No. 19).
Illustration slide: Ghana No. 166/1961.
Type locality: Southwest Ghana. Fresh water (the Mansi river, a tributary to the Ankobra river, Loc. No. 19).

— *minutissima* Hust. HUSTEDT 1930–62, II, p. 376, fig. 802.
Loc. Nos. 7, 8, 11, 12, 15, 17, 18, 26, 30, 53.
Fairly rare in the Congo territory (HUSTEDT 1949 a, p. 74), but very common in Sierra Leone (MÖLDER 1962, p. 35).

— — var. *cryptocephala* Grun. Ibid. p. 377, figs. 820 d, e.
Loc. Nos. 11–13, 44.
Very common in Sierra Leone (MÖLDER 1962, p. 35).

— *pinnata* Hust. HUSTEDT 1937–39, p. 201, 13: 54–57.
Loc. Nos. 12, 19, 21, 22, 27.
Plate III, fig. 14: 8.7×4.0 μ. 15 striae in 10 μ. (Sample No. 172, Loc. No. 22).
Plate III, fig. 15: 9.4×4.0 μ. 15 striae in 10 μ. (Sample No. 170, Loc. No. 21).

— *subhudsonis* Hust. HUSTEDT 1910, p. 144, 1: 10–12. 1937–39, p. 195, 13: 58, 59. 1949 a, p. 74.
Loc. Nos. 14, 19, 22, 25, 27, 28, 30–33, 36, 60, 63–65.
Fairly rare in the Tropics in Africa and Asia (HUSTEDT 1949 a, p. 74).
Plate IV, fig. 1: 22.0×4.3 μ. 18–20 striae in 10 μ. (Sample No. 218, Loc. No. 33).
Plate IV, fig. 2: 13.3×4.0 μ. a: 17–18 striae in 10 μ, b: 18–20 striae in 10 μ. (Sample No. 299, Loc. No. 60).

Rhoiscosphenia Grun.

Rhoiscosphenia curvata (Kütz.) Grun. HUSTEDT 1930–62, II, p. 430, fig. 879.
Not shown to occur in Ghana. Widely distributed and not rare in the Congo territory (HUSTEDT 1949 a, p. 76), but very rare in Sierra Leone (MÖLDER 1962, p. 35).

III. Naviculaceae

Diatomella Greville.

Diatomella balfouriana Grev. Hustedt 1930–62, II, p. 440, fig. 822.
Loc. Nos. 23, 26.

Mastogloia Thwaites.

No species of this genus has with certainty been shown to occur in the material investigated. Hustedt (1949 a, p. 76) has found *M. elliptica* (Ag.) Cleve and var. *dansei* (Thwaites) Cleve very rarely and rarely, respectively, in lakes in East Africa. In South Africa Cholnoky (1960 a, p. 50) has found several species in fresh water.

Frustulia Agardh.

Frustulia rhomboides (Ehr.) De Toni var. *saxonica* (Rabenh.) De Toni. Hustedt 1930–62, p. 729, fig. 1099 a.
Loc. Nos. 8, 9, 11–16, 18–20, 22, 26, 27, 30, 52, 53, 57, 59–62, 64.
Widely distributed and common in the volcanic region in the northeasterly part of the Congo territory (Hustedt 1949 a, p. 78). Very common in Sierra Leone (Mölder 1962, p. 35).
— — — fo. *capitata* (A. Mayer) Hust. Ibid. p. 729.
Loc. Nos. 12, 15, 16, 33, 34, 38, 61, 64.
Not rare in Sierra Leone (Mölder 1962, p. 36).
— *vulgaris* (Thwaites) De Toni. Ibid. p. 730, fig. 1100 a.
Loc. No. 11.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 78).
— *weinholdi* Hust. fo. *ghanaensis* nov. fo. Plate V, fig. 1.
Differs from the species in the greater distance between the striae.
Plate V, fig. 1: 57.5×9.0 μ. About 24 striae in 10 μ. (Sample No. 136, Loc. No. 11).
Illustration slide: Ghana No. 136/1961.
Type locality: Southwest Ghana. Fresh water (river west of Takoradi, Loc. No. 11).

Gyrosigma Hassall.

Gyrosigma acuminatum Kütz.) Rabenh. Hustedt 1930, p. 222, fig. 329.
Loc. Nos. 14, 20.
— *attenuatum* (Kütz.) Rabenh. Ibid. p. 224, fig. 330.
Loc. Nos. 34, 49.
— *distortum* (W. Smith) Cleve var. *parkeri* Harrison. Ibid. p. 224, fig. 335.
Loc. Nos. 4, 5, 67.
Mesohalobous.
— *kützingii* (Grun.) Cleve. Ibid. p. 224, fig. 333.
Loc. Nos. 34, 61.
Rather common in South Africa (Cholnoky 1960 a, p. 48).
— *scalproides* (Rabenh.) Cleve. Ibid. p. 226, fig. 338.
Loc. Nos. 4, 6, 8, 28–30, 35, 47, 49, 62.

Gyrosigma spencerii (W. Smith) Cleve. Ibid. p. 225, fig. 336.
Loc. Nos. 4, 5, 12, 26, 31, 32, 33, 36, 49.
Previously reported from South Africa (Cholnoky 1960 a, p. 49).
Mesohalobous.

— — var. *nodifera* Grun. Ibid. p. 226, fig. 337.
Loc. Nos. 4–6, 8, 9, 11–22, 24, 25, 27, 28, 33, 60, 61, 65, 67.
Reported from Lake Edward, East Africa (Hustedt 1949 a, p. 110), and from South Africa (Cholnoky 1960 a, p. 49).
Mesohalobous.

— *wansbeckii* (Donkin) Cleve. Ibid. p. 226, fig. 340.
Loc. No. 62.
Mesohalobous.

— sp.
Loc. Nos. 1, 2.

Pleurosigma W. Smith.

Pleurosigma subsalsum Wislouch et Kolbe. Foged 1949, p. 12, 2: 17.
Loc. Nos. 2, 3.
Mesohalobous.

— sp.
Loc. Nos. 11, 31.
Mesohalobous.

Caloneis Cleve.

Caloneis aequatorialis Hust. Hustedt 1921, figs. 5, 6. 1949 a, p. 101, 11: 17–20. 1922, p. 148, 1: 5, 6. E. Manguin 1962, 4: 5. Guermeur 1954, 5: 4.
Loc. No. 47.
Scarce in the Congo territory (Hustedt 1949 a, p. 101), but very common in South Africa (Cholnoky 1960 a, p. 27).
Plate V, fig. 8: 53.3 × 10.0 μ. 18 striae in 10 μ. (Sample No. 260, Loc. No. 47).

— *bacillum* (Grun.) Cleve. Hustedt 1930, p. 236, fig. 360.
Loc. Nos. 1, 6, 8, 11–13, 17, 18, 21, 22, 26–29, 31, 32, 34, 38, 46, 47, 58–62, 64–66.
Widely distributed and not rare in the Congo territory (Hustedt 1949 a, p. 99). Fairly rare in Sierra Leone (Mölder 1962, p. 36).

— — var. *lancettula* (Schulz) Hust. Ibid. p. 236, fig. 361.
Loc. No. 50.

— — fo. *inflata* Hust. Hustedt 1949 a, p. 99, 11: 26–31.
Loc. Nos. 8, 11, 12, 18, 19, 22, 27, 28, 31, 32, 34, 54, 58, 60–62, 65.
Reported from lakes in East Africa, but not common (Hustedt 1949 a, p. 99).

— *beccariana* (Grun.) Cleve. P. T. Cleve 1894–95, I, p. 50, fig. 6. Hustedt 1949 b, p. 44, figs. 1–7. Cholnoky 1956, p. 59, figs. 11, 12. Foged 1959, p. 49, 7: 6.
Syn.: *C. aequatorialis* var. *capitata* Hust. (Cholnoky 1959, p. 148, 1: 4).
Loc. No. 47.
Plate VI, fig. 4: 32.0 × 6.7 μ. 18 striae in 10 μ. (Sample No. 260, Loc. No. 47).
Cholnoky (1960, p. 27) considers it to be doubtful whether *C. aequatorialis* and *C. beccariana* can be distinguished with certainty.

— *bosumtwiensis* nov. spec. Plate XVII, fig. 4.
Valves linear-lanceolate with parallel or slightly convex sides and extended, broadly and obtusely rounded apices, 24 μ long, 4–5 μ broad. Raphe filiform, straight, with central and apical fissures deflected to the same side. The axial area very broad, half or three

fourths of the breadth of the valve, and in the middle of the valve expanded into a broad central area reaching the margin of the valve. Transapical striae radial, 15–16 in 10 μ.
Loc. No. 26.
Plate XVII, fig. 4: 24.0×4.7 μ. 15–16 striae in 10 μ. (Sample No. 194, Loc. No. 26).
Illustration slide: Ghana No. 194/1961.
Type locality: South Ghana. Fresh water (Bosumtwi Lake, Loc. No. 26).

Caloneis clevei (Lagerst.) Cleve. P. T. Cleve 1894–95, I, p. 51. Hustedt 1930, p. 236, fig. 359. 1949 a, p. 98.
Loc. Nos. 11, 34, 47.
Rare in the Congo territory (Hustedt 1949 a, p. 98), and in Sierra Leone (Mölder 1962, p. 36).

— *desertorum* Hust. Hustedt 1949 b, p. 45, figs. 8, 9. Foged 1959, p. 50, 2: 13.
Loc. Nos. 34, 37.
Previously reported from the Sinai Peninsula (Hustedt 1949 b, p. 45) and from Afghanistan (Foged 1959, p. 50).
Plate V, fig. 10: 31.5×8.7 μ. 20 striae in 10 μ. (Sample No. 220, Loc. No. 34).

— *fasciata* (Lagerst.) Cleve. J. W. G. Lund 1946, p. 58, figs. L, M, Q–T. Foged 1959, p. 50, 2: 16.
Loc. No. 32.
Plate V, fig. 7: 21.3×6.0 μ. 18–20 striae in 10 μ. (Sample No. 215, Loc. No. 32).

— *formosa* (Greg.) Cleve. Hustedt 1930, p. 232, fig. 350.
Loc. No. 11.
Mesohalobous.

— *incognita* Hust. Hustedt 1910, p. 373, 3: 7. 1937–39, p. 284. 1942, p. 79, fig. 147. Cholnoky 1958 a, 1: 9–12.
Loc. Nos. 3–5, 6, 8, 11–13, 17–22, 24, 27–29, 31–34, 36, 38, 44, 46, 47, 60–62, 64–67.
Recorded from, but only rare in the Congo territory (Hustedt 1949 a, p. 100).
Plate V, fig. 2: 66×7.5 μ. 20 striae in 10 μ. (Sample No. 168, Loc. No. 20).
Plate V, fig. 3: 32.0×9.0 μ. 18 striae in 10 μ. (Sample No. 299, Loc. No. 60).
Plate V, fig. 6: 28.0×10.0 μ. 21–22 striae in 10 μ. (Sample No. 168, Loc. No. 20).

— *latiuscula* (Kütz.) Cleve var. *subholstei* Hust. Hustedt 1930, p. 233, fig. 352.
Loc. No. 11.

— *macedonica* Hust. Hustedt 1945, p. 934, 42: 27. Guermeur 1954, p. 37, 5: 8. Foged 1959, p. 50, 2: 14. Cholnoky 1960 a, p. 29, fig. 70.
Loc. No. 1.
Widely distributed in South Africa (Cholnoky 1960 a, p. 29).
Plate VI, fig. 3: 30.0×6.7 μ. 22–24 striae in 10 μ. (Sample No. 39, Loc. No. 1).

— *sansomei* nov. spec. Plate V, fig. 9.
Valves linear with parallel margins and broadly rounded apices, 55–60 μ long, 9–10 μ broad. Raphe straight, with central fissures deflected to the same side. Axial area lanceolate, rather broad, suddenly highly constricted at a short distance from the apices. Central area a broad transversal zone extended to the sides of the valves. Transapical striae radial, convergent towards the apices, 18 in 10 μ, crossed by a fine longitudinal line near the margin of the valve.
Loc. No. 47.
Plate V, fig. 9: 57.3×9.3 μ. 18 striae in 10 μ. (Sample No. 260, Loc. No. 47).
Illustration slide: Ghana No. 260/1961.
Type locality: North Ghana. Fresh water (river between the villages Asong and Nangodi, Loc. No. 47).

Dedicated to Professor F. W. SANSOME, Ph. D., University of Ghana, who as head of the Botanical Laboratory of the University placed a car and necessary assistance at my disposal for the collections in Ghana.

Caloneis schroederi Hust. HUSTEDT 1930, p. 235, fig. 356.
Loc. No. 8.
Plate VI, fig. 2: 32.6 × 6.6 μ. 12 striae in 10 μ. (Sample No. 119, Loc. No. 8).

— *silicula* (Ehr.) Cleve. Ibid. p. 236, fig. 362.
Loc. Nos. 12, 47, 53, 65.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 100).

— fo. *minutula* Cholnoky. CHOLNOKY 1954 b, p. 410, fig. 5.
Loc. No. 32.

— — var. *alpina* Cleve. HUSTEDT 1930, p. 238, fig. 366.
Loc. No. 26.

— — var. *truncatula* Grun. Ibid. p. 238, figs. 363, 364.
Loc. Nos. 11, 33, 61.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 100). More common in South Africa (CHOLNOKY 1960 a, p. 29).

— *vehemens* Cholnoky. CHOLNOKY 1962 b, p. 15, figs. 19, 20.
Loc. No. 3.
Plate VI, fig. 1: 53.3 × 10.0 μ. 18 striae in 10 μ. (Sample No. 73, Loc. No. 3).

— *voltaensis* nov. spec. Plate V, fig. 4.
Valves linear with parallel sides and cuneately tapering, broadly rounded apices. 25–30 μ long, 6 μ broad. Raphe straight, with central fissures slightly deflected to the same side. Axial area broadly lanceolate, about half the breadth of the valve, suddenly tapering towards the apices. Central area a broad transversal zone reaching the sides of the valves. All striae radial, 18 in 10 μ, clearly dotted, near the margin of the valve crossed by a fine longitudinal band.
Loc. No. 61.
Plate V, fig. 4: 28.7 × 6.0 μ. 18 striae in 10 μ. (Sample No. 92, Loc. No. 61).
Illustration slide: Ghana No. 92/1961.
Type locality: East Ghana. Fresh water (the Volta river at Ajena, Loc. No. 61).

— — var. *tarkwaensis* nov. var. Plate V, fig. 5.
Differs from the species by having linear-elliptical valves with pointed apices. Axial area lanceolate, about one third of the breadth of the valve.
Loc. Nos. 18, 64.
Plate V, fig. 5: 32.0 × 6.6 μ. 18 striae in 10 μ. (Sample No. 159, Loc. No. 18).
Illustration slide: Ghana No. 159/1961.
Type locality: Southwest Ghana. Fresh water (a small tributary of the Ankobra river near the town Tarkwa, Loc. No. 18).

Neidium Pfitzer.

Neidium affine (Ehr.) Cleve. HUSTEDT 1930, p. 242, fig. 376.
Loc. Nos. 2, 3, 12, 13, 35, 37–39, 41, 42, 44, 45, 50, 52, 56, 62, 65.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 109).
Rather rare in Sierra Leone (MÖLDER 1962, p. 36).

— — var. *amphirhynchus* (Greg.) Cleve. Ibid. p. 244, fig. 377.
Loc. Nos. 4, 11–16, 18, 22, 23, 27, 30, 32, 45, 46, 60–62.

Rare in lakes in East Africa (Hustedt 1949 a, p. 109). Common in Sierra Leone (Mölder 1962, p. 36).

Neidium affine var. *bonsaensis* nov. var. Plate VI, fig. 5.

Differs from the species by having rather narrow, cuneately tapering apices.

Loc. Nos. 11, 12, 14, 38, 43, 44.

Plate VI, fig. 5: 42.7 × 8.7 μ. 21–22 striae in 10 μ. (Sample No. 151, Loc. No. 44).

Illustration slide: Ghana No. 151/1961.

Type locality: Southwest Ghana. Fresh water (the Bonsa river, tributary to the Ankobra river, Loc. No. 44).

Probably related to *N. affine* var. *longiceps* (Greg.) Cleve sensu Reimer 1959, p. 13.

— — var. *longiceps* (Greg.) Cleve. Hustedt 1930, p. 244, fig. 378.

Loc. Nos. 8, 9, 12, 18, 22, 24, 27, 28, 30, 62.

Rather rare in Sierra Leone (Mölder 1962, p. 36).

— *agonaense* nov. spec. Plate VI, fig. 11.

Valves elliptical with slightly protracted, pointed apices, 84 μ long, 30 μ broad. Raphe straight, with central pores deflected in the opposite direction. Axial area rather narrow and tapering towards the central area and the apices, in the middle expanded into a rounded central area. Transapical striae in the middle of the valve slightly radial, towards the apices more highly radial, rather finely punctate, about 18 in 10 μ, along the margin of the valve with several dense fine hyaline stripes.

Loc. Nos. 2, 9, 12, 19, 33, 58.

Plate VI, fig. 11: 84 × 30 μ. 18 striae in 10 μ. (Sample No. 141, Loc. No. 12).

Illustration slide: Ghana No. 141/1961.

Type locality: Southwest Ghana. Fresh water (a small river between the villages Agona and Nsuaem, Loc. No. 12).

Perhaps closely related to *N. apiculatum* Reimer var. *apiculatum* Reimer (Reimer 1959, p. 16, 3: 6).

— *alpinum* Hust. Hustedt 1943, p. 189, fig. 48. Reimer 1959, p. 15, 4: 4.

Syn.: *N. perminutum* A. Cleve-Euler 1959, p. 16, 3: 6.

Loc. No. 61.

Plate VI, fig. 13: 18.6 × 4.8 μ. 28–30 striae in 10 μ. (Sample No. 92, Loc. No. 61).

— *binodis* (Ehr.) Hust. var. *binodis* Reimer. Reimer 1959, p. 17, 2: 4.

Loc. No. 46.

— *bisulcatum* (Lagerst.) Cleve. Hustedt 1930, p. 242, fig. 374.

Loc. No. 46.

— — var. *baicalensis* (Skvortzow et Meyer) Reimer. Reimer 1959, p. 18, 2: 2.

Loc. Nos. 2, 42, 46.

Plate VI, fig. 9: 32 × 5.7 μ. 24 striae in 10 μ. (Sample No. 70, Loc. No. 2).

— *dayiense* nov. spec. Plate VI, fig. 7.

Valves linear with obtusely rounded apices. 25–26 μ long, 5–6 μ broad. Raphe filiform, with long, straight central fissures deflected in opposite directions. Axial area narrow. Central area obliquely rectangular, about three fourths of the breadth of the valve. Transapical striae oblique, about 36–40 in 10 μ.

Loc. No. 65.

Plate VI, fig. 7: 25.3 × 5.7 μ. 36–40 striae in 10 μ. (Sample No. 309, Loc. No. 65).

Illustration slide: Ghana No. 309/1961.

Type locality: Southeast Ghana. Fresh water (the Dayi river, a tributary to the Volta river south of Kpandu, Loc. No. 65).

Fairly closely related to *N. javanicum* Hust. (HUSTEDT 1937–39, p. 408, 16: 12, 13), which also has the characteristic long, straight central fissures, but the transapical striae here are slightly convergent towards the apices.

Neidium dubium (Ehr.) Cleve. HUSTEDT 1930, p. 246, fig. 384.
Loc. Nos. 58, 65.
Rather rare in Sierra Leone (MÖLDER 1962, p. 36).

— *gracile* Hust. fo. *aequalis* Hust. HUSTEDT 1937–39, p. 406, 16: 10. 1949 a, p. 110, 8: 20.
Loc. No. 23.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 110). Fairly rare in Sierra Leone (MÖLDER 1962, p. 36).
Plate VII, fig. 1: 42.7×10.7 μ. 18–20 striae in 10 μ. (Sample No. 178, Loc. No. 23).

— *hercynicum* A. Mayer fo. *bogosoensis* nov. fo. Plate VI, fig. 6.
Differs from the species and fo. *subrostratum* Reimer by the central area being obliquely across expanded to about half the breadth of the valve.
Loc. Nos. 18, 23, 53, 56.
Plate VI, fig. 6: 40×8.0 μ. About 22 striae in 10 μ. (Sample No. 163, Loc. No. 18).
Illustration slide: Ghana 163/1961.
Type locality: Southwest Ghana. Fresh water (a small tributary to the Ankobra river near the village Bogoso, Loc. No. 18).

— *iridis* (Ehr.) Cleve. HUSTEDT 1930, p. 245, fig. 379.
Loc. Nos. 12, 34, 35, 44, 51, 54, 58.
Very rare in the lakes in East Africa (HUSTEDT 1949 a, p. 109). Fairly rare in Sierra Leone (MÖLDER 1962, p. 36).

— — fo. *vernalis* Reichelt. Ibid. p. 245, fig. 380.
Loc. Nos. 1, 2, 11, 12, 19, 26, 28, 35, 38–40, 44, 46, 48, 49, 58, 61, 62, 67.
Fairly rare in Sierra Leone (MÖLDER 1962, p. 36).

— — var. *ampliata* (Ehr.) Cleve. Ibid. p. 245, fig. 381.
Loc. Nos. 2, 32, 47.

— — var. *amphigomphus* (Ehr.) Van Heurck. Ibid. p. 245, fig. 382.
Loc. Nos. 2, 32, 34, 37, 49, 55.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 109).

— *kozlowi* Mereschk. Ibid. 247, fig. 387.
Loc. No. 2.

— — var. *parva* Mereschk. Ibid. p. 248, fig. 389. FOGED 1955, p. 45, 5: 10.
Loc. No. 44.

— *kumasiense* nov. spec. Plate VI, fig. 8.
Valves linear to slightly lanceolate with protracted, broadly rounded apices. 23–26 μ long, 8–9 μ broad. Raphe filiform with rather long central fissures deflected in opposite directions. Axial area very narrow, small slightly oblique central area. Transapical striae diagonal, 24–26 in 10 μ, with 6–9 distinct hyaline longitudinal stripes.
Loc. Nos. 8, 19, 20, 27, 29, 41, 44, 46.
Plate VI, fig. 8: 24.6×8.7 μ. 24–26 striae in 10 μ. (Sample No. 196, Loc. No. 27).
Illustration slide: Ghana No. 196/1961.
Type locality: West Ghana. Fresh water (a small river northwest of the Ashanti capital Kumasi, Loc. No. 27).

— *ladogense* (Cleve) Foged var. *densestriata* Østrup. FOGED 1952 b, fig. 2 b.
Syn.: *Caloneis ladogensis* Cleve var. *densestriata* Hust.
Loc. No. 14.
Rare in Sierra Leone (MÖLDER 1962, p. 36).

Neidium minutissimum Krasske. Krasske 1932, fig. 12. J.W.G. Lund 1946, p. 59, fig. 2 n.
Loc. Nos. 32, 35.
Plate VI, fig. 10: 19.0×4.2 μ. 24 striae in 10 μ. (Sample No. 215, Loc. No. 32).

— *nsuaemense* nov. spec. Plate VI, fig. 12.
Valves linear-elliptical with rounded apices. 28–30 μ long, 6–7 μ broad. Raphe filiform, straight, with long central fissures deflected in opposite directions. Axial area rather narrow, in the middle expanded into an elliptical, somewhat oblique central area. Transapical striae rather greatly diagonal, at one end at right angles to the raphe or slightly convergent, about 24 in 10 μ, with several distinct longitudinal stripes.
Loc. Nos. 12, 20, 30.
Plate VI, fig. 12: 29.3×6.7 μ. 24 striae in 10 μ. (Sample No. 141, Loc. No. 12).
Illustration slide: Ghana No. 141/1961.
Type locality: Southwest Ghana. Fresh water (a small river between the two villages Agona and Nsuaem, Loc. No. 12).
Perhaps related to *N. herrmanni* Hust. (Hustedt 1938, p. 408, 16: 11), which, however, has considerably denser striae (30–34 in 10 μ).

— *productum* (W. Smith) Cleve. Hustedt 1930, p. 245, fig. 383.
Loc. Nos. 12, 15, 38, 44, 62.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 110), rare in Sierra Leone (Mölder 1962, p. 36).

Diploneis Ehr.

Diploneis notabilis (Grev.) Cleve. Hustedt 1930–62, II, p. 682, fig. 1074 a.
Loc. Nos. 2, 3, 66, 67.
Polyhalobous.

— *oculata* (Bréb.) Cleve. Ibid. p. 675, fig. 1068 a.
Loc. Nos. 1, 29.

— *ovalis* (Hilse) Cleve. Ibid. p. 671, figs. 1065 a–e.
Loc. Nos. 1–3, 8, 9, 11–13, 17, 18, 23, 27, 29, 30, 33–36, 39, 40, 47–50, 54, 58, 61, 62, 64, 66.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 78). Common in Sierra Leone (Mölder 1962, p. 36).

— *pseudovalis* Hust. Ibid. p. 668, fig. 1063 c.
Loc. No. 18.
Plate IV, fig. 9: 11.3×8.6 μ. 12 striae in 10 μ. (Sample No. 161, Loc. No. 18).
Mesohalobous.
The specimen pictured is very small; usual dimensions are 16–31×9–14 μ.

— *subovalis* Cleve. Ibid. p. 667, figs. 1063 a, b.
Loc. Nos. 1, 4–6, 8, 9, 11–14, 17–19, 21, 22, 24–33, 36, 37, 41, 62, 64, 66.
Widely distributed in the Tropics, but only infrequently in lakes in East Africa (Hustedt 1949 a, p. 77).
Plate IV, fig. 10: 20×10 μ. 14–15 striae in 10 μ. (Sample No. 207, Loc. No. 31).
IV: 10 has somewhat closer striae than usual (10–12 in 10 μ) in this species.

Stauroneis Ehr.

Stauroneis akrosoensis nov. spec. Plate VII, fig. 2.
Valves linear-elliptical with protracted, obtusely rounded apices. 52 μ long, 13–14 μ broad. Raphe filiform, straight. Axial area narrow, immediately before the middle expanded into a central area, the midmost part of which is expanded into a very narrow transversal band extended to the sides of the valve. Transapical striae, 26–28 in 10 μ, in the middle

of the valve nearly at right angles to the raphe, towards the apices more and more radial; distinctly punctate.
Loc. Nos. 19, 60.
Plate VII, fig. 2: 52×13.6 μ. 26–28 striae in 10 μ. (Sample No. 299, Loc. No. 60).
Illustration slide: Ghana No. 299/1961.
Type locality: East Ghana. Fresh water (the Asukawkaw river, the Volta river system, near the village Akroso, Loc. No. 60).

Stauroneis anceps Ehr. HUSTEDT 1930–62, II, p. 771, fig. 1120 a.
Loc. Nos. 2–5, 8, 9, 12–16, 20, 26, 34, 35, 37–39, 44–47, 49, 50, 53–56, 58, 59, 62, 65.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 79).
Not common in Sierra Leone (MÖLDER 1962, p. 37).

— *anceps* fo. *gracilis* Rabenh. Ibid. p. 771, fig. 1120 b.
Loc. Nos. 4, 6, 8, 12, 20, 26, 32, 38, 44, 46, 55, 62.
Very rare in Sierra Leone (MÖLDER 1962, p. 37).

— — var. *hyalina* Brun et Peragallo. Ibid. p. 773, fig. 1120 g.
Loc. Nos. 9, 14, 28, 30, 37, 38, 44–46, 65.
Fairly rare in Sierra Leone (MÖLDER 1962, p. 37).

— *borrichii* (Boye Petersen) Lund. J. W. G. LUND 1946, p. 63, figs. 3 C–H. HUSTEDT 1930–62, II, p. 803, fig. 1151.
Loc. Nos. 4, 26, 47.
Plate VII, fig. 8: 20.0×4.3 μ. 18 striae in 10 μ. (Sample No. 194, Loc. No. 26). This specimen has somewhat coarser striae than shown in LUND 1946.
Plate VII, fig. 11: 15.3×3.4 μ. 18–20 striae in 10 μ. (Sample No. 260, Loc. No. 47).

— *crucicula* (Grun.) Cleve. P.T. CLEVE 1894–95, I, p. 151, O. MÜLLER 1911. ZANON 1941, p. 55, 2: 12. CHOLNOKY 1956, p. 87, figs. 128–130.
Loc. Nos. 1, 4–6, 8, 9, 11–14, 16–25, 27–34, 40, 58, 60–65, 67.
Common in Sierra Leone (MÖLDER 1962, p. 37).
Plate VII, fig. 4: 28×7.4 μ. 24 striae in 10 μ. (Sample No. 221, Loc. No. 34).
Plate VII, fig. 5: 23.3×5.6 μ. 21–22 striae in 10 μ. (Sample No. 217, Loc. No. 32).
Plate VII, fig. 6: 13.3×6.7 μ. 21 striae in 10 μ. (Sample No. 203, Loc. No. 29).
Plate VII, fig. 7: 22×6.7 μ. 22 striae in 10 μ. (Sample No. 207, Loc. No. 31).
A very variable species, common in all parts of Ghana.

— *kriegeri* Patrick. HUSTEDT 1930–62, II, p. 780, figs. 1126 a, b. GUERMEUR 1954, p. 41, 5: 13.
Syn.: *S. pygmaea* Krieger. HUSTEDT 1930, p. 257, fig. 409.
Loc. Nos. 3, 12, 13, 20, 46, 64.
Plate VII, fig. 15: 17.3×4.7 μ. About 20 striae in 10 μ. (Sample No. 307, Loc. No. 64).

— *legumen* (Ehr.) Kütz. HUSTEDT 1930–62, II, p. 809, fig. 1156.
Loc. No. 12.

— *lundii* (Lund) Hust. Ibid. p. 798, fig. 1146.
Syn.: *S. truncatula* Lund. J. W. G. LUND 1946, p. 59, figs. 2 U–AA.
Loc. Nos. 1, 38, 44, 49, 58.

— *navrongensis* nov. spec. Plate VII, fig. 12.
Valves linear with triundulate sides and broadly proboscidiform, obtusely rounded apices. 20–25 μ long, 4–5 μ broad. Pseudoseptae very short. Raphe straight, filiform. Axial area narrow, somewhat expanded towards the central area, which is a very broad transversal band extended to the sides of the valve. Transapical striae all radial, 24–26 in 10 μ, distinctly punctate.
Loc. No. 46.
Plate VII, fig. 12: 21.3×4.6 μ. 24–26 striae in 10 μ. (Sample No. 258, Loc. No. 46).
Illustration slide: Ghana No. 258/1961.

Type locality: North Ghana. Fresh water (an artificial pond, 6–7 km east of the village Navrongo).

Stauroneis nobilis Schum. HUSTEDT 1930–62, II, p. 778, fig. 1125 b.
Loc. Nos. 12, 18, 30.

— — fo. *alabamae* (Heiden) A. Cleve-Euler. Ibid. p. 780, figs. 1125 a, c, d.
Loc. Nos. 11, 12, 18.

— *obtusa* Lagerst. Ibid. p. 817, fig. 1162.
Loc. Nos. 1, 46, 55.
Plate VII, fig. 13: 28×4.3 μ. About 24 striae in 10 μ. (Sample No. 285, Loc. No. 55).

— *phoenicenteron* (Nitzsch) Ehr. Ibid. p. 766, fig. 1118 a.
Loc. Nos. 2, 3, 7, 11, 34, 37, 38, 41, 44, 46, 56, 61, 62.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 79), but common in Sierra Leone (MÖLDER 1962, p. 37).

— — fo. *brevis* Dippel. Ibid. p. 768, fig. 1118 c.
Loc. No. 26.

— *prominula* (Grun.) Hust. Ibid. p. 802, fig. 1153.
Syn.: *S. parvula* Grun. HUSTEDT 1930, p. 260, fig. 417 a.
Loc. Nos. 12, 19, 26, 27.
Rare in Sierra Leone (MÖLDER 1962, p. 37).

— *schinzii* (Brun) Cleve. P. T. CLEVE 1894–95, I, p. 146. A. SCHMIDT Atlas 242: 9. REIMER 1961, p. 205, 2: 2. BRUN 1891, p. 38, 16: 1.
Loc. Nos. 44, 45, 54.
Previously reported from Southwest Africa and North America. REIMER 1961, p. 206, calls attention to a resemblance to the genus *Pinnularia* "when one considers the broad comma-shaped distal raphe-ends. Yet the striae are distinctly punctate."
Plate VII, fig. 14: 93×11.3 μ. 18 striae in 10 μ. (Sample No. 249, Loc. No. 44).

— *slateri* nov. spec. Plate VII, fig. 3.
Valves linear-elliptical with rather narrow, slightly protracted apices. 51–52 μ long, 10 μ broad. Raphe straight, with rather long polar fissures deflected in the same direction. Axial area narrow, near the middle of the valve slightly expanded towards a broad central area extended to the sides of the valve. All transapical striae highly radial, rather coarsely punctate, 18 in 10 μ. The midmost pair reduced to a few pores near the raphe.
Loc. No. 12.
Plate VII, fig. 3: 51.3×10.0 μ. 18 striae in 10 μ. (Sample No. 144, Loc. No. 12).
Illustration slide: Ghana No. 144/1961.
Type locality: Southwest Ghana. Fresh water (a small tributary to the Ankobra river between the villages Agona and Nsuaem).
Dedicated to the botanist, Dr. SLATER, University of Ghana.

— *smithii* Grun. HUSTEDT 1930–62, II, p. 810, figs. 1157 a–c.
Loc. Nos. 8, 12, 13.

— — var. *borgei* (Manguin) Hust. Ibid. p. 811, figs. 1157 h–k.
Syn.: *S. borgei* Manguin. E. MANGUIN 1941 a, p. 179, fig. 69.
S. smithii var. *elliptica* Hust. HUSTEDT 1945, p. 914, 42: 34–36.
Loc. Nos. 8, 13.

— — var. *incisa* Pantocsek. Ibid. p. 810, figs. 1157 d–g.
Loc. Nos. 6, 8, 9, 11–14, 17–19.

— *spicula* Hickie. Ibid. p. 830, fig. 1173.
Loc. Nos. 42, 44–46.
Plate VIII, fig. 1: 46.7×8.8 μ. 24 striae in 10 μ. (Sample No. 252, Loc. No. 45).
Polyhalobous.

Stauroneis subdahomensis Guermeur. GUERMEUR 1954, p. 41, 5: 15 e.
Loc. No. 23.
Plate VII, fig. 9: 14.7×4.3 μ. 22 striae in 10 μ. (Sample nr. 181, Loc. No. 23).
Possibly this species is identical with *S. dahomensis* Hustedt 1910, p. 378, fig. 11.
— *thermicola* (Boye Petersen), Lund. HUSTEDT 1930–62, p. 800, figs. 1148 a, b.
Loc. No. 30.
— *tropicalis* Guermeur var. *undulata* Guermeur. GUERMEUR 1954, p. 42, 5: 5.
Loc. Nos. 11, 23, 33.
Plate VII, fig. 16: 28.3×5.3 μ. About 28 striae in 10 μ. (Sample No. 181, Loc. No. 23).
It is very similar to *S. kriegeri* Patrick fo. *undulata* Hust. (Hustedt 1930–62, II, p. 782, fig. 1126 c).
— *undata* Hust. HUSTEDT 1930–62, II, p. 804, fig. 1152.
Loc. No. 12.
— *wislouchii* Poretzky et Anisimowa. HUSTEDT 1930–62, II, p. 792, fig. 1137.
Loc. Nos. 14, 28.
Plate VII, fig. 10: 37.3×8.7 μ. 22–24 striae in 10 μ. (Sample No. 151, Loc. No. 14).

Anomoeoneis Pfitzer.

Anomoeoneis exilis (Kütz.) Cleve. HUSTEDT 1930–62, II, p. 751, figs. 1114 a–c.
Loc. Nos. 7, 10–12, 14–16, 27.
Very common in Sierra Leone (MÖLDER 1962, p. 37).
— — var. *lanceolata* A. Mayer. Ibid. p. 752, fig. 1114 d.
Loc. Nos. 7, 8, 11–13, 32.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 78).
CHOLNOKY (1960 a, p. 26) points out that species and variety are connected by even transitions so that it must be considered unjustifiable to keep the distinction.
— *polygramma* (O. Müller) Hust. Ibid. p. 744.
Loc. Nos. 26, 31, 57.
Previously regarded as a variety of *A. sphaerophora*, but HUSTEDT (1930–62, II, p. 744) says: "Neuerdings durchgeführte Untersuchungen an europäischen und aussereuropäischen Natrongewässern haben mich überzeugt, das *A. polygramma* besser als eigene Art aufzufassen ist."
Mesohalobous.
— *serians* (Bréb.) Cleve var. *brachysira* (Bréb.) Cleve. Ibid. p. 748, figs. 1112 e–h.
Loc. Nos. 11, 38.
Very rare in the lakes in East Africa (HUSTEDT 1949 a, p. 79).
Not rare in Sierra Leone (MÖLDER 1962, p. 37).
— *sphaerophora* (Kütz.) Pfitzer. Ibid. p. 740, fig. 1108 a.
Loc. Nos. 2, 8, 9, 11, 22, 26, 38, 47, 59, 67.
Widely distributed und rather common in lakes in East Africa (HUSTEDT 1949 a, p. 79).
Halophilous.
— — forma.
Loc. No. 26.
Plate VIII, fig. 3: 56×13.3 μ. 15–16 striae in 10 μ. (Sample No. 192, Loc. No. 26).
Halophilous.
— — var. *güntheri* O. Müller. HUSTEDT 1930–62, II, p. 741, fig. 1108 b.
Loc. No. 26.
Plate VIII, fig. 2: 26.7×12.0 μ. 15–16 striae in 10 μ. (Sample No. 192, Loc. No. 26.
Halophilous.

Navicula Bory.

Naviculae orthostichae Cleve.

Navicula cuspidata Kütz. Hustedt 1930–62, III, p. 59, fig. 1206 a.
Loc. Nos. 4, 8, 12, 23, 25, 28, 30, 34, 39, 46.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 81).

— — var. *ambigua* (Ehr.) Cleve. Ibid. p. 62, fig. 1206 b.
Loc. Nos. 2, 3, 12, 40, 43, 44, 46, 47, 53, 58, 67.
Fairly rare in lakes in East Africa (Hustedt 1949 a, p. 81).

— — var. *héribaudii* Peragallo. Ibid. p. 60, fig. 1207.
Loc. Nos. 2, 8, 12, 19, 20, 23, 33, 34, 36, 40, 44, 46–50, 58, 62.
Disputed form. Hustedt (1957, p. 264) is of opinion that it is a mutation of the species, whereas Cholnoky (1960 a, p. 57) considers it to be a phenotype which develops under certain ecological circumstances.

— *gregaria* Donkin. Hustedt 1930, p. 269, fig. 437.
Loc. Nos. 9, 26, 30.
Halophilous.
Hustedt (1957, p. 265) and Cholnoky (1960 a, p. 62) are of opinion that this species is extremely widely distributed, but that it has often so far been mistaken for *N. cryptocephala* Kütz. In South Africa, according to Cholnoky (1960 a, p. 62), it is very common.

— *halophila* (Grun.) Cleve. Hustedt 1930–62, III, p. 64, fig. 1209.
Loc. Nos. 1, 4, 7–9, 16, 22, 23, 27, 30, 34, 35, 38, 39, 43, 44, 46, 47, 50, 53–56, 58, 60, 66, 67.
Plate VIII, fig. 4: 40×6.0 μ. 18–20 striae in 10 μ. (Sample No. 223, Loc. No. 35).
Halophilous.
Very narrow form, the ordinary breadth of the species being 8–16 μ.

— — var. *subcapitata* Østrup. Østrup 1910, p. 29, 1: 22.
Loc. Nos. 2–4, 15, 20, 33, 36, 38, 44–46, 49, 50, 54, 55, 62.
Plate VIII, fig. 8: 40×7.4 μ. 21 striae in 10 μ. (Sample No. 268, Loc. No. 50).
Halophilous.

— *halophila* fo. *nabogoensis* nov. fo. Plate VIII, fig. 9.
Differs from the species by having very little protracted apices and by its "gedrungene" form.
Loc. Nos. 37, 43, 44.
Plate VIII, fig. 9: 21.4×7.5 μ. 15–16 striae in 10 μ. (Sample No. 234, Loc. No. 37).
Illustration slide: Ghana No. 234/1961.
Type locality: North Ghana. Fresh water (the Nabogo river, the White Volta system, north of the town Tamale, Loc. No. 37).
Perhaps closely related to *N. accommoda* Hust. (Hustedt 1930–62, III, p. 64, fig. 1208), but as VIII: 9 has striae with the same density through the whole length of the valve, it is probably more closely related to *N. halophila*.

— — fo. *tenuirostris* Hust. Hustedt 1942, p. 52, fig. 76.
Loc. Nos. 44, 46.
Plate VIII, fig. 7: 30.6×7.8 μ. 24 striae in 10 μ. (Sample No. 258, Loc. No. 46).

— — forma.
Loc. Nos. 34, 44, 66.
Plate VIII, fig. 6: 22.7×6.0 μ. 18 striae in 10 μ. (Sample No. 220, Loc. No. 34).

— — forma.
Loc. No. 35.
Plate VIII, fig. 5: 28.6×7.3 μ. 22 striae in 10 μ. (Sample No. 223, Loc. No. 35).

Navicula perrotettii Grun. HUSTEDT 1930–62, III, p. 56, fig. 1205 a.
Loc. Nos. 1, 2, 4, 5, 7–9, 24, 33, 36, 44, 46, 61, 66.
Common in the Tropics (HUSTEDT 1960–62, III, p. 59).
— — *perrotettii* var. *enervis* Hust. Ibid. p. 59, fig. 1205 c.
Loc. No. 58.

Naviculae subtilissimae Hust.

Navicula ankobraensis nov. spec. Plate VIII, fig. 10.
Valves linear with slightly concave sides and narrowly protracted capitate apices. 16–20 μ long, 4–5 μ broad. Raphe linear, filiform. Axial area linear, narrow, no actual central area, but in the middle of the valve the transapical striae are alternately long and short. Transapical striae radial, 24–26 in 10 μ.
Loc. No. 22.
Plate VIII, fig. 10: 16.6 × 4.6 μ. 24–26 striae in 10 μ. (Sample No. 172, Loc. No. 22).
Illustration slide: Ghana No. 172/1961.
Type locality: Southwest Ghana. Fresh water (a small tributary to the Ankobra river, near the village Awaso, Loc. No. 22).
Fairly great similarity to *N. subarvensis* Hust. (HUSTEDT 1930–62, III, p. 87, fig. 1230) as regards form, and to *N. kwamkuji* Hust. (HUSTEDT 1922, p. 154, fig. 19) as regards the course of the striae, especially in the middle of the valve.
— *bella* Hust. HUSTEDT 1937–39, p. 245, 17: 37.
Loc. No. 35.
Plate VIII, fig. 17: 16.5 × 4.0 μ. Striae very dense. (Sample No. 223, Loc. No. 35).
— *festiva* Krasske. HUSTEDT 1930–62, III, p. 95, fig. 1242.
Loc. No. 17.
— *invicta* Hust. Ibid. p. 88, fig. 1232. 1937–39, p. 254, 17: 42. CHOLNOKY 1954 d, p. 217, fig. 77.
Loc. Nos. 12, 13, 14, 17, 32.
Plate VIII, fig. 19: 14.0 × 4.0 μ. Very dense striae. (Sample No. 149, Loc. No. 13).
Somewhat similar to *N. inpunctata* Cholnoky (CHOLNOKY 1957 b, p. 353, figs. 54–57) and *N. perlucida* Hust. (HUSTEDT 1930–62, III, p. 87, fig. 1231).
— *kwamkuji* Hust. HUSTEDT 1922, p. 154, fig. 19.
Loc. Nos. 17, 19, 34, 46, 58, 59, 61, 62.
Previously reported from East Africa (HUSTEDT 1922, p. 154).
Plate VIII, fig. 11: 18.6 × 4.2 μ. Striae very dense. (Sample No. 220, Loc. No. 34).
— *perlucida* Hust. HUSTEDT 1930–62, III, p. 87, fig. 1231.
Loc. No. 18.
Plate VIII, fig. 18: 13.3 × 3.5 μ. Striae very dense. (Sample No. 159, Loc. No. 18).
— *standeri* Cholnoky. CHOLNOKY 1957 b, p. 354, fig. 67.
Loc. Nos. 17, 18, 58.
Previously reported from South Africa (CHOLNOKY 1957 b, p. 354).
Plate VIII, fig. 12: 16.6 × 4.6 μ. 28–30 striae in 10 μ. (Sample No. 295, Loc. No. 58).
Possibly related to *N. tridentula* Krasske sensu CHOLNOKY 1954 c, figs. 84, 85 and A. SCHMIDT Atlas 400: 85–87.
— *tridentula* Krasske. HUSTEDT 1930–62, III, p. 82, figs. 1223 a–c.
Loc. Nos. 34, 49.
Plate VIII, fig. 13: 16.7 × 3.4 μ. More than 30 striae in 10 μ. (Sample No. 221, Loc. No. 34).
— *tridentulaeformis* Bourelly. BOURELLY et MANGUIN 1949, p. 171, 7: 85.
Loc. Nos. 34, 36, 40, 58, 61.
Plate VIII, fig. 14: 11.5 × 3.4 μ. About 36 striae in 10 μ. (Sample No. 232, Loc. No. 36).

According to Bourelly et Manguin 1949, p. 172: "Differ de *N. tridentula* Krasske par l'absence d'area centrale transversalement élargie".

Navicula voltaensis nov. spec. Plate VIII, fig. 16.

Valves linear with almost parallel or very little convex sides, with obtusely protracted apices. 22 μ long, 5–6 μ broad. Raphe straight, filiform. Axial area very narrow, linear, no specially indicated central area. Transapical striae radial, about 36 in 10 μ.

Loc. No. 58.

Plate VIII, fig. 16: 22.0 $\times$ 5.3 μ. About 36 striae in 10 μ. (Sample No. 296, Loc. No. 58).

Illustration slide: Ghana No. 296/1961.

Type locality: East Ghana. Fresh water (the Volta river near the town Kete Krachi, Loc. No. 58).

Navicula bacillares Cleve.

Navicula aketechiensis nov. spec. Plate X, fig. 33.

Valves linear-elliptical with rounded apices. 30–35 μ long, 10–12 μ broad. Raphe filiform, straight. Axial area rather broad, slightly increasing in breadth from the poles towards the middle of the valve. No specially indicated central area. Transapical striae all radial, 21 in 10 μ, towards the apices somewhat denser.

Loc. No. 11.

Plate X, fig. 33: 33.6 $\times$ 10.7 μ. 21 striae in 10 μ. (Sample No. 136, Loc. No. 11).

Illustration slide: Ghana No. 136/1961.

Type locality: Southwest Ghana. Fresh water (a small river to the west of the town Takoradi, Loc. No. 11).

Perhaps closely related to *N. seminoides* Hust. (Hustedt 1927, p. 163, 5: 8 and Foged 1959, p. 62, 6: 2), which has a narrow axial area, whereas X: 33 has rather a broad axial area very slightly increasing in breadth from the apices towards the middle of the valve.

— *americana* Ehr. Hustedt 1930–62, III, p. 111, fig. 1246.

Loc. Nos. 2, 4, 41, 50, 54, 58, 62.

— *bacillum* Ehr. Ibid. p. 113, figs. 1248 a–d.

Loc. Nos. 2, 6, 8, 9, 11, 14, 16–18, 33, 34, 36, 40, 48, 54, 58–60, 62, 65.

Very rare in East Africa (Hustedt 1949 a, p. 88), and rare in Sierra Leone (Mölder 1962, p. 38).

— *bosumtwiensis* nov. spec. Plate IX, fig. 19.

Valves linear-elliptical, 20 μ long, 5–6 μ broad. Raphe linear, with rather long polar fissures deflected to the same side. The middle of the surface of the valve is without any visible structure. Transapical striae very short, only reaching about one fourth from the margin towards the raphe, 21–22 in 10 μ.

Loc. No. 26.

Plate IX, fig. 19: 20.0 $\times$ 5.4 μ. 21–22 striae in 10 μ. (Sample No. 192, Loc. No. 26).

Illustration slide: Ghana No. 192/1961.

Type locality: South Ghana. Fresh water (Bosumtwi Lake, Loc. No. 26).

Resembles *N. lucens* Hust. (Hustedt 1930–62, III, p. 177, fig. 1311), which has been found at the coast of Borneo, and at the coast of South Africa (Cholnoky 1963 c). IX: 19, however, differs considerably from *N. lucens*, first of all by having greatly lengthened polar fissures, but also by its considerably greater dimensions and denser striae.

— *demissa* Hust. Hustedt 1930–62, III, p. 160, figs. 1294 a, b.

Loc. No. 1.

Plate IX, fig. 5: 9.4 $\times$ 5.3 μ. 18 striae in 10 μ. (Sample No. 35, Loc. No. 1).

— *esamangensis* nov. spec. Plate VIII, fig. 20.

Valves linear-elliptical with broadly rounded apices. 18–20 μ long, 6 μ broad. Raphe linear, filiform, with short polar fissures deflected to the same side. Axial area linear, narrow, in the middle of the valve expanded into a small rounded central area. Transapical striae radial, about 24 in 10 μ; in the middle of the valve a few striae with a greater distance.

Loc. Nos. 12, 14, 19, 21, 29, 31–36, 39, 58, 61, 64.

Plate VIII, fig. 20: 19.3×6.0 μ. 24 striae in 10 μ. (Sample No. 207, Loc. No. 31).

Illustration slide: Ghana No. 207/1961.

Type locality: West Ghana. Fresh water (a small river, about 60 km. northwest of Kumasi, near the village Esamang).

Navicula helensis Schulz. HUSTEDT 1930–62, III, p. 179, fig. 1314.

Loc. No. 34.

Plate IX, fig. 3: 24.0×6.6 μ. 21–22 striae in 10 μ. (Sample No. 220, Loc. No. 34).

— *impexa* Hust. Ibid. p. 150, fig. 1282.

Loc. Nos. 4, 19, 29, 32, 34, 37, 39, 44, 46, 54, 62, 65.

Previously only reported from South Sweden (HUSTEDT 1930–62, III, p. 150).

— *insociabilis* Krasske. Ibid. p. 181, figs. 1315 a–h. A. SCHMIDT Atlas 400: 19–26, 103, 105. FOGED 1959, p. 54, 3: 11.

Syn.: *N. fritschii* (Hust.). LUND 1946, p. 77, figs. a–g. CHOLNOKY 1957, p. 62, fig. 130.

Plate XI, fig. 2: 11.4×4.7 μ. 18–19 striae in 10 μ. (Sample No. 70, Loc. No. 62).

Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 87).

— *kriegeri* Krasske. HUSTEDT 1930–62, III, p. 157, fig. 1290.

Loc. No. 32.

Plate IX, fig. 4: 12.2×4.2 μ. 16 striae in 10 μ. (Sample No. 215, Loc. No. 32).

— *langoraensis* nov. spec. Plate X, fig. 32.

Valves linear with parallel sides and flatly rounded apices. 20 μ long, 6–7 μ broad. Raphe filiform with short polar fissures deflected to the same side. Axial area narrow, in the middle of the valve slightly expanded into a central area. Transapical striae at right angles to the raphe, about 24 in 10 μ.

Loc. Nos. 32, 34, 39, 60.

Plate X, fig. 32: 20.0×6.5 μ. About 24 striae in 10 μ. (Sample No. 220, Loc. No. 34).

Illustration slide: Ghana No. 220/1961.

Type locality: West Ghana. Fresh water (the Black Volta river near the village Langora, Loc. No. 34).

— *medioconvexa* Hust. HUSTEDT 1930–62, III, p. 151, fig. 1283.

Loc. No. 14.

— *modica* Hust. Ibid. p. 154, fig. 1289.

Loc. No. 60.

Plate IX, fig. 7: 11.4×5.0 μ. 18–19 striae in 10 μ. (Sample No. 299, Loc. No. 60).

— *nyassensis* O. Müller. O. MÜLLER 1911, p. 83, 1: 5. A. SCHMIDT Atlas 396: 35–38. 397: 43. HUSTEDT 1949 a, p. 88, 5: 20.

Loc. Nos. 19, 33, 36, 40, 58, 60.

Widely distributed in lakes in East Africa (HUSTEDT 1949 a, p. 88).

Plate IX, fig. 14: 48×10.7 μ. 21–22 striae in 10 μ. (Sample No. 165, Loc. No. 19).

Plate IX, fig. 15: 36.0×12.7 μ. 18 striae in 10 μ. (Sample No. 293, Loc. No. 58). A somewhat deviating, wide specimen.

— *omissa* Hust. HUSTEDT 1930–62, III, p. 160, fig. 1295. 1957, p. 277, figs. 12, 13.

Loc. Nos. 3, 46, 47.

Previously reported from the Balkans and North Germany (HUSTEDT 1930–62, III, p. 160).

Plate IX, fig. 6: 11.3×5.4 μ. 18–20 striae in 10 μ. (Sample No. 73, Loc. No. 3).

Navicula pelliculosa (Bréb.) Hilse. HUSTEDT 1930–62, III, p. 172, fig. 1305.
Loc. No. 1.
Not rare in Sierra Leone (MÖLDER 1962, p. 39).

— *platycephala* O. Müller. O. MÜLLER 1911, p. 84, 1: 12. A. SCHMIDT Atlas 396: 34. HUSTEDT 1949 a, p. 89, 5: 19, 21, 22. CHOLNOKY 1956, p. 79, fig. 94.
Loc. Nos. 2, 3, 13, 15, 17, 19, 20, 23, 26–28, 30, 31, 33–37, 40, 51, 44, 49, 51, 55, 58, 59, 62, 65.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 89).
Plate IX, fig. 16: 46.7×12.0 μ. 18 striae in 10 μ. (Sample No. 284, Loc. No. 55).
Plate IX, fig. 17: 32.0×8.0 μ. 18–19 striae in 10 μ. (Sample No. 234, Loc. No. 37).

— — forma.
Loc. No. 41.
Plate IX, fig. 18: 57.4×8.0 μ. 20 striae in 10 μ. (Sample No. 243, Loc. No. 41).

— *pseudographa* Manguin. GUERMEUR 1954, p. 56, 10: 3.
Loc. Nos. 6, 30.
Plate X, fig. 28: 13.3×6.2 μ. 22–24 striae in 10 μ. (Sample No. 204, Loc. No. 30).
Plate XI, fig. 12: 12.0×5.3 μ. 18–19 striae in 10 μ. (Sample No. 203, Loc. No. 30).

— *pupula* Kütz. HUSTEDT 1930–62, III, p. 120, figs. 1254 a–g.
Loc. Nos. 1–6, 8, 9, 11–15, 17–21, 24–26, 28–35, 37, 40, 43, 44, 46, 47, 49, 50–53, 57–59, 61–63, 65–67.
Widely distributed and not rare in the Congo territory (HUSTEDT 1949 a, p. 88). Very common in Sierra Leone (Mölder 1962, p. 39).

— — fo. *capitata* Skvortzow et Meyer. Ibid. p. 121, figs. 1254 i–m.
Loc. Nos. 1–4, 7, 8, 10–16, 18, 19, 21–23, 26–29, 31, 32, 34, 38, 41–49, 52, 53, 57, 58, 60–62, 64–67.
Not rare in lakes in East Africa (HUSTEDT 1949 a, p. 88), and in Sierra Leone (MÖLDER 1962, p. 39).

— — fo. *elliptica* Hust. Ibid. p. 121, fig. 1254 h.
Loc. Nos. 12, 21, 29, 61.

— — fo. *rectangularis* (Greg.) Grun. Ibid. p. 121, figs. 1254 n-q.
Loc. Nos. 2–4, 15, 16, 21, 33, 36, 38–40, 44, 46, 52, 53, 58, 61, 62, 65–67.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 88), but very common in Sierra Leone (MÖLDER 1962, p. 39).

— — fo. *rostrata* Hust. Ibid. p. 121, fig. 155.
Loc. No. 58.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 88) and in Sierra Leone (MÖLDER 1962, p. 39).

— *thienemanni* Hust. HUSTEDT 1937–39, p. 235, 17: 16, 17. 1949 a, p. 82.
Loc. Nos. 13, 18–20, 32, 46, 60.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 82).
(var. *africana* Cholnoky reported, but very rare, from Sierra Leone (MÖLDER 1962, p. 40)).
Plate IX, fig. 8: 15.3×4.7 μ. 21 striae in 10 μ. (Sample No. 165, Loc. No. 19).

— *ventralis* Krasske. HUSTEDT 1930–62, III, p. 140, figs. 1273 a–d. FOGED 1959, p. 56, 3: 22.
Loc. Nos. 22, 23, 28, 31.
Very rare in Sierra Leone (MÖLDER 1962, p. 40).
Plate IX, fig. 9: 13.9×5.3 μ. 20 striae in 10 μ. (Sample No. 210, Loc. No. 31). Somewhat coarser striae than usual (28 in 10 μ).

Naviculae minisculae (Cleve) Hust.

Navicula abuensis nov. spec. Plate XII, fig. 10.
Valves rhomboid with rounded apices. 26 μ long, 8–9 μ broad. Raphe straight, filiform.

Axial area rhomboid, from the apices evenly increasing until three fourth of the breadth of the valve in the middle of the valve. Transapical striae short, ca. one fourth of the breadth of the valve, ca. 18 in 10 μ, distinctly punctate.

Loc. Nos. 1, 2, 4, 21, 22, 25–31, 33, 38, 58, 62, 65, 67.

Plate XII, fig. 10: 26.0×8.7 μ. 18 striae in 10 μ. (Sample No. 207, Loc. No. 31).

Illustration slide: Ghana No. 207/1961.

Type locality: West Ghana. Fresh water (the Abu river, a tributary to Tano river, Loc. No. 31).

Navicula ajenaensis nov. spec. Plate IX, fig. 1.

Valves linear-elliptical, 25–40 μ long, 5–8 μ broad. Raphe straight, filiform. Axial area narrow, linear, in the middle of the valve expanded into a rounded-off, slightly irregular central area. Transapical striae radial, 20–21 in 10 μ, in the middle of the valve a few shortened ones.

Loc. Nos. 58, 61.

Plate IX, fig. 1: 36.7×6.7 μ. 20 striae in 10 μ. (Sample No. 294, Loc. No. 58).

Illustration slide: Ghana No. 294/1961.

Type locality: East Ghana. Fresh water (the Volta river near the town Kete Krachi, Loc. No. 58).

Plate IX, fig. 2: 26.0×5.9 μ. 21 striae in 10 μ. (Sample No. 95, Loc. No. 61). Deviates from the typus by having somewhat curved raphe branches.

— *bacilliformis* Grun. Hustedt 1930, p. 273, fig. 446.

Loc. Nos. 2–4, 11, 23, 26, 30, 41, 53, 54, 64.

Very rare in lakes in East Africa (Hustedt 1949 a, p. 83), and rare in Sierra Leone (Mölder 1962, p. 37).

— *bamboiensis* nov. spec. Plate X, fig. 29.

Valves rhombic-elliptical with obtusely rounded apices. 10 μ long, 5–6 μ broad. Raphe filiform, straight. Axial area linear, narrow, in the middle of the valve expanded into a rounded central area. Transapical striae all radial, about 20 in 10 μ, denser towards the poles.

Loc. No. 34.

Plate X, fig. 29: 10.0×5.3 μ. 19–20 striae in 10 μ. (Sample No. 220, Loc. No. 34).

Illustration slide: Ghana No. 220/1961.

Type locality: West Ghana. Fresh water (the Black Volta river at the Bamboi ferry, Loc. No. 34).

— *bawdiaensis* nov. spec. Plate X, fig. 26.

Valves linear-elliptical with rounded apices. 16 μ long, 6 μ broad. Raphe straight, with polar fissures deflected to the same side. Axial area narrow, linear, in the middle of the valve expanded into an irregular central area extended across the valve. Transapical striae slightly radial, 24–25 in 10 μ.

Loc. Nos. 19, 58.

Plate X, fig. 26: 16.0×6.0 μ. 24–25 striae in 10 μ. (Sample No. 165, Loc. No. 19).

Illustration slide: Ghana No. 165/1961.

Type locality: Southwest Ghana. Fresh water (the Mansi river, a tributary to the Ankobra river, near the village Bawdia, Loc. No. 19).

Perhaps closely related to *N. variostriata* Krasske (Hustedt 1930–62, III, p. 201, fig. 1320), but the course of striae in the middle of the valve is somewhat different.

— *bicephala* Hust. Hustedt 1952, p. 398, fig. 106.

Loc. Nos. 18, 23.

Plate XVI, fig. 7: 21.3×4.2 μ. 18–19 striae in 10 μ. (Sample No. 163, Loc. No. 18).

— *butreensis* nov. spec. Plate IX, fig. 11.

Valves linear-elliptical with protracted, obtusely rounded apices. 12 μ long, 5 μ broad.

Raphe filiform, straight. Axial area rather narrow, linear. No specially indicated central area. Transapical striae at right angles to the raphe or slightly radial, 24 in 10 μ.
Loc. No. 6.
Plate IX, fig. 11: 12.0 × 5.0 μ. 24 striae in 10 μ. (Sample No. 116 b, Loc. No. 6).
Illustration slide: Ghana No. 116 b/1961.
Type locality: Southwest Ghana. Fresh water (the Butre river north of Cape Three Points, Loc. No. 6).

Navicula consentanea Hust. HUSTEDT 1939, p. 625, figs. 98–100.
Loc. No. 11.
Plate X, fig. 7: 16.0 × 4.7 μ. 18–20 striae in 10 μ. (Sample No. 136, Loc. No. 11).
Mesohalobous.
Differing somewhat from the typical form of *N. consentanea*, especially as regards apical striae, which in X: 7 are slightly convergent.

— *contenta* Grun. HUSTEDT 1930–62, III, p. 209, figs. 1328 a–d.
Loc. Nos. 11, 22, 29, 30, 31, 65.
Very common in Sierra Leone (MÖLDER 1962, p. 38).

— — fo. *biceps* Arnott. Ibid. p. 209, figs. 1328 h, l.
Loc. Nos. 4, 6, 8, 9, 11–14, 16–19, 22, 27, 30, 31, 33, 39, 64, 66.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 85). Fairly rare in Sierra Leone (MÖLDER 1962, p. 38).
Plate VIII, fig. 15: 7.0 × 2.7 μ. Striae very dense. (Sample No. 210, Loc. No. 31).
The shape of this very small specimen is, if anything, like that of *N. aërophila* Krasske (HUSTEDT 1930–62, III, fig. 1327), but striae, axial and central areas are as usual in *N. contenta* fo. *biceps*.

— — fo. *parallela* Boy Petersen. Ibid. p. 209, figs. 1328 e–g.
Loc. Nos. 6, 8, 11–13, 16–18, 22, 29, 31, 62, 67.
Rather common in Sierra Leone (MÖLDER 1962, p. 38).

— *confervacea* (Kütz.) Grun. Ibid. p. 205, figs. 1224 a–d. GUERMEUR 1954, p. 46, 7: 4.
Loc. Nos. 2–4, 6–19, 23, 27, 29, 31, 58, 59, 62, 67.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 97) and in Sierra Leone (MÖLDER 1962, p. 38).
Plate XII, fig. 6: 20.0 × 7.5 μ. 22 striae in 10 μ. (Sample No. 161, Loc. No. 18).

— *dugaensis* nov. spec. Plate X, fig. 25.
Valves linear-elliptical with rounded apices. 20–22 μ long, 6 μ broad. Raphe filiform, with polar fissures deflected to the same side. Axial area narrow, linear, in the middle of the valve expanded into a central area extended to the margins and with a few irregularly distributed striae. Transapical striae radial, about 22 in 10 μ, denser towards the apices.
Loc. Nos. 22, 64.
Plate X, fig. 25: 20.6 × 6.0 μ. 22 striae in 10 μ. (Sample No. 305, Loc. No. 64).
Illustration slide: Ghana No. 305/1961.
Type locality: East Ghana. Fresh water (a torrent between the villages Duga and Wuinta, Loc. No. 64).
Plate X, fig. 27: 14.7 × 4.7 μ. 21 striae in 10 μ. (Sample No. 173, Loc. No. 22). I refer this specimen to *N. dugaensis* with some doubt.

— *huniensis* nov. spec. Plate X, fig. 1.
Valves linear, with parallel sides and slightly protracted, obtusely rounded apices, 18 μ long, 6 μ broad. Raphe filiform, straight. Axial area narrow, no specially indicated central area. Transapical striae in the middle of the valve at right angles to the raphe, towards the apices slightly radial, 30–32 in 10 μ.
Loc. No. 17.

Plate X, fig. 1: 18.0×6.0 μ. 30–32 striae in 10 μ. (Sample No. 157, Loc. No. 17).
Illustration slide: Ghana No. 157/1961.
Type locality: Southwest Ghana. Fresh water (the Huni river, a tributary to the Ankobra river, Loc. No. 17).
Presumably this species is related to *N. abstrusa* Hust. (HUSTEDT 1930–62, III, p. 270, fig. 1378), in which all striae are radiating.

— *iniqua* Krasske. CHOLNOKY 1957 c, p. 75. A. SCHMIDT Atlas 398: 40–42.
Loc. Nos. 17, 19.
Plate X, fig. 24: 18.0×5.7 μ. 21 striae in 10 μ. (Sample No. 157, Loc. No. 17).

— *kolugoensis* nov. spec. Plate XII, fig. 9.
Valves broadly elliptical with broadly rounded apices. 17–18 μ long, 8–9 μ broad. Raphe filiform, straight. Axial area lanceolate, in the middle of the valve up to about one third of the breadth of the valve. Transapical striae radial, 12–15 in 10 μ, coarsely punctate.
Loc. Nos. 33, 41.
Plate XII, fig. 9: 18.0×8.0 μ. 12–13 striae in 10 μ. (Sample No. 244, Loc. No. 41).
Illustration slide: Ghana No. 244/1961.
Type locality: North Ghana. Freshwater (swamp near the river White Volta near the village Kolugo, Loc. No. 41).
Similar to *N. confervacea* (Kütz.) Grun., but in XII: 9 the striation is considerably coarser.

— *lawsonii* nov. spec. Plate X, fig. 6.
Valves linear with slightly convex expansion in the middle of the valve and with broadly rounded apices. 16 μ long, 3–4 μ broad. Raphe filiform, straight. Axial area narrow, in the middle expanded into a small rounded central area. Transapical striae, about 24 in 10 μ, in the middle of the valve slightly radial, towards the apices fairly highly convergent.
Loc. No. 26.
Plate X, fig. 6: 16.0×3.4 μ. 24 striae in 10 μ. (Sample No. 192, Loc. No. 26).
Illustration slide: Ghana No. 192/1961.
Type locality: South Ghana. Fresh water (Bosumtwi lake, Loc. No. 26).
Dedicated to the botanist, Dr. G. W. LAWSON, University of Ghana.

— *longicephala* Hust. HUSTEDT 1944, p. 277, fig. 17.
Loc. Nos. 12, 18.
Previously only reported from the Cameroons (HUSTEDT 1944, p. 277).
Plate XVI, fig. 8: 22.0×4.2 μ. 18 striae in 10 μ. (Sample No. 141, Loc. No. 12).

— *minima* Grun. HUSTEDT 1930–62, III, p. 249, fig. 1374.
Loc. Nos. 8, 19, 30, 31.
(var. *atomoides* (Grun.) Cleve is recorded as very rare from lakes in East Africa (HUSTEDT 1949 a, p. 84), and rare from Sierra Leone (MÖLDER 1962, p. 39)).
Plate X, fig. 22: 7.6×3.5 μ. 24–26 striae in 10 μ. (Sample No. 165, Loc. No. 10).

— *nunguaensis* nov. spec. Plate X, fig. 5.
Valves broadly elliptical, with narrowly protracted apices, 18–20 μ long, 5–6 μ broad. Raphe linear, filiform. Axial area linear, narrow; no specially indicated central area. Transapical striae at right angles to the raphe, 18–20 in 10 μ.
Loc. Nos. 1, 43, 46.
Plate X, fig. 5: 19.4×6.0 μ. 18–20 striae in 10 μ. (Sample No. 33, Loc. No. 1).
Illustration slide: Ghana No. 33/1961.
Type locality: South Ghana. Fresh water (cattle-pool at the Nungua farm, property of the University of Ghana, Loc. No. 1).
Seems to be closely related to *N. molesta* Krasske (HUSTEDT 1930–62, III, p. 252, fig. 1359). Especially deviating by the shape of the apices.

Navicula pseudagrestis Lund. Foged 1958, p. 101, 7: 16.
Loc. No. 63.
Plate X, fig. 23: 14.7×4.3 μ. 18 striae in 10 μ. (Sample No. 301, Loc. No. 63).

— *pseudofaceta* Guermeur. Guermeur 1954, 10: 8.
Loc. Nos. 3, 29, 66.
Plate X, fig. 18: 9.5×4.8 μ. 16–18 striae in 10 μ. (Sample No. 73, Loc. No. 3).

— *rotunda* Hust. Hustedt 1930–62, III, p. 273, fig. 1403.
Loc. Nos. 6, 11, 35, 47, 58, 64.
Plate X, fig. 16: 14.0×8.0 μ. 21–22 striae in 10 μ. (Sample No. 136, Loc. No. 11).

— *sansomei* nov. spec. Plate IX, fig. 12.
Valves elliptical with rather pointedly protracted apices. 14 μ long, 5–6 μ broad. Raphe filiform, straight. Transapical striae at right angles to the raphe or slightly radial, 18 in 10 μ. Axial area rather narrow, linear; no specially indicated central area.
Loc. Nos. 61, 62, 65.
Plate IX, fig. 12: 14.0×5.3 μ. 18 striae in 10 μ. (Sample No. 95, Loc. No. 61).
Illustration slide: Ghana No. 95/1961.
Type locality: East Ghana. Fresh water (the Volta river near the village Ajena, Loc. No. 61).
Dedicated to Professor, Dr. F. W. Sansome.

— *schadei* Krasske. Hustedt 1930–62, III, p. 222, fig. 1340.
Loc. Nos. 31, 32, 46.
Plate IX, fig. 10: 10.7×5.6 μ. 22–24 striae in 10 μ. (Sample No. 217, Loc. No. 32).
IX: 10 is with some doubt referred to this species, even though there is fairly good agreement as regards shape as well as structure.

— *seminuloides* Hust. Ibid. p. 244, fig. 1369 a.
Loc. Nos. 1, 6, 14, 17, 19, 25, 31, 32, 34, 58, 60.
Very rare in Sierra Leone (Mölder 1962, p. 40). (var. *sumatrana* Hust. is reported, but rarely, from lakes in East Africa (Hustedt 1949 a, p. 84)).
Plate X, fig. 12: 12.0×5.3 μ. 21 striae in 10 μ. (Sample No. 294, Loc. No. 58).
Plate X, fig. 13: 8.0×4.0 μ. 24–26 striae in 10 μ. (Sample No. 186, Loc. No. 25).
Plate X, fig. 14: 7.0×3.4 μ. 25–26 striae in 10 μ. (Sample No. 165, Loc. No. 19).
Plate X, fig. 17: 8.7×4.7 μ. 22 striae in 10 μ. (Sample No. 220, Loc. No. 34).
Presumably Plate X, fig. 15: 10.6×4.3 μ. 28–30 striae in 10 μ. (Sample No. 213, Loc. No. 29) is related to this species.

— *seminulum* Grun. Ibid. p. 241, fig. 1367.
Loc. Nos. 3, 22, 26, 28–30, 43, 46, 64.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 83), and in Sierra Leone (Mölder 1962, p. 40).
Plate X, fig. 8: 10.6×4.0 μ. 18 striae in 10 μ. (Sample No. 204, Loc. No. 30).
Plate X, fig. 9: 11.0×4.4 μ. 18–20 striae in 10 μ. (Sample No. 73, Loc. No. 3).
Plate X, fig. 10: 14.7×4.0 μ. 21 striae in 10 μ. (Sample No. 203, Loc. No. 29).

— *sorriensis* nov. spec. Plate XII, fig. 12.
Valves broadly elliptical with broadly protracted, obtusely rounded apices. 22 μ long, 8 μ broad. Raphe filiform, straight, with short polar fissures deflected to the same side. Axial area rather narrow, straight, in the middle of the valve expanded into an irregular, narrow central area with irregularly shortened transapical striae. Transapical striae 18 in 10 μ, crossed by 4 hyaline longitudinal stripes.
Loc. No. 35.
Plate XII, fig. 12: 22.0×8.0 μ. 18 striae in 10 μ. (Sample No. 227, Loc. No. 35).

Illustration slide: Ghana No. 227/1961.
Type locality: North Ghana. Fresh water (the Sorri river, a tributary to the White Volta in the Damongo reserve, Loc. No. 35).

Navicula subminuscula Manguin. HUSTEDT 1930–62, III, p. 257, fig. 1384. MANGUIN 1942, 2: 39.
Loc. Nos. 28, 60.
Plate X, fig. 21: 10.0×4.0 μ. 25–26 striae in 10 μ. (Sample No. 299, Loc. No. 60).

— *submolesta* Hust. HUSTEDT 1949 a, p. 86, 5: 16–18. 1930–62, III, p. 253, fig. 1380.
Loc. Nos. 6, 8, 13, 14, 16, 17, 19, 58.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 86).
Plate X, fig. 4: 16.6×4.7 μ. 21 striae in 10 μ. (Sample No. 123, Loc. No. 8).
With some doubt referred to this species:
Plate X, fig. 2: 13.3×5.3 μ. 22 striae in 10 μ. (Sample No. 149, Loc. No. 13), and
Plate X, fig. 3: 15.3×5.4 μ. 22 striae in 10 μ. (Sample No. 157, Loc. No. 17).
X: 2 and X: 3, which both are somewhat broader than usual in this species.
In dimensions and structure these forms also remind of *N. similis* Krasske var. *strigosa* Hust. (HUSTEDT 1937–39, p. 274, 19: 18), but this species has a small rounded central area, which is missing in those pictured here.

— *tantula* Hust. HUSTEDT 1930–62, III, p. 250, fig. 1375.
Loc. No. 26.
Very rare in the Congo territory (HUSTEDT 1949 a, p. 83).
Plate X, fig. 11: 16.6×4.1 μ. 18–20 striae in 10 μ. (Sample No. 194, Loc. No. 26).
X: 11 has larger valves and coarser striae than indicated for the species in HUSTEDT, but it is referred to this species especially because of the characteristic central area.

— *tranciloba* Guermeur. GUERMEUR 1954, p. 59, 10: 14.
Loc. Nos. 23, 31.
Previously reported from the Tropics in Africa (GUERMEUR 1954, p. 59).
Plate X, fig. 19: 12.7×4.0 μ. 27–28 striae in 10 μ. (Sample No. 180, Loc. No. 23).

— *vanidica* Cholnoky. CHOLNOKY 1962 b, p. 49, fig. 69.
Loc. No. 67.
Reported from South Africa (CHOLNOKY 1962 b, p. 49).
Plate X, fig. 20: 9.4×3.6 μ. 20–22 striae in 10 μ. (Sample No. 78, Loc. No. 67).
This taxon is somewhat similar to *N. muraliformis* Hust. (HUSTEDT 1930–62, III, p. 156, fig. 1289. 1949 a, p. 85, 4: 29, 30).

— *variostriata* Krasske. HUSTEDT 1930–62, III, p. 201, fig. 1320.
Loc. No. 34.

— *vitabunda* Hust. Ibid. p. 223, fig. 1341.
Loc. Nos. 12, 31.
Plate IX, fig. 13: 12.3×5.3 μ. 23–24 striae in 10 μ. (Sample No. 141, Loc. No. 12).

Naviculae microstigmaticae (Cleve) Hust.

Navicula limata Hust. HUSTEDT 1944, p. 274, 8: 7.
Loc. No. 11.
Previously recorded from the Cameroons (HUSTEDT 1944, p. 284).

— *protracta* Grun. HUSTEDT 1930–62, III, p. 315, fig. 1433.
Loc. No. 11.
According to MÖLDER (1962, p. 39) *N. prostrata* Grun. is rather common in Sierra Leone. Presumably, owing to a misprint, it is *N. protracta* Grun.
Halophilous.

Naviculae lyratae Cleve.

Navicula auriculata Hust. Hustedt 1944, p. 273, fig. 4.
Loc. Nos. 1–6, 8, 9, 12, 13, 17–19, 21, 22, 23, 24, 28, 29, 31, 32, 34, 58–62, 65, 67.
Plate X, fig. 31: 12.0×6.0 μ. 15–16 striae in 10 μ. (Sample No. 220, Loc. No. 34).
Plate XI, fig. 1: 15.3×6.7 μ. 18 striae in 10 μ. (Sample No. 37, Loc. No. 1).
If the species found here is in agreement with the species from a lagoon in the Cameroons described by Hustedt (1944, p. 273, fig. 4), it must no doubt be considered a freshwater species as it is rather common in many samples from the whole country.

— *pygmaea* Kütz. Hustedt 1930, p. 299, fig. 513.
Loc. Nos. 1, 4, 11, 22, 31, 38, 43, 44, 46, 67.
Mesohalobous.

Naviculae punctatae (Cleve) Hust.

Navicula abelioensis nov. spec. Plate XI, fig. 22.
Valves linear with slightly convex sides and broadly protracted, obtusely rounded apices. 16 μ long, 4–5 μ broad. Raphe filiform, straight. Axial area very narrow. Central area a rather broad transversal band extended to the margins. Transpical striae radial, about 24 in 10 μ, distinctly punctate.
Loc. No. 46.
Plate XI, fig. 22: 16.0×4.7 μ. 24 striae in 10 μ. (Sample No. 254, Loc. No. 46).
Illustration slide: Ghana No. 254/1961.
Type locality: North Ghana. Fresh water (cattle-pool near the village Abelio, southwest of Navrongo, Loc. No. 46).
Very much resembles *Stauroneis borrichii* Boye Petersen var. *undulata* Boye Petersen (Syn.: *S. undata* Hust. sensu Hustedt 1937–39, p. 237, 17: 7) and *S. borrichii* (Petersen) Lund (Hustedt 1930–62, III, p. 803, fig. 1151), but XI: 22 is not seen to have pseudo-septae at the apices and amongst other things must therefore presumably be considered an *N.* species.

— *abonuensis* nov. spec. Plate XI, fig. 4.
Valves linear-elliptical, 20–25 μ long, 6–7 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area rather broad, linear, in the middle of the valve expanded into a central area extended across the valve. Transapical striae radial, about 20 in 10 μ, distinctly punctate; in the middle of the valve they are irregularly shortened.
Loc. No. 26.
Plate XI, fig. 4: 20.8×6.7 μ. 20 striae in 10 μ. (Sample No. 194, Loc. No. 26).
Illustration slide: Ghana No. 194/1961.
Type locality: South Ghana. Fresh water (pool near the shore of Bosumtwi Lake, near the village Abonu, Loc. No. 26).
Similar to *N. scabellum* Hust. (Hustedt 1942, p. 62, fig. 112), and *N. comoides* (Ag.?) Perag. (Hustedt 1930–62, III, p. 304, fig. 1423).

— *adampeensis* nov. spec. Plate XIII, fig. 4.
Valves elliptical with very shortly protracted, broadly rounded apices. 32 μ long, 17–18 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area narrow, linear, in the middle of the valve expanded into a small rounded central area. Transapical striae radial, 12 in 10 μ, rather coarsely punctate, somewhat denser towards the apices.
Loc. Nos. 14, 15, 62.
Plate XIII, fig. 4: 32.0×17.3 μ. 12 striae in 10 μ. (Sample No. 102, Loc. No. 62).
Illustration slide: Ghana No. 102/1961.

Type locality: Southeast Ghana. Fresh water (reservoir at the University farm near the village Kpong). Adampe, the name of a tribe in Southeast Ghana.

Navicula akimensis nov. spec. Plate XIII, fig. 2.

Valves elliptical with obtusely proboscidiform apices. 40 μ long, 15–16 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area narrow, linear. Central area rounded, irregularly delimited, on one side with two isolated stigmata. Transapical striae radial, 12 in 10 μ, in the middle of the valve with inserted shorter striae; towards the apices a little denser; rather coarsely punctate.

Loc. No. 33.

Plate XIII, fig. 2: 40.0×15.5 μ. 12 striae in 10 μ. (Sample No. 218, Loc. No. 33).

Illustration slide: Ghana No. 218/1961.

Type locality: West Ghana. Fresh water (a tributary to the river Black Volta, north of the town Wenchi, Loc. No. 33). Akim, the name of a tribe in the Ashanti territory.

This species has some resemblance, especially regarding the shape of the valve, to *N. densa* Hust. (Hustedt 1944, p. 284, fig. 28), but *N. densa* differs by having the polar fissures bent to opposite sides and having somewhat denser striae.

— *ancisa* Hust. Hustedt 1953, p. 150, fig. 3.

Loc. Nos. 5, 12, 18, 21, 26–28, 30, 31, 35, 45, 58, 65.

Previously reported from the south of Tunisia (Hustedt 1953, p. 150).

Plate XI, fig. 16: 22.0×5.4 μ. 18 striae in 10 μ. (Sample No. 159, Loc. No. 18).

Somewhat doubtful as regards identity with *N. ancisa*, which usually is considerably smaller than the form occurring in Ghana.

— *ashantiensis* nov. spec. Plate XIII, fig. 5.

Valves elliptically lanceolate with shortly protracted and obtusely rounded apices, 35–40 μ long, 15–16 μ. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area narrow, in the middle of the valve expanded into an irregular central area of one fourth to one third of the breadth of the valve. Transapical striae radial, 12–13 in 10 μ, a few shorter ones being inserted in the middle of the valve, towards the apices a little denser, distinctly punctate.

Loc. Nos. 14, 34, 35, 58.

Plate XIII, fig. 5: 37.3×16.0 μ. 12–13 striae in 10 μ. (Sample No. 220, Loc. No. 34).

Illustration slide: Ghana No. 220/1961.

Type locality: West Ghana. Fresh water (the Black Volta river at the Bamboi ferry, Loc. No. 34). Ashanti, the name of a native state in Ghana.

— *bannajensis* Boye Petersen. J. Boye Petersen 1946, p. 86, fig. 10. Foged 1959, p. 58, 3: 23, 24.

Loc. Nos. 1, 3, 18, 22, 29, 41, 46, 49, 62, 67.

Previously only reported from Asia (Boye Petersen 1946, p. 86. Foged 1959, p. 58).

Plate XII, fig. 4: 16.0×5.3 μ. 18 striae in 10 μ. (Sample No. 163, Loc. No. 18).

Plate XII, fig. 5: 19.3×7.3 μ. 20 striae in 10 μ. (Sample No. 173, Loc. No. 22).

— *bertelsenii* nov. spec. Plate XI, fig. 23.

Valves elliptical with broadly protracted, obtusely rounded apices, 20–25 μ long, 6–7 μ broad. Raphe filiform, straight. Axial area narrow, linear, in the middle expanded into a rounded central area of one third to half the breadth of the valve. Transapical striae radial, 18 in 10 μ, in the middle of the valve with greater mutual distance and more coarsely punctate than at the apices.

Loc. Nos. 31, 66.

Plate XI, fig. 23: 23.3×6.7 μ. 18 striae in 10 μ. (Sample No. 207, Loc. No. 31).

Illustration slide: Ghana No. 207/1961.

Type locality: West Ghana. Fresh water (pool, about 60–62 km's northwest of the town Kumasi, Loc. No. 31).

Dedicated to POUL BERTELSEN, M.A., Senior Tutor at the University of Ghana.

Somewhat similar to *N. grimmei* Krasske (HUSTEDT 1930, p. 274, fig. 448).

Navicula chadwickii nov. spec. Plate XII, fig. 8.

Valves lanceolate with slightly protracted apices. 24–26 μ long, 6–7 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area very narrow, linear, not expanded in the middle of the valve. Transapical striae all radial, 22–24 in 10 μ, very finely punctate.

Loc. No. 30.

Plate XII, fig. 8: 24.7 × 6.7 μ. 22–24 striae in 10 μ. (Sample No. 205, Loc. No. 30).

Illustration slide: Ghana No. 205/1961.

Type locality: West Ghana. Fresh water (a tributary to the Apropong river, Loc. No. 30).

Dedicated to R. CHADWICK, Game Warden of the Damongo reserve.

— *damongensis* nov. spec. Plate XI, fig. 14.

Valves linear-elliptical with rounded apices. 18–20 μ long, 5–6 μ broad. Raphe filiform, straight, with polar and central fissures deflected to the same side. Axial area rather broad with a central area that is rather a broad band extended to the sides of the valves. Transapical striae with two hyaline longitudinal stripes, 20–21 in 10 μ.

Loc. No. 35.

Plate XI, fig. 14: 18.6 × 5.3 μ. 21 striae in 10 μ. (Sample No. 223, Loc. No. 35).

Illustration slide: Ghana No. 223/1961.

Type locality: Central Ghana. Fresh water (the Sorri river, tributary to the Black Volta in the reserve south of the village Damongo, Loc. No. 35).

— *densa* Hust. HUSTEDT 1944, p. 284, fig. 28.

Loc. Nos. 21, 65.

Previously reported from a lagoon in the Cameroons (HUSTEDT 1944, p. 284: "wahrscheinlich eingeschleppte Süsswasserform").

Plate XIII, fig. 3: 37.3 × 15.3 μ. 12 striae in 10 μ. (Sample No. 308, Loc. No. 65).

XIII: 3: Polar fissures deflected in opposite directions. Dimensions of the valves somewhat greater than indicated by HUSTEDT (1944, p. 284), but otherwise good agreement.

— *densuensis* nov. spec. Plate XII, fig. 7.

Valves linear-elliptical with much protracted apices, 30–35 μ long, 7–8 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area very narrow, linear, not expanded in the middle of the valve. Transapical striae at right angles to the raphe, 16 in 10 μ, in the middle of the valve coarsely punctate, towards the apices more finely punctate.

Loc. No. 3.

Plate XII, fig. 7: 32.6 × 7.2 μ. 16 striae in 10 μ. (Sample No. 73, Loc. No. 3).

Illustration slide: Ghana No. 73/1961.

Type locality: South Ghana. Fresh water (the Densu river, west of the capital Accra, Loc. No. 3).

Perhaps related to *N. cryptocephaloides* Hust. (HUSTEDT 1937–39, p. 261, 18: 12), which, however, deviates by having another form of central area.

— *fawumangensis* nov. spec. Plate XI, fig. 17.

Valves broadly elliptical, with broadly protracted, obtusely rounded apices. 16–18 μ long, 5–6 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area very narrow, linear, with a central area with a single short stria, extended to the margins. Transapical striae radial, 16 in 10 μ, in the middle of the valve at right angles to the raphe at the apices, coarsely punctate.

Loc. No. 30.
Plate XI, fig. 17: 16.7×5.2 μ. 16–17 striae in 10 μ. (Sample No. 204, Loc. No. 30).
Illustration slide: Ghana No. 204/1961.
Type locality: West Ghana. Fresh water (a small river near the village Fawumang, about 40–41 km. northwest of the town Kumasi, Loc. No. 30).
This species is somewhat similar to *N. ancisa* Hust. (HUSTEDT 1953, p. 150, fig. 9).

Navicula finitima. Hust. HUSTEDT 1949 a, p. 90, 4: 29, 30.
Loc. No. 8.
Very rare in the Congo territory (HUSTEDT 1949 a, p. 90).
Plate XII, fig. 2: 20.0×10.6 μ. 18–20 striae in 10 μ. (Sample No. 121, Loc. No. 8).

— *grimmei* Krasske. HUSTEDT 1930, p. 274, fig. 448. 1949 a, p. 83.
Loc. Nos. 22, 47.
The commonest *N.* species in the samples from the Congo territory worked up in HUSTEDT 1949 a.
Plate XI, fig. 15: 22.0×6.7 μ. 18–20 striae in 10 μ. (Sample No. 260, Loc. No. 47). Striae somewhat coarser than usual.

— — var. *rostellata* Hust. HUSTEDT 1937–39, p. 236, 17: 14.
Loc. Nos. 1, 8, 12, 13, 18, 19, 22, 24, 61.

— *grundtvigii* nov. spec. Plate XIII, fig. 6.
Valves elliptical-lanceolate, with protracted, obtusely rounded apices. 34–38 μ long, 15–16 μ broad. Raphe filiform, straight. Axial area narrow, linear, in the middle of the valve expanded into a small rounded central area of about one fifth to one fourth of the breadth of the valve. Transapical striae radial, 13 in 10 μ; in the middle of the valve a single shortened stria on each side of the valve; a little denser towards the apices, distinctly punctate.
Loc. No. 60.
Plate XIII, fig. 6: 34.6×15.9 μ. 13 striae in 10 μ. (Sample No. 299, Loc. No. 60).
Illustration slide: Ghana No. 299/1961.
Type locality: East Ghana. Fresh water (the Asukawkaw river, a tributary to the Volta river, near the village Akroso, Loc. No. 60).
Named after a Dane JACOB GRUNDTVIG (1777–1800), who was a pastor in Guinea 1800.

— *ingoldii* nov. spec. Plate XII, fig. 3.
Valves elliptical with slightly protracted, obtusely rounded apices. 25–30 μ long, 10–11 μ broad. Raphe filiform, straight. Axial area narrowly lanceolate, evenly increasing in breadth from the apices to about one fifth of the breadth of the valve in the middle. Transapical striae radial, 15 in 10 μ, distinctly punctate.
Loc. Nos. 11, 17.
Plate XII, fig. 3: 26.7×10.7 μ. 15 striae in 10 μ. (Sample No. 157, Loc. No. 17).
Illustration slide: Ghana 157/1961.
Type locality: Southwest Ghana. Fresh water (the Huni river, a tributary to the Ankobra river, about 12 km. from the village Tarkwa, Loc. No. 17).
Dedicated to the English botanist, Professor C.T. INGOLD, Ph. D.

— *inserata* Hust. var. *undulata* Hust. HUSTEDT 1955 b, p. 125, figs. 16, 17. CHOLNOKY 1960 a, p. 66, figs. 206–208.
Loc. No. 6.
Plate XI, fig. 20: 19.3×10.0 μ. 22 striae in 10 μ. (Sample No. 114, Loc. No. 6).
Mesohalobous (?).

— *isertii* nov. spec. Plate XII, fig. 16.
Valves elliptical, with broadly proboscidiform apices, flatly rounded at the poles. 30–32 μ long, 12–13 μ broad. Raphe filiform, straight, with polar fissures deflected to the same

side. Axial area narrow, linear. Central area small, rounded. Transapical striae radial, about 11 in 10 μ, coarsely punctate, towards the apices at right angles to the raphe and denser. In the middle of the valve a few striae are shortened.

Loc. Nos. 1, 23, 30, 66.

Plate XII, fig. 16: 30.6 × 12.2 μ. 11 striae in 10 μ. (Sample No. 205, Loc. No. 30).

Illustration slide: Ghana No. 205/1961.

Type locality: West Ghana. Fresh water (a small river, near the village Dwinyana, Loc. No. 30).

Named after the Dane P. E. Isert, a Royal Danish Senior Surgeon in Guinea 1783–87. He made planting experiments, and he left valuable records concerning the flora and fauna in Guinea.

Navicula kotschyi Grun. A. Schmidt Atlas 370: 31, 32. Foged 1953, p. 43, 4: 8. Hustedt 1937–39, p. 235.

Loc. Nos. 6, 14, 19, 22, 28, 32, 65.

Very rare in Sierra Leone (Mölder 1962, p. 38).

— *kpongensis* nov. spec. Plate XII, fig. 14.

Valves lanceolate, with much protracted apices, 30–35 μ long, 7–8 μ broad. Raphe filiform, straight, with short polar fissures deflected to the same side. Axial area narrow, linear, in the middle of the valve expanded into a rounded central area one third to one half of the breadth of the valve. Transapical striae radial, 17–18 in 10 μ, distinctly punctate, denser towards the apices.

Loc. Nos. 8, 9, 11, 12, 22, 29, 62.

Plate XII, fig. 14: 31.3 × 7.5 μ. 17–18 striae in 10 μ. (Sample No. 101, Loc. No. 62).

Illustration slide: Ghana No. 101/1961.

Type locality: Southeast Ghana. Fresh water (a small river near the University Farm near Kpong, Loc. No. 62).

— *lagerheimii* Cleve. P. T. Cleve 1894–95, I, p. 131. Hustedt 1949 a, p. 81. A. Schmidt Atlas 370: 19–21.

Loc. Nos. 2, 4, 7, 8, 12–20, 22, 23, 30, 33, 56, 66.

Widely distributed and not rare in the Congo territory (Hustedt 1949 a, p. 81).

Plate XI, fig. 9: 24.0 × 6.7 μ. 21 striae in 10 μ. (Sample No. 159, Loc. No. 18).

— — var. *intermedia* Hust. Hustedt 1937–39, p. 234, 17: 12. 1955 b, p. 121–122.

Loc. No. 25.

Plate XI, fig. 8: 38 × 9.4 μ. 21 striae in 10 μ. (Sample No. 186, Loc. No. 25).

— *laingii* nov. spec. Plate XII, fig. 1.

Valves broadly linear, with slightly convex sides and broadly rounded apices. 40 μ long, 12 μ broad. Raphe filiform, straight. Axial area rather broad and in the middle of the valve expanded into a longitudinally rounded central area, about one third of the breadth of the valve. Transapical striae radial, 18 in 10 μ, in the middle of the valve alternately short and long, near the apices at right angles to the raphe and denser; all striae coarsely punctate.

Loc. Nos. 18, 34, 58, 62.

Plate XII, fig. 1: 40 × 12 μ. 18 striae in 10 μ. (Sample No. 220, Loc. No. 34).

Illustration slide: Ghana No. 220/1961.

Type locality: West Ghana. Fresh water (the river Black Volta at the Bamboi ferry, Loc. No. 34).

Dedicated to the Ghanaian botanist E. Laing, Ph. D., of the University of Ghana.

Perhaps it is related to *N. riojae* Cleve (P. T. Cleve 1894–95, I, p. 137), and the variety of the same species var. *punctata* Frenguelli (Krasske 1948, p. 432, 2: 1, 2)

— *mansiensis* nov. spec. Plate XI, fig. 3

Valves broadly elliptical with protracted, obtusely rounded apices, 18–20 μ long, 6–7 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area very narrow, linear, without any specially indicated central area. Transapical striae in the middle of the valve radial, towards the apices at right angles to the raphe, about 22 in 10 μ; in the middle of the valve a few shorter striae.

Loc. No. 19.

Plate XI, fig. 3: 18.0×6.0 μ. 22 striae in 10 μ. (Sample No. 166, Loc. No. 19).

Illustration slide: Ghana No. 166/1961.

Type locality: Southwest Ghana. Fresh water (the Mansi river, a tributary to the Ankobra river, Loc. No. 19).

It seems to be related to *N. opressa* Hust. (HUSTEDT 1952 b, p. 397, fig. 119), which has been recorded from a river in Brazil.

Navicula monradii nov. spec. Plate XII, fig. 11.

Valves linear-lanceolate, 26 μ long, 6 μ broad. Raphe filiform, straight. Axial area rather narrow, straight, in the middle somewhat expanded into an oblong, elliptical central area, about one third of the breadth of the valve. Transapical striae radial, 24 in 10 μ, finely punctate.

Loc. Nos. 1, 6, 8, 9, 12, 13, 17–19, 21, 22, 24, 25, 27–34, 36, 49, 57, 58, 60–62, 67.

Plate XII,. fig 11: 26.0×6.0 μ. 24 striae in 10 μ. (Sample No. 220, Loc. No. 34).

Illustration slide: Ghana No. 220/1961.

Type locality: West Ghana. Fresh water (the river Black Volta at the Bamboi ferry, Loc. No. 34).

Named after the Dane H.C. MONRAD, pastor at Christiansborg 1805–09.

— *mutica* Kütz. HUSTEDT 1930, p. 274, fig. 453 a.

Loc. Nos. 1–6, 8, 11–18, 20–25, 27, 30, 31, 34, 35, 38, 41, 43, 44, 46, 53, 56, 58, 60–62, 64–67.

Rare in lakes in East Africa (HUSTEDT 1949 a, p. 81). Very common in Sierra Leone (MÖLDER 1962, p. 39).

— — var. *cohnii* (Hilse) Grun. Ibid. p. 275, fig. 453 b.

Loc. Nos. 1–6, 8, 9, 11–19, 22–24, 28–32, 37, 38, 44, 46, 47, 53, 56, 59–61, 64–67.

Plate X, fig. 30: 8.7×4.8 μ. 22–24 striae in 10 μ. (Sample No. 114, Loc. No. 6).

— — fo. *nivalis* (Ehr.) Hust. Ibid. p. 275, fig. 453 c.

Loc. Nos. 1, 6.

— — formae.

Loc. No. 1.

Plate XI, fig. 13: 12.0×7.5 μ. 15 striae in 10 μ. (Sample No. 37, Loc. No. 1).

Plate XI, fig. 19: 12.0×8.0 μ. 12 striae in 10 μ. (Sample No. 34, Loc. No. 1).

Both have very coarse striae. In shape they are closely related to fo. *cohnii*, but they have not the isolated stigma in the central area which is usually found in *N. mutica* and its varieties.

— *muticoides* Hust. HUSTEDT 1949 a, p. 82, 4: 33–36.

Loc. Nos. 1, 6, 19, 20, 23, 25, 27, 30, 31, 51, 53, 64.

Rare in lakes in East Africa (HUSTEDT 1949 a, p. 82), and fairly rare in Sierra Leone (MÖLDER 1962, p. 39).

— *navrongensis* nov. spec. Plate XI, fig. 11.

Valves linear-elliptical, with obtusely rounded apices. 14–25 μ long, 4–6 μ broad. Raphe filiform, straight, with central and polar fissures deflected to the same side. Axial area narrow, linear, in the middle of the valve expanded into a transversely extended central area reaching halfway or three fourths of the distance to the margin. Transapical striae 20–24 in 10 μ, crossed by several hyaline longitudinal lines.

Loc. Nos. 1, 19, 45, 46, 48, 49, 66.

Plate XI, fig. 11: 21.5×6.0 μ. 23–24 striae in 10 μ. (Sample No. 254, Loc. No. 46).

Illustration slide: Ghana No. 254/1961.

Type locality: North Ghana. Fresh water (a cattle-pool near the village Navrongo, Loc. No. 46).

Plate XI, fig. 10: 14.6×4.0 μ. 18 striae in 10 μ. (Sample No. 262, Loc. No. 48).

Navicula nsutaensis nov. spec. Plate XI, fig. 18.

Valves elliptical with rather narrowly protracted, rounded apices. 18–20 μ long, 6 μ broad. Raphe filiform, straight. Axial area narrow, linear, with an irregular, transversally extended central area. Transapical striae radial, 17–18 in 10 μ. in the middle of the valve of irregular length; punctate.

Loc. Nos. 5, 31, 44, 47, 67.

Plate XI, fig. 18: 19.4×6.0 μ. 17–18 striae in 10 μ. (Sample No. 207, Loc. No. 31).

Illustration slide: Ghana No. 207/1961.

Type locality: West Ghana. Fresh water (a small river near the village Nsuta, northwest of Kumasi, Loc. No. 31).

Plate XI, fig. 21: 19.3×5.3 μ. 18 striae in 10 μ. (Sample No. 81, Loc. No. 67).

— *obstinata* Krasske. Krasske 1939, p. 557, figs. 13, 14.

Loc. No. 11.

Previously reported from Brazil (Krasske 1939, p. 557).

Plate XI, fig. 5: 12.0×5.0 μ. 18 striae in 10 μ. (Sample No. 136, Loc. No. 11). Only with some doubt referred to *N. obstinata* Krasske.

— *omegopsis* Hust. Hustedt 1944, p. 275, fig. 8.

Loc. Nos. 58, 61.

Previously reported from a lagoon in the Cameroons (Hustedt 1944, p. 275).

Plate XIII, fig. 1: 53.3×21.0 μ. 12 striae in 10 μ. (Sample No. 294, Loc. No. 58). Polyhalobous.

— *schweickerdtii* Cholnoky. Cholnoky 1952, p. 129, fig. 161.

Loc. Nos. 14, 20, 21.

Previously recorded from South Africa (Cholnoky 1952, p. 129).

Plate XI, fig. 6: 12.6×7.6 μ. About 30 striae in 10 μ. (Sample No. 171, Loc. No. 21).

— *subinsoensis* nov. spec. Plate XII, fig. 13.

Valves broadly elliptical, with rather much protracted apices. 24–25 μ long, 7–8 μ broad. Raphe filiform, straight. Axial area narrow, linear, in the middle of the valve expanded into a transversally extended central area of about three fourths of the breadth of the valve. Transapical striae radial, 22–23 in 10 μ, distinctly punctate.

Loc. No. 33.

Plate XII, fig. 13: 24.3×7.5 μ. 22–23 striae in 10 μ. (Sample No. 218, Loc. No. 33).

Illustration slide: Ghana No. 218/1961.

Type locality: West Ghana. Fresh water (the Suhin river near the village Subinso, Loc. No. 33).

— *suecorum* Carlsson. Hustedt 1949 b, p. 49, figs. 33–35. Cholnoky 1956, p. 80, fig. 97.

Loc. Nos. 4, 17, 21, 32, 33, 65.

Previously recorded from the Sinai Peninsula (Hustedt 1949 b, p. 49), and from South Africa (Cholnoky 1956, p. 80).

Plate XI, fig. 7: 37.3×10.0 μ. 22 striae in 10 μ. (Sample No. 218, Loc. No. 33).

— *syrachii* nov. spec. Plate No. XI, fig. 24.

Valves broadly elliptical with obtusely rounded apices, 12–15 μ long, 5–6 μ broad. Raphe filiform, straight. Axial area narrow, in the middle expanded into a rounded, somewhat irregular central area of half to one third of the breadth of the valve. Transapical striae radial, 24–26 in 10 μ, of irregular length in the middle of the valve; punctate.

Loc. No. 61.

Plate XI, fig. 24: 13.3×5.9 μ. 24–26 striae in 10 μ. (Sample No. 95, Loc. No. 61).

Illustration slide: Ghana No. 95/1961.
Type locality: East Ghana. Fresh water (the Volta river, near Ajena, Loc. No. 61).
Dedicated to the Danish forest botanist C. SYRACH LARSEN, Dr. Agro. & Dr. Phil. h. c.

Naviculae lineolatae Cleve.

Navicula abraensis nov. spec. Plate XV, fig. 12.
Valves elliptical, 32 μ long, 8–9 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area narrow, linear. Central area rounded, transversally extended to about half of the breadth of the valve. Transapical striae rather highly radial, 10 in 10 μ.
Loc. Nos. 8, 11, 21, 30, 32.
Plate XV, fig. 12: 32×8.7 μ. 10 striae in 10 μ. (Sample No. 124, Loc. No. 8).
Illustration slide: Ghana No. 124/1961.
Type locality: Southwest Ghana. Freshwater (a small river in the rain forest near the village Abra between Takoradi and Axim, Loc. No. 8).
Closely related to *N. perobesa* Hust. (A. SCHMIDT, Atlas 295: 22–25), but XV: 12 has more radial striae, especially at the apices.

— *ammophila* Grun. P.T. CLEVE 1894–95, II, p. 29. CHOLNOKY 1960 a, p. 51, figs. 150–155.
Loc. Nos. 4, 6, 8, 12, 13, 16, 21–23, 26, 28, 29, 31, 32, 39, 40, 56, 60, 61, 67.
Mesohalobous.
According to P.T. CLEVE (1894–95, II, p. 29), this species is a marine or brackish water species. The determination has mainly been made on the basis of CHOLNOKY (1960 a, figs. 150–55).
Plate XV, fig. 13: 23.2×5.6 μ. 12–13 striae in 10 μ. (Sample No. 217, Loc. 32). Determination uncertain.

— *anglica* Ralfs. HUSTEDT 1930, p. 303, figs. 530, 531.
Loc. Nos. 26, 29–31.
Common in Sierra Leone (MÖLDER 1962, p. 37).

— *asanwinsoensis* nov. spec. Plate XIV, fig. 15.
Valves linear with slightly convex sides and rather far protracted, obtusely rounded apices. 20–22 μ long, 6–7 μ broad. Raphe filiform, linear. Axial area linear, rather broad, in the middle of the valve expanded into a central area of about half of the breadth of the valve. Transapical striae at right angles to the raphe or slightly radial, 15 in 10 μ.
Loc. No. 22.
Plate XVI, fig. 15: 20.7×6.6 μ. 15 striae in 10 μ. (Sample No. 173, Loc. No. 22.).
Illustration slide: Ghana No. 173/1961.
Type locality: Southwest Ghana. Fresh water (the Ankobra river near the village Asanwinso, Loc. No. 22).

— *bansoensis* nov. spec. Plate XIV, fig. 4.
Valves broadly elliptical, with rounded apices. 20–25 μ long, 10 μ broad. Raphe filiform, straight. Axial area rather narrow, linear, not expanded in the middle of the valve. Transapical striae radial, 12 in 10 μ, in the middle of the valve alternately long and short; denser towards the apices.
Loc. No. 8.
Plate XIV, fig. 4: 23.3×10.0 μ. 12 striae in 10 μ. (Sample No. 122, Loc. No. 8).
Illustration slide: Ghana No. 122/1961.
Type locality: Southwest Ghana. Fresh water (a small river near the village Banso between Takoradi and Axim, Loc. No. 8).

— *carloffii* nov. spec. Plate XV, fig. 6.
Valves linear-lanceolate with obtusely protracted, rounded apices. 15–20 μ long, 3–4 μ

broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area narrow, straight. Transapical striae in the middle of the valve at right angles to the raphe, towards the apices slightly convergent, 15 in 10 μ; denser towards the apices.

Loc. No. 30.

Plate XV, fig. 6: 16.7×3.4 μ. 15 striae in 10 μ. (Sample No. 204, Loc. No. 30).

Illustration slide: Ghana No. 204/1961.

Type locality: West Ghana. Fresh water (a small river near the village Dwinyana, northwest of Kumasi, Loc. No. 30).

Named after H. Carloff, the first Danish Governor in Guinea, 1658.

Navicula carstensenii nov. spec. Plate XIV, fig. 11.

Valves lanceolate, tapering, and proboscidiform to capitately protracted towards the apices. 33–35 μ long, 8–9 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area narrow, linear, in the middle of the valve expanded into a rounded central area, one third to half of the breadth of the valve. Transapical striae radial, 12 in 10 μ, towards the apices at right angles to the raphe, coarsely punctate (in longitudinal stripes).

Loc. No. 26.

Plate XIV, fig. 11: 33.3×8.0 μ. 12 striae in 10 μ. (Sample No. 188, Loc. No. 26).

Illustration slide: Ghana No. 188/1961.

Type locality: South Ghana. Fresh water (Bosumtwi Lake, Loc. No. 26).

Named after E. I. A. Carstensen, Danish Governor in Guinea 1844.

— *cincta* (Ehr.) Kütz. Hustedt 1930, p. 298, fig. 510.

Loc. Nos. 2, 6, 11, 12, 17, 32, 47.

Very rare in lakes in East Africa (Hustedt 1949 a, p. 94), and in Sierra Leone (Mölder 1962, p. 38).

Halophilous.

— — var. *leptocephala* (Bréb.) Greg. Hustedt 1930, p. 299. Guermeur 1954, p. 47, 8: 1 b.

Loc. Nos. 43, 47, 58.

Halophilous.

— *constans* Hust. var. *symmetrica* Hust. Hustedt 1957, p. 289, figs. 40, 41.

Loc. Nos. 8, 12, 14, 17, 27, 28, 33, 44, 60, 64.

Plate XIV, fig. 6: 19.3×8.0 μ. 15–16 striae in 10 μ. (Sample No. 218, Loc. No. 33).

Plate XIV, fig. 7: 18.7×8.0 μ. 15 striae in 10 μ. (Sample No. 121, Loc. No. 8).

Plate XIV, fig. 8: 18.7×8.7 μ. 15 striae in 10 μ. (Sample No. 219, Loc. No. 33).

All the specimens found here, have about 15–16 striae in 10 μ, which is approximately the same as indicated for the species (14), whereas Hustedt (1957, p. 289) states the number of striae for the var. *symmetrica* at 10. As, however, an isolated dot in the central area has never been seen in the Ghanaian specimens, they have been referred to var. *symmetrica*.

— *costulata* Grun. Hustedt 1930, p. 298, fig. 505.

Loc. No. 6.

Plate XV, fig. 15: 11.3×3.3 μ. 15 striae in 10 μ. (Sample No. 114, Loc. No. 6).

— *cryptocephala* Kütz. Hustedt 1930, p. 295, fig. 496.

Loc. Nos. 1–6, 8, 10–15, 17–19, 21–24, 26–31, 34, 35, 37, 38, 41, 43–47, 49–52, 55, 56, 58, 59, 61–67.

Widely distributed and not rare in the Congo territory (Hustedt 1949 a, p. 92), and common in Sierra Leone (Mölder 1962, p. 38).

— — var. *intermedia* Grun. Ibid. p. 295, fig. 497 b.

Loc. Nos. 2, 3, 6, 12, 23, 26, 31, 32, 46, 47, 62, 64–66.

Fairly rare in the Congo territory (Hustedt 1949 a, p. 92).

Navicula cryptocephala var. *veneta* (Kütz.) Grun. Ibid. p. 295, fig. 497 a.
Loc. Nos. 12, 15, 27, 37, 39, 56, 57, 66.
Occurs, but is never common in Sierra Leone (Mölder 1962, p. 38).

— *decussis* Østrup. Østrup 1910, p. 77, 2: 50. A. Schmidt Atlas 398: 36, 37. 401: 12, 13. Foged 1959, p. 59, 5: 5.
Loc. No. 17.
Plate XVI, fig. 5: 20.0 × 6.7 μ. 15 striae in 10 μ. (Sample No. 157, Loc. No. 17).

— *dicephala* (Ehr.) W. Smith. Hustedt 1930, p. 302, fig. 526.
Loc. Nos. 17, 23, 31, 32, 35.
Fairly rare in Sierra Leone (Mölder 1962, p. 38).

— *dodowaensis* nov. spec. Plate XV, fig. 7.
Valves linear-lanceolate, with suddenly protracted and rather pointedly rounded apices, 25–30 μ long, 8 μ broad. Raphe filiform, straight, with polar fissures deflected to the side. Axial area narrow, linear, with very little rounded expansion in the middle of the valve. Transapical striae radial, 12 in 10 μ.
Loc. No. 62.
Plate XV, fig. 7: 26.7 × 8.0 μ. 12 striae in 10 μ. (Sample No. 106, Loc. No. 62).
Illustration slide: Ghana No. 106/1961.
Type locality: Southeast Ghana. Fresh water (a small river near the village Dodowa between Kpong and Akuse, Loc. No. 62).

— *exigua* (Greg.) O. Müller. Hustedt 1930, p. 305, fig. 538. 1949 a, p. 97, 5: 10. Foged 1959, p. 60, 5: 4.
Loc. Nos. 4, 6, 8, 14, 16, 17, 25, 32, 35, 59, 61.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 97), and fairly rare in Sierra Leone (Mölder 1962, p. 38).

— — var. *signata* Hust. Hustedt 1944, p. 287, fig. 14.
Loc. Nos. 21, 22, 28, 58, 60.
Plate XIV, fig. 10: 27.3 × 9.4 μ. 14–15 striae in 10 μ. (Sample No. 171, Loc. No. 21).

— *exiguiformis* Hust. Hustedt 1944, p. 283, fig. 23. 1945, p. 929, 42: 21, 22. 1949 a, p. 95.
Loc. Nos. 1, 2, 4–6, 8, 9, 11, 14, 19–22, 25, 27, 28, 32–34, 36, 37, 39, 40, 49, 50, 58, 60–63, 65.
One of the commonest *N.* species in the Congo territory (Hustedt 1949 a, p. 95), but very rare in Sierra Leone (Mölder 1962, p. 38).
Plate XIV, fig. 13: 27.3 × 10.7 μ. 11–12 striae in 10 μ. (Sample No. 220, Loc. No. 34).
Plate XIV, fig. 14: 23.3 × 11.5 μ. 17–18 striae in 10 μ. (Sample No. 123, Loc. No. 8).
Plate XIV, fig. 5: 32 × 10 μ. 17–18 striae in 10 μ. (Sample No. 309, Loc. No. 65).

— *fauta* Hust. Hustedt 1954 b, p. 273, fig. 17.
Loc. Nos. 4, 6, 8, 12, 13, 18, 19, 22, 26, 28–31, 39, 47, 61, 62, 65, 66.
Previously reported from Central America (Hustedt 1954 b, p. 273).
Plate XV, fig. 11: 32 × 5.4 μ. 11 striae in 10 μ. (Sample No. 204, Loc. No. 30).
Plate XV, fig. 10: 32.7 × 6.0 μ. 11 striae in 10 μ. (Sample No. 101, Loc. 62).
Mesohalobous.
Uncertain determination. There is also some similarity to *N. cancellata* Donkin and *N. ramosissima* (Ag.) Cleve.

— *feuerborni* Hust. Hustedt 1937–39, p. 269, 19: 9, 10.
Loc. Nos. 8, 9, 12, 17, 18, 64.
Rare in Sierra Leone (Mölder 1962, p. 38).
Plate XVI, fig. 1: 40 × 6.7 μ. 15 striae in 10 μ. (Sample No. 122, Loc. No. 8).

— — fo. *africana* nov. fo. Plate XVI, fig. 2.
Differs from the species by having more tapering and not constricted apices.
Loc. Nos. 8, 11, 12, 63–65.

Plate XVI, fig. 2: 42.6×5.1 μ. 15 striae in 10 μ. (Sample No. 119, Loc. No. 8).
Illustration slide: Ghana No. 119/1961.
Type locality: Southwest Ghana. Fresh water (a small river in the rain forest between Takoradi and Axim, Loc. No. 8).
Plate XVI, fig. 3: 44×7.0 μ. 15 striae in 10 μ. (Sample No. 305, Loc. No. 64).

Navicula gastrum Ehr. Hustedt 1930, p. 305, fig. 537.
Loc. Nos. 2, 5, 6, 22, 24, 25, 28, 29, 31–34, 40, 46, 48, 49, 58, 61–63.
Rare in lakes in East Africa (Hustedt 1949 a, p. 97) and in Sierra Leone (Mölder 1962, p. 38).

— — fo. *minuta* Guermeur. Guermeur 1954, p. 49, 9: 5.
Loc. No. 28.

— *gothlandica* Grun. Hustedt 1930, p. 296, fig. 499.
Loc. Nos. 2, 44, 47.
Mesohalobous.

— *gracilis* Ehr. Ibid. p. 299, fig. 514.
Loc. Nos. 5, 11, 13, 18, 19, 28, 39.
Rare in lakes in East Africa (Hustedt 1949 a, p. 94) and in Sierra Leone (Mölder 1962, p. 38).

— *humjibreensis* nov. spec. Plate XV, fig. 8.
Valves lanceolate, protracted towards the apices, obtusely rounded. 20–25 μ long, 6–7 μ broad. Raphe filiform, straight. Axial area narrow, linear, very little expanded in the middle of the valve. Transapical striae radial or at right angles to the raphe, 14 in 10 μ, distinctly longitudinally striped.
Loc. No. 21.
Plate XV, fig. 8: 23.3×6.7 μ. 14 striae in 10 μ. (Sample No. 171, Loc. No. 21).
Illustration slide: Ghana No. 171/1961.
Type locality: West Ghana. Fresh water (a tributary in the Ankobra river system near the village Humjibre, Loc. No. 21).

— *hungarica* Grun. Hustedt 1930, p. 298, fig. 506.
Loc. Nos. 1, 2, 6, 8, 12–15, 17–19, 21, 22, 24, 27–30, 33, 35, 37, 39, 50, 54, 58, 60–63, 65.
Rare in lakes in East Africa (Hustedt 1949 a, p. 94), and fairly rare in Sierra Leone (Mölder 1962, p. 38).
Plate XV, fig. 14: 18.1×4.8 μ. 9 striae in 10 μ. (Sample No. 33, Loc. No. 1).

— — var. *capitata* (Ehr.) Cleve. Ibid. p. 298, fig. 508.
Loc. Nos. 12, 33.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 94).

— — var. *lüneburgensis* Grun. Ibid. p. 298, fig. 509.
Loc. No. 27.

— *manguini* Guermeur. Guermeur 1954, p. 50, 8: 9.
Loc. Nos. 4–6, 9, 12, 18–20, 23, 26–28, 31, 49, 60, 67.
Previously reported from the Tropics in Africa (Guermeur 1954, p. 50).
Plate XV, fig. 3: 40.7×10.4 μ. 14–15 striae in 10 μ. (Sample No. 144, Loc. No. 12).
N. sp. Bourelly et Manguin 1952, p. 73, 4: 98 seems to be the same species.

— *menisculus* Schum. Hustedt 1930, p. 301, fig. 507.
Loc. Nos. 3, 4, 6, 34, 49, 58.
Common in Sierra Leone (Mölder 1962, p. 38).

— *meyeri* nov. spec. Plate XIV, fig. 12.
Valves linear, with slightly convex sides and broadly protracted and broadly rounded apices. 34–38 μ long, 12–14 μ broad. Raphe filiform, slightly curved and with polar fissures deflected to the same side. Axial area narrow, linear. Central area very small, rounded.

Transapical striae radial, 9–10 in 10 μ; a few shorter ones inserted in the middle of the valve; denser towards the apices; distinctly punctate.

Loc. No. 58.

Plate XIV, fig. 12: 34.0×12.6 μ. 9–10 striae in 10 μ. (Sample No. 295, Loc. No. 58).

Illustration slide: Ghana No. 295/1961.

Type locality: East Ghana. Fresh water (the Volta river near Kete Krachi, Loc. No. 58).

Named after P. Meyer, Danish Commandant at Kongensten, Guinea (died in 1815). Laid out plantations and sent entomological collections to Denmark.

Navicula moerckii nov. spec. Plate XV, fig. 5.

Valves linear with slightly convex sides, 16–17 μ long, 4 μ broad. Raphe filiform, slightly curved, with polar fissures deflected to the same side. Axial area broad, about half the breadth of the valve, not specially expanded in the middle of the valve. Transapical striae slightly radial, 15 in 10 μ.

Loc. No. 31.

Plate XV, fig. 5: 16.7×4.0 μ. 15 striae in 10 μ. (Sample No. 207, Loc. No. 31).

Illustration slide: Ghana No. 207/1961.

Type locality: West Ghana. Fresh water (a small river, about 65 km. northwest of Kumasi, Loc. No. 31).

Named after F. S. Mørck, Danish Governor in Guinea 1834–39. He founded a plantation near Frederiksgave, the Gold Coast.

— *nagbogensis* nov. spec. Plate XV, fig. 1.

Valves elliptical, with broadly protracted, obtusely rounded apices, 40–45 μ long, 12–15 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area very narrow, linear, and very little expanded in the middle of the valve. Transapical striae slightly radial, 15 in 10 μ, distinctly punctate, slightly convergent and denser towards the apices.

Loc. No. 53.

Plate XV, fig. 1: 41.3×12.6 μ. 15 striae in 10 μ. (Sample No. 279, Loc. No. 53).

Illustration slide: Ghana No. 279/1961.

Type locality: East Ghana. Fresh water (a river near the village Nagbog, Loc. No. 53).

It is rather doubtful whether this species should be referred to this group (*lineolatae*).

— *placentula* (Ehr.) Grun. Hustedt 1930, p. 303, fig. 532.

Loc. Nos. 2, 60.

Rare in Sierra Leone (Mölder 1962, p. 39).

— — fo. *latiuscula* (Grun.) Meister. Ibid. p. 304, fig. 534.

Loc. No. 58.

— — fo. *rostrata* A. Mayer. Ibid. p. 304, fig. 533.

Loc. No. 21.

Rare in Sierra Leone (Mölder 1962, p. 39).

— *quadripartita* Hust. A. Schmidt. Atlas 400: 12–15. E. Manguin 1941, p. 155, fig. 9.

Syn.: *N. hambergi* Hust. Hustedt: Bacill. Sarekgeb. 1924, p. 562, 17: 2.

Loc. Nos. 4, 12, 18, 26.

Very rare in lakes in East Africa (Hustedt 1949 a, p. 95).

Plate XIV, fig. 1: 23.4×7.5 μ. 12 striae in 10 μ. (Sample No. 145, Loc. No. 12).

Plate XIV, fig. 2: 20×7.3 μ. 12 striae in 10 μ. (Sample No. 163, Loc. No. 18).

Plate XIV, fig. 3: 14.7×6.0 μ. 15 striae in 10 μ. (Sample No. 112, Loc. No. 4).

— *ramosissima* Agardh. P. T. Cleve 1894–95, II, p. 26. Hustedt et A. A. Aleem 1951, p. 185, figs. 1 A, B.

Loc. No. 11.

Polyhalobous.

Navicula rhynchocephala Kütz. Hustedt 1930, p. 296, fig. 501.
Loc. Nos. 4, 5, 8, 11–13, 18, 19, 21, 22, 24, 28, 30, 31, 34, 41, 47, 58, 61–63, 65–67.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 92) and in Sierra Leone (Mölder 1962, p. 39).

— — var. *elongata* Mayer. Bourelly et E. Manguin 1949, p. 171, 7: 83.
Loc. No. 8.

— *salinarum* Grun. Hustedt 1930, p. 295, fig. 498.
Loc. Nos. 6, 8, 12, 17, 23, 26.
Mesohalobous.

— *schönfeldii* Hust. Ibid. p. 301, fig. 520.
Loc. Nos. 2, 6, 8, 9, 11, 12, 14, 17, 18, 33–35, 46, 54, 58, 61, 62, 65.
Very rare in Sierra Leone (Mölder 1962, p. 40).

— *sepasiensis* nov. spec. Plate XV, fig. 4.
Valves elliptical-lanceolate with broadly protracted apices, 30 μ long, 10–12 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area rather narrow. Central area rounded, about half to one third of the breadth of the valve. Transapical striae rather highly radial, 12 in 10 μ; in the middle of the valve with inserted shorter striae.
Loc. No. 27.
Plate XV, fig. 4: 30.0×10.7 μ. 12 striae in 10 μ. (Sample No. 196, Loc. No. 27).
Illustration slide: Ghana No. 196/1961.
Type locality: West Ghana. Fresh water (a small river near the village Sepasi, northwest of Kumasi, Loc. No. 27).

— *simplex* Krasske. Hustedt 1930, p. 296, fig. 500.
Loc. Nos. 23, 26, 40.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 93) and in Sierra Leone (Mölder 1962, p. 40).

— *subrhynchocephala* Hust. Hustedt 1937–39, p. 262, 18: 35. 1949 a, p. 92. Guermeur 1954, p. 51, 8: 3.
Loc. Nos. 26, 43, 57.
Fairly rare in lakes in East Africa (Hustedt 1949 a, p. 92).

— *suhinensis* nov. spec. Plate XIV, fig. 9.
Valves linear-elliptical, with protracted, obtusely rounded apices. 20–25 μ long, 7–8 μ broad. Raphe filiform, straight. Axial area very narrow, in the middle of the valve expanded into a transversally extended central area. Transapical striae radial, 22 in 10 μ; denser towards the apices.
Loc. No. 33.
Plate XIV, fig. 9: 23.3×7.4 μ. 22 striae in 10 μ. (Sample No. 218, Loc. No. 33).
Illustration slide: Ghana No. 218/1961.
Type locality: West Ghana. Fresh water (the Suhin river, north of the town Wenchi, Loc. No. 33).

— *tainensis* nov. spec. Plate XV, fig. 9.
Valves linear, with slightly convex sides, broadly protracted towards the apices, with broadly rounded poles. 40 μ long, 6–7 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area narrow, linear. Central area very small, rounded. Transapical striae very highly radial, 15 in 10 μ.
Loc. Nos. 28, 31, 32, 37, 60, 62.
Plate XV, fig. 9: 40×6.7 μ. 15 striae in 10 μ. (Sample No. 217, Loc. No. 32).
Illustration slide: Ghana No. 217/1961.
Type locality: West Ghana. Fresh water (the Tain river, north of the town Wenchi, Loc. No. 32).

Closely related to *N. simulata* Manguin (MANGUIN 1942, 3: 50) from the Azores, but XV: 9 has, i.a., a smaller central area than this species.

Navicula towutiensis (Hust.) Cholnoky. CHOLNOKY 1963 b, p. 245, fig. 24.

Syn.: *N. Woltereckí* Hust. var. *rostrata* (Hust.) Cholnoky. CHOLNOKY 1959 a, p. 53, fig. 278. 1960 a, p. 86.

Loc. Nos. 2, 7, 57, 58.

Previously recorded from South Africa (CHOLNOKY 1963 b, p. 245).

Plate XII, fig. 15: 42 × 8.9 μ. 12 striae in 10 μ. (Sample No. 118, Loc. No. 7).

CHOLNOKY (1960 a, p. 86): small specimens of 35 × 8 μ are common. The central area in CHOLNOKY's specimens and XII: 15 are almost identical, but XII: 15 has a coarser punctation than the species in CHOLNOKY.

— *viridula* Kütz. HUSTEDT 1930, p. 297, fig. 503.

Loc. Nos. 3, 6, 8, 11, 12, 23, 36, 42, 48, 60, 65.

Rare in lakes in East Africa (HUSTEDT 1949 a, p. 93). Rather common in Sierra Leone (MÖLDER 1962, p. 40).

— — var. *slesvicensis* (Grun.) Cleve. Ibid. p. 297.

Loc. No. 8.

— *zanoni* Hust. HUSTEDT 1949 a, p. 92, 5: 1–5.

Loc. Nos. 6, 11, 12, 13, 19, 21, 25, 28, 29, 31, 32, 53, 57, 65.

Fairly rare in lakes in East Africa (HUSTEDT 1949 a, p. 92) and in Sierra Leone (MÖLDER 1962, p. 40).

Plate XV, fig. 2: 46.7 × 8.8 μ. 11–12 striae in 10 μ. (Sample No. 142, Loc. No. 12).

Naviculae tusculae Hust.

Navicula tuscula (Ehr.) Grun. HUSTEDT 1930, p. 308, fig. 552.

Loc. No. 65.

Naviculae annulatae Hust.

Navicula paludosa Hust. HUSTEDT 1957, p. 286.

Syn.: *N. lagerstedtii* Cleve var. *palustris* Hust. A. SCHMIDT. Atlas 400: 27–29.

Loc. No. 33.

Plate XVI, fig. 4: 24.0 × 8.8 μ. 15–16 striae in 10 μ. (Sample No. 218, Loc. No. 33).

— *pseudolagerstedtii* Cholnoky. CHOLNOKY 1960 a, p. 75, fig. 236.

Loc. No. 12.

Previously recorded from South Africa (CHOLNOKY 1960 a, p. 75).

Plate XVI, fig. 6: 14.0 × 6.0 μ. 12 striae in 10 μ. (Sample No. 144, Loc. No. 12).

Pinnularia Ehr.

a. Parallelistriata

Pinnularia gracillima Greg. HUSTEDT 1930, p. 315, fig. 524.

Loc. No. 30.

Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 101).

— *molaris* Grun. Ibid. p. 316, fig. 568.

Loc. Nos. 8, 12, 22, 30, 46, 60, 64.

Common in Sierra Leone (MÖLDER 1962, p. 41).

Plate XVI, fig. 9: 24.7 × 5.0 μ. 15 striae in 10 μ. (Sample No. 305, Loc. No. 64).

Rather doubtful. Resembles *P. molaris* in some respects, *P. leptosoma* in others.

— *nunguaensis* nov. spec. Plate XVII, fig. 1.

Valves broadly linear, sides straight or slightly concave, apices broadly rounded. 25–30 μ long, 9–10 μ broad. Raphe filiform, straight, with central and polar fissures deflected to the same side. Axial area expanding from the apices towards the middle of the valve into a broad central area, which in the middle of the valve reaches the margins as a narrow transversal band. Transapical striae at right angles to the raphe, 10 in 10 μ; slightly convergent towards the apices.

Loc. No. 1.

Plate XVII, fig. 1: 30.0×9.5 μ. 10 striae in 10 μ. (Sample No. 39, Loc. No. 1).

Illustration slide: Ghana No. 39/1961.

Type locality: Southeast Ghana. Fresh water (a big pond at the Nungua farm, property of the University of Ghana, Loc. No. 1).

This species is somewhat similar to *P. parva* (Greg.) Cleve.

Pinnularia nunguaensis forma.

Plate XVII, fig. 2: 27.3×10.0 μ. 12 striae in 10 μ. (Sample No. 39, Loc. No. 1).

— *parva* (Greg.) Cleve var. *lagerstedtii* Cleve fo. *interrupta* Petersen. Boye Petersen 1928, p. 407, fig. 28.

Loc. No. 41.

Plate XVII, fig. 3: 23.9×6.7 μ. 12 striae in 10 μ. (Sample No. 204, Loc. No. 41).

— *suhinensis* nov. spec. Plate XVII, fig. 5.

Valves linear-lanceolate, 24–26 μ long, 4–5 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area broad, about half the breadth of the valve. Central area very broad and extended to the margin. Transapical striae at right angles to the raphe, 11–12 in 10 μ.

Loc. Nos. 33, 64.

Plate XVII, fig. 5: 24.7×4.7 μ. 11–12 striae in 10 μ. (Sample No. 218, Loc. No. 33).

Illustration slide: Ghana No. 218/1961.

Type locality: West Ghana. Fresh water (the Suhin river near the village Subinso, Loc. No. 33).

This species seems to be related to *P. parva* (Greg.) Cleve var. *minuta* Østrup (Boye Petersen 1928, p. 408, fig. 29).

— *takoradiensis* nov. spec. Plate XVI, fig. 13.

Valves narrowly linear, with broadly rounded apices. 30–32 μ long, 4–5 μ broad. Raphe filiform, straight, with central and polar fissures deflected to the same side. Central area very broad and extended to the margin. All transapical striae are convergent, 15 in 10 μ.

Loc. No. 8.

Plate XVI, fig. 13: 30.6×4.7 μ. 15 striae in 10 μ. (Sample No. 122, Loc. No. 8).

Illustration slide: Ghana No. 122/1961.

Type locality: Southwest Ghana. Fresh water (a small river in the rain forest between Takoradi and Axim, Loc. No. 8).

The placing of this species is very doubtful. Perhaps it is not a *P.* species, but rather a *Caloneis* form, which, however, is so characteristic that it probably represents a new species.

— sp.

Plate XVIII, fig. 6: 20.0×3.4 μ. 15 striae in 10 μ. (Sample No. 145, Loc. No. 12).

A somewhat dubious form.

b. Capitatae

Pinnularia appendiculata (Ag.) Cleve. Hustedt 1930, p. 317, fig. 570 a.

Loc. Nos. 10, 12.

Rather common in Sierra Leone (Mölder 1962, p. 40).

— *braunii* (Grun.) Cleve. Ibid. p. 319, fig. 577.

Loc. Nos. 3, 15.

Very rare in lakes in East Africa (Hustedt 1949 a, p. 102).

Rare in Sierra Leone (Mölder 1962, p. 40).
Plate XVI, fig. 11: 37.3×8.2 μ. 12 striae in 10 μ. (Sample No. 153, Loc. No. 15).
Plate XVI, fig. 15: 30.6×6.0 μ. 10 striae in 10 μ. (Sample No. 73, Loc. No. 3).

Pinnularia braunii var. *amphicephala* (A. Mayer) Hust. Ibid. p. 319, fig. 578.
Loc. Nos. 1–4, 6, 8, 10, 12, 13, 16, 18, 20, 23, 27, 28, 34, 38, 39, 41, 53, 54, 58, 62, 64.
Rather common in Sierra Leone (Mölder 1962, p. 40).

— *interrupta* E. Smith. Ibid. p. 317, fig. 573.
Loc. Nos. 1, 4, 5, 8–13, 16, 19, 20, 22–32, 37–39, 43, 44, 46, 47, 50, 54, 63–66.
Fairly rare in lakes in East Africa (Hustedt 1949 a, p. p. 102), but very common in Sierra Leone (Mölder 1962, p. 41).

— — fo. *minutissima* Hust. Ibid. p. 317, fig. 574.
Loc. Nos. 1–3, 6–9, 11–14, 17–19, 24–28, 32, 33, 35, 36, 38, 39, 43, 44, 46, 47, 58, 60–62, 64–67.
Very rare in Sierra Leone (Mölder 1962, p. 41).

— — var. *jaculata* Manguin. Guermeur 1954, p. 61, 10: 26. Bourelly et Manguin 1952, p. 77, 5: 12 a, b.
Loc. Nos. 1, 12, 13, 15, 27, 38, 46, 56.
Plate XVI, fig. 10: 25.0×5.5 μ. 12–13 striae in 10 μ. (Sample No. 195, Loc. No. 27).

— *krockei* (Grun.) Hust. Hustedt 1942 (Aërophile Diatomeen in der nordwestdeutschen Flora), p. 71.
Syn.: *P. globiceps* Greg. var. *krookei* Grun. (Hustedt 1930, p. 319, fig. 580).
Loc. Nos. 3, 64.
Halophilous (?).

— *mesolepta* (Ehr.) W. Smith. Ibid. p. 319, fig. 575 a.
Loc. Nos. 1, 4, 5, 7, 8, 14, 21, 28, 37, 39, 44, 46.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 102).
Fairly rare in Sierra Leone (Mölder 1962, p. 41).
Plate XVI, fig. 16: 32.0×6.0 μ. 9–10 striae in 10 μ. (Sample No. 151, Loc. No. 14).
Plate XVI, fig. 12: 36.0×7.0 μ. 12 striae in 10 μ. (Sample No. 4, Loc. No. 66).

— *mankesimensis* nov. spec. Plate XVIII, fig. 10.
Valves linear with triundulate margins and protracted apices. 30 μ long, 4–5 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. Axial area broad, half to two thirds of the breadth of the valve. The central area is a very broad transversal band, which extends to the margins. Transapical striae short, at right angles to the raphe, 12 in 10 μ.
Loc. No. 5.
Plate XVIII, fig. 10: 30.0×4.7 μ. 12 striae in 10 μ. (Sample No. 111, Loc. No. 5).
Illustration slide: Ghana No. 111/1961.
Type locality: Southwest Ghana. Fresh water (the river Amisa near the village Mankesim, Loc. No. 5).
Fairly closely related to *P. mesolepta* (Ehr.) W. Smith, but XVIII: 10 has a much broader central area extending to the margin and has much shorter striae than this species.

— *polyonca* (Bréb.) O. Müller. Hustedt 1930, p. 319, fig. 576.
Loc. No. 13.
Not rare in Sierra Leone (Mölder 1962, p. 41).
Plate XVIII, fig. 1: 60×8 μ. 9 striae in 10 μ. (Sample No. 150, Loc. No. 13).

— *subcapitata* Greg. Hustedt 1949 a, p. 101, 8: 6–15. 1930, p. 317, fig. 571.
Loc. Nos. 8, 13, 41, 53, 62.
Not rare in lakes in East Africa (Hustedt 1949 a, p. 101) and in Sierra Leone (Mölder 1962, p. 41).

c. Divergentes

Pinnularia acoricola Hust. Hustedt 1937–39, p. 293, 21: 11–16. A. Schmidt. Atlas 390, 13–16. Hustedt 1949 a, p. 102. Guermeur 1954, 15: 4.
Loc. Nos. 9, 14, 16, 17, 20, 22, 64.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 102).
Plate XVII, fig. 6: 37.3×5.7 μ. 12 striae in 10 μ. (Sample No. 155, Loc. No. 16).
Plate XVII, fig. 11: 36×5.5 μ. 10 striae in 10 μ. (Sample No. 152, Loc. No. 14).

— *bogosoensis* nov. spec. Plate XIX, fig. 1.
Valves linear-lanceolate with protracted, rather pointed apices. 60 μ long, 8–9 μ broad. Raphe straight, with central and polar fissures slightly deflected to the same side. Axial area increasing to half the breadth of the valve from the apices into a very broad central area extended to the margin. Transapical striae 10–11 in 10 μ, radial, convergent towards the apices.
Loc. Nos. 18, 20, 27, 38.
Plate XIX, fig. 1: 60×8.3 μ. 10–11 striae in 10 μ. (Sample No. 163, Loc. No. 18).
Illustration slide: Ghana No. 163/1961.
Type locality: Southwest Ghana. Fresh water (a ditch about 5–6 km. southeast of the village Bogoso, Loc. No. 18).
Some similarity to *P. acoricola* Hust., which, however, i.a. is considerably smaller than XIX: 1.

— — forma.
Loc. No. 41.
Plate XIX, fig. 2: 62.7×10.0 μ. 9 striae in 10 μ. (Sample No. 244, Loc. No. 41).

— *divergens* W. Smith. Hustedt 1930, p. 323, fig. 589.
Loc. Nos. 5, 8, 11, 12, 15, 16, 18, 20–22.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 103), fairly rare in Sierra Leone (Mölder 1962, p. 40).

— — var. *undulata* Hérib. et Perag. Ibid. p. 323, fig. 591.
Loc. Nos. 5, 15, 29.

— *graciloides* Hust. Hustedt 1937–39, p. 293, 22: 9. A. Schmidt. Atlas 392: 2, 3. Hustedt 1942, p. 82, figs. 155–158. Guermeur 1954, 12: 3.
Loc. Nos. 21, 31.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 103). Fairly rare in Sierra Leone (Mölder 1962, p. 40).

— *legumen* Ehr. Hustedt 1930, p. 322, fig. 587.
Loc. Nos. 3, 5, 8, 11, 12, 17–19, 24, 27, 28, 31, 32, 46, 54, 58, 66.
Rather rare in Sierra Leone (Mölder 1962, p. 41).

— *mansiensis* nov. spec. Plate XVIII, fig. 5.
Valves linear-lanceolate with broadly protracted apices, 40 μ long, 7–8 μ broad. Raphe filiform, with polar fissures deflected to the same side. Axial area rather broad, expanding from the apices towards the middle into a rather broad central area extended to the margins. Transapical striae radial, 11 in 10 μ in the middle of the valve, convergent and denser towards the apices.
Loc. No. 19.
Plate XVIII, fig. 5: 40.0×7.4 μ. 11 striae in 10 μ. (Sample No. 165, Loc. No. 19).
Illustration slide: Ghana No. 165/1961.
Type locality: Southwest Ghana. Fresh water (the Mansi river, a tributary to the Ankobra river).

— *microstauron* (Ehr.) Grun. Hustedt 1930, p. 320, fig. 582.
Loc. Nos. 2, 5, 7–9, 11–15, 17, 18, 27, 28, 30, 34, 35, 37, 38, 40, 41, 44, 46–48, 50, 52–54, 56, 59–62, 65, 66.

Rare in lakes in East Africa (HUSTEDT 1949 a, p. 102). Rather common in Sierra Leone (MÖLDER 1962, p. 41).

Pinnularia microstauron var. *brébissonii* (Kütz.) Hust. Ibid. p. 321, fig. 584.
Loc. Nos. 1, 2, 7, 12, 15, 16, 22, 23, 27–29, 37, 38, 41, 44–46, 51, 56, 58, 62, 65–67.
Rather common in lakes in East Africa (HUSTEDT 1949 a, p. 102).
Rare in Sierra Leone (MÖLDER 1962, p. 41).

— — — fo. *diminuta* Grun. p. 322, fig. 585.
Loc. No. 62.

— *nsuaemensis* nov. spec. Plate XVI, fig. 14.
Valves linear-lanceolate, 25–28 μ long, 4–5 μ broad. Raphe filiform, straight, with central and polar fissures deflected to the same side. Axial area narrow, increasing in breadth from the apices towards a very broad central area reaching the margin. Transapical striae, 17–18 in 10 μ, radial nearest to the middle of the valve, convergent towards the apices.
Loc. Nos. 12, 60.
Plate XVI, fig. 14: 26.0×4.3 μ. 17–18 striae in 10 μ. (Sample No. 142, Loc. No. 12).
Illustration slide: Ghana No. 142/1961.
Type locality: Southwest Ghana. Fresh water (a small river in the rain forest between the villages Nsuaem and Agona, Loc. No. 12).

— *obscura* Krasske. J. BOYE PETERSEN 1935, p. 147, fig. 6. J. W. G. LUND 1946, p. 92, figs. 12 A–J.
Loc. Nos. 14, 38, 66.
Plate XVIII, fig. 7: 20.0×4.0 μ. 12 striae in 10 μ. (Sample No. 152, Loc. No. 14).

— *otiensis* nov. spec. Plate XVIII, fig. 4.
Valves linear with slightly convex sides and very broadly protracted and broadly rounded apices. 50–60 μ long, 12–14 μ broad. Raphe straight, with polar fissures deflected to the same side. Axial area rather broad and increasing in breadth from the apices towards the central area, which is a rather broad transversal band extended to the margins. Transapical striae radial, 9–10 in 10 μ, slightly convergent towards the apices.
Loc. Nos. 4, 43, 59, 62.
Plate XVIII, fig. 4: 54.6×13 μ. 9 striae in 10 μ. (Sample No. 298, Loc. No. 59).
Illustration slide: Ghana No. 298/1961.
Type locality: East Ghana. Fresh water (the Oti river near the village Otisu, Loc. No. 59).

— *standeri* Cholnoky. CHOLNOKY 1957, p. 358, figs. 78–81.
Loc. No. 11.
Previously recorded from South Africa (CHOLNOKY 1957, p. 358).

— *subsolaris* (Grun.) Cleve. HUSTEDT 1930, p. 322, fig. 588.
Loc. Nos. 8, 12, 13, 16, 23, 25, 28, 30, 64, 65.
Fairly rare in Sierra Leone (MÖLDER 1962, p. 41).

— *suchlandti* Hust. HUSTEDT 1943, p. 184, figs. 39–41. A. SCHMIDT. Atlas 388: 9–11.
Loc. No. 13.
Plate XIX, fig. 5: 46.7×8.7 μ. 12 striae in 10 μ. (Sample No. 150, Loc. No. 13). Differs from the nominate taxon (HUSTEDT 1943, p. 184, figs. 39–41) by its somewhat slender valves.

— *tomentoensis* nov. spec. Plate XIX, fig. 3.
Valves elliptical-lanceolate with convex margins and obtusely protracted apices, 50–55 μ long, 10 μ broad. Axial area about one third of the breadth of the valve and in the middle expanded into a central area extended to the margin. Raphe with slightly curved branches and long polar fissures. Transapical striae about 9 in 10 μ, in the middle of the valve radial, convergent towards the apices.
Loc. Nos. 11, 43, 44, 45.

Plate XIX, fig. 3: 53.3×10.0 μ. 9 striae in 10 μ. (Sample No. 133, Loc. No. 11).
Illustration slide: Ghana No. 133/1961.
Type locality: Southwest Ghana. Fresh water (a small river in the rain forest near the village Tomento, 13–14 km. north of Cape Three Points, Loc. No. 11).

Pinnularia sp.
Loc. No. 4.
Plate XVIII, fig. 9: 24.0×4.6 μ. 9–10 striae in 10 μ. (Sample No. 107, Loc. No. 4).

d. Distantes

Pinnularia borealis Ehr. Hustedt 1930, p. 326, fig. 547.
Loc. Nos. 1, 4, 11, 12, 15, 41, 44, 46, 52, 53, 65, 66.
Widely distributed and not rare in the Congo territory (Hustedt 1949 a, p. 105).

— *dubitabilis* Hust. Hustedt 1949 a, p. 105, 6: 11–13.
Syn.: *P. borealis* Ehr. var. *rectangularis* Hust. (Hustedt 1937–39, p. 394, 21: 8).
P. eburnea (Carlsson) Zanon. Cholnoky 1960 a, p. 108, figs. 324–331.
Loc. Nos. 1, 46.
Rare in lakes in East Africa (Hustedt 1949 a, p. 105).
Plate XVIII, fig. 8: 28.0×5.8 μ. 6 striae in 10 μ. (Sample No. 33, Loc. No. 1).
The species is between *P. borealis* Ehr. and *P. lagerstedti* (Cleve) Hust. Usually it has very short striae with a smaller mutual distance than those of *P. borealis*, and it is more delicate than this species, but more robust than the smaller *P. lagerstedtii*, which also has denser striae. XVIII: 8 has denser striae than indicated by Hustedt as normal to the species.

— *rivularis* Hust. A. Schmidt. Atlas 392: 1. Hustedt 1937–39, p. 393, 23: 3.
Loc. Nos. 53, 62.
Previously reported from the Sunda Islands. (Hustedt 1937–39, p. 393).
Plate XIX, fig. 4: 54.7×8.0 μ. 12 striae in 10 μ. (Sample No. 279, Loc. No. 53). Differs from the common type by its somewhat more shortened striae near the central area.

e. Tabellariae

Pinnularia gibba Ehr. Hustedt 1930, p. 327, fig. 600.
Loc. Nos. 1, 3, 6–9, 12, 15, 19, 20, 23, 26, 28, 33, 35, 37, 38, 41, 44, 54, 56, 62.
Rare in the Congo territory (Hustedt 1949 a, p. 107), rather common in Sierra Leone (Mölder 1962, p. 40).

— — var. *linearis* Hust. Ibid. p. 327, fig. 604.
Loc. No. 2.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 107).

— — var. *mesogongyla* (Ehr.) Hust. Ibid. p. 327, fig. 603.
Loc. Nos. 1, 8, 34, 43.

— — var. *parva* (Ehr.) Grun. Ibid. p. 327, fig. 602.
Loc. Nos. 2, 3, 35.

— — var. *sancta* Grun. Hustedt 1937–39, 20: 35. Guermeur 1954, p. 64, 15: 1.
Loc. Nos. 13, 23, 29, 41, 62, 66.
Fairly rare in lakes in East Africa (Hustedt 1949 a, p. 107).
Plate XVII, fig. 9: 56.0×10.4 μ. 9 striae in 10 μ. (Sample No. 181, Loc. No. 23).

— — fo. *subundulata* Mayer. Hustedt 1930, p. 327, fig. 601.
Loc. Nos. 2, 8, 11, 18, 22, 28, 29, 33, 37, 41, 42, 44, 46.
Rare in Sierra Leone (Mölder 1962, p. 40).
Plate XVIII, fig. 2: 57.3×7.8 μ. 9 striae in 10 μ. (Sample No. 243, Loc. No. 41).

Pinnularia stomatophora Grun. Ibid. p. 327, fig. 605.
Loc. Nos. 8, 9, 12, 13, 15, 16, 18, 22, 23, 27, 53, 61, 62, 64–66.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 107). Fairly rare in Sierra Leone (MÖLDER 1962, p. 41).
— — var. *triundulata* Fontell. HUSTEDT 1942, p. 88, fig. 168.
Loc. Nos. 2, 5, 11–13, 19, 23, 24, 27, 29, 32, 33, 44, 53, 61, 62.

f. Brevistriatae

Pinnularia acrosphaeria Bréb. HUSTEDT 1930, p. 330, fig. 610.
Loc. Nos. 1–5, 8, 9, 11–15, 18, 22–24, 26–28, 30, 32, 33, 38, 40, 41, 44, 46, 48, 50, 53, 58–67.
Widely distributed, but never common in the Congo territory (HUSTEDT 1949 a, p. 108). Fairly rare in Sierra Leone (MÖLDER 1962, p. 40).
— *agogoensis* nov. spec. Plate XVII, fig. 7.
Valves linear, with slightly convex sides and broadly rounded apices. 50–55 μ long, 8–10 μ broad. Raphe straight, with polar fissures deflected to the same side. Axial area very broad, about three fourths of the breadth of the valve. The central area is a very broad transversal band extending to the margins. Transapical striae very short, at right angles to the raphe, 9 in 10 μ.
Loc. No. 24.
Plate XVII, fig. 7: 50.7 × 8.7 μ. 9 striae in 10 μ. (Sample No. 185, Loc. No. 24).
Illustration slide: Ghana No. 185/1961.
Type locality: West Ghana. Fresh water (the Agogo river between the towns Bibiani and Kumasi, Loc. No. 24).
— *brevicostata* Cleve. HUSTEDT 1930, p. 329, fig. 609.
Loc. No. 41.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 107) and in Sierra Leone (MÖLDER 1962, p. 40).
— — var. *sumatrana* Hust. HUSTEDT 1937–39, p. 358, 22: 4–6. A. SCHMIDT. Atlas 389: 7–9.
Loc. Nos. 38, 41.
Previously reported from Sumatra (HUSTEDT 1937–39, p. 358).
— *lawsonii* nov. spec. Plate XVIII, fig. 3.
Valves linear, with slightly convex sides and broadly capitate apices, 45–60 μ long, 10–12 μ broad. Raphe straight, filiform, with central and polar fissures deflected to the same side. Axial area broad, about half of the breadth of the valve, straight, with no or very slight expansion in the middle of the valve. Transapical striae at right angles to the raphe, 12 in 10 μ. Loc. Nos. 2–4, 29, 30.
Plate XVIII, fig. 3: 56 × 10.4 μ. 12 striae in 10 μ. (Sample No. 204, Loc. No. 30).
Illustration slide: Ghana No. 204/1961.
Type locality: West Ghana. Fresh water (a small river near the village Dwiniana, north-west of Kumasi, Loc. No. 30).
Dedicated to Dr. G. W. LAWSON. University of Ghana.
This species is presumably related to *P. brevicostata* Cleve var. *sumatrana* Hust.
— *montana* Hust. A. SCHMIDT. Atlas 399: 6.
Loc. No. 41.
Plate XVII, fig. 10: 57 × 12.0 μ. 12 striae in 10 μ. (Sample No. 244, Loc. No. 41).
— *odaensis* nov. spec. Plate XVII, fig. 8.
Valves linear, with broadly rounded apices, 45–50 μ long, 7–8 μ broad. Raphe filiform, central and polar fissures deflected to the same side. Axial area very broad, about two thirds of the breadth of the valve. The central area is a very broad transversal band extending to the margins. Transapical striae at right angles to the raphe, 9 in 10 μ.

Loc. No. 28.
Plate XVII, fig. 8: 48×7.5 μ. 9 striae in 10 μ. (Sample No. 198, Loc. No. 28).
Illustration slide: Ghana No. 198/1961.
Type locality: West Ghana. Fresh water (the Oda river, northwest of Kumasi, Loc. No. 28).

Pinnularia tafoensis nov. spec. Plate XVIII, fig. 11.
Valves linear-elliptical, 40–45 μ long, 12 μ broad. Raphe filiform, straight, with polar fissures deflected to the same side. The axial area expands from the apices towards the middle of the valve, where it expands into a central area extended to the margins. Transapical striae slightly radial, 10 in 10 μ, towards the apices at right angles to the raphe.
Loc. Nos. 2, 66.
Plate XVIII, fig. 11: 42.7×12.0 μ. 10 striae in 10 μ. (Sample No. 6, Loc. No. 66).
Illustration slide: Ghana No. 6/1961.
Type locality: South Ghana. Fresh water (a waterwork pond at the Tafo Cocoa Research Station, north of Accra, Loc. No. 66).

g. Maiores

Pinnularia maior (Kütz.) Cleve. Hustedt 1930, p. 331, fig. 614.
Loc. Nos. 1, 8, 12, 30, 41, 58, 64.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 108) and in Sierra Leone (Mölder 1962, p. 41).

— — var. *linearis* Cleve fo. *neglecta* Mayer. Ibid. p. 331.
Loc. No. 41.

h. Complexae

Pinnularia gentilis (Donkin) Cleve. Hustedt 1930, p. 335, fig. 618.
Loc. No. 12.
Rare in Sierra Leone (Mölder 1962, p. 40).

— *esox* Ehr. Ibid. p. 334, fig. 616.
Loc. No. 64.

— *robusta* Hust. A. Schmidt. Atlas 387: 1, 2.
Loc. No. 8.

— *viridis* (Nitzsch) Ehr. Hustedt 1930, p. 334, fig. 617 a.
Loc. Nos. 1, 8, 12, 19, 21, 22, 26–28, 33, 34, 37, 40, 44, 46, 47, 53, 54, 61.
Fairly rare in lakes in East Africa (Hustedt 1949 a, p. 109) and in Sierra Leone (Mölder 1962, p. 41).

Amphora Ehr.

Amphora abuensis nov. spec. Plate XIX, fig. 6.
Valves with a straight ventral margin, a convex dorsal margin, and slightly protracted apices, 23–25 μ long, 4–5 μ broad. Raphe straight, running near the ventral margin. Axial area towards the dorsal side very narrow, without expansion in the middle of the valve, broader—to the margin of the valve—on the ventral side. Transapical striae on the dorsal side radial, 15–16 in 10 μ, distinctly punctate. No visible striae on the ventral side.
Loc. No. 31.
Plate XIX, fig. 6: 23.4×4.2 μ. 15–16 striae in 10 μ. (Sample No. 207, Loc. No. 31).
Illustration slide: Ghana No. 207/1961.
Type locality: West Ghana. Freshwater (the Abu river, Loc. No. 31).

— *acutiuscula* Kütz. Guermeur 1954, p. 67, 16: 10. P. T. Cleve 1894–95, II, p. 121.
Loc. No. 31.

Amphora ayensuensis nov. spec. Plate XIX, fig. 7.

Valves with a straight ventral margin, a convex dorsal margin, and protracted capitate apices. 25 μ long, 4–5 μ broad. Raphe straight. Axial area very narrow, not expanded in the middle of the valve. Transapical striae on the dorsal side prominent, radial, 14–15 in 10 μ. No visible striae on the ventral side.

Loc. Nos. 4, 19–23, 25, 26, 62, 66, 67.

Plate XIX, fig. 7: 25.0 × 4.8 μ. 14–15 striae in 10 μ. (Sample No. 107, Loc. No. 4).

Illustration slide: Ghana No. 107/1961.

Type locality: South Ghana. Fresh water (the Ayensu river between the towns Accra and Takoradi, Loc. No. 4).

Presumably related to *A. cymbamphora* Cholnoky (Cholnoky 1960 a, p. 22, fig. 54), which species, however, has somewhat more distinct striae on the ventral side of the valve.

— *commutata* Grun. Hustedt 1930, p. 345, fig. 632.

Loc. No. 12.

Mesohalobous.

— *crameri* nov. spec. Plate XIX, fig. 8.

Valves with almost straight ventral margin, highly convex dorsal margin and pointedly protracted apices. 25–30 μ long, 7–8 μ broad. Raphe straight. Axial area very narrow towards the dorsal side, extended to the margin on the ventral side. Transapical striae radial, 22 in 10 μ on the dorsal side, a single shortened one in the middle. No visible striae on the ventral side.

Loc. No. 31.

Plate XIX, fig. 8: 26.0 × 7.4 μ. 22 striae in 10 μ. (Sample No. 207, Loc. No. 31).

Illustration slide: Ghana No. 207/1961.

Type locality: West Ghana. Freshwater (scrapings from soil at edge of pool, 60–65 km. northwest of Kumasi, Loc. No. 31).

Named after J. Cramer, Danish governor in Guinea 1658–59.

— *fontinalis* Hust. Hustedt 1937–39, p. 414, 24: 4, 5. Cholnoky 1957 a, p. 42, fig. 4.

Loc. Nos. 12, 22, 26.

Previously reported from the Sunda Islands. (Hustedt 1937–39, p. 414) and from South Africa (Cholnoky 1957 a, p. 42).

Plate XIX, fig. 10: 25.3 × 4.6 μ. 21 striae in 10 μ. (Sample No. 144, Loc. No. 12).

— *holsatica* Hust. Hustedt 1930, p. 345, fig. 633.

Loc. Nos. 19, 27.

Mesohalobous.

— *luciae* Cholnoky. Cholnoky 1960 a, p. 23, figs. 58–61.

Loc. Nos. 6, 11, 14, 22, 24, 26, 31, 32.

Previously reported from South Africa (Cholnoky 1960 a, p. 23).

Plate XIX, fig. 9: 25.3 × 5.4 μ. 18 striae in 10 μ. (Sample No. 136, Loc. No. 11).

— *mansiensis* nov. spec. Plate XX, fig. 1.

Valves with convex ventral and dorsal margin and protracted apices deflected towards the ventral side. 38–50 μ long, 8–10 μ broad (from girdle view). Raphe running in the middle of the side of the valve, somewhat curved. Axial area on the dorsal side narrow, slightly expanded in the middle of the valve, broad on the ventral side. Transapical striae prominent, slightly radial, 12–14 in 10 μ on the dorsal side, not visible on the ventral side.

Loc. Nos. 6, 8, 9, 11, 17–21, 24, 27, 28, 58, 60, 66, 67.

Plate XX, fig. 1: 49.3 × 9.3 μ. 14 striae in 10 μ. (Sample No. 168, Loc. No. 20).

Illustration slide: Ghana No. 168/1961.

Type locality: Southwest Ghana. Fresh water (the Mansi river, Loc. No. 20).

Amphora montana Krasske. Guermeur 1954, p. 67, 16: 4.
Loc. Nos. 2, 4, 5, 6, 12, 13, 19, 21–28, 30–32, 46, 60, 65, 67.
— *mutabunda* Manguin. Guermeur 1954, p. 67, 16: 7.
Loc. No. 6.
Previously reported from the Tropics in Africa (Guermeur 1954, p. 67).
— *normanni* Rabenh. Guermeur 1954, p. 67, 16: 4. Hustedt 1930, p. 343, fig. 630.
Loc. Nos. 4, 7, 11.
— *ovalis* Kütz. var. *libyca* (Ehr.) Cleve. Hustedt 1939, p. 342. A. Schmidt. Atlas 26: 102–111.
Loc. Nos. 1, 2, 4–6, 8, 9, 11, 12, 14, 17–19, 22, 26, 28, 31, 32, 34, 35, 37, 39, 40, 43, 44, 47–50, 58–62, 66, 67.
— — var. *pediculus* Kütz. Hustedt 1939, p. 343, fig. 629.
Loc. Nos. 6, 31, 32, 61.
— *ovalis* forma.
Plate XX, fig. 2: 27.3×6.7 μ. 13 striae in 10 μ. (Sample No. 81, Loc. No. 23).
Almost identical with Guermeur 1954, 16: 4 ("Proche d'*A. ovalis* Kütz.").
— *sancta-martiali* Peragallo. Guermeur 1954, p. 68, 16: 5. Amossé 1941, p. 147, figs. 7, 8.
Loc. No. 6.
Previously reported from the Tropics in Africa (Guermeur 1954, p. 68).
— *submontana* Hust. Hustedt 1949 a, p. 112, 11: 4.
Loc. Nos. 4, 32, 35, 46.
Very rare in the lakes in East Africa (Hustedt 1949 a, p. 112).

Cymbella Agardh.

Cymbella affinis Kütz. Hustedt 1930, p. 362, fig. 671. Foged 1959, p. 68, pl. 9: 2.
Loc. Nos. 45, 50.
Sparse in some lakes in East Africa (Hustedt 1949 a, p. 116).
— *ankobraensis* nov. spec. Plate XIX, fig. 11.
Valves unsymmetrical with slightly convex ventral margin, a more convex dorsal margin, and obtusely rounded apices. 28–30 μ long, 6 μ broad. Raphe in the middle of the surface of the valve, with polar fissures deflected towards the ventral side and the central fissures slightly deflected towards the dorsal side. Axial area rather broad and not particularly expanded in the middle of the valve. Transapical striae radial, about 12 in 10 μ; distance between the two midmost ones on the dorsal side greater; striae of the ventral side slightly convergent.
Loc. No. 19.
Plate XIX, fig. 11: 28.6×6.0 μ. 12 striae in 10 μ. (Sample No. 166, Loc. No. 19).
Illustration slide: Ghana No. 166/1961.
Type locality: Southwest Ghana. Freshwater (the Mansi river, about 44 km. north of the town Tarkwa, Loc. No. 19).
Presumably related to *C. nylstroomensis* Cholnoky (Cholnoky 1958 a, p. 109), which has been reported from South Africa.
— *aspera* (Ehr.) Cleve. Hustedt 1930, p. 351, fig. 639.
Loc. No. 34.
— — var. *bengalensis* Grun. P. T. Cleve 1894–95, I, p. 176. Cholnoky 1953 b, p. 140, fig. 4.
Syn.: *C. bengalensis* Grun. A. Schmidt Atlas 9: 11, 12. 71: 79. 375: 2, 3, 6.
Loc. Nos. 2, 5, 8, 19, 21, 25, 28, 33, 34, 36, 40, 49, 58, 61.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 117).
Plate XX, fig. 8: 80×26 μ. 9 striae in 10 μ. (Sample No. 171, Loc. No. 21).
— *cucumis* A. Schmidt. A. Schmidt Atlas 9: 21, 22. 375: 7–9.
Loc. No. 19.

Cymbella dadwinensis nov. spec. Plate XX, fig. 3.

Valves unsymmetrical, lanceolate, with a convex ventral margin with a slight expansion in the middle of the valve and a more highly convex dorsal margin. 55–60 μ long, 10–12 μ broad. Raphe straight, with rather long polar fissures deflected towards the ventral side and central fissures slightly deflected towards the dorsal side. Axial area narrowly lanceolate, without any specially indicated central area. Transapical striae radial, on the dorsal side 8, on the ventral side 9 in 10 μ.

Loc. Nos. 12, 13, 17, 18.

Plate XX, fig. 3: 57.3×10.7 μ. 9 striae in 10 μ on the ventral side of the valve; 7 striae in 10 μ on the dorsal side. (Sample No. 147, Loc. No. 13).

Illustration slide: Ghana No. 147/1961.

Type locality: Southwest Ghana. Fresh water (a small river in the rain forest near the village Dadwin, Loc. No. 13).

Presumably related to *C. subturgida* Hust. var. *wallaceana* Hust. (Hustedt 1942, p. 105, figs. 222–24).

— *gracilis* (Rabenh.) Cleve. Hustedt 1930, p. 359, fig. 663.

Loc. Nos. 8, 11, 12, 26, 30, 32, 47, 53, 60.

Rare in lakes in East Africa (Hustedt 1949 a, p. 116). Very common in Sierra Leone (Mölder 1962, p. 42).

— *helvetica* Kütz. Ibid. p. 364, fig. 678.

Loc. No. 43.

— *hustedtii* Krasske. Ibid. p. 363, fig. 674.

Loc. Nos. 2, 12, 26, 50, 58, 61.

— *kolbei* Hust. Hustedt 1949 b, p. 46, figs. 20–26.

Syn.: *C. sumatraensis* Hust. Guermeur 1954, p. 70, 16: 15.

Loc. Nos. 2, 5, 8–13, 23, 26, 34, 38, 46, 47, 49, 58–62.

— *leptoceros* (Ehr.) Grun. Hustedt 1930, p. 353, fig. 645.

Loc. Nos. 20, 33, 58, 59.

Very rare in lakes in East Africa (Hustedt 1949 a, p. 113).

— *moragoensis* nov. spec. Plate XX, fig. 9.

Valves unsymmetrical with slightly convex ventral margin and highly convex dorsal margin, and slightly protracted, rather pointed apices. 25–30 μ long, 9–10 μ broad. Raphe slightly curved, rather close to the ventral margin, with polar fissures deflected towards the ventral margin and the central fissures slightly deflected towards the dorsal margin. Axial area rather narrow, without any specially indicated central area. Transapical striae highly radial, about 9 in 10 μ.

Loc. Nos. 2, 8, 12, 14, 18, 25, 28, 29, 42, 50, 57, 58, 60, 64, 65.

Plate XX, fig. 9: 26.7×9.4 μ. About 9 striae in 10 μ. (Sample No. 268, Loc. No. 50).

Illustration slide: Ghana No. 268/1961.

Type locality: Northeast Ghana. Fresh water (the Morago river, the White Volta system, Loc. No. 50).

Presumably related to *C. grossestriata* O. Müller var. *obtusiuscula* O. Müller (Cholnoky 1953 b, p. 144, fig. 5).

— *mülleri* Hust. Hustedt 1937–39, p. 425, 26: 1–4.

Syn.: *C. grossestriata* O. Müller var. *obtusiuscula* O. Müller. O. Müller 1905, p. 154, fig. 13. A. Schmidt Atlas 373: 6, 7.

Loc. Nos. 2, 17, 22, 26, 30, 46, 49, 55, 57–59, 67.

Widely distributed and common in lakes in East Africa (Hustedt 1949 a, p. 115. Zanon 1938, figs. 33, 34).

Plate XX, fig. 11: 40.7×12.2 μ. Striae 7 in 10 μ on dorsal side, and 5 in 10 μ on ventral side of the valve. (Sample No. 193, Loc. No. 26).

Cymbella mülleri var. *sumatrana* Hust. Guermeur 1954, p. 70, 17: 2 b.
Loc. No. 2.

— *raytonensis* Cholnoky. Cholnoky 1954 b, p. 411, fig. 13. 1960 a, p. 34, fig. 50.
Syn.: *C. schubartii* Hust. Hustedt 1955 c, p. 59, figs. 22, 23.
Loc. No. 15.
Plate XX, fig. 10: 20.0×5.4 μ. 10–11 striae in 10 μ on the dorsal side and 9–10 striae in 10 μ on the ventral side of the valve. (Sample No. 154, Loc. No. 15).

— *tainensis* nov. spec. Plate XX, fig. 4.
Valves unsymmetrically lanceolate, naviculoid, with convex ventral margin and with somewhat more convex dorsal margin. 38–40 μ long, 7–8 μ broad. Raphe almost in the middle of the valve, somewhat closer to the ventral side, straight, with short polar fissures deflected towards the dorsal margin. Axial area narrow, linear, with a prolonged slight expansion in the middle of the valve. Transapical striae radial, 15 in 10 μ, distinctly punctate.
Loc. No. 32.
Plate XX, fig. 4: 38.7×7.3 μ. 15 striae in 10 μ. (Sample No. 215, Loc. No. 32).
Illustration slide: Ghana No. 215/1961.
Type locality: West Ghana. Fresh water (the Tain river near the village Tanoso, Loc. No. 32).
Presumably related to *C. pseudostodderi* Cholnoky (Cholnoky 1959, p. 19, fig. 111).

— *takoradiensis* nov. spec. Plate XX, fig. 5.
Valves unsymmetrical, lanceolate, with almost straight (slightly convex) ventral margin and convex dorsal margin. 40–45 μ long, 5–7 μ broad. Raphe almost straight, almost in the middle of the valve, with short polar fissures deflected towards the dorsal side. Transapical striae radial, 15 in 10 μ, on the ventral side of the valve slightly convergent towards the apices.
Loc. No. 6.
Plate XX, fig. 5: 41×6.0 μ. 15 striae in 10 μ. (Sample No. 114, Loc. No. 6).
Illustration slide: Ghana No. 114/1961.
Type locality: Southwest Ghana. Fresh water (a small river west of the town Takoradi, Loc. No. 6).
Similar to *C. subalpina* Hust. var. *natalensis* Cholnoky (Cholnoky 1957 a, p. 48, fig. 44–52), but XX: 5 has somewhat denser striae, and an axial area wider than this.

— *theronii* Cholnoky. Cholnoky 1954 a, p. 122, figs. 6–8. 1963 a, p. 166, fig. 21.
Loc. Nos. 6, 8, 9, 12, 17–19, 26, 34, 49, 58, 59.
Previously known from South Africa and New Guinea (Cholnoky 1954 a, p. 122. 1963 a, p. 166).
Plate XX, fig. 6: 16.0×5.0 μ. 12 striae in 10 μ. (Sample No. 166, Loc. No. 19).

— *turgida* (Greg.) Cleve. Hustedt 1930, p. 358, fig. 660.
Loc. Nos. 1–9, 11–22, 24–40, 42, 44, 46–49, 53, 54, 58–66.
Rare in lakes in East Africa (Hustedt 1949 a, p. 116), but very common in Sierra Leone (Mölder 1962, p. 42).

— — var. *pseudogracilis* Cholnoky. Cholnoky 1958 a, p. 112, figs. 49, 50.
Loc. Nos. 33, 34.
Previously known from South Africa (Cholnoky 1958 a, p. 112).

— *ventricosa* Kütz. Hustedt 1930, p. 359, fig. 661.
Loc. Nos. 1, 2, 6, 8, 9, 11–14, 17, 18–20, 25, 26, 29, 32–41, 43–48, 50, 54, 57, 58, 60–62, 64, 65.

Widely distributed and in many localities rather common in the Congo territory (HUSTEDT 1949 a, p. 116). Very common in Sierra Leone (MÖLDER 1962, p. 42).

Gomphocymbella O. Müller.

Gomphocymbella ruttneri Hust. A. SCHMIDT Atlas 294: 29–32.
Loc. Nos. 6, 19, 22, 32, 40, 42, 48, 58–60, 65.
Plate XX, fig. 7: 28.7×7.0 μ. 11 striae in 10 μ. (Sample No. 299, Loc. No. 60).

Gomphonema Agardh.

Gomphonema acuminatum Ehr. var. *turris* (Ehr.) Cleve. HUSTEDT 1930, p. 372, fig. 687.
Loc. Nos. 1–3, 31, 34, 47, 48, 50, 58, 59, 66.
— *africanum* G. S. West. HUSTEDT 1949 a, p. 121, 10: 1–5.
Loc. Nos. 1, 34, 35, 41, 47–49, 54, 58, 62.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 121).
Plate XXI, fig. 6: 130×16 μ. 9 striae in 10 μ. (Sample No. 221, Loc. No. 34).
Somewhat similar to *G. subapicatum* Fritsch et Rich 1929, fig. 6 B.
— *angustatum* (Kütz.) Rabenh. HUSTEDT 1930, p. 373, fig. 690.
Loc. Nos. 2, 3, 8, 9, 12–14, 18, 23, 25, 26, 28–30, 37, 39, 42, 46, 48–50, 61.
Not rare in Sierra Leone (MÖLDER 1962, p. 42).
— — var. *producta* Grun. Ibid. p. 373, fig. 693.
Loc. Nos. 2, 3, 8, 12, 14, 18, 22, 23, 26, 29, 30, 46, 50.
Rather common in Sierra Leone (MÖLDER 1962, p. 42).
— *brasiliense* Grun. O. MÜLLER 1903, 1: 9.
Loc. Nos. 6–9, 11–14, 17–23, 27–32, 58, 62–66.
Previously reported from the Tropics in Africa (O. MÜLLER 1903).
Plate XXI, fig. 4: 20.6×4.7 μ. 10–11 striae in 10 μ. (Sample No. 203, Loc. No. 29).
Plate XXI, fig. 5: 29.3×4.7 μ. 11 striae in 10 μ. (Sample No. 305, Loc. No. 64).
Somewhat similar to *G. rautenbachia* Cholnoky (CHOLNOKY 1959, p. 29).
— *clevei* Fricke. HUSTEDT 1949 a, p. 122. A. SCHMIDT Atlas 234: 44–46. GUERMEUR 1954, p. 71, 18: 4. FOGED 1959, p. 76, 12: 6.
Loc. Nos. 8, 12, 17.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 122) and rather common in Sierra Leone (MÖLDER 1962, p. 42).
— — var. *javanica* Hust. CHOLNOKY 1956, fig. 70. A. SCHMIDT Atlas 266: 35.
Loc. Nos. 8, 11, 13, 14, 17, 58, 60.
— *farakulumense* Foged. FOGED 1959, p. 76, 11: 8.
Loc. Nos. 2, 62, 67.
Previously reported from Afghanistan (FOGED 1959, p. 76).
Plate XXI, fig. 10: 14.7×4.0 μ. 20 striae in 10 μ. (Sample No. 70, Loc. No. 2).
— — forma.
Loc. No. 67.
Plate XXI, fig. 11: 17.6×3.6 μ. 20–22 striae in 10 μ. (Sample No. 78, Loc. No. 67).
— *gracile* Ehr. HUSTEDT 1930, p. 376, fig. 702.
Loc. Nos. 1–4, 7, 8, 11–13, 15, 16, 18–23, 26–33, 35–42, 44–50, 53–56, 58, 59, 61, 62, 64–67.
Widely distributed and in many localities common in lakes in East Africa (HUSTEDT 1949 a, p. 122). Very common in Sierra Leone (MÖLDER 1962, p. 42).
— — var. *lanceolata* (Kütz.) Cleve. Ibid. p. 376, fig. 703.
Loc. No. 58.
Fairly rare in Sierra Leone (MÖLDER 1962, p. 43).

Gomphonema intricatum Kütz. Ibid. p. 375, fig. 697.
Loc. Nos. 12, 26.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 121) and in Sierra Leone (Mölder 1962, p. 43).

— — var. *vibrio* (Ehr.) Cleve. Ibid. p. 376, fig. 698.
Loc. No. 66.

— *lanceolatum* Ehr. Ibid. p. 376, fig. 700.
Loc. Nos. 3, 6, 8, 11, 13, 14, 17–19, 22, 24, 26, 31, 32, 44, 49, 56, 57, 61, 62, 64, 65.
Widely distributed and not rare in the Congo territory (Hustedt 1949 a, p. 122). Not rare in Sierra Leone (Mölder 1962, p. 43).

— — var. *insignis* (Greg.) Cleve. Ibid. p. 376, fig. 702.
Loc. Nos. 14, 25, 26, 38, 39, 44, 60, 63, 67.
Not common in lakes in East Africa (Hustedt 1949 a, p. 122). Not rare in Sierra Leone (Mölder 1962, p. 43).

— *lingulatum* Hust. Hustedt 1927, p. 166, fig. 5.
Loc. Nos. 34, 58, 61.
Previously reported from Japan (Hustedt 1927, p. 166).
Plate XXI, fig. 3: 23.5×6.7 μ. 15 striae in 10 μ. (Sample No. 295, Loc. No. 58).

— *longiceps* Ehr. var. *subclavata* Grun. Hustedt 1930, p. 375, fig. 705.
Loc. Nos. 58, 59, 61, 64.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 119). Fairly rare in Sierra Leone (Mölder 1962, p. 43).

— — — fo. *gracilis* Hust. Ibid. p. 375, fig. 706.
Loc. Nos. 30, 45.
Fairly rare in Sierra Leone (Mölder 1962, p. 43).

— *parvulum* (Kütz.) Grun. Ibid. p. 372, fig. 713 a.
Loc. Nos. 1, 2, 4, 6, 8, 11, 12, 15, 17–20, 23, 24, 26–35, 38, 39, 41, 43, 44, 46–49, 54, 56, 58–63, 65, 67.
Widely distributed and in some places very common in the Congo territory (Hustedt 1949 a, p. 119). Very common in Sierra Leone (Mölder 1962, p. 43).

— — var. *lagenula* (Kütz.?. Grun.) Hust. Ibid. p. 373.
Loc. Nos. 1–4, 8, 12, 13, 16–19, 22, 23, 26–28, 30–32, 34, 35, 38–41, 43, 44, 46, 48–50, 52, 54, 56–63, 65, 67.
Occurs together with the species in the Congo territory (Hustedt 1949 a, p. 119).

— — var. *micropus* (Kütz.) Cleve. Ibid. p. 373, fig. 713 c.
Loc. Nos. 2, 8, 12–14, 19, 28, 32, 35, 37–39, 44, 49, 53, 55, 56, 58, 61, 63, 64.

— — var. *subelliptica* Cleve. Ibid. p. 373, fig. 695.
Loc. No. 25.
Not rare in Sierra Leone (Mölder 1962, p. 43).

— *sphaerophorum* Ehr. Ibid. p. 372, fig. 695.
Loc. Nos. 2, 4, 6, 8, 9, 11–14, 16–19, 22, 23, 26–28, 52, 58, 61, 63, 65, 67.
Not rare in Sierra Leone (Mölder 1962, p. 43).

— *suhmii* nov. spec. Plate XXI, fig. 1.
Valves cuneate, with a broad head pole and rather greatly tapering towards the foot pole. 45–55 μ long, 6–8 μ broad. Slight transapical expansion between the middle of the valve and the head pole. Axial area broad, about one third of the breadth of the valve, slightly lengthily expanded in the middle of the valve. Transapical striae radial, 15 in 10 μ, with 1–2 distinct, hyaline longitudinal stripes.
Loc. Nos. 58, 62.
Plate XXI, fig. 1: 49.5×6.8 μ. 15 striae in 10 μ. (Sample No. 294, Loc. No. 58).

Illustration slide: Ghana No. 294/1961.
Type locality: East Ghana. Fresh water (the Volta river at Kete Krachi, Loc. No. 58).
Named after H. von Suhm, a Danish Governor in Guinea 1724–27. He established the Ada Lodge at the Volta river.
Plate XXI, fig. 2: 35.3×6.7 μ. 18 striae in 10 μ. (Sample No. 295, Loc. No. 58).

Gomphonema wulasiense nov. spec. Plate XXI, fig. 7.
Valves clavate, with a more obtuse head pole and a somewhat narrower foot pole, evenly tapering from the middle. 15–20 μ long, 4.7 μ broad. Axial area very narrow, central area rounded, about half of the breadth of the valve. Transapical striae radial, about 20 in 10 μ, with 3–4 hyaline longitudinal stripes.
Loc. Nos. 2, 56.
Plate XXI, fig. 7: 16.7×4.7 μ. 20 striae in 10 μ. (Sample No. 287, Loc. No. 56).
Illustration slide: Ghana No. 287/1961.
Type locality: East Ghana. Fresh water (a pool near the village Wulasi, Loc. No. 56).

— — var. *nunguaensis* nov. var. Plate XXI, fig. 9.
Differs from the species by the valves being ovally clavate. Transapical striae denser, 22–24 in 10 μ, than in the species.
Loc. Nos. 1–3, 29, 62.
Plate XXI, fig. 9: 16.0×5.9 μ. 22–24 striae in 10 μ. (Sample No. 33, Loc. No. 1).
Illustration slide: Ghana No. 33/1961.
Type locality: South Ghana. Fresh water (a cattle pool at Nungua Farm, Loc. No. 1).

— — var. *voltaensis* nov. var. Plate XXI, fig. 8.
Deviates from the species by having broadly cuneate valves, which near the head pole as well as the foot pole are cuneately acuminate.
Loc. Nos. 2, 58.
Plate XXI, fig. 8: 15.3×4.0 μ. 20 striae in 10 μ. (Sample No. 293, Loc. No. 58).
Illustration slide: Ghana No. 293/1961.
Type locality: East Ghana. Fresh water (the Volta river near Kete Krachi, Loc. No. 58).

IV. Epithemiaceae

Denticula Kütz.

Denticula tenuis Kütz. Hustedt 1930, p. 381, fig. 723.
Loc. No. 11.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 123), and in Sierra Leone (Mölder 1962, p. 43).

Epithemia Bréb.

Epithemia sorex Kütz. Hustedt 1930, p. 388, fig. 736.
Loc. Nos. 11, 38.
Not common in the Congo territory (Hustedt 1949 a, p. 124).

— *zebra* (Ehr.) Kütz. Ibid. p. 384, fig. 729.
Loc. Nos. 31, 33.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 122).

— — var. *porcellus* (Kütz.) Grun. Ibid. p. 385, fig. 731.
Loc. No. 35.
More common than the species in lakes in East Africa (Hustedt 1949 a, p. 123).

— — var. *saxonica* (Kütz.) Grun. Ibid. p. 385, fig. 730.
Loc. No. 47.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 123).

Rhopalodia O. Müller.

Rhopalodia gibba (Ehr.) O. Müller. Hustedt 1930, p. 390, fig. 740.
Loc. Nos. 2, 3, 19, 34, 40, 44, 47, 49, 58, 59.
Widely distributed and often common in the Congo territory (Hustedt 1949 a, p. 124).
— — var. *ventricosa* (Ehr.) Grun. Ibid. p. 391, fig. 741.
Loc. No. 49.
Very common in Sierra Leone (Mölder 1962, p. 44).
— *gibberula* (Ehr.) O. Müller. Ibid. p. 391, fig. 742.
Loc. No. 6.
Widely distributed and in many places common in the Congo territory (Hustedt 1949 a, p. 125).
Mesohalobous.
— *musculus* (Ehr.) O. Müller. Ibid. p. 391, fig. 742.
Loc. Nos. 2, 4, 6–8, 11–13, 16, 20, 23, 26, 27, 47, 58, 62, 66.
Mesohalobous.

V. Nitzschiaceae

Hantzschia Grun.

Hantzschia amphioxys (Ehr.) Grun. Hustedt 1930, p. 394, fig. 747. Guermeur 1954, p. 74, 19: 1.
Loc. Nos. 3, 6, 8, 11–13, 19, 26, 34, 35, 37, 38, 40, 41, 43, 44, 46, 49, 56, 58, 59.
Widely distributed but most frequently singly in the Congo territory (Hustedt 1949 a, p. 129). Fairly rare in Sierra Leone (Mölder 1962, p. 44).
— — fo. *capitata* O. Müller. Hustedt 1930, p. 394, fig. 748.
Loc. No. 3.
Very rare in Sierra Leone (Mölder 1962, p. 44).
— — var. *africana* O. Müller. O. Müller 1921, p. 167, 1: 25.
Loc. Nos. 37–39, 44, 46, 53.
Previously reported from tropical Africa (O. Müller 1921, p. 167).
Plate XXI, fig. 14: 60 × 7.2 μ. 8–9 carinate dots and 19–20 striae in 10 μ. (Sample No. 249, Loc. No. 44).
— — var. *maior* Grun. Hustedt 1930, p. 394, fig. 749.
Loc. Nos. 38, 39, 41, 43, 44, 58, 59.
— — var. *vivax* (Hantzsch) Grun. Ibid. p. 394, fig. 750.
Loc. Nos. 2, 33, 34, 36, 38, 44, 45, 54, 58.
— *distincte-punctata* Hust. Hustedt 1922, p. 167. A. Schmidt Atlas 329: 21, 22. Cholnoky 1957 c, p. 66, fig. 63.
Loc. Nos. 6, 8, 11, 12, 18, 19, 21, 22, 27, 28, 55.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 129).
Plate XXII, fig. 3: 50 × 7.3 μ. 5–6 carinate dots and 12 striae in 10 μ. (Sample No. 171, Loc. No. 21).
— *virgata* (Rop.) Grun. Hustedt 1930, p. 395, fig. 752.
Loc. No. 2.
Mesohalobous.
— — var. *capitellata* Hust. Ibid. p. 395, fig. 753.
Loc. No. 1.
Mesohalobous.

Bacillaria Gmelin

Bacillaria paradoxa Gmelin. Hustedt 1930, p. 396, fig. 755.
Loc. Nos. 1, 3–6, 8, 11–14, 17–19, 21, 22, 61, 62, 67.
Mesohalobous.

Nitzschia Hassall

a. **Tryblionellae** (W. Smith. Grun.) Hust.

Nitzschia angustata (W. Smith) Grun. Hustedt 1930, p. 402, fig. 767.
Loc. Nos. 22, 58.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 130), and in Sierra Leone (Mölder 1962, p. 44).

— *apiculata* (Greg.) Grun. Ibid. p. 401, fig. 765.
Loc. Nos. 4, 5, 19, 26, 32, 47, 58, 67.
Mesohalobous.

— *debilis* (Arnott) A. Mayer. Ibid. p. 400, fig. 759.
Syn.: *N. tryblionella* Hantz. var. *debilis* (Arnott) A. Mayer.
Loc. Nos. 2–6, 8, 9, 11, 12, 15, 16, 22, 26, 28, 33, 47, 61, 62.

— *hungarica* Grun. Ibid. p. 401, fig. 766.
Loc. Nos. 2, 8, 26, 31, 57.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 130).
Halophilous-mesohalobous.

— *levidensis* (W. Smith) Grun. Ibid. p. 399, fig. 760.
Syn.: *N. tryblionella* Hantz. var. *levidensis* (W. Smith) Grun.
Loc. Nos. 1, 2, 8, 12–14, 17–19, 27, 28, 30, 47, 60, 64, 65.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 129).
Halophilous.

— *perversa* Grun. Cleve et Grun. 1880, p. 70. A. Schmidt Atlas 35: 9. Hendey 1957–58, p. 77, 3: 9. 5: 7.
Loc. Nos. 8, 13, 18, 22.
Polyhalobous.

— *punctata* (W. Smith) Grun. var. *coarctata* Grun. Hustedt 1930, p. 401.
Loc. Nos. 4–6, 8, 11–14, 17–22, 24, 25, 28, 31, 32, 34, 61, 62, 67.
Halophilous-mesohalobous.

— *subpunctata* Cholnoky. Cholnoky 1960 a, p. 104, fig. 314.
Loc. No. 6.
Previously reported from South Africa (Cholnoky 1960 a, p. 104).

— *tryblionella* Hantzsch var. *victoriae* Grun. Hustedt 1930, p. 399, fig. 758.
Loc. Nos. 1–6, 8, 9, 11, 12, 14, 17–25, 27, 28, 30–34, 36, 40, 41, 47, 50, 58, 61, 62, 65, 67.
Halophilous.

b. **Dubiae** Grun.

Nitzschia amisaensis nov. spec. Plate XXI, fig. 15.
Valves broadly linear with almost parallel sides and shortly protracted apices. 30–35 μ long, 5–6 μ broad. Carina highly eccentric. Carinate dots 11–12 in 10 μ with greater distance between the two midmost ones. Transapical striae 24 in 10 μ, finely punctate.
Loc. No. 5.
Plate XXI, fig. 15: $30.6 \times 5.4\ \mu$. 11–12 carinate dots and 24 striae in 10 μ. (Sample No. 111, Loc. No. 5).
Illustration slide: Ghana No. 111/1961.

Type locality: Southwest Ghana. Fresh water (the Amisa river near the village Mankesim, Loc. No. 5).
Somewhat similar to *N. plicatula* Hust. (Hustedt 1953, p. 151, figs. 1, 2).

Nitzschia commutata Grun. Hustedt 1930, p. 405, fig. 774.
Loc. Nos. 38, 45.
Halophilous-mesohalobous.

— *dubia* W. Smith. Ibid. p. 403, fig. 770.
Loc. Nos. 44, 56.
Halophilous.

— *mankesimensis* nov. spec. Plate XXI, fig. 17.
Valves broadly linear with parallel sides and shortly protracted, pointedly rounded apices. 40–45 μ long, 8 μ broad. Carina highly eccentric. Carinate dots 8–9 in 10 μ. Transapical striae 15 in 10 μ.
Loc. Nos. 4, 6, 44.
Plate XXI, fig. 17: 43.4 × 8.0 μ. 8–9 carinate dots and 15 striae in 10 μ. (Sample No. 112, Loc. No. 4).
Illustration slide: Ghana No. 112/1961.
Type locality: Southwest Ghana. Fresh water (a pond near the Amisa river near the village Mankesim, Loc. No. 4).

— *nunguaensis* nov. spec. Plate XXI, fig. 16.
Valves broadly linear with parallel sides and shortly protracted capitate apices, 30–35 μ long, 7–8 μ broad. Carina highly eccentric. Carinate dots 6–8 in 10 μ. Transapical striae 18–19 in 10 μ.
Loc. Nos. 1, 46.
Plate XXI, fig. 16: 34.5 × 7.3 μ. 6–8 carinate dots and 18–19 striae in 10 μ. (Sample No. 33, Loc. No. 1).
Illustration slide: Ghana No. 33/1961.
Type locality: South Ghana. Fresh water (a cattle pool at the university farm Nungua, Loc. No. 1).
Somewhat similar to *N. stagnorum* Rabenh. (Hustedt 1930, p. 405, fig. 773).

— *plicatula* Hust. Hustedt 1953, p. 150, figs. 1, 2. Cholnoky 1959, p. 58, figs. 295, 296.
Loc. Nos. 1, 5, 8, 22, 28, 31, 46, 47, 49, 58, 62, 67.
Plate XXIII, fig. 3: 44.6 × 8.0 μ. 6–8 carinate dots and 18–19 striae in 10 μ. (Sample No. 210, Loc. No. 31).
Similar to *N. commutata* Grun.
Halophilous-mesohalobous.

— *thermalis* Kütz. Hustedt 1930, p. 403, fig. 771.
Loc. Nos. 32, 35, 67.
Very rare in lakes in East Africa (Hustedt 1949 a, p. 130). Fairly rare in Sierra Leone (Mölder 1962, p. 49).

c. **Bilobatae** Grun.

Nitzschia syrachii nov. spec. Plate XXII, fig. 12.
Valves lanceolate, slightly retracted on the dorsal side, and with slightly protracted apices. 30–40 μ long, 5–6 μ broad. Carina eccentric. Carinate dots rounded, rather prominent, 12 in 10 μ; greater distance between the two midmost ones. Transapical striae not visible.
Loc. Nos. 6, 56.
Plate XXII, fig. 12: 40 × 5.5 μ. 12 carinate dots in 10 μ, and striae very dense. (Sample No. 114, Loc. No. 6).
Illustration slide: Ghana No. 114/1961.

Type locality: South Ghana. Fresh water (a river to the west of Takoradi, Loc. No. 6). Dedicated to C. SYRACH LARSEN, Dr. agro. & Dr. phil.

d. **Lineares** (Grun.) Hust.

Nitzschia aketechiensis nov. spec. Plate XXII, fig. 2.

Valves elliptical-lanceolate with broadly protracted, evenly severed apices. 45–50 μ long, 7–8 μ broad. Carina eccentric. Carinate dots linear, prominent, 5–6 in 10 μ. Transapical striae 30–34 in 10 μ with undulate longitudinal stripes.

Loc. No. 11.

Plate XXII, fig. 2: 45.5 × 7.3 μ. 5—6 carinate dots and 30–34 striae in 10 μ. (Sample No. 136, Loc. No. 11).

Illustration slide: Ghana No. 136/1961.

Type locality: Southwest Ghana. Fresh water (a river in the rain forest near the village Akitechi, Loc. No. 11).

— *bansoensis* nov. spec. Plate XXII, fig. 4.

Valves lanceolate with somewhat protracted, slightly capitate apices. 40–45 μ long, 4 μ broad. Carina narrow, eccentric. Carinate dots 11 in 10 μ, rather small, rounded. Transapical striae 15 in 10 μ.

Loc. Nos. 8, 9, 11, 12, 18, 22, 30.

Plate XXII, fig. 4: 40.4 × 4.0 μ. 11 carinate dots and 15 striae in 10 μ. (Sample No. 144, Loc. No. 12).

Illustration slide: Ghana No. 144/1961.

Type locality: Southwest Ghana. Fresh water (a small stream in a bamboo thicket between the villages Agona and Nsuaem, Loc. No. 12).

— *lawsonii* nov. spec. Plate XXII, fig. 13.

Valves linear with slightly concave carinate side and non-protracted, obtusely rounded apices. 90–100 μ long, 8 μ broad. Carina eccentric. Carinate dots 6 in 10 μ, prominent. Transapical striae 28–30 in 10 μ.

Loc. Nos. 1, 2, 4, 5.

Plate XXII, fig. 13: 96.5 × 8.0 μ. 6 carinate dots and 28–30 striae in 10 μ. (Sample No. 112, Loc. No. 4).

Illustration slide: Ghana No. 112/1961.

Type locality: Southwest Ghana. Fresh water (a pond east of Mankesim, Loc. No. 4). Dedicated to Dr. G. W. LAWSON, University of Ghana.

— *linearis* W. Smith. HUSTEDT 1930, p. 409, fig. 784.

Loc. Nos. 3, 7, 11, 13, 14, 18, 21, 22, 24–32, 34, 46, 47, 49, 62.

Rare in lakes in East Africa (HUSTEDT 1949 a, p. 131), not rare in Sierra Leone (MÖLDER 1962, p. 44).

— *nagbogensis* nov. spec. Plate XXII, fig. 6.

Valves linear, with parallel sides and capitate apices, 40–45 μ long, 4–5 μ broad. Carina eccentric. Carinate dots 9–10 in 10 μ, linear. Transapical striae not visible.

Loc. Nos. 25, 53.

Plate XXII, fig. 6: 43.3 × 4.2 μ. 9–10 carinate dots in 10 μ. Striae very dense. (Sample No. 279, Loc. No. 53).

Illustration slide: Ghana No. 279/1961.

Type locality: Northeast Ghana. Fresh water (a river near the village Nagbog, Loc. No. 53).

— *pretoriensis* Cholnoky. CHOLNOKY 1957 c, p. 77, fig. 110.

Loc. No. 11.

Previously reported from South Africa (CHOLNOKY 1957 c, p. 77).

Plate XXII, fig. 1: 56×6 μ. 6 carinate dots in 10 μ. Striae very dense. (Sample No. 136, Loc. No. 11).

The size of XXII: 1 is considerably greater than the dimensions of the species given by Cholnoky 1957 c, p. 77.

Nitzschia recta Hantzsch. Hustedt 1930, p. 411, fig. 785.

Loc. Nos. 2, 3, 26, 67.

Rare in lakes in East Africa (Hustedt 1949 a, p. 132).

— *ruttneri* Manguin. E. Manguin 1942, 4: 79.

Loc. No. 59.

Previously reported from the Azores (E. Manguin 1942).

— *tonoensis* nov. spec. Plate XXIII, fig. 5.

Valves linear-lanceolate, with rather far protracted capitate apices. 90–95 μ long, 8–9 μ broad. Carina eccentric. Carinate dots 7–8 in 10 μ; greater distance between the two midmost ones. Transapical striae 18 in 10 μ.

Loc. Nos. 2, 4, 33–36, 44, 45, 67.

Plate XXIII, fig. 5: 90.6×8.3 μ. 7–8 carinate dots in 10 μ. 18 striae in 10 μ. (Sample No. 252, Loc. No. 45).

Illustration slide: Ghana No. 252/1961.

Type locality: North Ghana. Freshwater (pond No. 26 at Tono agricultural station near the town Navrongo; Loc. No. 45).

— *vedelii* nov. spec. Plate XXII, fig. 5.

Valves lanceolate, with long and narrowly protracted capitate apices. 40–45 μ long, 4–5 μ broad. Carina narrow, eccentric. Carinate dots 11–12 in 10 μ, small, rounded. Transapical striae 12–13 in 10 μ.

Loc. No. 11.

Plate XXII, fig. 5: 44×4.3 μ. 11–12 carinate dots and 12–13 striae in 10 μ. (Sample No. 135, Loc. No. 11).

Illustration slide: Ghana No. 135/1961.

Type locality: Southwest Ghana. Fresh water (a small river in the rain forest west of Takoradi; Loc. No. 11).

Dedicated to the Danish Vice-Admiral A.H. Vedel, Ph. D. h. c.

— *vitrea* Norman. Hustedt 1930, p. 411, fig. 787.

Loc. Nos. 14, 16.

Very rare in hot springs in East Africa (Hustedt 1949 a, p. 132).

e. **Dissipatae** Grun.

Nitzschia acuta Hantzsch. Hustedt 1930, p. 412, fig. 790.

Loc. Nos. 12, 17, 18.

Not rare in Sierra Leone (Mölder 1962, p. 44).

— *dissipata* (Kütz.) Grun. Ibid. p. 412, fig. 789.

Loc. Nos. 1, 6, 8, 9, 12–14, 18, 19, 21, 22, 27–29, 31, 47, 61, 62, 65.

Very rare in lakes in East Africa (Hustedt 1949 a, p. 132), and in Sierra Leone (Mölder 1962, p. 44).

— *socialis* Greg. Cleve et Grunow 1880, p. 85. H. et M. Peragallo 1897–1908, p. 280, 72: 7, 8.

Loc. Nos. 4, 8, 12, 14.

f. **Lanceolatae** Grun.

Nitzschia abonuensis nov. spec. Plate XXII, fig. 8.

Valves linear, with parallel sides, tapering a little towards the obtusely rounded apices. 25–30 μ long, 2.5–3.0 μ broad. Carina eccentric. Carinate dots 9–10 in 10 μ, rather small. Transapical striae not visible.

Loc. No. 26.

Plate XXII, fig. 8: 26.6×2.7 μ. 9–10 carinate dots in 10 μ. Striae very dense. (Sample No. 194, Loc. No. 26).

Illustration slide: Ghana No. 194/1961.

Type locality: West Ghana. Fresh water (a pond near the shore of Bosumtwi Lake near the village Abonu; Loc. No. 26).

Nitzschia amphibia Grun. Hustedt 1930, p. 414, fig. 793.

Loc. Nos. 2–4, 6, 7, 11, 13, 17–19, 22, 23, 26, 28, 29, 31, 32, 34, 35, 43, 44, 46, 47, 49, 57–59, 61, 62, 66, 67.

Widely distributed and rather common in the Congo territory (Hustedt 1949 a, p. 140). Rather rare in Sierra Leone (Mölder 1962, p. 44).

— *ankobraensis* nov. spec. Plate XXI, fig. 13.

Valves broadly linear, with parallel sides and capitate apices. 20–25 μ long, 5–6 μ broad. Carina highly eccentric. Carinate dots 8–9 in 10 μ. Transapical striae prominent, 24–26 in 10 μ, finely punctate.

Loc. Nos. 33, 35.

Plate XXI, fig. 13: 22.7×5.7 μ. 8–9 carinate dots and 24–26 striae in 10 μ. (Sample No. 205, Loc. No. 33).

Illustration slide: Ghana No. 205/1961.

Type locality: West Ghana. Fresh water (a small river near the village Dwinyana; Loc. No. 33).

Similar to *N. legleri* Hust. (Hustedt 1959 b, p. 437, figs. 18–20).

— *apropongensis* nov. spec. Plate XXIV, fig. 13.

Valves broadly linear, with parallel sides and protracted apices. 20–25 μ long, 5–6 μ broad. Carina broad, eccentric. Carinate dots 6 in 10 μ, irregular, rounded. Transapical striae 28–30 in 10 μ.

Loc. No. 29.

Plate XXIV, fig. 13: 23.3×5.3 μ. 6 carinate dots and 28–30 striae in 10 μ. (Sample No. 203, Loc. No. 29).

Illustration slide: Ghana No. 203/1961.

Type locality: West Ghana. Fresh water (the Apropong river, Loc. No. 29).

— *bosumtwiensis* nov. spec. Plate XXIII, fig. 13.

Valves linear, with parallel sides and evenly rounded apices. 40–45 μ long, 3–4 μ broad. Carina eccentric. Carinate dots 11 in 10 μ, rather prominent. Transapical striae not visible.

Loc. No. 26.

Plate XXIII, fig. 13: 43.4×3.4 μ. 11 carinate dots in 10 μ. Striae very dense. (Sample No. 189, Loc. No. 26).

Illustration slide: Ghana No. 189/1961.

Type locality: West Ghana. Fresh water (Bosumtwi Lake, Loc. No. 26).

— *capitellata* Rabenh. Hustedt 1930, p. 417, fig. 798.

Loc. Nos. 28, 35, 40, 43, 44, 49, 58.

Rare in lakes in East Africa (Hustedt 1949 a, p. 139), and in Sierra Leone (Mölder 1962, p. 44).

Halophilous.

— *chuchiligaensis* nov. spec. Plate XXIV, fig. 8.

Valves linear, with almost parallel sides (slightly concave), protracted and obtusely rounded apices. 25–30 μ long, 4 μ broad. Carina eccentric. Carinate dots 7–8 in 10 μ, prominent, greater distance between the two midmost ones. Transapical striae not visible.

Loc. Nos. 43, 44, 46.

Plate XXIV, fig. 8: 28.6×4.0 μ. 7–8 carinate dots in 10 μ. Striae very dense. (Sample No. 254, Loc. No. 46).
Illustration slide: Ghana No. 254/1961.
Type locality: North Ghana. Fresh water (a cattle-pool near the village Chuchiliga southwest of Navrongo; Loc. No. 46).

Nitzschia congolensis Hust. HUSTEDT 1949 a, p. 134, 12: 15, 16.
Loc. No. 46.
Previously reported from Lake Edward, East Africa, only (HUSTEDT 1949 a, p. 134).

— *dadwinensis* nov. spec. Plate XXIII, fig. 10.
Valves linear, with parallel sides and evenly, broadly tapering apices. 45–50 μ long, 3–4 μ broad. Carina eccentric. Carinate dots 7 in 10 μ, of different size and with diverse distances. Transapical striae not visible.
Loc. No. 13.
Plate XXIII, fig. 10: 46,6×3.5 μ. 7 carinate dots in 10 μ. Striae very dense. (Sample No. 149, Loc. No. 13).
Illustration slide: Ghana No. 149/1961.
Type locality: Southwest Ghana. Fresh water (a small river near the village Dadwin, Loc. No. 13).

— *densuensis* nov. spec. Plate XXIV, fig. 9.
Valves lanceolate, with shortly protracted apices, 26 μ long, 4–5 μ broad. Carina eccentric. Carinate dots very prominent, 9 in 10 μ. Transapical striae 30–34 in 10 μ, finely, but distinctly punctate.
Loc. Nos. 3, 8.
Plate XXIV, fig. 9: 26.0×4.5 μ. 9 carinate dots and 30–34 striae in 10 μ. (Sample No. 73, Loc. No. 3).
Illustration slide: Ghana No. 73/1961.
Type locality: South Ghana. Fresh water (the Densu river, west of Accra; Loc. No. 3).

— *fonticola* Grun. HUSTEDT 1930, p. 415, fig. 800.
Loc. Nos. 13, 18, 33, 43, 66.
Common in lakes in East Africa (HUSTEDT 1949 a, p. 142). Not rare in Sierra Leone (MÖLDER 1962, p. 44).

— *frustulum* (Kütz.) Grun. HUSTEDT 1930, p. 414, fig. 795.
Loc. Nos. 2, 6, 8, 9, 11–14, 17–19, 21, 22, 26–29, 31, 32, 34, 38, 43, 46, 47, 49, 57–62, 65, 67.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 145).

— — var. *perpusilla* (Rabenh.) Grun. Ibid. p. 415.
Loc. Nos. 6, 26, 29, 58, 60.

— *gracilis* Hantzsch. Ibid. p. 416, fig. 784.
Loc. No. 46.
Rare in Sierra Leone (MÖLDER 1962, p. 44).

— *hantzschiana* Rabenh. Ibid. p. 415, fig. 797.
Loc. No. 26.
Rare in Sierra Leone (MÖLDER 1962, p. 44).

— *heufleriana* Grun. Ibid. p. 414, fig. 805.
Loc. Nos. 37, 47, 62.

— *huniensis* nov. spec. Plate XXIV, fig. 17.
Valves linear, with almost parallel sides and broadly protracted, obtusely rounded apices. 12–15 μ long, 2.0–2.5 μ broad. Carina eccentric. Carinate dots 9 in 10 μ, prominent, greater distance between the two midmost ones. Transapical striae not visible.
Loc. No. 17.

Plate XXIV, fig. 17: 14.0×2.1 μ. 9 carinate dots in 10 μ. Striae very dense. (Sample No. 157, Loc. No. 17).
Illustration slide: Ghana No. 157/1961.
Type locality: Southwest Ghana. Fresh water (the Huni river north of the town Tarkwa; Loc. No. 17).

Nitzschia intermedia Hantzsch. HUSTEDT 1937–39, p. 477, 41: 4–7. 1949 a, p. 136, 12: 21–23.
Loc. Nos. 43, 46.
Rare in lakes in East Africa (HUSTEDT 1949 a, p. 136).

— *krachiensis* nov. spec. Plate XXIV, fig. 1.
Valves narrowly lanceolate, with tapering, pointed apices. 35–40 μ long, 2.5–3.0 μ broad. Carina narrow, eccentric. Carinate dots 11 in 10 μ, small. Transapical striae 22 in 10 μ.
Loc. Nos. 18, 58, 65.
Plate XXIV, fig. 1: 37.3×2.7 μ. 11 carinate dots and 22 striae in 10 μ. (Sample No. 293, Loc. No. 58).
Illustration slide: Ghana No. 293/1961.
Type locality: East Ghana. Fresh water (the Volta river at the town Kete Krachi; Loc. No. 58).
Very similar to *N. subrostrata* Hust. (HUSTEDT 1942, p. 137, figs. 313–319), which taxon differs by its denser striae.

— *kützingiana* Hilse. HUSTEDT 1930, p. 416, fig. 802.
Loc. Nos. 1, 4–6, 13, 18, 19, 24–26, 28, 34, 44, 49, 57, 60, 65.
Very rare in Sierra Leone (MÖLLER 1962, p. 44).

— *lancettula* O. Müller. A. SCHMIDT Atlas 348: 52, 53. HUSTEDT 1949 a, p. 141, 13: 39–47.
Loc. No. 34.
One of the commonest diatom species in the Congo territory, an "Endemismus des tropischen Afrika" (HUSTEDT 1949 a, p. 141).

— *mamataensis* nov. spec. Plate XXII, fig. 10.
Valves narrowly linear with parallel sides and evenly, obtusely rounded apices. 50–55 μ long, 3–4 μ broad. Carina eccentric. Carinate dots 11–12 in 10 μ, rather small. Transapical striae not visible.
Loc. Nos. 4, 57.
Plate XXII, fig. 10: 53.3×3.4 μ. 11–12 carinate dots in 10 μ. Striae very dense. (Sample No. 291, Loc. No. 57).
Illustration slide: Ghana No. 291/1961.
Type locality: East Ghana. Fresh water (a small river, the Volta river system, near the village Mamata, Loc. No. 57).

— *obsidialis* Hust. HUSTEDT 1949 a, p. 148, 13: 25. CHOLNOKY 1960 a, figs. 300–302.
Loc. Nos. 6, 61.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 148).
Plate XXIII, fig. 9: 30.0×4.0 μ. 8 carinate dots in 10 μ. Striae very dense. (Sample No. 92, Loc. No. 61).

— *ofinensis* nov. spec. Plate XXIV, fig. 12.
Valves broadly lanceolate, with pointed apices. 15–16 μ long, 4 μ broad. Carina narrow, eccentric. Carinate dots 12 in 10 μ. Greater distance between the two midmost ones. Transapical striae 24 in 10 μ.
Loc. No. 25.
Plate XXIV, fig. 12: 15.3×4.0 μ. 12 carinate dots and 24 striae in 10 μ. (Sample No. 186, Loc. No. 25).
Illustration slide: Ghana No. 186/1961.

Type locality: West Ghana. Fresh water (theOfin river at the Adiembra bridge; Loc. No. 25).
Presumably related to *N. pseudoamphioxys* Hust. (HUSTEDT 1942, p. 135, figs. 301–308), which taxon, however, has considerably fewer carinate dots in 10 μ than XXIV: 12.

Nitzschia ovalis Arnott. VAN HEURCK 1880–85, 69: 36. CHOLNOKY 1962 b, p. 57, figs. 86–88.
Loc. Nos. 22, 62.
Plate XXI, fig. 12: 17.3 × 6.6 μ. 7–8 carinate dots in 10 μ. Striae very dense. (Sample No. 173, Loc. No. 22).

— *palea* (Kütz.) W. Smith. HUSTEDT 1930, p. 416, fig. 801.
Loc. Nos. 1, 3, 5, 8, 11, 13–16, 18, 19, 21–24, 28–31, 34, 35, 37–39, 41, 43, 46, 49, 50, 53, 56, 58–61, 64, 66, 67.
Widely distributed but mainly singly in lakes in East Africa (HUSTEDT 1949 a, p. 147). Very common in Sierra Leone (MÖLDER 1962, p. 44).
Plate XXIII, fig. 8: 26.0 × 4.6 μ. 12 carinate dots in 10 μ. Striae very dense. (Sample No. 256, Loc. No. 46).

— — fo. *dubia* Manguin. E. MANGUIN 1942, 4: 78.
Loc. Nos. 8, 21, 22, 25, 43, 47, 53.
Previously reported from tropical Africa (E. MANGUIN, 1942).
Plate XXIII, fig. 11: 32.3 × 5.3 μ. 10–12 carinate dots in 10 μ. Striae very dense. (Sample No. 186, Loc. No. 25).

— — var. *tenuirostris* Grun. HUSTEDT 1930, p. 416.
Loc. No. 46.

— *paleaceae* Grun. Ibid. p. 416, fig. 807.
Loc. Nos. 3, 4, 20, 28, 35, 37, 45, 46, 61, 66.

— *paleaeformis* Hust. HUSTEDT 1946–50, p. 439, 39: 6–14.
Loc. Nos. 3, 15, 43.
Plate XXIII, fig. 12: 48 × 4.0 μ. 9–10 carinate dots in 10 μ. Striae very dense. (Sample No. 73, Loc. No. 3).

— *perminuta* Hust. HUSTEDT 1949 a, p. 145.
Syn.: *N. frustulum* (Kütz.) Grun. var. *perminuta* Grun. (HUSTEDT 1930, p. 415).
Loc. No. 6.
Fairly rare in the Congo territory (HUSTEDT 1949 a, p. 145).

— *philippinarum* Hust. HUSTEDT 1942, p. 137, figs. 322–330.
Loc. Nos. 1, 2, 6, 8, 13, 26, 28, 29, 34, 37, 39, 44, 46, 53, 58, 59, 61, 63, 65–67.
Previously reported from the Philippines (HUSTEDT 1942, p. 137).

— *pseudofonticola* Hust. HUSTEDT 1957, p. 353, figs. 83–90.
Loc. Nos. 1, 2, 4, 5, 8, 9, 11, 12, 16, 18, 19, 21–23, 26–29, 38, 39, 42–44, 46, 50, 54, 57, 58, 60–63, 65, 66.

— *pumila* Hust. HUSTEDT 1954 c, p. 480, figs. 67–69.
Loc. Nos. 39, 43.

— *sakaensis* nov. spec. Plate XXIV, fig. 16.
Valves linear-lanceolate, with broadly rounded apices. 20–25 μ long, 4 μ broad. Carina narrow, eccentric. Carinate dots 7 in 10 μ. Transapical striae 20–21 in 10 μ.
Loc. No. 49.
Plate XXIV, fig. 16: 23.2 × 4.0 μ. 7 carinate dots and 20–21 striae in 10 μ. (Sample No. 266, Loc. No. 49).
Illustration slide: Ghana No. 266/1961.
Type locality: Northeast Ghana. Fresh water (the White Volta river near the village Saka, Loc. No. 49).

— *salinicola* Aleem et Hust. A. A. ALEEM et HUSTEDT 1951, p. 19, fig. 6.
Loc. Nos. 46, 52.

Previously reported from Southern England (A.A. ALEEM et HUSTEDT 1951, p. 19).
Halophilous.

Nitzschia sansomei nov. spec. Plate XXIII, fig. 4.
Valves linear, with parallel sides, cuneately tapering towards the rounded apices. 50–55 μ long, 4–5 μ broad. Carina narrow, eccentric. Carinate dots 7–8 in 10 μ, rather prominent. Transapical striae 15–16 in 10 μ, punctate in longitudinal stripes.
Loc. Nos. 58, 67.
Plate XXIII, fig. 4: 53.3×4.1 μ. 7–8 carinate dots and 15–16 striae in 10 μ. (Sample No. 295, Loc. No. 58).
Illustration slide: Ghana No. 295/1961.
Type locality: East Ghana. Fresh water (the Volta river at Kete Krachi, Loc. No. 58).
Dedicated to Professor F.W. SANSOME, Ph. D., University of Ghana.

— *schiellerupii* nov. spec. Plate XXII, fig. 9.
Valves linear-lanceolate, rather evenly tapering from the middle towards the obtusely rounded apices. 35–40 μ long, 5–6 μ broad. Carina narrow, eccentric. Carinate dots 7 in 10 μ, rather prominent. Transapical striae 21–22 in 10 μ, greater distance between the two midmost ones.
Loc. Nos. 58, 59.
Plate XXII, fig. 9: 37.3×5.3 μ. 7 carinate dots and 21–22 striae in 10 μ. (Sample No. 296, Loc. No. 58).
Illustration slide: Ghana No. 296/1961.
Type locality: East Ghana. Fresh water (the Volta river at Kete Krachi, Loc. No. 58).
Named after S. SCHIELLERUP, Danish governor in Guinea 1735–36.

— *subrostrata* Hust. HUSTEDT 1942, p. 137, figs. 313–319.
Loc. Nos. 8, 38, 44, 49, 67.
Previously reported from Indonesia (HUSTEDT 1942, p. 137).

— *subvitrea* Hust. var. *capensis* Cholnoky. CHOLNOKY 1959, p. 59, fig. 318.
Loc. Nos. 2, 11–13, 21, 22, 43, 65, 66.
Previously reported from South Africa (CHOLNOKY 1959, p. 59).
Plate XXIII, fig. 2: 44×5.3 μ. 8–9 carinate dots and 26 striae in 10 μ. (Sample No. 135, Loc. No. 11).

— *svedstrupii* nov. spec. Plate XXII, fig. 14.
Valves broadly linear with slightly concave sides and shortly protracted apices. 20–25 μ long, 4–5 μ broad. Carina eccentric. Carinate dots 7 in 10 μ, prominent. Transapical striae not visible.
Loc. Nos. 8, 18, 30.
Plate XXII, fig. 14: 23.6×4.7 μ. 7 carinate dots in 10 μ. Striae very dense. (Sample No. 204, Loc. No. 30).
Illustration slide: Ghana No. 204/1961.
Type locality: West Ghana. Fresh water (a small river near the village Dwinyana, Loc. No. 30).
Named after C.W. SVEDSTRUP, a Danish lieutenant in Guinea 1844–46, father of the Danish author ALEXANDER SVEDSTRUP.

— *tainensis* nov. spec. Plate XXIII, fig. 14.
Valves linear with almost parallel sides, cuneately tapering towards the apices. 20–25 μ long, 3–4 μ broad. Carina eccentric. Carinate dots 7–8 in 10 μ, rather prominent. Transapical striae 14–15 in 10 μ, coarsely punctate.
Loc. No. 32.
Plate XXIII, fig. 14: 23.3×3.4 μ. 7–8 carinate dots and 14–15 striae in 10 μ. (Sample No. 216, Loc. No. 32).

Illustration slide: Ghana No. 216/1961.
Type locality: West Ghana. Fresh water (the Tain river, the Black Volta river system, Loc. No. 32).

Nitzschia tarda Hust. Hustedt 1949 a, p. 138, 12: 24, 25.
Loc. Nos. 1, 8, 31, 43, 58, 59, 67.
Previously reported from Lake Edward, East Africa (Hustedt 1949 a, p. 138).
Plate XXIII, fig. 1: 53.3×5.6 μ. 7–8 carinate dots and 24 striae in 10 μ. (Sample No. 210, Loc. No. 31).
This taxon is very similar to *N. goetzeana* O. Müller 1905, p. 176, 2: 20, reported from East Africa.

— *towutensis* Hust. Hustedt 1942, p. 139, figs. 338, 339.
Loc. Nos. 6, 8.
Previously reported from Celebes (Hustedt 1942, p. 139).
Plate XXIV, fig. 11: 16.6×4.7 μ. 14–15 carinate dots and 30–32 striae in 10 μ. (Sample No. 114, Loc. No. 6).

— *tropica* Hust. Hustedt 1949 a, p. 147, 11: 34–38. Cholnoky 1958 a, p. 132, figs. 140–142.
Loc. Nos. 8, 46.
Widely distributed and not rare in the Congo territory (Hustedt 1949 a, p. 147).

— *voltaensis* nov. spec. Plate XXII, fig. 11.
Valves narrow linear, with parallel sides and tapering, rounded apices. 35–40 μ long, 2.5–3.0 μ broad. Carina eccentric. Carinate dots 10–11 in 10 μ, prominent. Transapical striae not visible.
Loc. No. 58.
Plate XXII, fig. 11: 39.3×2.7 μ. 10–11 carinate dots in 10 μ. Striae very dense. (Sample No. 293, Loc. No. 58).
Illustration slide: Ghana No. 293/1961.
Type locality: East Ghana. Fresh water (the Volta river at Kete Krachi, Loc. No. 58).

g. **Sigmoideae** (Grun.) Hust.

Nitzschia abraensis nov. spec. Plate XXII, fig. 7.
Valves linear, with parallel sides; towards the capitate apices very slightly sigmoid. 60–70 μ long, 6–7 μ broad. Carina eccentric. Carinate dots 8–9 in 10 μ, linear. Transapical striae not visible.
Loc. No. 8.
Plate XXII, fig. 7: 65.4×6.7 μ. 8–9 carinate dots in 10 μ. Striae very dense. (Sample No. 123, Loc. No. 8).
Illustration slide: Ghana No. 123/1961.
Type locality: Southwest Ghana. Fresh water (a small river in the rain forest near the village Abra, north of Takoradi, Loc. No. 8).

— *apowaensis* nov. spec. Plate XXIV, fig. 7.
Valves lanceolate, with rather far and pointedly protracted apices, slightly sigmoid. 70 μ long, 5–6 μ broad. Carina narrow, eccentric. Carinate dots 7–8 in 10 μ, rather prominent, rounded, with irregular intervals and with greater distance between the two midmost ones. Transapical striae not visible.
Loc. No. 6.
Plate: XXIV, fig. 7: 70×5.3 μ. 7–8 carinate dots in 10 μ. Striae very dense. (Sample No. 114, Loc. No. 6).
Illustration slide: Ghana No. 114/1961.
Type locality: Southwest Ghana. Fresh water (a river in the rain forest west of Takoradi, near the village Apowa, Loc. No. 6).

Nitzschia clausii Hantzsch. Hustedt 1930, p. 421, fig. 814.
Loc. No. 30.
Halophilous-mesohalobous.
— *pseudosigma* Hust. Hustedt 1937–39, p. 486, 40: 13–15.
Loc. No. 6.
Very rare in Sierra Leone (Mölder 1962, p. 44).
— *sigma* (Kütz.) W. Smith. Hustedt 1930, p. 420, fig. 813.
Loc. Nos. 1, 4–6, 8, 9, 11–14, 17–23, 25, 28–32, 60–62, 65–67.
Singly in hot springs, East Africa (Hustedt 1949 a, p. 152). Rare in Sierra Leone (Mölder 1962, p. 44).
Mesohalobous.
— *sigmoidea* (Ehr.) W. Smith. Ibid. p. 419, fig. 810.
Loc. Nos. 17, 18.
Very rare in Lake Kiwu, East Africa (Hustedt 1949 a, p. 151). Not rare in Sierra Leone Mölder 1962, p. 44).
— *vermicularis* (Kütz.) Grun. Ibid. p. 419, fig. 811.
Loc. Nos. 5, 8, 9, 13, 22, 60, 62.

h. **Obtusae** (Grun.) Hust.

Nitzschia adiembraensis nov. spec. Plate XXIV, fig. 2.
Valves linear-lanceolate, with broadly protracted, obtusely rounded apices, slightly sigmoid. 35–40 μ long, 4 μ broad. Carina narrow, eccentric. Carinate dots 11 in 10 μ, with a somewhat irregular mutual distance. Transapical striae not visible.
Loc. No. 25.
Plate XXIV, fig. 2: 36.6 $\times$ 4.0 μ. 11 carinate dots in 10 μ. Striae very dense. (Sample No. 186, Loc. No. 25).
Illustration slide: Ghana No. 186/1961.
Type locality: West Ghana. Fresh water (the Ofin river at Adiembra bridge, Loc. No. 25).
— *filiformis* (W. Smith) Hust. Hustedt 1930, p. 422, fig. 818.
Loc. No. 27.
Very rare in Lake Kiwu, East Africa (Hustedt 1949 a, p. 151).
Halophilous-mesohalobous.
— *ghanaensis* nov. spec. Plate XXIV, fig. 15.
Valves broadly linear, with concave sides, a little sigmoid, and with obtusely protracted apices. 20–25 μ long, 4–5 μ broad. Carina narrow, eccentric. Carinate dots 10–11 in 10 μ, small, rounded, greater distance between the two midmost ones. Transapical striae dense.
Loc. No. 8.
Plate XXIV, fig. 15: 23.4 $\times$ 4.2 μ. 10–11 carinate dots in 10 μ. Striae very dense. (Sample No. 123, Loc. No. 8).
Illustration slide: Ghana No. 123/1961.
Type locality: Southwest Ghana. Fresh water (a small river in the rain forest between Takoradi and Axim, Loc. No. 8).
Somewhat similar to *N. parvula* Lewis.
— *ignorata* Krasske. Hustedt 1930, p. 422, fig. 819. Guermeur 1954, p. 83, 23: 5.
Loc. Nos. 6, 8, 11–17, 22, 23, 26, 27, 29, 30, 61, 62, 64.
Plate XXIV, fig. 5: 49.3 $\times$ 4.0 μ. 10 carinate dots in 10 μ. Striae very dense. (Sample No. 203, Loc. No. 29).
Loc. No. 11.
— *irresoluta* Hust. fo. *minor* nov. fo. Plate XXIV. fig. 10.
Loc. No. 11.

Plate XXIV, fig. 10: 30.6 × 3.3 μ. 11–12 carinate dots in 10 μ. Striae very dense. (Sample No. 136, Loc. No. 11).

Differs from the species only by its considerably smaller size of the valve. As to shape of the valve and carinate dots, which have a greater distance between the two midmost ones, and the very dense striae, this form seems to be very closely related to *N. irresoluta* Hust. from Celebes (Hustedt 1942, p. 142, figs. 349, 350).

Nitzschia obtusa W. Smith. Hustedt 1930, p. 422, fig. 817 a.

Loc. Nos. 1–5, 11, 17.

Rare in Sierra Leone (Mölder 1962, p. 44).

Mesohalobous.

— — var. *scalpelliformis* Grun. Guermeur 1954, p. 84, 23: 10.

Loc. Nos. 1, 3, 4, 6, 8, 20, 22, 26, 27, 29, 30, 61, 62, 64.

Plate XXIV, fig. 3: 25.6 × 4.7 μ. 9 carinate dots in 10 μ. Striae very dense. (Sample No. 196, Loc. No. 27).

Plate XXIV, fig. 4: 36 × 4.5 μ. 9 carinate dots in 10 μ. Striae 28 in 10 μ (Sample No. 73, Loc. No. 3).

Presumably closely related to *N. obtusa* fo. *parva* Hust. Cholnoky 1960 a, fig. 303. A. Schmidt Atlas 336: 25, 26.

Halophilous (?).

— *parvula* Lewis. Hustedt 1930, p. 421, fig. 816.

Loc. Nos. 1, 2, 11–14, 16, 19–21, 29, 45–47, 53, 62.

Rare in Sierra Leone (Mölder 1962, p. 44).

Mesohalobous.

i. **Nitzschiellae** (Rabenh.) Grun.

Nitzschia acicularis W. Smith. Hustedt 1930, p. 423, fig. 821.

Loc. Nos. 1, 4, 7, 44–47.

Very rare in Lake Edward, East Africa (Hustedt 1949 a, p. 150). Rare in Sierra Leone (Mölder 1962, p. 44).

— *closterium* (Ehr.) W. Smith. Ibid. p. 424, fig. 822.

Loc. Nos. 3–5, 8, 12, 13, 16, 21, 23, 58, 63.

Plate XXIV, fig. 14: 82.5 × 4.6 μ. 12 carinate dots in 10 μ. Striae very dense. (Sample No. 181, Loc. No. 23).

Mesohalobous.

— *lorenziana* Grun. Ibid. p. 423. H. et M. Peragallo 1897–1908, p. 293, 24: 25.

Loc. Nos. 27, 31.

Mesohalobous.

— — var. *subtilis* Grun. Hustedt 1930, p. 423, fig. 820. 1937–39, p. 489, 41: 17.

Loc. Nos. 6, 8, 11–13, 18, 21, 22, 27–29, 62.

Plate XXIV, fig. 6: 97 × 3.3 μ. 9 carinate dots and 17–18 striae in 10 μ. (Sample No. 145, Loc. No. 12).

Mesohalobous.

— *navrongensis* nov. spec. Plate XXIII, fig. 6.

Valves narrowly lanceolate, with much protracted, greatly tapering apices. 60–70 μ long, 2.5–3.0 μ broad. Carina eccentric. Carinate dots 12 in 10 μ. Transapical striae not visible.

Loc. Nos. 44, 62.

Plate XXIII, fig. 6: 66 × 2.7 μ. 12 carinate dots in 10 μ. Striae very dense. (Sample No. 249, Loc. No. 44).

Illustration slide: Ghana No. 249/1961.

Type locality: North Ghana. Fresh water (the pond No. 14 at Tono agricultural station near Navrongo; Loc. No. 44).

Nitzschia spiculoides Hust. HUSTEDT 1949 a, p. 151, 13: 5, 6.
Loc. Nos. 1, 35, 48, 50, 55, 60, 62, 67.
Very rare in Lake Edward, East Africa (HUSTEDT 1949 a, p. 151).
Plate XXIII, fig. 7: 60.7 × 3.3 μ. 11–12 carinate dots in 10 μ. Striae very dense. (Sample No. 223, Loc. No. 35).

Surirellaceae

Cymatopleura W. Smith.

Cymatopleura solea (Bréb.) W. Smith. HUSTEDT 1930, p. 425, fig. 823 a.
Loc. No. 25.
Singly in some lakes in East Africa (HUSTEDT 1949 a, p. 152).
— — var. *rugosa* O. Müller. A. SCHMIDT Atlas 245: 4.
Loc. No. 31.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 152).

Stenopterobia Bréb.

Stenopterobia intermedia Lewis. HUSTEDT 1930, p. 830. 1937–39, p. 492.
Loc. Nos. 38, 41, 54.
Fairly rare in Sierra Leone (MÖLDER 1962, p. 45).

Surirella Turpin.

Surirella agonaensis nov. spec. Plate XXV, fig. 3.
Apical axis heteropolar. Valves lengthily cuneate, with broadly rounded apices; head pole a little broader than foot pole. 80 μ long, 28–30 μ broad. Alae, 15–16 in 100 μ, prolonged into a narrow, linear central area and provided with small irregularly distributed spines. Alar canals much broader than alae. Striae indistinct.
Loc. Nos. 11, 12.
Plate XXV, fig. 3: 80 × 28.7 μ. 15–16 alae in 100 μ. (Sample No. 141, Loc. No. 12).
Illustration slide: Ghana No. 141/1961.
Type locality: Southwest Ghana. Fresh water (a small river in the bamboo thicket between the villages Agona and Nsuaem, Loc. No. 12).
Perhaps related to *S. tenera* Greg.
— *anassae* Cholnoky. CHOLNOKY 1957 a, fig. 84. 1959, p. 65, fig. 342.
Loc. Nos. 4, 31, 67.
Previously reported from South Africa (CHOLNOKY 1957 a, p. 84. 1959, p. 65).
— *angusta* Kütz. HUSTEDT 1930, p. 435, figs. 844, 845.
Loc. Nos. 31, 32, 35, 40, 49.
Very rare in Lake Kiwu, East Africa (HUSTEDT 1949 a, p. 156), but not rare in Sierra Leone (MÖLDER 1962, p. 45).
— *angustiformis* Hust. HUSTEDT 1942, p. 156, figs. 389, 390.
Loc. Nos. 8, 9, 11–13, 18, 22, 27, 28, 32, 64, 65.
Previously reported from Indonesia (HUSTEDT 1942, p. 156).
— *biseriata* Bréb. HUSTEDT 1930, p. 432, figs. 831, 832.
Loc. Nos. 18, 21, 22, 28, 29, 31, 32, 35, 37, 39, 42–44, 46, 47, 50, 54.
Rare in the Congo territory (HUSTEDT 1949 a, p. 152), and very rare in Sierra Leone (MÖLDER 1962, p. 45).
— — var. *bifrons* (Ehr.) Hust. Ibid. p. 433, fig. 833.
Loc. No. 46.

Surirella bonsaensis nov. spec. Plate XXV, fig. 1.

Apical axis isopolar. Valves broadly linear, with parallel sides and broadly rounded apices. 70 μ long, 25–26 μ broad. Alae, 22–24 in 100 μ, prolonged into a narrow, hyaline central area. The alae are of the same breadth as the intervals ("flügelkanäle").

Loc. Nos. 12, 14, 19, 65.

Plate XXV, fig. 1: 70×25.2 μ. 22–24 alae in 100 μ. (Sample No. 151, Loc. No. 14).

Illustration slide: Ghana No. 151/1961.

Type locality: Southwest Ghana. Fresh water (the Bonsa river, a tributary to the Ankobra river; Loc. No. 14).

Presumably related to *S. didyma* Kütz.

— *capronii* Bréb. HUSTEDT 1930, p. 440, fig. 857.

Loc. Nos. 47, 61.

— *celebesiana* Hust. HUSTEDT 1942, p. 161, figs. 403–406.

Loc. Nos. 27, 44.

Previously reported from Celebes (HUSTEDT 1942, p. 161).

— *delicatissima* Lewis. HUSTEDT 1930, p. 436, figs. 846, 847.

Loc. Nos. 8, 12–18, 33, 38, 41, 44, 48, 50, 55, 64.

Rare in the Congo territory (HUSTEDT 1949 a, p. 155); not rare in Sierra Leone (MÖLDER 1962, p. 45).

— — var. *africana* Cholnoky. CHOLNOKY 1959, p. 65, fig. 345. 1960 a, p. 339.

Loc. Nos. 8, 12–14, 39, 51, 53, 64, 65.

Previously reported from South Africa (CHOLNOKY 1959, p. 65. 1960 a, p. 339).

— — var. *ghanaensis* nov. var. Plate XXV, fig. 9.

Differs from the species and from var. *africana* Cholnoky, especially by its small size and rather dense alae.

Loc. No. 30.

Plate XXV, fig. 9: 25.3×4.9 μ. 68 alae in 100 μ. (Sample No. 204, Loc. No. 30).

Illustration slide: Ghana No. 204/1961.

Type locality: West Ghana. Fresh water (a small river north of the village Dwinyana; Loc. No. 30).

— — fo. *tenuissima* Manguin. E. MANGUIN 1942, 4: 85.

Loc. No. 41.

Previously reported from the Azores (E. MANGUIN 1942).

— *didyma* Kütz. HUSTEDT 1930, p. 437, figs. 848, 849.

Loc. Nos. 6, 8, 9, 13, 17, 18, 33, 36, 65.

Very rare in Sierra Leone (MÖLDER 1962, p. 45).

Mesohalobous.

— *dodowaensis* nov. spec. Plate XXV, fig. 6.

Apical axis heteropolar. Valves ovally elliptical, with broadly rounded head pole and a somewhat more pointed foot pole. 35–40 μ long, 12–15 μ broad. Alae, 18–20 in 100 μ, lengthened almost to the middle of the valve. Alar canals broader than the alae. Area narrow, linear. Striae indistinct.

Loc. No. 62.

Plate XXV, fig. 6: 36×14 μ. 18–20 alae in 100 μ. (Sample No. 106, Loc. No. 62).

Illustration slide: Ghana No. 106/1961.

Type locality: Southeast Ghana. Fresh water (a river near the village Dodowa, Loc. No. 62).

— *engleri* O. Müller. HUSTEDT 1949 a, p. 153, 15: 1–6.

Loc. Nos. 8, 29.

Widely distributed in lakes in East Africa (HUSTEDT 1949 a, p. 153). Rare in Sierra Leone (MÖLDER 1962, p. 45).

Surirella esamangensis nov. spec. Plate XXV, fig. 2.

Apical axis slightly heteropolar. Valves lengthily elliptical, with evenly rounded apices. 60 μ long, 24 μ broad. Alae, 24 in 100 μ, lengthened on to the surface of the valve, into a rather narrow, hyaline central area. Alar canals much broader than alae. Striae indistinct.

Loc. Nos. 12, 18, 34.

Plate XXV, fig. 2: 60×24 μ. 24 alae in 100 μ. (Sample No. 144, Loc. No. 12).

Illustration slide: Ghana No. 144/1961.

Type locality: Southwest Ghana. Fresh water (a small river in the rain forest near the village Esamang, Loc. No. 12).

— *fimbriata* Hust. HUSTEDT 1942, p. 164, figs. 409, 410. CHOLNOKY 1957 a, p. 85, figs. 282–284.
Loc. Nos. 4, 5, 22, 24, 28.

— *linearis* W. Smith. HUSTEDT 1930, p. 434, figs. 837, 838.
Loc. Nos. 2, 8, 17, 18, 40, 43–45, 47, 55, 62.
Rare in Sierra Leone (MÖLDER 1962, p. 45).

— — var. *constricta* (Ehr.) Grun. Ibid. p. 434, fig. 839.
Loc. Nos. 2, 17, 32–34, 36, 40, 48, 49, 58.
Rare in Sierra Leone (MÖLDER 1962, p. 45).

— *minima* Ross et Abdin. ROSS et ABDIN 1949, p. 226, 1: 2. FOGED 1958, p. 141, 16: 24.
Loc. Nos. 6, 8, 12, 14, 35, 60, 64.

— *nagbogensis* nov. spec. Plate XXV, fig. 7.

Apical axis heteropolar. Valves lengthily elliptical with broadly rounded head pole and somewhat narrower foot pole. 40 μ long, 13–15 μ broad. Alae, 35 in 100 μ, narrow, lengthened almost to the middle of the valve. Alar canals broader than alae. Area narrow, linear. Striae indistinct.

Loc. Nos. 2, 12, 14, 23, 27, 35, 44, 46, 53, 54.

Plate XXV, fig. 7: 40×13.3 μ. 35 alae in 100 μ. (Sample No. 279, Loc. No. 53).

Illustration slide: Ghana No. 279/1961.

Type locality: Northeast Ghana. Fresh water (a small river near the village Nagbog, Loc. No. 53).

— *ovata* Kütz. HUSTEDT 1930, p. 442, figs. 863, 864.
Loc. No. 12.
Rare in Sierra Leone (MÖLDER 1962, p. 45).

— — var. *africana* Cholnoky. CHOLNOKY 1955 a, p. 21, fig. 46.
Loc. No. 6.
Very rare in Sierra Leone (MÖLDER 1962, p. 45).

— — var. *pinnata* W. Smith. HUSTEDT 1930, p. 422, fig. 865.
Loc. Nos. 1, 22, 25, 35, 43, 46, 48, 50, 54.
Fairly rare in Sierra Leone (MÖLDER 1962, p. 45).

— *pseudovalis* Hust. HUSTEDT 1942, p. 166, figs. 412–415.
Loc. No. 62.
Previously reported from Indonesia (HUSTEDT 1942, p. 166).

— *robusta* Ehr. HUSTEDT 1930, p. 437, fig. 850.
Loc. Nos. 1, 2, 4, 6, 8, 11, 27, 31, 34, 37, 44, 50, 54, 59, 64, 65.
Common in Sierra Leone (MÖLDER 1962, p. 45).

— *sorriensis* nov. spec. Plate XXV, fig. 8.

Apical axis heteropolar. Valves egg-shaped, with a broadly rounded head pole and a somewhat narrower foot pole. 35–40 μ long, 18 μ broad. Alae, 30–35 in 100 μ, reach a hyaline area which includes about one fourth of the breadth of the valve. Alar canals very narrow. Striae indistinct.

Loc. Nos. 34, 35.

Plate XXV, fig. 8: 36×18 μ. 30–35 alae in 100 μ. (Sample No. 223, Loc. No. 35).
Illustration slide: Ghana No. 223/1961.
Type locality: North Ghana. Fresh water (the Sorri river, the White Volta river system, Loc. No. 35).

Surirella takoradiensis nov. spec. Plate XXV, fig. 4.
Apical axis heteropolar. Valves ovally elliptical with a broadly rounded head pole and a somewhat narrower foot pole. 20–25 μ long, 7–8 μ broad. Alae, 60–65 in 100 μ, very short and somewhat narrower than the alar canals. The surface of the valve with a very broad, hyaline central area, about two thirds of the breadth of the valve. Striae very fine.
Loc. Nos. 8, 9, 13, 14, 18, 19, 24, 64.
Plate XXV, fig. 4: 22.7×7.5 μ. 60–65 alae in 100 μ. (Sample No. 119, Loc. No. 8).
Illustration slide: Ghana No. 119/1961.
Type locality: Southwest Ghana. Fresh water (a small river in the rain forest west of Takoradi; Loc. No. 8).

— — var. *suhinensis* nov. var. Plate XXV, fig. 5.
Differs from the species by only having about 40 alae in 100 μ.
Loc. Nos. 19, 33, 65.
Plate XXV, fig. 5: 25.3×8.7 μ. 40 alae in 100 μ. (Sample No. 218, Loc. No. 33).
Illustration slide: Ghana No. 218/1961.
Type locality: West Ghana. Fresh water (the Suhin river, the Black Volta river system; Loc. No. 33).

— *tenera* Greg. HUSTEDT 1930, p. 438, fig. 853.
Loc. Nos. 1, 13, 14, 18–23, 27, 30, 34, 37, 39, 43–45, 47, 50, 54, 61, 62, 64, 65.
Very rare in lakes in East Africa (HUSTEDT 1949 a, p. 156). Rare in Sierra Leone (MÖLDER 1962, p. 45).

— — var. *nervosa* A. Schmidt. Ibid. p. 439, figs. 854, 855.
Loc. Nos. 1, 5, 6, 8, 9, 12, 13, 17–19, 21–23, 27, 28, 30, 32, 35, 44, 47, 54, 62, 64, 65.
Rare in Sierra Leone (MÖLDER 1962, p. 45).

— *tenuis* Cholnoky. CHOLNOKY 1960 a, 120, fig. 346.
Loc. Nos. 9, 11–13.

— *ventricosa* Hust. HUSTEDT 1942, p. 168, fig. 421–424.
Loc. Nos. 11, 13, 17, 20, 22, 34, 35, 53, 55, 65.
Previously reported from Celebes (HUSTEDT 1942, p. 168).

— *welshii* Cholnoky. CHOLNOKY 1962 d, p. 337, fig. 45.
Loc. Nos. 8, 9, 11–14, 18, 22, 27, 33, 64, 65.
Previously reported from South Africa (CHOLNOKY 1962 d, p. 337).

9 of the 43 genera demonstrated (*Bacillaria, Biddulphia, Coscinodiscus, Licmophora, Pleurosigma, Scoliopleura, Terpsinoë, Thalassiosira,* and *Tropidoneis*) exclusively comprise mesohalobous and polyhalobous species. Of these the polyhalobous *Coscinodiscus* sp. and the mesohalobous *Bacillaria paradoxa* and *Thalassiosira fluviatilis* are the most frequent, whereas species of the other six genera are less common. It might be expected that the species of these nine genera were more frequent in the localities near the coast and rarer farther into the country, as has generally been the case in other areas investigated. In the localities south of a line from Bamboi to Kete Krachi it is not, however, possible to establish a sure difference in the frequency of the occurrence of the haline forms, while the density north of this line is considerably slighter.

In a number of localities no mesohalobous and (or) polyhalobous species have been found. As to the density of halophilous (oligohalobous) species, it is not possible in the material investigated to point out differences from one province to the other. The genera *Eunotia, Cymbella, Neidium,* and *Stauroneis* occur with rather large numbers of species. In other regions of the earth these genera are especially conspicuous in circumneutral, oligotrophic localities, and presumably many of the Ghanese localities in a considerable part of the year are of the same character.

The two genera richest in species in the material, *Navicula* and *Nitzschia,* of which 182 and 93 forms, respectively, have been found, both have a very wide ecological range. Especially, some *Nitzschia* species are eurytopical as regards the contents of salt and the pH of the environment, just as many of them have a great tolerance to pollution and slight contents of oxygen in the biotope.

The causes of this peculiar composition of the diatomaceous flora, characterized by rather a frequent occurrence of more or less haline forms, and the mixture of oligotrophic and eutrophic forms in the great majority of localities, are no doubt to be sought in the very great fluctuations in the quantity of water characteristic of the great majority of water localities in Ghana. Even in the area of the Rain Forest (B) in the southwesternmost part of the country several months are generally almost without rain every year. The result must be great fluctuations in the contents of salt and the pH of the water. In many localities, especially with stagnant water, there will during the dry season also be a great concentration of products formed by the decomposition of organic substances in connexion with the pollution due to the fact that animals as well as human beings use the places as drinking-, bathing-, and washing-places. Near towns and villages, furthermore, it was seen in many localities that ponds and streams were highly polluted by the dumping of refuse into them. Freshwater diatoms with a narrow ecological range will only have negligible possibilities of existence and survival under such circumstances, and indeed they seem to be missing completely.

The difference which in many other places can be established between the types of diatomaceous flora in running water and stagnant water, is little conspicuous in Ghana. Rheophilous species such as *Meridion circulare* and *Ceratoneis arcus* play quite a subordinate part in all the localities examined.

It is also remarkable that the three centric genera *Cyclotella, Melosira,* and *Stephanodiscus,* which in other places are commonly represented by a number of plankton forms in lakes and ponds, have been found here equally frequently in stagnant and running water, distributed all over the country, but everywhere constituting rather a subordinate element in the diatomaceous flora.

NEW SPECIES, LATIN DIAGNOSES

Eunotia bonsaensis nov. spec. Pl. III, fig. 7.

Valvae margine ventrali recto, dorsali convexo; a medio versus apices obtuse rotundatos multum attenuatae, longae 32 μ, latae 8–9 μ. Rhaphae brevissimae proxime a margine ventrali decurrentes paulum modo in superficiem valvae ascendentes. 12 striae transapicales in 10 μ in medio valvae, versus apices paulo densius congestae. Pseudorhaphe in margine ventrali decurrens a superficie valvae non visibilis.
Holotypus: Ghana No. 151/1961.

Eunotia lawsonii nov. spec. Pl. III, fig. 12.

Valvae margine ventrali paene recto, dorsali paululum convexo, lateribus fere parallelis, et valvae versus apices non attenuatae, longae 20–23 μ, latae 4 μ. Rhaphae prope apices proxime a margine ventrali valvae; paulum modo in superficiem ascendentes. 12 striae transapicales in 10 μ, paulum modo versus apices densius congestae. Pseudorhaphe a superficie valvae non visibilis.
Holotypus: Ghana No. 165/1961.

Eunotia mansiensis nov. spec. Pl. II, fig. 4.

Valvae margine ventrali tenuiter concavo, dorsali convexo; latitudo valvae a medio versus apices obtuse rotundatos valde attenuata, 45–50 μ longae, latae 8–9 μ. Rhaphae admodum longae a margine ventrali paululum in superficiem valvae ascendentes. 12 striae transapicales in 10 μ, paulum modo versus apices densius congestae. Pseudorhaphe proxime a margine ventrali posita, zonam angustissimam hic efficiens.
Holotypus: Ghana No. 166/1961.

Eunotia sorriensis nov. spec. Pl. III, fig. 8.

Valvae margine ventrali levissime concavo, dorsali convexo; a medio valvae versus apices obtuse rotundatos sensim attenuatae, longae 30 μ, latae 4–5 μ. Rhaphae breves prope apices a margine ventrali paulum in latus valvae decurrentes. Striae transapicales 15–16 in 10 μ in medio valvae, paulum modo versus apices densius congestae. Pseudorhaphe a superficie valvae non visibilis.
Holotypus: Ghana No. 223/1961.

Eunotia tanosoensis nov. spec. Pl. II, fig. 9.

Valvae margine ventrali concavo, dorsali convexo; apices versus latus dorsale reflexi; longae 33–38 μ, latae 7–8 μ. Rhaphae brevissimae prope apices positae paulum modo in superficiem valvae ascendentes. 8–10 striae transapicales in 10 μ in medio valvae, versus apices densius congestae. Pseudorhaphe proxime a margine ventrali.
Holotypus: Ghana No. 216(1)/1961.

Eunotia tarkwaensis nov. spec. Pl. II, fig. 6.

Valvae margine ventrali recto vel paululum convexo, dorsali valde convexo; sensim a medio valvae versus apices obtuse rotundatos attenuatae, longae 15–26 μ, latae 9–10 μ. Rhaphae admodum prope apices in latere ventrali positae, paulum modo in superficiem valvae prolongatae. 9 striae transapicales in 10 μ in medio valvae, versus apices usque ad 15–20 crescentes. Pseudorhaphe in margine ventrali posita a superficie valvae non visibilis.
Holotypus: Ghana No. 296/1961.

Cocconeis ankobraensis nov. spec. Pl. IV, fig. 8 a, b.

Valvae ellipticae, longae 20–25 μ, latae 8–10 μ. Valva sine rhaphe striis transapicalibus radiantibus, robustis, crasse punctatis, 14–15 in 10 μ. Pseudorhaphe admodum angusta. Valva rhaphes striis transapicalibus radiantibus robustus crasse punctatis, 15 in 10 μ. Area axiliaris admodum lata, a medio valvae aream centralem decisam non habentis versus apices sensim convergens. Rhaphae rectae tenues appendices in medio valvae vel versus apices non habentes.
Holotypus: Ghana No. 168/1961.

Cocconeis schörderii nov. spec. Pl. IV, fig. 7 a, b.

Valvae ellipticae, longae 15–20 μ, latae 10–12 μ. Valva sine rhaphe striis transapicalibus fortissimis radiantibus crasse punctatis, 12 in 10 μ. Pseudorhaphe angustissima. Valva rhaphes striis transapicalibus radiantibus tenuissime punctatis, 18 in 10 μ. Area axiliaris angustissima in medio valvae paululum dilatata. Rhaphae rectae tenues.
Holotypus: Ghana No. 171/1961.

Achnanthes mansiensis nov. spec. Pl. IV, fig. 3 a, b.

Valvae linear-ellipticae apicibus obtuse protractis rotundatis, longae 18 μ, latae 6–7 μ. Valva sine rhaphe pseudorhaphe angusta, aream centralem decisam non habens. Striae transapicales radiantes subtiliter punctatae, ca. 24 in 10 μ. Valva rhaphes rhaphe filiformi recta, area axiliari aream centralem decisam non habens. Striae transapicales radiantes subtiliter punctatae, ca. 24 in 10 μ, versus apices paulo densius congestae.
Holotypus: Ghana No. 166/1961.

Frustulia weinholdi Hust. fo. *ghanaensis* nov. fo. Pl. V, fig. 1.
Maiore inter strias spatio (ca. 24 in 10 μ) a forma *weinholdi* differt.
Holotypus: Ghana No. 136/1961.

Caloneis bosumtwiensis nov. spec. Pl. XVII, fig. 4.

Valvae linear-lanceolatae lateribus parallelis vel leviter convexis, apicibus protractis, late obtuseque rotundatis, longae 24 μ, latae 4–5 μ. Rhaphe filiformis, recta fissuris centralibus et apicalibus in idem latus deflexis. Area axiliaris latissima, $^1/_2$–$^3/_4$ latitudinis valvae, in medio valvae in aream centralem ad marginem valvae pertinentem dilatata. Striae transapicales radiantes, 15–16 in 10 μ.
Holotypus: Ghana no. 194/1961.

Caloneis sansomei nov. spec. Pl. V, fig. 9.

Valvae lineares marginibus parallelis apicibus late rotundatis, longae 55–60 μ, latae 9–10 μ. Rhaphe recta, fissuris centralibus in idem latus leviter deflexis. Area axiliaris lanceolata, admodum lata, brevi spatio ab apicibus subito contracta. Area centralis fascia transversalis ad latera valvarum dilatata. Striae transapicales radiantes, versus apices convergentes, 18 in 10 μ, linea longitudinali prope marginem valvae divisae.
Holotypus: Ghana no. 260/1961.

Caloneis voltaensis nov. spec. Pl. V, fig. 4.

Valvae lineares lateribus parallelis apicibus cuneate convergentibus et late rutundatis, longae 25–30 μ, latae 6 μ. Rhaphe recta leviter in idem latus deflexis fissuris centralibus. Area centralis late lanceolata, ca. $^1/_2$ latitudinis valvae, versus apices subito attenuata. Area centralis fascia transversalis ad latera valvae pertinens. Omnes striae radiantes, 18 in 10 μ, manifesto punctatae, prope marginem valvae tenui fascia longitudinali decisae.
Holotypus: Ghana No. 92/1961.

Caloneis voltaensis var. *tarkwaensis* nov. var. Pl. V, fig. 5.

A var. *voltaensis* valvis linear-ellipticis, apicibus acutis differt. Area axiliaris lanceolata, ca. $^1/_3$ latitudinis valvae.
Holotypus: Ghana No. 159/1961.

Neidium affine (Ehr.) Cleve. var. *bonsaensis* nov. var. Pl. VI, fig. 5.

Apicibus admodum angustis cuneate acutis a var. *affine* differt.
Holotypus: Ghana No. 151/1961.

Neidium agonaense nov. spec. Pl. VI, fig. 11.

Valvae ellipticae apicibus leviter protractis, longae 84 μ, latae 30 μ. Rhaphe recta poris centralibus in contrarium deflexis. Area axiliaris admodum angusta, versus

aream centralem et apices attenuata, in medio in aream centralem rotundatam dilatata. Striae transapicales in medio valvae leviter radiantes, versus apices fortius radiantes, admodum subtiliter punctatae, ca. 18 in 10 μ, secundum marginem valvae pluribus fasciis tenuissimis hyalinibus dense congestis.
Holotypus: Ghana No. 141/1961.

Neidium dayiense nov. spec. Pl. VI, fig. 7.

Valvae lineares apicibus obtuse rotundatis, longae 25–26 μ, latae 5,6 μ. Rhaphe filiformis, fissuris centralibus varie deflexis longis et rectis. Area axiliaris angusta. Area centralis oblique quadrata, ca. $^3/_4$ latitudinis valvae. Striae transapicales obliquae, ca. 36 in 10 μ.
Holotypus: Ghana No. 309/1961.

Neidium hercynicum A. Mayer fo. *bogosoensis* nov. forma. Pl. VI, fig. 6.

Area centrali oblique ad $^1/_2$ fere latitudinem valvae dilatata a *N. hercynicum* et a fo. *subrostratum* Reimer differt.
Holotypus: Ghana No. 163/1961.

Neidium kumasiense nov. spec. Pl. VI, fig. 8.

Valvae lineares vel leviter lanceolatae apicibus protractis late rotundatis, longae 23–26 μ, latae 8–9 μ. Rhaphe filiformis fissuris centralibus admodum longis diverse deflexis. Area axiliaris angustissima. Area centralis parva leviter obliqua. Striae transapicales diagonales, 24–26 in 10 μ, 6–9 manifestis striis hyalinibus.
Holotypus: Ghana No. 196/1961.

Neidium nsuaemense nov. spec. Pl. VI, fig. 12.

Valvae linear-ellipticae apicibus rotundatis, longae 28–30 μ, latae 6–7 μ. Rhaphe filiformis recta fissuris centralibus diverse deflexis longis. Area axiliaris admodum angusta, in medio in aream centralem ellipticam obliquiorem dilatata. Striae transapicales fortius diagonales, ad alterum latus rectis in rhaphen angulis vel leviter convergentes, ca. 24 in 10 μ, compluribus manifestis striis longitudinalibus.
Holotypus: Ghana No. 141/1961.

Stauroneis akrosoensis nov. spec. Pl. VII, fig. 2.

Valvae linear-ellipticae apicibus protractis obtuse rotundatis, longae 52 μ, latae 13–14 μ. Rhaphe filiformis recta. Area axiliaris angusta breviter ante medium in aream centralem dilatata, cuius media pars in fasciam transversalem angustissimam ad latera valvae dilatata extensa est. Striae transapicales 26–28 in 10 μ in medio valvae rectis fere in rhaphen angulis, versus apices sensim radiantes, manifesto punctatae.
Holotypus: Ghana No. 299/1961.

Stauroneis navrongensis nov. spec. Pl. VII, fig. 12.

Valvae lineares lateribus ter undatis apicibus late rostratis obtuse rotundatis, longae 20–25 μ, latae 4–5 μ. Pseudoseptae brevissimae. Rhaphe recta filiformis. Area axiliaris angusta, versus aream centralem fasciam transversam latissimam ad latera valvarum dilatatam efficientem aliquantum dilatata. Striae transapicales omnes radiantes, 24–26 in 10 μ, manifesto punctatae.
Holotypus: Ghana No. 258/1961.

Stauroneis slateri nov. spec. Plate VII, fig. 3.

Valvae linear-ellipticae apicibus admodum angustis leviter protractis, longae 51–52 μ, latae 10 μ. Rhaphe recta longis in idem latus deflexis fissuris polaribus. Area axiliaris angusta versus mediam valvam versus aream centralem latam ad latera valvae dilatatam leviter dilatata. Stria transapicales omnes valde radiantes, admodum crasse punctatae, 18 in 10 μ; par medium in poros paucos prope rhaphen reductum.
Holotypus: Ghana No. 144/1961.

Navicula halophila fo. *nabogoensis* nov. fo. Pl. VIII, fig. 9.

Apicibus modo minime protractis et forma compacta a forma *halophila* differt.
Holotypus: Ghana No. 234/1961.

Navicula ankobraensis nov. spec. Pl. VIII, fig. 10.

Valvae lineares lateribus leviter concavis apicibus anguste protractis et capitatis, longae 16–20 μ, latae 4–5 μ. Rhaphe linearis filiformis. Area axiliaris linearis angusta aream centralem propriam non habens, sed in medio valvae striae transapicales alternis vicibus longiores vel breviores. Striae transapicales radiantes, 24–26 in 10 μ.
Holotypus: Ghana No. 172/1961.

Navicula voltaensis nov. spec. Plate VIII, fig. 16.

Valvae lineares lateribus fere parallelis vel paulum convexis, apicibus obtuse protractis, longae 22 μ, latae 5–6 μ. Rhaphe recta filiformis. Area axiliaris angustissima linearis aream centralem decisam non habens. Striae transapicales radiantes, ca. 36 in 10 μ.
Holotypus: Ghana No. 296/1961.

Navicula aketechiensis nov. spec. Plate X, fig. 33.

Valvae linear-ellipticae apicibus rotundatis, longae 30–35 μ, latae 10–12 μ. Rhaphe filiformis recta. Area axiliaris admodum lata, a polis versus medium valvae leviter in latitudinem crescens. Nulla area centralis decisa. Striae transapicales omnes radiantes, 21 in 10 μ, versus apices densiores congestae.
Holotypus: Ghana No. 136/1961.

Navicula bosumtwiensis nov. spec. Pl. IX, fig. 19.

Valvae linear-ellipticae, longae 20 μ, latae 5–6 μ. Rhaphe linearis admodum longis in idem latus deflexis fissuris polaribus. Media superficies valvae structuram visibilem non habens. Striae transapicales brevissimae in partem modo fere quartam a margine valvae ad rhaphen ascendentes, 21–22 in 10 μ.
Holotypus: Ghana No. 192/1961.

Navicula esamangensis nov. spec. Pl. VIII, fig. 20.

Valvae linear-ellipticae apicibus late rotundatis, longae 18–20 μ, latae 6 μ. Rhaphe linearis filiformis in idem latus deflexis brevibus fissuris polaribus. Area axiliaris linearis angusta in medio valvae in aream centralem parvam rotundatam dilatata. Striae transapicales radiantes, ca. 24 in 10 μ, in medio valvae singulae maiore inter se distantia.
Holotypus: Ghana No. 207/1961.

Navicula langoraensis nov. spec. Pl. X, fig. 32.

Valvae lineares lateribus parallelis apicibus plane rotundatis, longae 20 μ, latae 6–7 μ. Rhaphe filiformis brevibus in idem latus deflexis fissuris polaribus. Area axiliaris angusta in medio valvae in aream centralem leviter dilatata. Striae transapicales rectis in rhaphen angulis, ca. 24 in 10 μ.
Holotypus: Ghana No. 220/1961.

Navicula abuensis nov. spec. Pl. XII, fig. 10.

Valvae rhomboides apicibus rotundatis, longae 26 μ, latae 8–9 μ. Rhaphe filiformis recta. Area axiliaris rhomboides ab apicibus ad $^3/_4$ fere latitudinis sensim latior in medio valvae. Striae transapicales breves, ca. $^1/_4$ latitudinis valvae, radiantes, ca. 18 in 10 μ, manifesto punctatae.
Holotypus: Ghana No. 207/1961.

Navicula ajenaensis nov. spec. Pl. IX, fig. 1.

Valvae linear-ellipticae, longae 25–40 μ, latae 5–8 μ. Rhaphe filiformis recta. Area axiliaris angusta linearis, in medio valvae in aream centralem rotundatam paulum enormem dilatata. Striae transapicales radiantes, 20–21 in 10 μ, in medio valvae nonnullae abbreviatae.
Holotypus: Ghana No. 294/1961.

Navicula bamboiensis nov. spec. Pl. X, fig. 29.

Valvae rhombo-ellipticae apicibus obtuse rotundatis, longae 10 μ, latae 5–6 μ. Rhaphe filiformis recta. Area axiliaris linearis angusta, in medio valvae in aream centralem rotundatam dilatata. Striae transapicales omnes radiantes, ca. 20 in 10 μ, versus apices densius congestae.
Holotypus: Ghana No. 220/1961.

Navicula bawdiaensis nov. spec. Pl. X, fig. 26.

Valvae linear-ellipticae apicibus rotundatis, longae 16 μ, latae 6 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angusta linearis in medio valvae in aream centralem oblique dilatatam dilatata. Striae transapicales tenuiter radiantes, 24–25 in 10 μ.
Holotypus: Ghana No. 165/1961.

Navicula butreensis nov. spec. Pl. IX, fig. 11.

Valvae linear-ellipticae apicibus protractis obtuse rotundatis, longae 12 μ, latae 5 μ. Rhaphe filiformis recta. Area axiliaris angusta linearis, nulla area centrali decisa. Striae transapicales radiantes, 24 in 10 μ.
Holotypus: Ghana No. 116 b/1961.

Navicula dugaensis nov. spec. Pl. X, fig. 25.

Valvae linear-ellipticae apicibus rotundatis, longae 20–22 μ, latae 6 μ. Rhaphe filiformis in idem latus deflexis fissuris polaribus. Area axiliaris angusta linearis in medio valvae in aream centralem ad latera valvae dilatatam expassa, singulis striis enormiter distributis. Striae transapicales radiantes, ca. 22 in 10 μ, versus apices densius congestae.
Holotypus: Ghana No. 305/1961.

Navicula huniensis nov. spec. Pl. X, fig. 1.

Valvae lineares lateribus parallelis apicibus breviter protractis et obtuse rotundatis, longae 18 μ, late 6 μ. Rhaphe filiformis recta. Area axiliaris angusta linearis nulla area centrali decisa. Striae transapicales in medio valvae rectis in rhaphen angulis versus apices tenuiter radiantes, 30–32 in 10 μ.
Holotypus: Ghana No. 157/1961.

Navicula kolugoensis nov. spec. Pl. XII, fig. 9.

Valvae late ellipticae apicibus late rotundatis, longae 17–18 μ, latae 8–9 μ. Rhaphe filiformis recta. Area axiliaris lanceolata, in medio valvae ad ca. $^1/_3$ latitudinis valvae. Striae transapicales radiantes, 12–15 in 10 μ, crasse punctatae.
Holotypus: Ghana No. 244/1961.

Navicula lawsonii nov. spec. Pl. X, fig. 6.

Valvae lineares in medio valvae leviter convexe dilatatae apicibus late rotundatis, longae 16 μ, latae 3–4 μ. Rhaphe filiformis recta. Area axiliaris angusta, in medio in aream centralem parvam rotundatam dilatata. Striae transapicales ca. 24 in 10 μ, in medio valvae tenuiter radiantes, versus apices admodum convergentes.
Holotypus: Ghana No. 192/1961.

Navicula nunguaensis nov. spec. Pl. X, fig. 5.

Valvae late ellipticae apicibus anguste protractis, longae 18–20 μ, latae 5–6 μ. Rhaphe linearis filiformis. Area axiliaris linearis angusta, nulla area centrali decisa. Striae transapicales rectis in rhaphen angulis, 18–20 in 10 μ.
Holotypus: Ghana No. 33/1961.

Navicula sansomei nov. spec. Pl. IX, fig. 12.

Valvae ellipticae apicibus admodum acute protractis, longae 14 μ, latae 5–6 μ. Rhaphe filiformis recta. Area axiliaris admodum angusta linearis, nulla area centrali decisa. Striae transapicales rectis in rhaphen angulis vel leviter radiantes, 18 in 10 μ.
Holotypus: Ghana No. 95/1961.

Navicula sorriensis nov. spec. Pl. XII, fig. 12.

Valvae late ellipticae apicibus late protractis obtuse rotundatis, longae 22 μ, latae 8 μ. Rhaphe filiformis recta brevibus in idem latus deflexis fissuris polaribus. Area axiliaris admodum angusta recta, in medio valvae in aream centralem angustam cum striis transapicalibus enormiter abbreviatis. Striae transapicales 18 in 10 μ, quattuor striis longitudinalibus hyalinis secantibus.
Holotypus: Ghana No. 227/1961.

Navicula abelioensis nov. spec. Pl. XI, fig. 22.

Valvae lineares lateribus leviter convexis apicibus late protractis obtuse rotundatis, longae 16 μ, latae 4–5 μ. Rhaphe filiformis recta. Area axiliaris angustissima. Area centralis admodum lata fascia ad latera valvae dilatata. Striae transapicales radiantes, ca. 24 in 10 μ, manifesto punctatae.
Holotypus: Ghana No. 254/1961.

Navicula abonuensis nov. spec. Pl. XI, fig. 4.

Valvae linear-ellipticae, longae 20–25 μ, latae 6–7 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris admodum lata linearis, in medio valvae in aream centralem transversam expassam dilatata. Striae transapicales radiantes, ca. 20 in 10 μ, manifesto punctatae, in medio valvae enormiter abbreviatae.
Holotypus: Ghana No. 194/1961.

Navicula adampeensis nov. spec. Pl. XIII, fig. 4.

Valvae ellipticae apicibus brevissime protractis late rotundatis, longae 32 μ, latae 17–18 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angusta, in medio valvae in aream centralem parvam rotundatam dilatata. Striae transapicales radiantes, 12 in 10 μ, admodum crasse punctatae, versus apices paulo densius congestae.
Holotypus: Ghana No. 102/1961.

Navicula akimensis nov. spec. Pl. XIII, fig. 2.

Valvae ellipticae apicibus obtuse rostratis, longae 40 μ, latae 15–16 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angusta linearis. Area centralis rotundata, enormiter definita, in uno latere duobus stigmatibus separatis. Striae transapicales radiantes, 12 in 10 μ, in medio valvae striis brevioribus interiectis, versus apices paulo densius congestae admodum crasse punctatae.
Holotypus: Ghana No. 218/1961.

Navicula ashantiensis nov. spec. Pl. XIII, fig. 5.

Valvae elliptico-lanceolatae apicibus breviter protractis obtuse rotundatis, longae 35–40 μ, latae 15–16 μ. Rhaphe filiformis recta, in idem latus deflexis fissuris polaribus. Area axiliaris angusta linearis, in medio valvae in aream centralem enormem ad ca. $^1/_4$ ad $^1/_3$ latitudinis valvae dilatata. Striae transapicales radiantes, 12–13 in 10 μ, nonnullae breviores in medium valvae insertae, versus apices paulo densius congestae, manifesto punctatae.
Holotypus: Ghana No. 220/1961.

Navicula bertelsenii nov. spec. Pl. XI, fig. 23.

Valvae ellipticae apicibus late protractis obtuse rotundatis, longae 20–25 μ, latae 6–7 μ. Rhaphe filiformis recta. Area axiliaris angusta linearis, in medio in aream centralem rotundatam ad $^1/_3$–$^1/_2$ latitudinis valvae dilatata. Striae transapicales radiantes, 18 in 10 μ, in medio valvae paulo distantius crassiusque quam ad apices punctatae.
Holotypus: Ghana No. 207/1961.

Navicula chadwickii nov. spec. Pl. XII, fig. 8.

Valvae lanceolatae apicibus leviter protractis, longae 24–26 μ, latae 6–7 μ. Rhaphe filiformis recta in idem latus deflexis brevibus fissuris polaribus. Area axiliaris angustissima linearis, in medio valvae non dilatata. Striae transapicales omnes radiantes, 22–24 in 10 μ, subtilissime punctatae.
Holotypus: Ghana No. 205/1961.

Navicula damongensis nov. spec. Pl. XI, fig. 14.

Valvae linear-ellipticae apicibus rotundatis, longae 18–20 μ, latae 5–6 μ. Rhaphe filiformis recta in idem latus deflexis fissuris centralibus et polaribus. Area axiliaris admodum lata cum area centrali fasciam ad latera valvae dilatatam admodum latam efficienti. Striae transapicales radiantes duobus hyalinibus lineis longitudinalibus, 20–21 in 10 μ.
Holotypus: Ghana No. 223/1961.

Navicula densuensis nov. spec. Pl. XII, fig. 7.

Valvae linear-ellipticae apicibus longe protractis, longae 30–35 μ, latae 7 μ. Rhaphe filiformis recta, in idem latus deflexis fissuris polaribus. Area axiliaris angustissima,

linearis, in medio valvae non dilatata. Striae transapicales rectis in rhaphen angulis, 16 in 10 μ, in medio valvae crasse punctatae, versus apices subtilius punctatae.
Holotypus: Ghana No. 73/1961.

Navicula fawumangensis nov. spec. Pl. XI, fig. 17.

Valvae late ellipticae apicibus late protractis obtuse rotundatis, longae 16–18 μ, latae 5–6 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angustissima, linearis, una stria brevissima ad latera valvae dilatata area centrali. Striae transapicales radiantes, 16 in 10 μ, in medio valvae radiantes, versus apices rectis in rhaphen angulis, crasse punctatae.
Holotypus: Ghana No. 204/1961.

Navicula grundtvigii nov. spec. Pl. XIII, fig. 6.

Valvae elliptico-lanceolatae apicibus protractis obtuse rotundatis, longae 34–38 μ, latae 15–16 μ. Rhaphe filiformis recta. Area axiliaris angusta linearis, in medio valvae in aream centralem parvam rotundatam ad ca. $^1/_4$–$^1/_5$ latitudinis valvae dilatata. Striae transapicales radiantes 13 in 10 μ, in medio valvae una in utroque latere paulum abbreviata stria, versus apices paulo densius congestae, manifesto punctatae.
Holotypus: Ghana No. 299/1961.

Navicula ingoldii nov. spec. Pl. XII, fig. 3.

Valvae ellipticae apicibus leviter protractis obtuse rotundatis, longae 25–30 μ, latae 10–11 μ. Rhaphe filiformis recta. Area axiliaris anguste lanceolata, ab apicibus ad ca. $^1/_5$ latitudinis valvae in medio sensim in latitudinem accrescens. Striae transapicales radiantes, 15 in 10 μ, manifesto punctatae.
Holotypus: Ghana No. 157/1961.

Navicula isertii nov. spec. Pl. XII, fig. 16.

Valvae ellipticae apicibus late rostratis ad polos plane rotundatis, longae 30–32 μ, latae 12–13 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angusta linearis. Area centralis parva rotundata. Striae transapicales radiantes, ca. 11 in 10 μ, crasse punctatae, versus apices rectis in rhaphen angulis densiusque congestae. In medio valvae singulae striae abbreviatae.
Holotypus: Ghana No. 205/1961.

Navicula kpongensis nov. spec. Pl. XII, fig. 14.

Valvae lanceolatae apicibus longe protractis, longae 30–35 μ, latae 7–8 μ. Rhaphe filiformis recta in idem latus deflexis brevibus fissuris polaribus. Area axiliaris angusta linearis, in medio valvae in aream centralem rotundatam in $^1/_3$–$^1/_2$ latitudinis valvae dilatata. Striae transapicales radiantes, 17–18 in 10 μ, manifesto punctatae, versus apices densius congestae.
Holotypus: Ghana No. 101/1961.

Navicula laingii nov. spec. Pl. XII, fig. 1.

Valvae late lineares lateribus leviter convexis apicibus late rotundatis, longae 40 μ, latae 12 μ. Rhaphe filiformis recta. Area axiliaris admodum lata et in medio in aream centralem in longitudinem rotundatam ca. $^1/_3$ latitudinis valvae dilatata. Striae transapicales radiantes, 18 in 10 μ, in medio valvae modo breviores, modo longiores, prope apices rectis in rhaphen angulis et densius congestae; omnes striae crasse punctatae.
Holotypus: Ghana No. 220/1961.

Navicula mansiensis nov. spec. Pl. XI, fig. 3.

Valvae late ellipticae apicibus protractis obtuse rotundatis, longae 18–20 μ, latae 6–7 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angustissima linearis nulla area centrali decisa. Striae transapicales in medio valvae radiantes versus apices rectis in rhaphen angulis, ca. 22 in 10 μ; in medio valvae singulae striae breviores interiectae.
Holotypus: Ghana No. 166/1961.

Navicula navrongensis nov. spec. Pl. XI, fig. 11.

Valvae linear-ellipticae apicibus obtuse rotundatis, longae 14–25 μ, latae 4–6 μ. Rhaphe filiformis recta in idem latus deflexis fissuris centralibus et polaribus. Area axiliaris angusta linearis, in medio valvae in aream centralem transversam vel in medium vel $^3/_4$ ad latus valvae pertinentem dilatata. Striae transapicales radiantes compluribus lineis hyalinibus longitudinalibus secantibus, 20–24 in 10 μ.
Holotypus: Ghana No. 254/1961.

Navicula nsutaensis nov. spec. Pl. XI, fig. 18.

Valvae ellipticae apicibus admodum anguste protractis rotundatis, longae 18–20 μ, latae 6 μ. Rhaphe filiformis recta. Area axiliaris angusta linearis area centrali enormi in transversum dilatata. Striae transapicales radiantes 17–18 in 10 μ, in medio valvae enormiter longae punctatae.
Holotypus: Ghana No. 207/1961.

Navicula subinsoensis nov. spec. Pl. XII, fig. 13.

Valvae late ellipticae apicibus admodum protractis, longae 24–25 μ, latae 7–8 μ. Rhaphe filiformis recta. Area axiliaris angusta linearis, in medio valvae in aream centralem transversam ca. $^3/_4$ latitudinis valvae dilatata. Striae transapicales radiantes, 22–23 in 10 μ, manifesto punctatae.
Holotypus: Ghana No. 218/1961.

Navicula syrachii nov. spec. Pl. XI, fig. 24.

Valvae late ellipticae apicibus obtuse rotundatis, longae 12–15 μ, latae 5–6 μ. Rhaphe filiformis recta. Area axiliaris angusta, in medio in aream centralem rotundatam

paulum irregularem $^1/_2$ ad $^1/_3$ latitudinis valvae dilatata. Striae transapicales radiantes, 24–26 in 10 μ, in medio valvae longitudine irregulari, punctatae.
Holotypus: Ghana No. 95/1961.

Navicula monradii nov. spec. Pl. XII, fig. 11.

Valvae linear-lanceolatae, longae 26 μ, latae 6 μ. Rhaphe filiformis recta. Area axiliaris admodum angusta recta, in medio valvae in aream centralem leviter in aream centralem oblongam ellipticam, ca. $^1/_3$ latitudinis valvae dilatata. Striae transapicales radiantes, 24 in 10 μ, subtiliter punctatae.
Holotypus: Ghana No. 220/1961.

Navicula abraensis nov. spec. Pl. XV, fig. 12.

Valvae ellipticae, longae 32 μ, latae 8–9 μ. Rhaphe filiformis recta, in idem latus deflexis fissuris polaribus. Area axiliaris angusta linearis. Area centralis rotundata e transverso in ca. $^1/_2$ latitudinis dilatata. Striae transapicales admodum radiantes, 10 in 10 μ, cum lineis longitudinalibus.
Holotypus: Ghana No. 124/1961.

Navicula asanwinsoensis nov. spec. Pl. XIV, fig. 15.

Valvae lineares lateribus leviter convexis et apicibus admodum protractis obtuse rotundatis, longae 20–22 μ, latae 6–7 μ. Rhaphe filiformis linearis. Area axiliaris linearis, admodum lata, in medio valvae in aream centralem ad ca. $^1/_2$ latitudinis valvae dilatata. Striae transapicales rectis in rhaphen angulis vel leviter radiantes, 15 in 10 μ.
Holotypus: Ghana No. 173/1961.

Navicula bansoensis nov. spec. Pl. XIV, fig. 4.

Valvae late ellipticae apicibus rotundatis, longae 20–25 μ, latae 10 μ. Rhaphe filiformis recta. Area axiliaris admodum angusta linearis, in medio valvae non dilatata. Striae transapicales radiantes, 12 in 10 μ, in medio valvae modo breviores modo longiores versus apices densius congestae.
Holotypus: Ghana No. 122/1961.

Navicula carloffii nov. spec. Pl. XV, fig. 6.

Valvae linear-lanceolatae apicibus obtuse protractis rotundatis, longae 15–20 μ, latae 3–4 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angusta recta. Striae transapicales in medio rectis in rhaphen angulis, versus apices leviter convergentes, 15 in 10 μ, versus apices densius congestae.
Holotypus: Ghana No. 204/1961.

Navicula carstensenii nov. spec. Pl. XIV, fig. 11.

Valvae lanceolatae attenuatae et rostratae ad capitatas versus apices protractae, longae 33–35 μ, latae 8–9 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus.

Area axiliaris angusta linearis, in medio valvae in aream centralem rotundatam $^1/_3$–$^1/_2$ latitudinis valvae dilatata. Striae transapicales leviter radiantes, 12 in 10 μ, versus apices rectis in rhaphen angulis, crasse punctatae (lineis longitudinalibus).
Holotypus: Ghana No. 188/1961.

Navicula dodowaensis nov. spec. Pl. XV, fig. 7.

Valvae linear-lanceolatae apicibus subito protractis admodum acute rotundatis, longae 25–30 μ, latae 8 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angusta linearis minima rotundata in medio valvae dilatatione. Striae transapicales radiantes, 12 in 10 μ, manifesto lineatae.
Holotypus: Ghana No. 106/1961.

Navicula feuerborni Hust. fo. *africana* nov. fo. Pl. XVI, fig. 2.

Apicibus acutis et non contractis a forma *feuerborni* differt.
Holotypus: Ghana No. 119/1961.

Navicula humjibreensis nov. spec. Pl. XV, fig. 8.

Valvae lanceolatae versus apices protractae obtuse rotundatae, longae 20–25 μ, latae 6–7 μ. Rhaphe filiformis recta. Area axiliaris angusta linearis, in medio valvae paululum dilatata. Striae transapicales leviter radiantes vel rectis in rhaphen angulis, 14 in 10 μ, manifestis striis longitudinalibus.
Holotypus: Ghana No. 171/1961.

Navicula meyeri nov. spec. Pl. XIV, fig. 12.

Valvae lineares lateribus leviter convexis apicibus late protractis lateque rotundatis, longae 34–38 μ, latae 12–14 μ. Rhaphe filiformis leviter curvata in idem latus deflexis fissuris polaribus. Area axiliaris angusta linaris. Area centralis minima rotundata. Striae transapicales radiantes, 9–10 in 10 μ, in medio valvae nonnullae breviores insertae, versus apices densius congestae, manifesto punctatae.
Holotypus: Ghana No. 295/1961.

Navicula moerckii nov. spec. Pl. XV, fig. 5.

Valvae lineares lateribus leviter convexis, longae 16–17 μ, latae 4 μ. Rhaphe filiformis leviter curvata in idem latus deflexis fissuris polaribus. Area axiliaris lata, ca. $^1/_2$ latitudinis valvae, in medio valvae haud ita dilatata. Striae transapicales leviter radiantes, 15 in 10 μ, tenuiter lineatae.
Holotypus: Ghana No. 207/1961.

Navicula nagbogensis nov. spec. Pl. XV, fig. 1.

Valvae ellipticae apicibus late protractis obtuse rotundatis, longae 40–45 μ, latae 12–15 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Rhaphe

angustissima linearis, in medio valvae paene non dilatata. Striae transapicales leviter radiantes, 15 in 10 μ, manifesto punctatae, leviter convergentes et versus apices densius congestae.
Holotypus: Ghana No. 279/1961.

Navicula sepasiensis nov. spec. Pl. XV, fig. 4.

Valvae elliptico-lanceolatae apicibus late protractis, longae 30 μ, latae 10–12 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris admodum angusta. Area centralis rotundata, ca. $^1/_3$–$^1/_2$ latitudinis valvae. Striae transapicales admodum fortiter radiantes, 12 in 10 μ, in medio brevioribus striis interiectis, versus apices densius congestae, subtiliter secundum longitudinem striatae.
Holotypus: Ghana No. 196/1961.

Navicula suhinensis nov. spec. Pl. XIV, fig. 9.

Valvae linear-ellipticae apicibus protractis obtuse rotundatis, longae 20–25 μ, latae 7–8 μ. Rhaphe filiformis recta. Area axiliaris angustissima, in medio valvae in aream centralem transversam dilatata. Striae transapicales radiantes 22 in 10 μ, versus apices densius congestae.
Holotypus: Ghana No. 218/1961.

Navicula tainensis nov. spec. Pl. XV, fig. 9.

Valvae lineares lateribus leviter convexis, versus apices late protractae polis late rotundatis, longae 40 μ, latae 6–7 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris angusta linearis. Area centralis paulula rotundata. Striae transapicales fortiter radiantes, 15 in 10 μ, manifestis lineis longitudinalibus.
Holotypus: Ghana No. 217/1961.

Pinnularia nunguaensis nov. spec. Pl. XVII, fig. 1.

Valvae late lineares, lateribus rectis vel leviter concavis, apicibus rotundatis, longae 25–30 μ, latae 9–10 μ. Rhaphe filiformis recta, in idem latus deflexis fissuris centralibus et polaribus. Area axiliaris ab apicibus versus medium valvae in aream centralem latam expassa, quae in medio valvae fasciam transversam ad latera efficit. Striae transapicales rectis in rhaphen angulis, 10 in 10 μ, versus apices leviter convergentes.
Holotypus: Ghana No. 39/1961.

Pinnularia suhinensis nov. spec. Pl. XVII, fig. 5.

Valvae linear-lanceolatae, longae 24–26 μ, latae 4–5 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris lata, ca. $^1/_2$ latitudinis valvae. Area centralis latissima ad marginem valvae dilatata. Striae transapicales rectis in rhaphen angulis, 11–12 in 10 μ.
Holotypus: Ghana No. 218/1961.

Pinnularia takoradiensis nov. spec. Pl. XVI, fig. 13.

Valvae anguste lineares apicibus late rotundatis, longae 30–32 μ, latae 4–5 μ. Rhaphe filiformis recta in idem latus deflexis fissuris centralibus et polaribus. Area axiliaris angusta. Area centralis latissima ad marginem valvae expassa. Striae transapicales omnes convergentes, 15 in 10 μ.
Holotypus: Ghana No. 122/1961.

Pinnularia mankesimensis nov. spec. Pl. XVIII, fig. 10.

Valvae lineares lateribus ter undulatis apicibus protractis, longae 30 μ, latae 4–5 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris lata, $^1/_2$–$^2/_3$ latitudinis valvae. Area centralis fascia transversalis latissima ad latera valvae pertinens. Striae transapicales breves rectis in rhaphen angulis, 12 in 10 μ.
Holotypus: Ghana No. 111/1961.

Pinnularia bogosoensis nov. spec. Pl. XIX, fig. 1.

Valvae linear-lanceolatae apicibus protractis admodum acutis, longae 60 μ, latae 8–9 μ. Rhaphe recta levissime in idem latus deflexis fissuris centralibus et polaribus. Area axiliaris ad ca. $^1/_2$ latitudinis valvae ab apicibus versus aream centralem latissimam ad latera valvarum dilatatam crescens. Striae transapicales 10–11 in 10 μ, radiantes, versus apices convergentes.
Holotypus: Ghana No. 163/1961.

Pinnularia mansiensis nov. spec. Pl. XVIII, fig. 5.

Valvae linear-lanceolatae apicibus late protractis, longae 40 μ, latae 7–8 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris admodum lata ab apicibus versus medium in aream centralem admodum latam ad latera valvae expassam dilatata. Striae transapicales radiantes, 11 in 10 μ versus medium valvae, versus apices convergentes densiusque congestae.
Holotypus: Ghana No. 165/1961.

Pinnularia nsuaemensis nov. spec. Pl. XVI, fig. 14.

Valvae linear-lanceolatae, longae 25–28 μ, latae 4–5 μ. Rhaphe filiformis recta in idem latus deflexis fissuris centralibus et polaribus. Area axiliaris angusta ab apicibus versus aream centralem latissimam ad marginem valvae pertinentem sensim latior. Striae transapicales 17–18 in 10 μ, propius medium valvae radiantes, versus apices convergentes.
Holotypus: Ghana No. 142/1961.

Pinnularia otiensis nov. spec. Pl. XVIII, fig. 4.

Valvae lineares lateribus leviter convexis apicibus latissime protractis et latissime rotundatis, longae 50–60 μ, latae 12–14 μ. Rhaphe recta in idem latus deflexis fissuris

polaribus. Area axiliaris admodum lata ab apicibus versus aream centralem fasciam transversalem ad latera valvae pertinentem admodum latam efficientem sensim latior. Striae transapicales radiantes, 9 in 10 μ, versus apices tenuiter convergentes.
Holotypus: Ghana No. 298/1961.

Pinnularia tomentoensis nov. spec. Pl. XIX, fig. 3.

Valvae elliptico-lanceolatae marginibus convexis apicibus obtuse protractis, longae 50–55 μ, latae 10 μ. Area axiliaris ca. $^1/_3$ latitudinis valvae et in medio in aream centralem ad marginem valvae expassam dilatata. Rhaphe ramis leviter curvatis longisque fissuris polaribus. Striae transapicales ca. 9 in 10 μ, in medio radiantes versus apices convergentes.
Holotypus: Ghana No. 133/1961.

Pinnularia agogoensis nov. spec. Pl. XVII, fig. 7.

Valvae lineares lateribus leviter convexis apicibus late rotundatis, longae 50–55 μ, latae 8–10 μ. Rhaphe recta in idem latus deflexis fissuris polaribus. Area axiliaris latissima, ca. $^3/_4$ latitudinis valvae et area centralis fasciam transversalem latissimam ad latera valvae pertinentem efficiens. Striae transapicales brevissimae rectis in rhaphen angulis, 9 in 10 μ.
Holotypus: Ghana No. 185/1961.

Pinnularia lawsonii nov. spec. Pl. XVIII, fig. 3.

Valvae lineares lateribus leviter convexis et apicibus late capitatis, longae 45–60 μ, latae 10–12 μ. Rhaphe recta filiformis in idem latus deflexis fissuris centralibus et polaribus. Area axiliaris lata, ca. $^1/_2$ latitudinis valvae, recta, nulla vel exigua in medio valvae dilatatione. Striae transapicales rectis in rhaphen angulis, 12 in 10 μ.
Holotypus: Ghana No. 204/1961.

Pinnularia odaensis nov. spec. Pl. XVII, fig. 8.

Valvae lineares apicibus late rotundatis, longae 45–50 μ, latae 7–8 μ. Rhaphe filiformis in idem latus deflexis fissuris centralibus et polaribus. Area axiliaris latissima, ca. $^2/_3$ latitudinis valvae. Area centralis fasciam transversalem latissimam ad marginem valvae pertinentem efficiens. Striae transapicales rectis in rhaphen angulis, 9 in 10 μ.
Holotypus: Ghana No. 198/1961.

Pinnularia tafoensis nov. spec. Pl. XVIII, fig. 11.

Valvae linear-ellipticae, longae 40–45 μ, latae 12 μ. Rhaphe filiformis recta in idem latus deflexis fissuris polaribus. Area axiliaris ab apicibus versus medium valvae ad ca. $^1/_2$ latitudinis et in aream centralem ad latera valvae expassam dilatata. Striae transapicales leviter radiantes, 10 in 10 μ versus apices rectis fere angulis in rhaphen.
Holotypus: Ghana No. 6/1961.

Amphora abuensis nov. spec. Pl. XIX, fig. 6.

Valvae margine ventrali recto, dorsali convexo apicibus leviter protractis, longae 23–25 μ, latae 4–5 μ. Rhaphe recta prope marginem ventralem decurrens. Area axiliaris versus latus dorsale angustissima, nulla in medio valvae dilatatione, in latere ventrali usque ad marginem valvae latior. Striae transapicales in latere dorsali radiantes, 15–16 in 10 μ, manifesto punctatae, in latere ventrali non visibiles.
Holotypus: Ghana No. 207/1961.

Amphora ayensuensis nov. spec. Pl. XIX, fig. 7.

Valvae margine ventrali recto, dorsali convexo et apicibus capitatis protractis, longae 25 μ, latae 4–5 μ. Rhaphe recta. Area axiliaris angustissima, in medio valvae non dilatata. Striae transapicales in latere dorsali fortes radiantes, 14–15 in 10 μ. Nullae in latere ventrali visibiles striae.
Holotypus: Ghana No. 107/1961.

Amphora crameri nov. spec. Pl. XIX, fig. 8.

Valvae margine ventrali fere recto, dorsali valde convexo apicibus acute protractis, longae 25–30 μ, latae 7–8 μ. Rhaphe recta. Area axiliaris versus latus dorsale angustissima, in latere ventrali ad marginem valvae dilatata. Striae transapicales radiantes, 22 in 10 μ, una in medio valvae abbreviata. Nullae in latere ventrali striae visibiles.
Holotypus: Ghana No. 207/1961.

Amphora mansiensis nov. spec. Pl. XX, fig. 1.

Valvae margine ventrali et dorsali convexo apicibus protractis et versus latus ventrale deflexis, longae 38–50 μ, latae 8–10 μ (in facie connectivali). Rhaphe in medio valvae decurrens aliquid curvata. Area axiliaris in latere dorsali angusta, in medio valvae leviter dilatata, in latere ventrali lata. Striae transapicales robustae, leviter radiantes, in latere dorsali 12–14 in 10 μ, in latere ventrali non visibiles.
Holotypus: Ghana No. 168/1961.

Cymbella ankobraensis nov. spec. Pl. XIX, fig. 11.

Valvae incongruentes margine ventrali leviter convexo dorsali convexiore et apicibus obtuse rotundatis, longae 28–30 μ, latae 6 μ. Rhaphe in medio valvae fissuris polaribus versus latus ventrale deflexis et fissuris centralibus versus latus dorsale leviter deflexis. Area axiliaris admodum lata, in medio valvae non ita dilatata. Striae transapicales radiantes, ca. 12 in 10 μ, duae mediae longiore inter se spatio; striae in latere ventrali versus apices leviter convergentes.
Holotypus: Ghana No. 166/1961.

Cymbella dadwinensis nov. spec. Pl. XX, fig. 3.

Valvae incongruentes lanceolatae margine ventrali convexo parva in medio valvae dilatatione, margine dorsali fortius convexo, longae 55–60 μ, latae 10–12 μ. Rhaphe

recta fissuris polaribus admodum longis versus latus ventrale deflexis, versus latus dorsale leviter deflexis fissuris centralibus. Area axiliaris anguste lanceolata nulla area centrali decisa. Striae transapicales radiantes, in latere dorsali 8, in ventrali 9 in 10 μ, manifesto lineatae.
Holotypus: Ghana No. 147/1961.

Cymbella moragoensis nov. spec. Pl. XX, fig. 9.

Valvae incongruentes margine ventrali leviter convexo, dorsali fortiter convexo et apicibus leviter protractis admodum acutis, longae 25–30 μ, latae 9–10 μ. Rhaphe leviter curvata prope ab margine ventrali, fissuris polaribus versus latus ventrale deflexis, centralibus versus latus dorsale leviter curvatis. Area axiliaris admodum angusta nulla area centrali decisa. Striae transapicales fortiter radiantes, ca. 9 in 10 μ, manifesto lineatae.
Holotypus: Ghana No. 268/1961.

Cymbella tainensis nov. spec. Pl. XX, fig. 4.

Valvae incongruenter lanceolatae naviculoides margine ventrali convexo, dorsali paulo fortius convexo, longae 38–40 μ, latae 7–8 μ. Rhaphe in medio fere valvae propius marginem ventralem, recta, brevibus versus marginem dorsalem deflexis fissuris polaribus. Area axiliaris angusta linearis, longa exigua in medio valvae dilatatione. Striae transapicales radiantes, 15 in 10 μ, manifesto punctatae (striis longitudinalibus).
Holotypus: Ghana No. 215/1961.

Cymbella takoradiensis nov. spec. Pl. XX, fig. 5.

Valvae incongruentes lanceolatae, recto fere (leviter convexo) margine ventrali, convexo dorsali, longae 40–45 μ, latae 5–7 μ. Rhaphe fere recta in medio paene valvae posita fissuris polaribus brevibus versus latus dorsale deflexis. Area axiliaris anguste lanceolata nulla area centrali separatim dilatata. Striae transapicales radiantes, 15 in 10 μ, in latere ventrali versus apices leviter convergentes.
Holotypus: Ghana No. 114/1961.

Gomphonema suhmii nov. spec. Pl. XXI, fig. 1.

Valvae cuneiformes polo superiore lato, versus inferiorem admodum fortiter attenuatae, polo superiori cuneiformiter rotundato, longae 45–55 μ, latae 6–8 μ. Exigua inter medium valvae et polum superiorem dilatatio transapicalis. Area axiliaris lata, ca. $^1/_3$ latitudinis valvae, leviter in medio valvae in longitudinem dilatata. Striae transapicales radiantes, 15 in 10 μ, 1–2 striis hyalinibus longitudinalibus manifestis.
Holotypus: Ghana No. 294/1961.

Gomphonema wulasiense nov. spec. Pl. XXI, fig. 7.

Valvae clavaformes polo superiori obtusiore inferiore paulo angustiore a medio sensim attenuatae, longae 15–20 μ, latae 4.7 μ. Area axiliaris angustissima, centralis rotundata,

ca. $^1/_2$ latitudinis valvae. Striae transapicales radiantes, ca. 20 in 10 μ, cum 3–4 striis hyalinibus longitudinalibus.
Holotypus: Ghana No. 287/1961.

Gomphonema wulasiense var. *nunguaensis* nov. var. Pl. XXI, fig. 9.

Valvis ovo-clavaformibus a var. *wulasiense* different. Striae transapicales 22–24 in 10 μ, densius quam apud var. congestae.
Holotypus: Ghana No. 33/1961.

Gomphonema wulasiense var. *voltaensis* nov. spec. Pl. XXI, fig. 8.

Valvis late cuneiformibus et prope polum superiorem et prope inferiorem cuneiformiter acutis a var. *wulasiense* differt.
Holotypus: Ghana No. 293/1961.

Nitzschia amisaensis nov. spec. Pl. XXI, fig. 15.

Valvae late lineares lateribus fere parallelis et apicibus breviter protractis, longae 30–35 μ, latae 5–6 μ. Carina fortiter excentrica. Puncta carinae 11–12 in 10 μ duabus mediis maiore inter se spatio. Striae transapicales 24 in 10 μ, subtiliter punctatae.
Holotypus: Ghana No. 111/1961.

Nitzschia mankesimensis nov. spec. Pl. XXI, fig. 17.

Valvae late lineares lateribus parallelis et apicibus breviter protractis acute rotundatis, longae 40–45 μ, latae 8 μ. Carina fortiter excentrica. Puncta carinae 8–9 in 10 μ. Striae transapicales 15 in 10 μ.
Holotypus: Ghana No. 112/1961.

Nitzschia nunguaensis nov. spec. Pl. XXI, fig. 16.

Valvae late lineares lateribus parallelis et apicibus capitatis breviter protractis, longae 30–35 μ, latae 7–8 μ. Carina fortiter excentrica. Puncta carinae 6–8 in 10 μ. Striae transapicales 18–19 in 10 μ.
Holotypus: Ghana No. 33/1961.

Nitzschia syrachii nov. spec. Pl. XXII, fig. 12.

Valvae lanceolatae, in medio lateris dorsalis aliquid contractae, apicibus leviter protractis, longae 30–40 μ, latae 5–6 μ. Carina excentrica. Puncta carinae rotundata admodum fortia, 12 in 10 μ, duobus mediis maiore inter se spatio. Striae transapicales non visibiles.
Holotypus: Ghana No. 114/1961.

Nitzschia aketechiensis nov. spec. Pl. XXII, fig. 2.

Valvae elliptico-lanceolatae apicibus late protractis et recte decisis, longae 45–50 μ, latae 7–8 μ. Carina excentrica. Puncta carinae lineata fortia, 5–6 in 10 μ. Striae transapicales 30–34 in 10 μ striis longitudinalibus undulatis.
Holotypus: Ghana No. 136/1961.

Nitzschia bansoensis nov. spec. Pl. XXII, fig. 4.

Valvae lanceolatae apicibus aliquid protractis leviter capitatis, longae 40–45 μ, latae 4 μ. Carina angusta excentrica. Puncta carinae 11 in 10 μ, admodum parva rotundata. Striae transapicales 15 in 10 μ.
Holotypus: Ghana No. 144/1961.

Nitzschia lawsonii nov. spec. Pl. XXII, fig. 13.

Valvae lineares latere carinae leviter concavo apicibus non protractis obtuse rotundatis, longae 90–100 μ, latae 8 μ. Carina excentrica. Puncta carinae 6 in 10 μ, fortia. Striae transapicales 28–30 in 10 μ.
Holotypus: Ghana No. 112/1961.

Nitzschia nagbogensis nov. spec. Pl. XXII, fig. 6.

Valvae lineares lateribus parallelis et apicibus capitatis, longae 40–45 μ, latae 4–5 μ. Carina excentrica, puncta carinae 9–10 in 10 μ, lineata. Striae transapicales non visibiles.
Holotypus: Ghana No. 279/1961.

Nitzschia tonoensis nov. spec. Pl. XXIII, fig. 5.

Valvae linear-lanceolatae apicibus capitatis admodum protractis, longae 90–95 μ, latae 8–9 μ. Carina excentrica. Puncta carinae 7–8 in 10 μ, duobus mediis maiore inter se spatio. Striae transapicales 18 in 10 μ, subtiliter punctatae.
Holotypus: Ghana No. 252/1961.

Nitzschia vedelii nov. spec. Pl. XXII, fig. 5.

Valvae lanceolatae apicibus capitatis longe et anguste protractis, longae 40–45 μ, latae 4–5 μ. Carina angusta excentrica. Puncta carinae 11–12 in 10 μ, parva rotundata. Striae transapicales 12–13 in 10 μ.
Holotypus: Ghana No. 135/1961.

Nitzschia abonuensis nov. spec. Pl. XXII, fig. 8.

Valvae lineares lateribus parallelis versus apices paulum modo attenuatae et apicibus obtuse rotundatis, longae 25–30 μ, latae 2.5–3.0 μ. Carina excentrica. Puncta carinae 9–10 in 10 μ admodum parva. Striae transapicales non visibiles.
Holotypus: Ghana No. 194/1961.

Nitzschia ankobraensis nov. spec. Pl. XXI, fig. 13.

Valvae late lineares lateribus parallelis et apicibus capitatis, longae 20–25 μ, latae 5–6 μ. Carina valde excentrica. Puncta carinae 8–9 in 10 μ. Striae transapicales fortes, 24–26 in 10 μ, subtiliter punctatae.
Holotypus: Ghana No. 205/1961.

Nitzschia apropongensis nov. spec. Pl. XXIV, fig. 13.

Valvae late lineares lateribus parallelis et apicibus protractis, longae 20–25 μ, latae 5–6 μ. Carina lata excentrica. Puncta carinae 6 in 10 μ, irregularia rotundata. Striae transapicales 28–30 in 10 μ.
Holotypus: Ghana No. 203/1961.

Nitzschia bosumtwiensis nov. spec. Pl. XXIII, fig. 13.

Valvae lineares lateribus parallelis et apicibus sensim rotundatis, longae 40–45 μ, latae 3–4 μ. Carina excentrica. Puncta carinae 11 in 10 μ, admodum fortia. Striae transapicales non visibiles.
Holotypus: Ghana No. 189/1961.

Nitzschia chuchiligaensis nov. spec. Pl. XXIV, fig. 8.

Valvae lineares lateribus fere parallelis (leviter concavis), et apicibus protractis obtuse rotundatis, longae 25–30 μ, latae 4 μ. Carina excentrica. Puncta carinae 7–8 in 10 μ, fortia, maiore inter duo media spatio. Striae transapicales non visibiles.
Holotypus: Ghana No. 254/1961.

Nitzschia dadwinensis nov. spec. Pl. XXIII, fig. 10.

Valvae lineares lateribus parallelis et apicibus sensim late attenuatis, longae 45–50 μ, latae 3–4 μ. Carina excentrica. Puncta carinae 7 in 10 μ diversa magnitudine et vario spatio. Striae transapicales non visibiles.
Holotypus: Ghana No. 149/1961.

Nitzschia densuensis nov. spec. Pl. XXIV, fig. 9.

Valvae lanceolatae apicibus breviter productis, longae 26 μ, latae 4–5 μ. Carina excentrica. Puncta carinae fortissima, 9 in 10 μ. Striae transapicales 30–34 in 10 μ, subtiliter sed manifesto punctatae (lineatae).
Holotypus: Ghana No. 73/1961.

Nitzschia huniensis nov. spec. Pl. XXIV, fig. 17.

Valvae lineares lateribus fere parallelis et apicibus late productis obtuse rotundatis, longae 12–15 μ, latae 2.0–2.5 μ. Carina excentrica. Puncta carinae 9 in 10 μ, parva, irregulariter distantia. Striae transapicales non visibiles.
Holotypus: Ghana No. 157/1961.

Nitzschia krachiensis nov. spec. Pl. XXIV, fig. 1.

Valvae anguste lanceolatae apicibus acutis sensim attenuatis, longae 35–40 μ, latae 2.5–3.0 μ. Carina angusta excentrica. Puncta carinae 11 in 10 μ, parva. Striae transapicales 22 in 10 μ.
Holotypus: Ghana No. 293/1961.

Nitzschia mamataensis nov. spec. Pl. XXII, fig. 10.

Valvae anguste lineares lateribus parallelis et apicibus sensim obtuse rotundatis, longae 50–55 μ, latae 3–4 μ. Carina excentrica. Puncta carinae 11–12 in 10 μ, admodum parva. Striae transapicales non visibiles.
Holotypus: Ghana No. 291/1961.

Nitzschia ofinensis nov. spec. Pl. XXIV, fig. 12.

Valvae late lanceolatae apicibus acutis, longae 15–16 μ, latae 4 μ. Carina angusta excentrica. Puncta carinae 12 in 10 μ, maiore inter duo media spatio. Striae transapicales 24 in 10 μ.
Holotypus: Ghana No. 186/1961.

Nitzschia sakaensis nov. spec. Pl. XXIV, fig. 16.

Valvae linear-lanceolatae apicibus late rotundatis, longae 20–25 μ, latae 4 μ. Carina angusta excentrica. Puncta carinae 7 in 10 μ. Striae transapicales 20–21 in 10 μ.
Holotypus: Ghana No. 266/1961.

Nitzschia sansomei nov. spec. Pl. XXIII, fig. 4.

Valvae lineares lateribus parallelis, versus apices rotundatos cuneiformiter attenuatae, longae 50–55 μ, latae 4–5 μ. Carina angusta excentrica. Puncta carinae 7–8 in 10 μ, admodum fortia. Striae transapicales 15–16 in 10 μ, punctatae (striis longitudinalibus).
Holotypus: Ghana No. 295/1961.

Nitzschia schiellerupii nov. spec. Pl. XXII, fig. 9.

Valvae linear-lanceolatae a medio versus apices obtuse rotundatos sensim attenuatae, longae 35–40 μ, latae 5–6 μ. Carina angusta excentrica. Puncta carinae 7 in 10 μ, admodum fortia. Striae transapicales 21–22 in 10 μ.
Holotypus: Ghana No. 296/1961.

Nitzschia svedstrupii nov. spec. Pl. XXII, fig. 14.

Valvae late lineares lateribus leviter concavis et apicibus breviter protractis, longae 20–25 μ, latae 4–5 μ. Carina excentrica. Puncta carinae 7 in 10 μ, fortia. Striae transapicales non visibiles.
Holotypus: Ghana No. 204/1961.

Nitzschia tainensis nov. spec. Pl. XXIII, fig. 14.

Valvae lineares lateribus fere parallelis, versus apices cuneiformiter attenuatae, longae 20–25 μ, latae 3–4 μ. Carina excentrica. Puncta carinae 7–8 in 10 μ, admodum fortia. Striae transapicales 14–15 in 10 μ, crasse punctatae.
Holotypus: Ghana No. 216/1961.

Nitzschia voltaensis nov. spec. Pl. XXII, fig. 11.

Valvae anguste lineares lateribus parallelis et apicibus attenuatis rotundatis, longae 35–40 μ, latae 2.5–3.0 μ. Carina excentrica. Puncta carinae 10–11 in 10 μ, admodum fortia. Striae transapicales non visibiles.
Holotypus: Ghana No. 293/1961.

Nitzschia abraensis nov. spec. Pl. XXII, fig. 7.

Valvae lineares lateribus parallelis versus apices capitatos levissime sigmoidibus, longae 60–70 μ, latae 6–7 μ. Carina excentrica. Puncta carinae 8–9 in 10 μ, linearia. Striae transapicales non visibiles.
Holotypus: Ghana No. 123/1961.

Nitzschia apowaensis nov. spec. Pl. XXIV, fig. 7.

Valvae lanceolatae apicibus admodum longe et acute protractis, leviter sigmoides, longae 70 μ, latae 5–6 μ. Carina angusta excentrica. Puncta carinae 7–8 in 10 μ, admodum fortia rotundata spatiis irregularibus et maiore inter duo media distantia. Striae transapicales non visibiles.
Holotypus: Ghana No. 114/1961.

Nitzschia adiembraensis nov. spec. Pl. XXIV, fig. 2.

Valvae linear-lanceolatae apicibus late protractis obtuse rotundatis, leviter sigmoides, longae 35–40 μ, latae 4 μ. Carina angusta excentrica. Puncta carinae 11 in 10 μ, distantia admodum varia. Striae transapicales non visibiles.
Holotypus: Ghana No. 186/1961.

Nitzschia ghanaensis nov. spec. Pl. XXIV, fig. 15.

Valvae late lineares lateribus leviter concavis paulum sigmoides apicibus obtuse protractis, longae 20–25 μ, latae 4–5 μ. Carina angusta excentrica. Puncta carinae 10–11 in 10 μ, parva rotundata maiore inter duo media spatio. Striae transapicales subtilissimae.
Holotypus: Ghana No. 123/1961.

Nitzschia irresoluta Hust. fo. *minor* nov. fo. Pl. XXIV, fig. 10.

Magnitudine tantum valvae multo minore a forma *irresoluta* differt.
Holotypus: Ghana No. 136/1961.

Nitzschia navrongensis nov. spec. Pl. XXIII, fig. 6.

Valvae anguste lanceolatae apicibus longe protractis et fortiter attenuatis, longae 60–70 μ, latae 2.5–3.0 μ. Carina excentrica. Puncta carinae 12 in 10 μ. Striae transapicales non visibiles.
Holotypus: Ghana No. 249/1961.

Surirella agonaensis nov. spec. Pl. XXV, fig. 3.

Axis apicalis heteropolis. Valvae oblonge cuneiformes apicibus late rotundatis, polo superiore paulo latiore quam polo inferiore, longae 80 μ, latae 28–30 μ. Alae 15–16 in 100 μ, ad aream medialem angustam linearem prolongatae et parvis spinis enormiter distributis praeditae. Canales alarum multo latiores quam alae. Striae non manifestae.
Holotypus: Ghana No. 141/1961.

Surirella bonsaensis nov. spec. Pl. XXV, fig. 1.

Axis apicalis isopolis. Valvae late lineares lateribus parallelis et apicibus late rotundatis, longae 70 μ, latae 25–26 μ. Alae 22–24 in 100 μ, ad aream medialem angustam hyalinam prolongatae. Alae eadem latitudine qua canales alarum.
Holotypus: Ghana No. 151/1961.

Surirella delicatissima Lewis var. *ghanaensis* nov. var. Pl. XXV, fig. 9.

A. var. *delicatissima* et var. *africana* Cholnoky exiguitate et alis admodum dense congestis differt.
Holotypus: Ghana No. 204/1961.

Surirella dodowaensis nov. spec. Pl. XXV, fig. 6.

Axis apicalis heteropolis. Valvae ovaliter ellipticae polo superiore late rotundato, inferiore aliquid acutiore, longae 35–40 μ, latae 12–15 μ. Alae 18–20 in 100 μ, ad medium fere valvae prolongatae. Canales alarum latiores quam alae. Area angusta linearis. Striae non distinctae.
Holotypus: Ghana No. 106/1961.

Surirella esamangensis nov. spec. Pl. XXV, fig. 2.

Axis apicalis leviter heteropolis. Valvae lineares apicibus sensim rotundatis, longae 60 μ, latae 24 μ. Alae 24 in 100 μ, in superficiem valvae ad aream medialem admodum angustam hyalinam prolongatae. Canales alarum multo latiores quam alae. Striae non distinctae.
Holotypus: Ghana No. 144/1961.

Surirella nagbogensis nov. spec. Pl. XXV, fig. 7.

Axis apicalis heteropolis. Valvae oblonge ellipticae polo superiore late rotundato, inferiore aliquid angustiore, longae 40 μ, latae 13–15 μ. Alae 35 in 100 μ, angusstae

ad medium fere superficiei valvae prolongatae. Canales alarum multo latiores quam alae. Area linearis angusta. Striae subtilissimae.
Holotypus: Ghana No. 279/1961.

Surirella sorriensis nov. spec. Pl. XXV, fig. 8.

Axis apicalis heteropolis. Valvae ovales polo superiore late rotundato, inferiore paulo angustiore, longae 35–40 μ, latae 18 μ. Alae 30–35 in 100 μ, ad aream hyalinam ca. $^1/_4$ latitudinis valvae ascendentes. Canales alarum angustissimae. Striae non distinctae.
Holotypus: Ghana No. 223/1961.

Surirella takoradiensis nov. spec. Pl. XXV, fig. 4.

Axis apicalis heteropolis. Valvae ovaliter ellipticae polo superiore late rotundato, inferiore aliquid angustiores, longae 20–25 μ, latae 7–8 μ. Alae 60–65 in 100 μ brevissimae et aliquid angustiores quam canales alarum. Superficies valvae area mediali hyalina latissima, ca. $^2/_3$ latitudinis valvae. Striae subtilissimae.
Holotypus: Ghana No. 119/1961.

Surirella takoradiensis var. *suhinensis* nov. var. Pl. XXV, fig. 5.

Ca. 40 alae in 100 μ a var. *takoradiensis* differt.
Holotypus: Ghana No. 218/1961.

Species novae praeparatae in collectione diatomearum Niels Foged, Odense, Danmark, exstant.

INDEX TO SPECIES

(* species novae. “ synonyms)

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Indleveret til Selskabet den 10. september 1964.
Færdig fra trykkeriet den 21. marts 1966.

PLATES

Plate I.

Fig. 1. Cyclotella stelligeroides Hust.
2. — pseudostelligera Hust.
3. — stelligera Cleve & Grun.
4, 8. — meneghiniana Kütz.
5. Melosira ikapöensis O. Müller var. minor Cholnoky.
6. — herzogi Lemmermann.
7. Cyclotella kützingiana Thwaites fo. minor Hust.
9. Fragilaria pinnatoides Cholnoky.
10. — leptostauron (Ehr.) Hust. var. dubia Grun. forma.
11. Synedra montana Krasske.
12, 13. — rumpens Kütz. var. fragilarioides Grun.
14. Eunotia asymmetrica Cholnoky.
15. — rabenhorsti Cleve & Grun. fo. monodon Cleve & Grun.
16, 17. — rhomboidea Hust.
18, 19. — tschirchiana O. Müller.
20. — trigibba Hust.

Scales 10 μ.

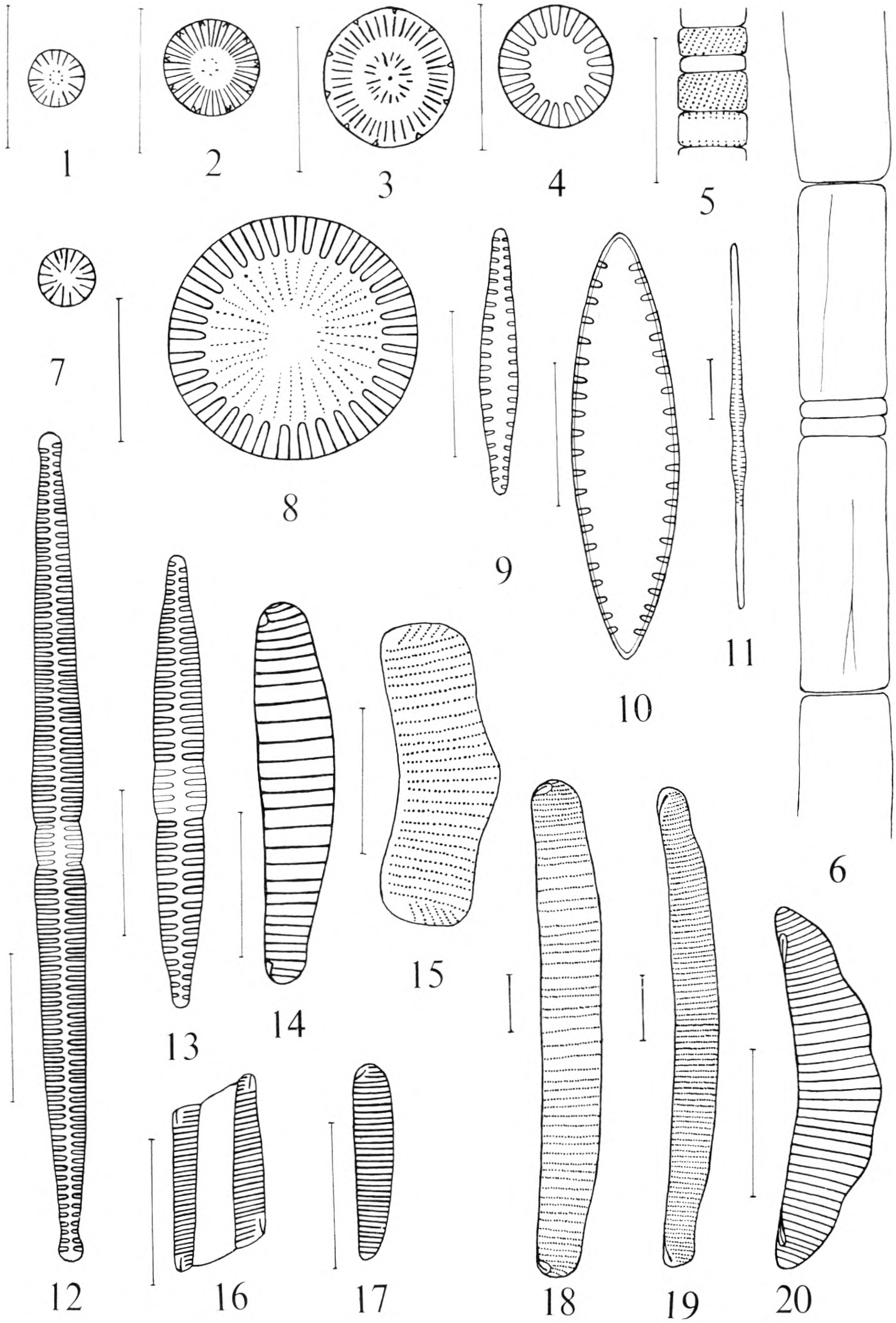
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Plate II.

Fig. 1. Eunotia monodon Ehr. var. bidens (Greg.) W. Smith.
2. — didyma Grun. fo. genuina Hust.
3. — — var. tuberosa Hust.
4. — mansiensis nov. spec.
5, 6, 7. — tarkwaensis nov. spec.
8. — epithemioides Hust.
9. — tanosoensis nov. spec.

Scales 10 μ.

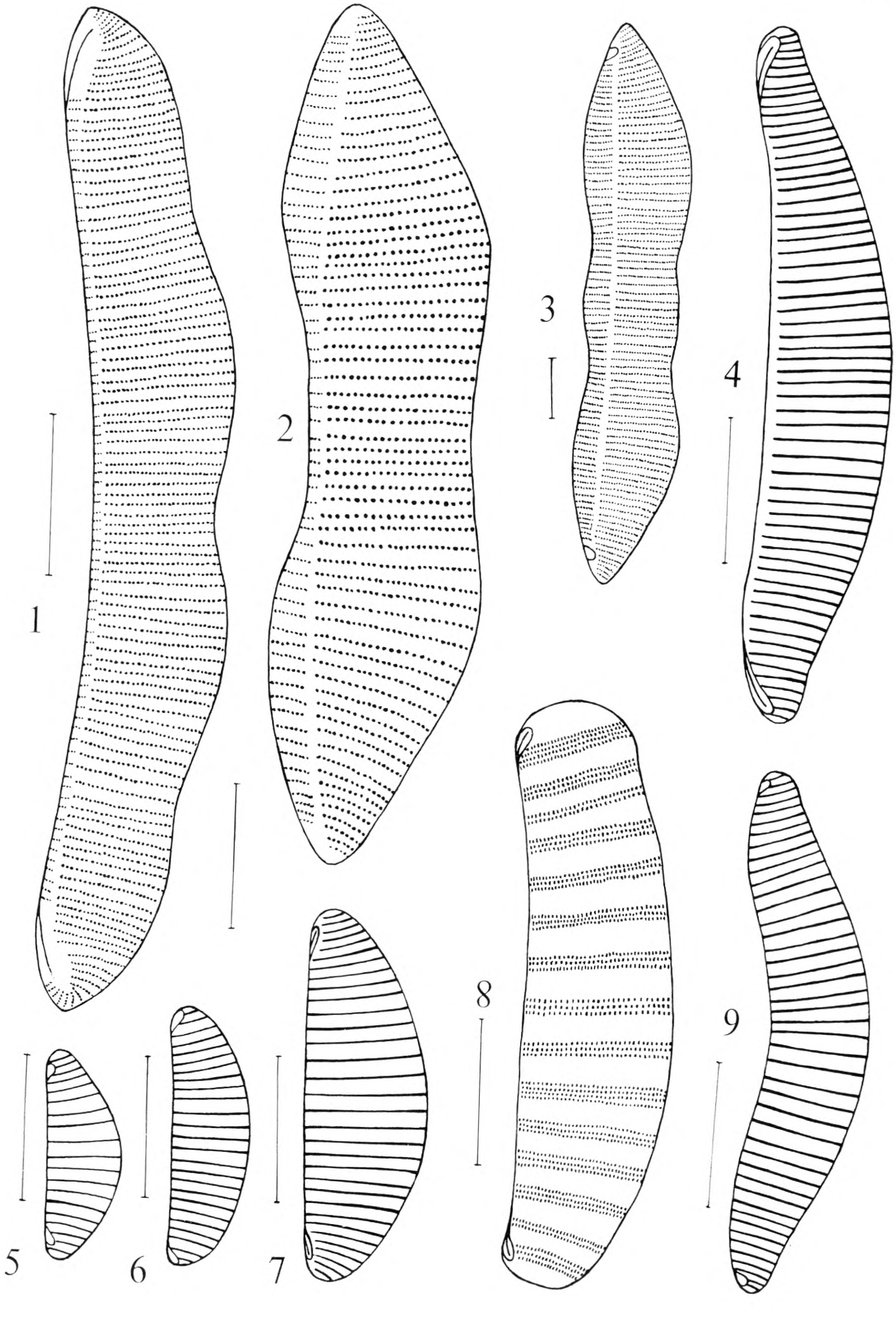
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Plate III.

Fig. 1. Eunotia gracilis (Ehr.) Rabenh.
2. — flexuosa (Bréb.) Kütz.
3. — lunaris (Ehr.) Grun.
4. — garussica Cholnoky.
5. — oliffii Cholnoky.
6. — diodon Ehr.
7. — bonsaensis nov. spc.
8. — sorriensis nov. spec.
9. — vumbae Cholnoky.
10. — similis Hust.
11. — hugenottarum Cholnoky.
12. — lawsonii nov. spec.
13. — asterionelloides Hust.
14 a, b. 15 a, b. Achnanthes pinnata Hust.

Scales 10 μ.

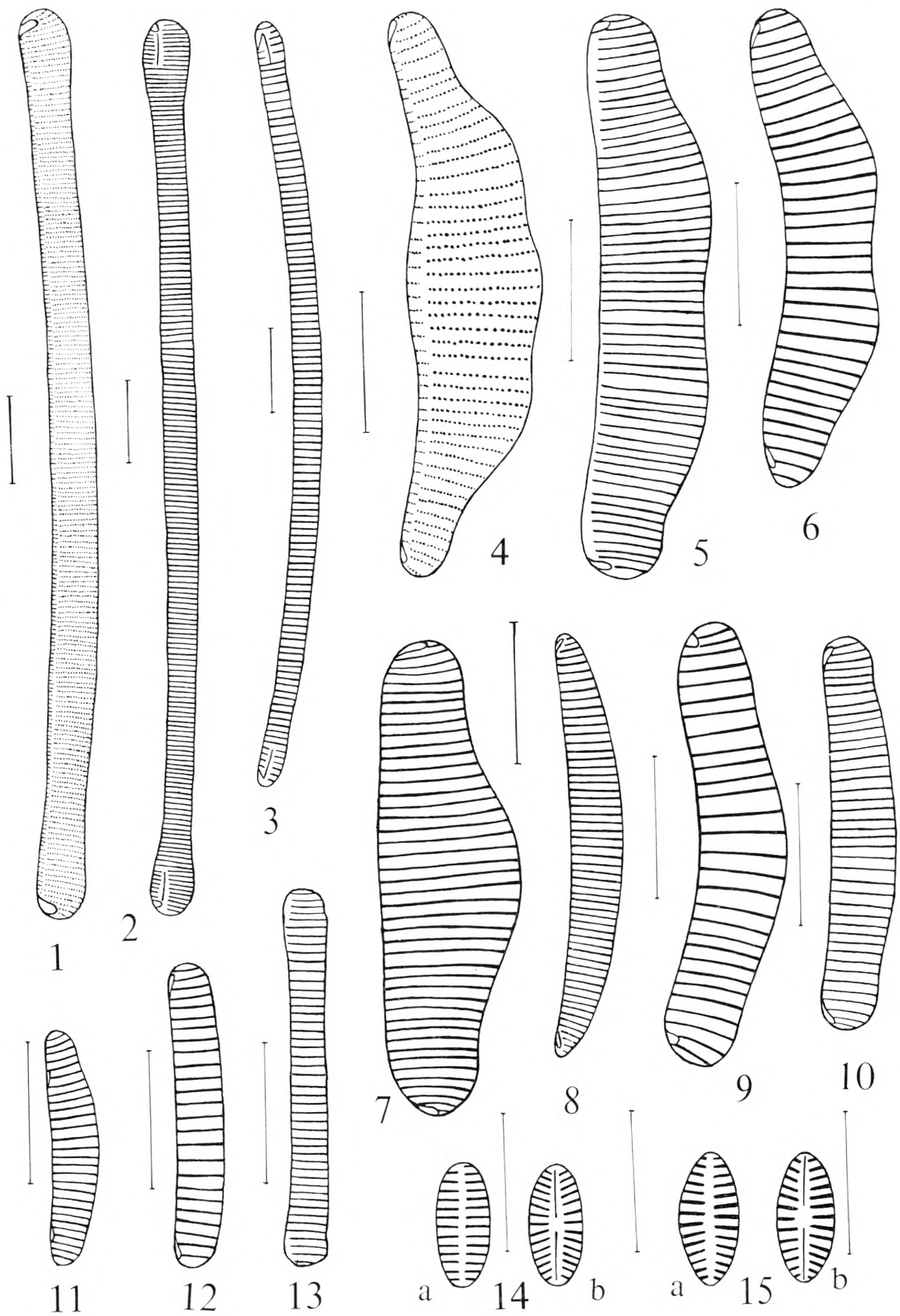
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Plate IV.

Fig. 1 a, b. 2 a, b.	Achnanthes subhudsonis Hust.
3 a, b.	— mansiensis nov. spec.
4 a, b.	Cocconeis subdirupta Cholnoky.
5 a, b. 6 a, b.	Achnanthes kraeuselii Cholnoky.
7 a, b.	Cocconeis schröderii nov. spec.
8 a, b.	— ankobraensis nov. spec.
9.	Diploneis pseudovalis Hust.
10.	— subovalis Cleve.
11 a, b.	Cocconeis feuerborni Hust.
12.	— sp. (rapheless valve).
13.	— sp. (rapheless valve).

Scales 10 μ.

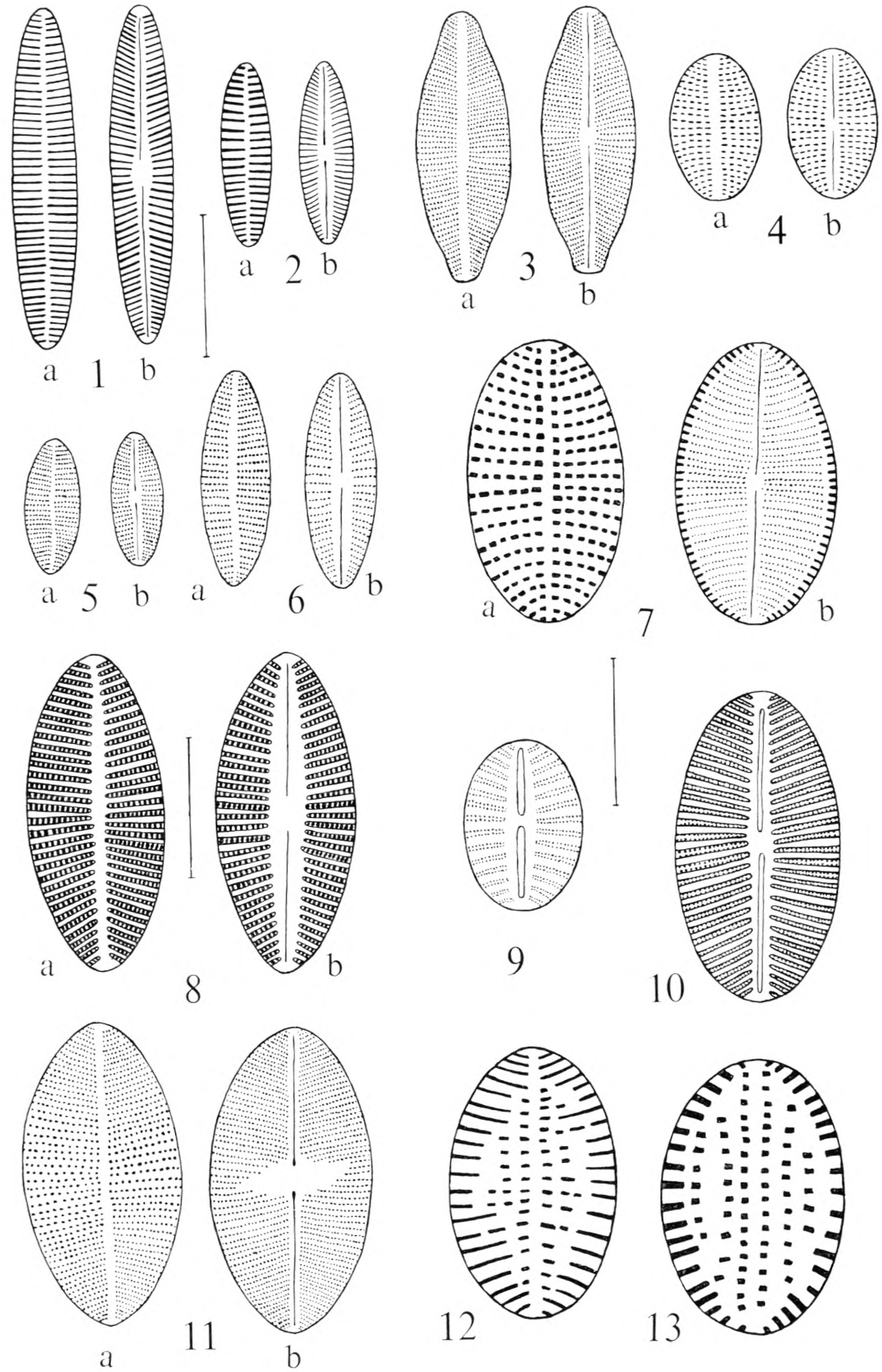
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Plate V.

Fig. 1.	Frustulia weinholdi Hust. fo. ghanaensis nov. f.
2, 3, 6.	Caloneis incognita Hust.
4.	— voltaensis nov. spec.
5.	— — var. tarkwaensis nov. var.
7.	— fasciata (Lagerst.) Cleve.
8.	— aequatorialis Hust.
9.	— sansomei nov. spec.
10.	— desertorum Hust.

Scale 10 μ.

PLATE V.

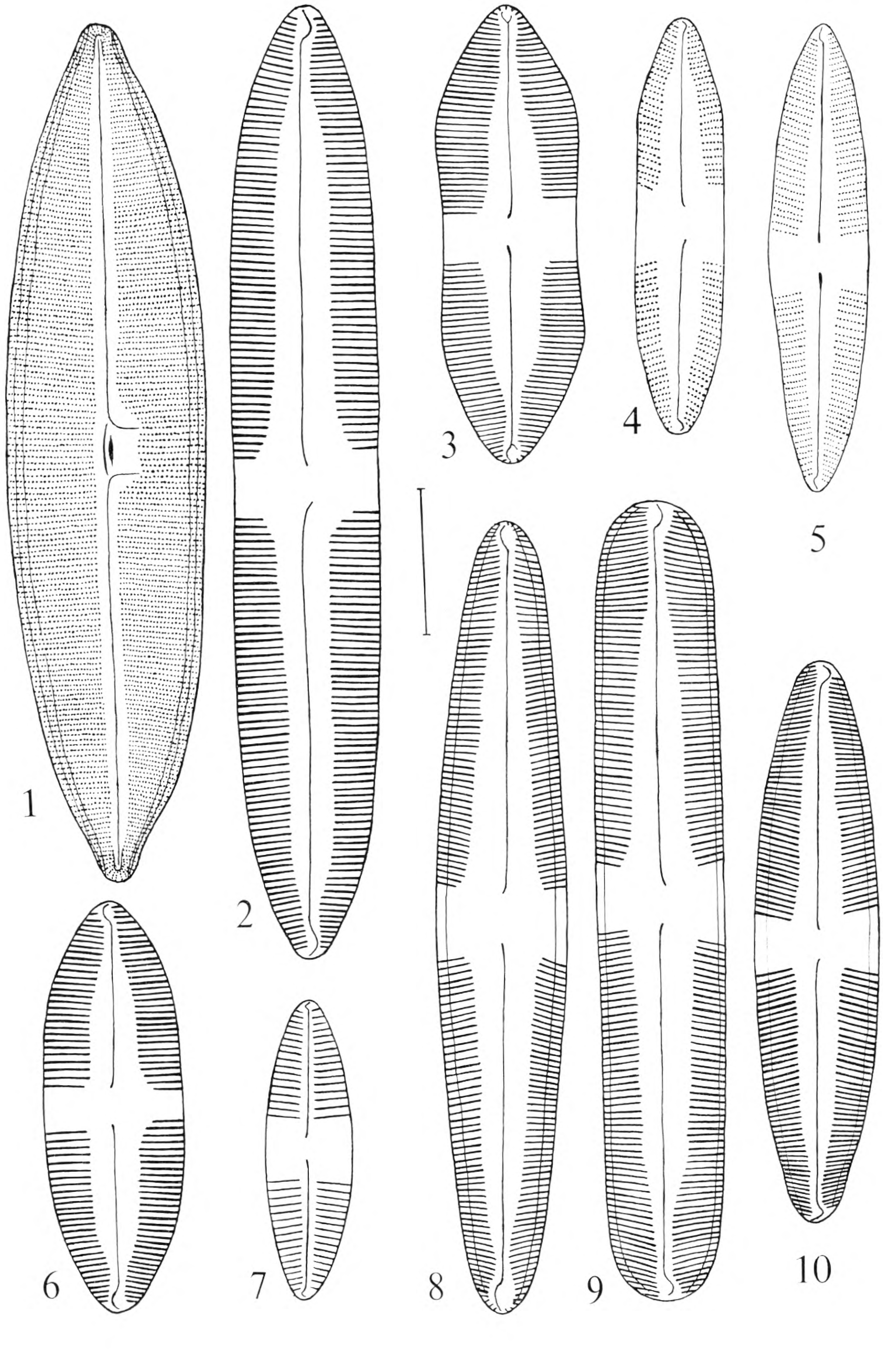

Plate VI.

Fig. 1. Caloneis vehemens Cholnoky.
2. — schroederi Hust.
3. — macedonica Hust.
4. — beccariana (Grun.) Cleve.
5. Neidium affine (Ehr.) Cleve var. bonsaensis nov. var.
6. — hercynicum A. Mayer fo. bogosoensis nov. fo.
7. — dayiense nov. spec.
8. — kumasiense nov. spec.
9. — bisulcatum (Lagerst.) Cleve var. baicalensis (Skvortzow & Meyer) Reimer.
10. — minutissimum Krasske.
11. — agonaense nov. spec.
12. — nsuaemense nov. spec.
13. — alpinum Hust.

Scales 10 μ

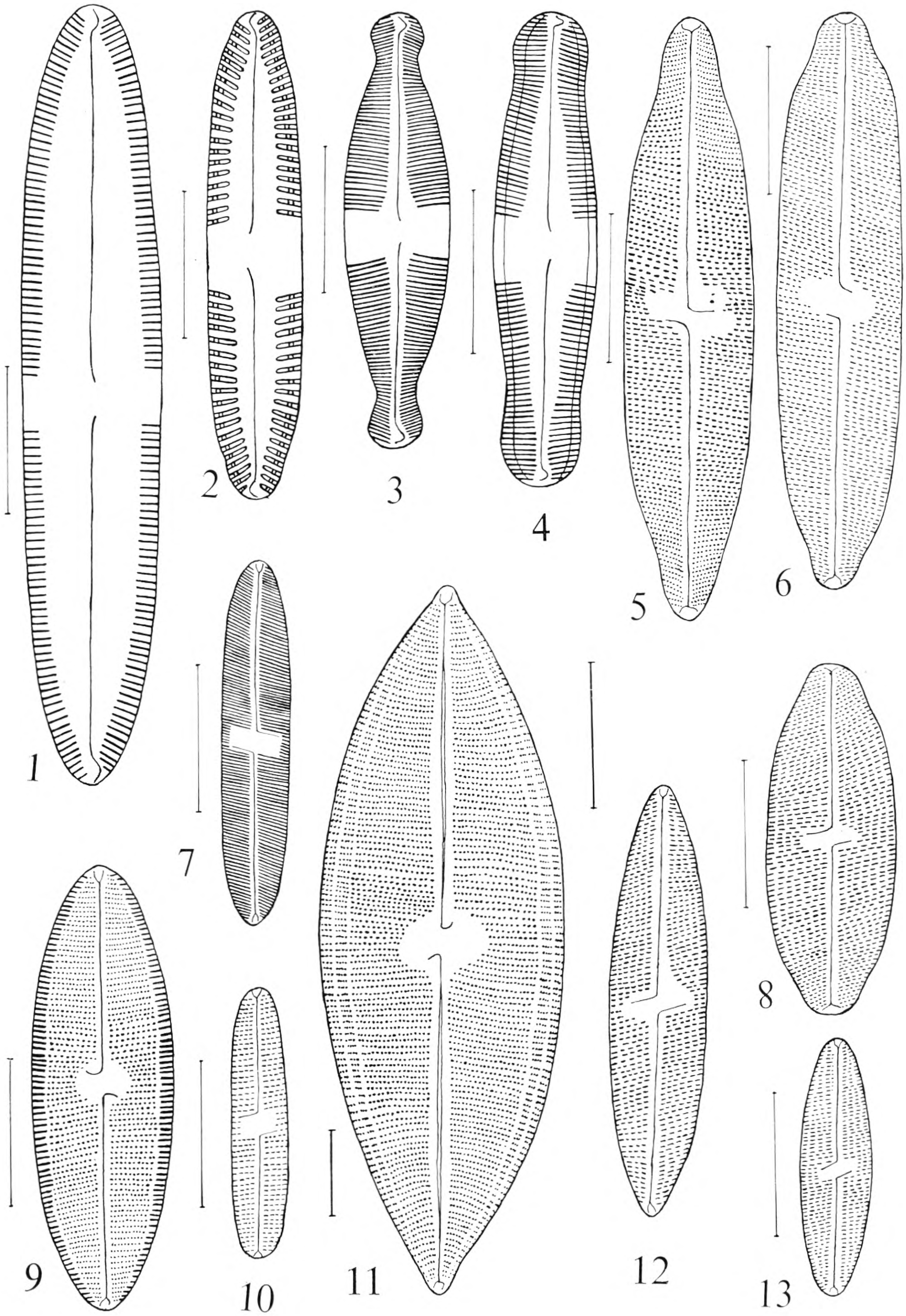
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Plate VII.

Fig. 1. Neidium gracile Hust. fo. aequalis Hust.
2. Stauroneis akrosoensis nov. spec.
3. — slateri nov. spec.
4, 5, 6, 7. — crucicula (Grun.) Cleve.
8, 11. — borrichii (Petersen) Lund.
9. — subdahomensis Guermeur.
10. — wislouchii Poretzky & Anisimowa.
12. — navrongensis nov. spec.
13. — obtusa Lagerst.
14. — schinzii (Brun) Cleve.
15. — kriegeri Patrick.
16. — tropicalis Guermeur var. undulata Guermeur.

Scales 10 μ.

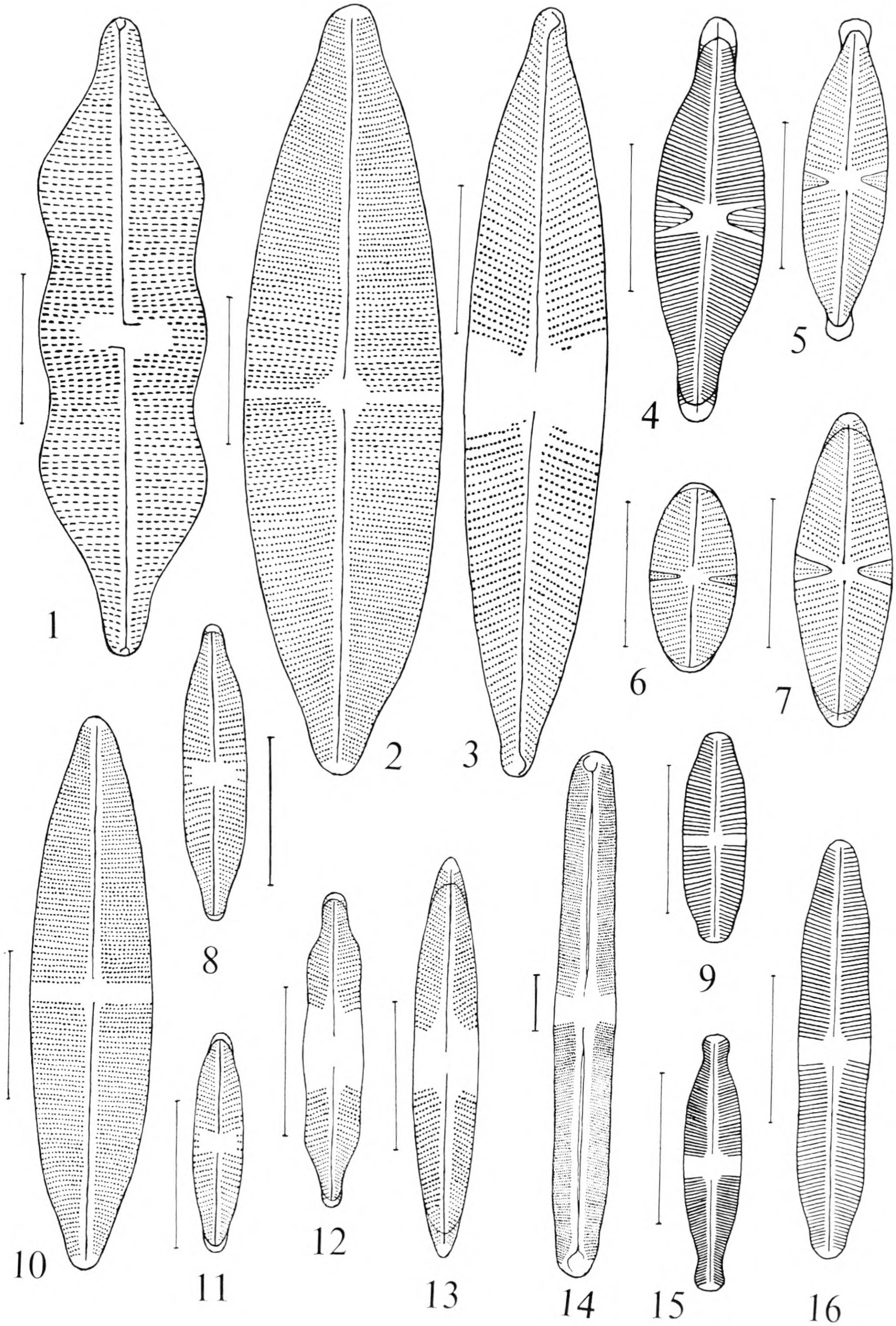
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Plate VIII.

Fig. 1. Stauroneis spicula Hickie.
2. Anomoeoneis sphaerophora (Kütz.) Pfitzer var. güntheri O. Müller.
3. — — forma (ca. 1040 ×).
4. Navicula halophila (Grun.) Cleve.
5, 6. — — formae.
7. — — fo. tenuirostris Hust.
8. — — var. subcapitata Østrup.
9. — — fo. nabogoensis nov. fo.
10. — ankobraensis nov. spec.
11. — kwamkuji Hust.
12. — standeri Cholnoky.
13. — tridentula Krasske.
14. — tridentulaeformis Bourelly.
15. — contenta Grun. fo. biceps Arnott.
16. — voltaensis nov. spec.
17. — bella Hust.?.
18. — perlucida Hust.
19. — invicta Hust.
20. — esamangensis nov. spec.

Scale 10 μ.

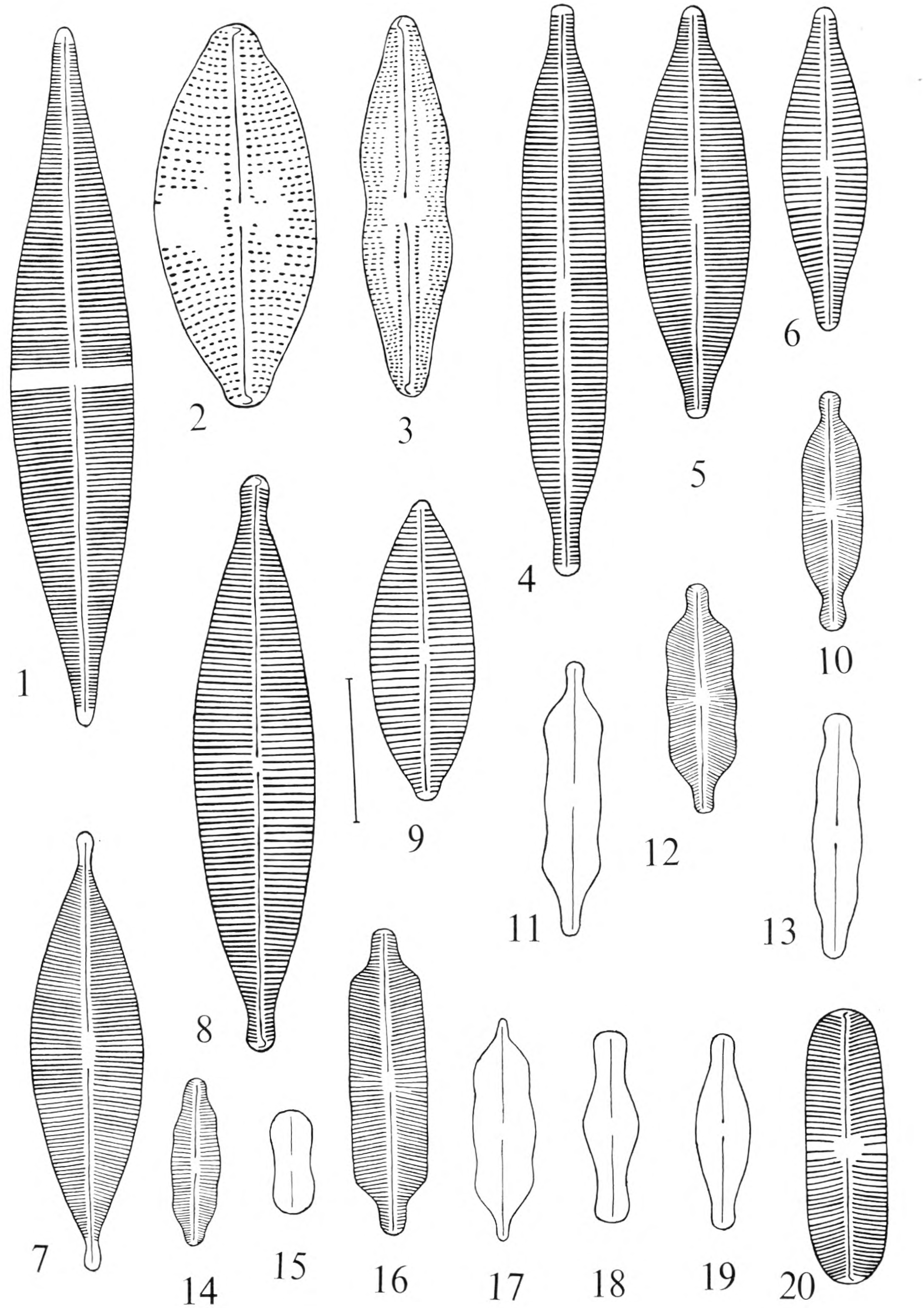
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Plate IX.

Fig. 1, 2.	Navicula ajenaensis nov. spec.
3.	— helensis Schulz.
4.	— kriegeri Krasske.
5.	— demissa Hust.
6.	— omissa Hust.
7.	— modica Hust.
8.	— thienemanni Hust.
9.	— ventralis Krasske.
10.	— schadei Krasske.
11.	— butreensis nov. spec.
12.	— sansomei nov. spec.
13.	— vitabunda Hust.
14, 15.	— nyassensis O. Müller.
16, 17.	— platycephala O. Müller.
18.	— — forma.
19.	— bosumtwiensis nov. spec.

Scale 10 μ.

PLATE IX.

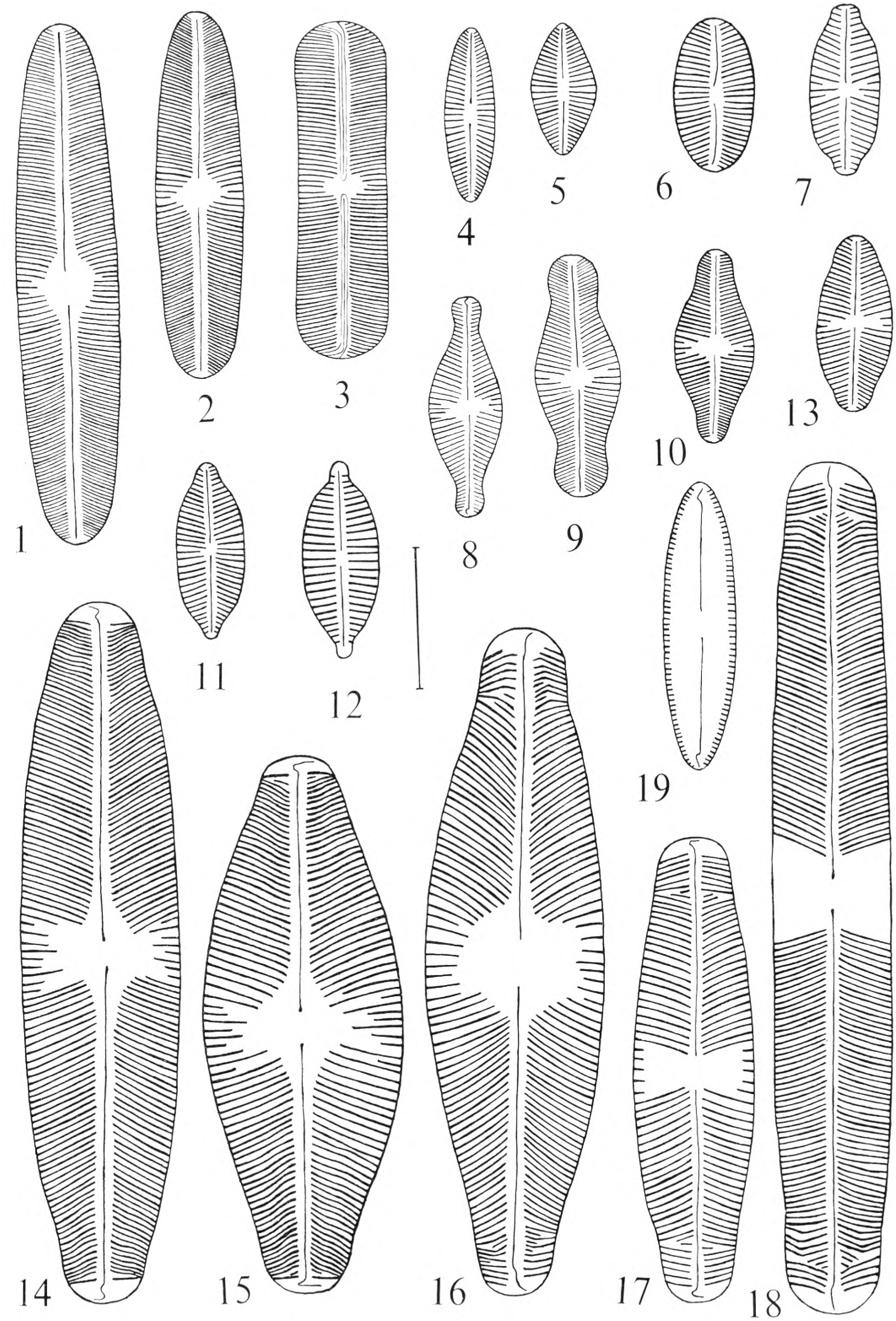

Plate X.

Fig. 1.	Navicula huniensis nov. spec.
2, 3.	— submolesta Hust.?.
4.	— submolesta Hust.
5.	— nunguaensis nov. spec.
6.	— lawsonii nov. spec.
7.	— consentanea Hust.
8, 9, 10.	— seminulum Grun.
11.	— tantula Hust.(?).
12, 13, 14.	— seminuloides Hust.
15.	— sp.
16.	— rotunda Hust.
17.	— seminuloides Hust.
18.	— pseudofaceta Guermeur.
19.	— tranciloba Guermeur.
20.	— vanidica Cholnoky.
21.	— subminuscula Manguin.
22.	— minima Grun.
23.	— pseudagrestis Lund.
24.	— iniqua Krasske.
25.	— dugaensis nov. spec.
26.	— bawdiaensis nov. spec.
27.	— dugaensis nov. spec. (?).
28.	— pseudographa Manguin
29.	— bamboiensis nov. spec.
30.	— mutica Kütz. var. cohnii (Hilse) Grun.
31.	— auriculata Hust.
32.	— langoraensis nov. spec.
33.	— aketechiensis nov. spec.

Scale 10 μ.

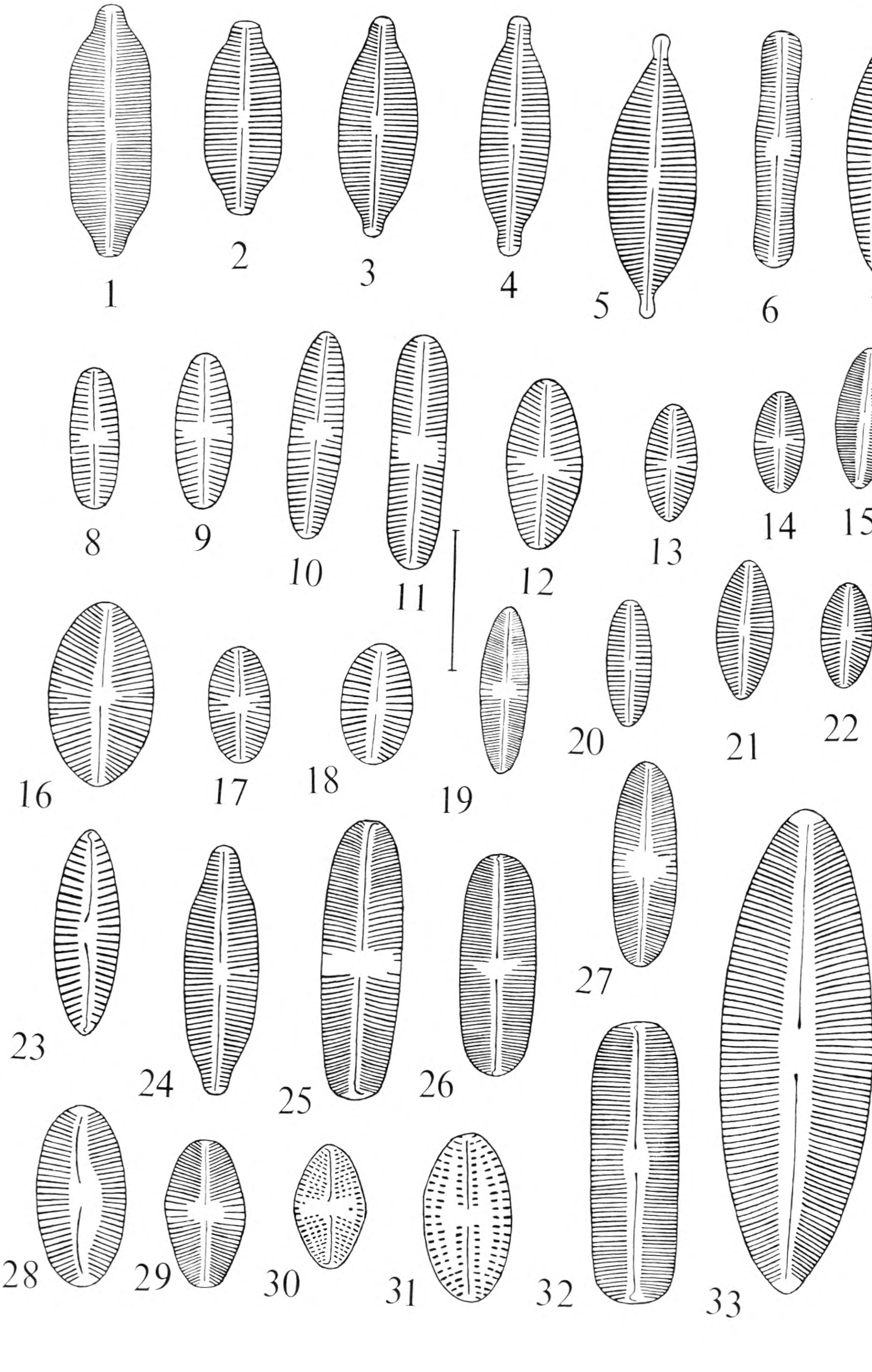
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Plate XI.

Fig. 1. *Navicula auriculata* Hust.
2. — *insociabilis* Krasske.
3. — *mansiensis* nov. spec.
4. — *abonuensis* nov. spec.
5. — *obstinata* Krasske.
6. — *schweickerdtii* Cholnoky.
7. — *suecorum* Carlsson.
8. — *lagerheimii* Cleve var. *intermedia* Hust.
9. — *lagerheimii* Cleve.
10, 11. — *navrongensis* nov. spec.
12. — *pseudographa* Manguin.
13. — *mutica* Kütz. var. *cohnii* (Hilse) Grun. forma.
14. — *damongensis* nov. spec.
15. — *grimmei* Krasske.
16. — *ancisa* Hust.
17. — *fawumangensis* nov. spec.
18, 21. — *nsutaensis* nov. spec.
19. — *mutica* Kütz. var. *cohnii* (Hilse) Grun. forma.
20. — *inserata* Hust. var. *undulata* Hust.
22. — *abelioensis* nov. spec.
23. — *bertelsenii* nov. spec.
24. — *syrachii* nov. spec.

Scale 10 μ.

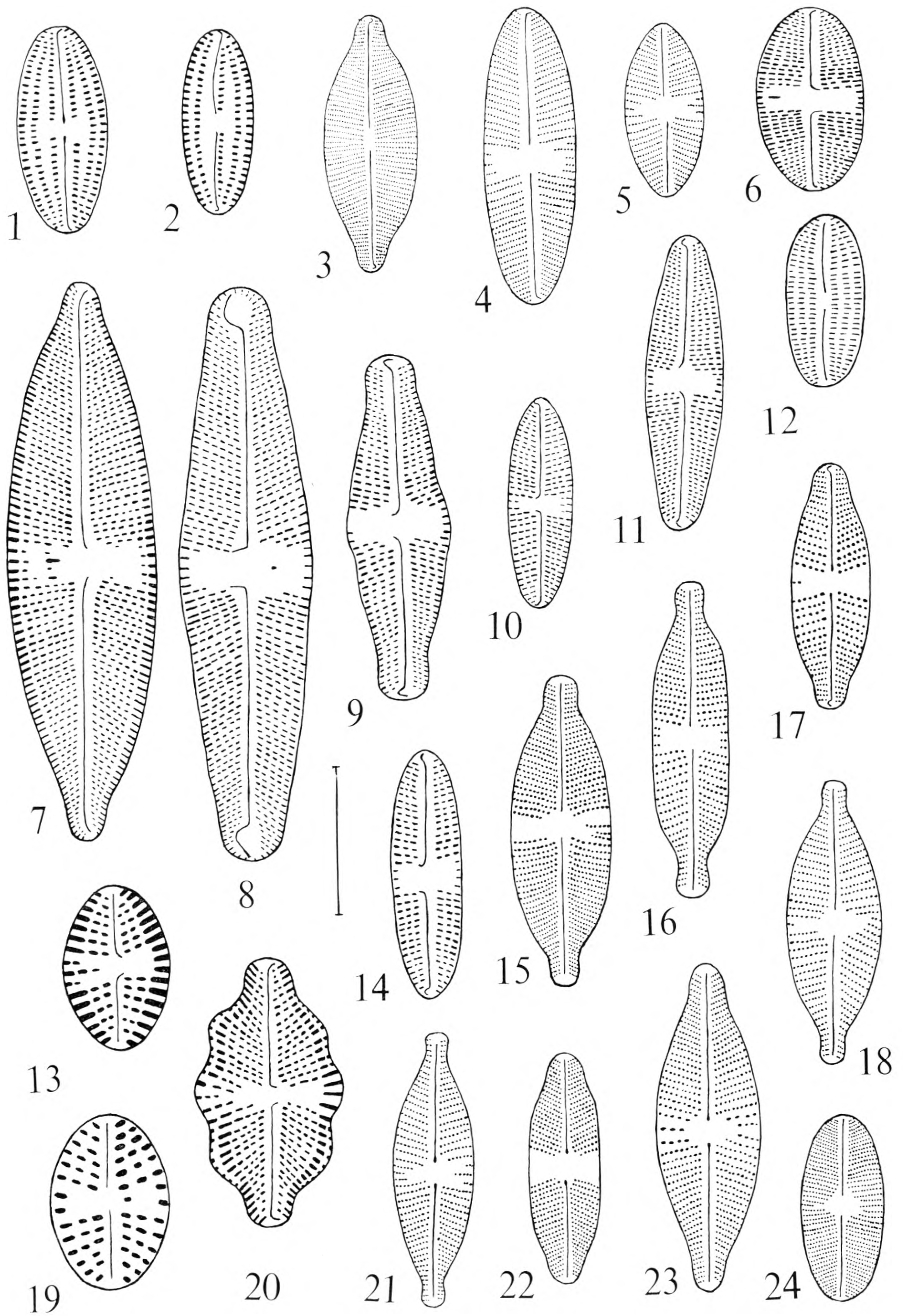
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Plate XII.

Fig. 1. Navicula laingii nov. spec.
2. — finitima Hust.
3. — ingoldii nov. spec.
4, 5. — bannajensis Boye Petersen.?.
6. — confervacea (Kütz.) Grun.
7. — densuensis nov. spec.
8. — chadwickii nov. spec.
9. — kolugoensis nov. spec.
10. — abuensis nov. spec.
11. — monradii nov. spec.
12. — sorriensis nov. spec.
13. — subinsoensis nov. spec.
14. — kpongensis nov. spec.
15. — towutiensis (Hust.) Cholnoky.
16. — isertii nov. spec.

Scale 10 μ.

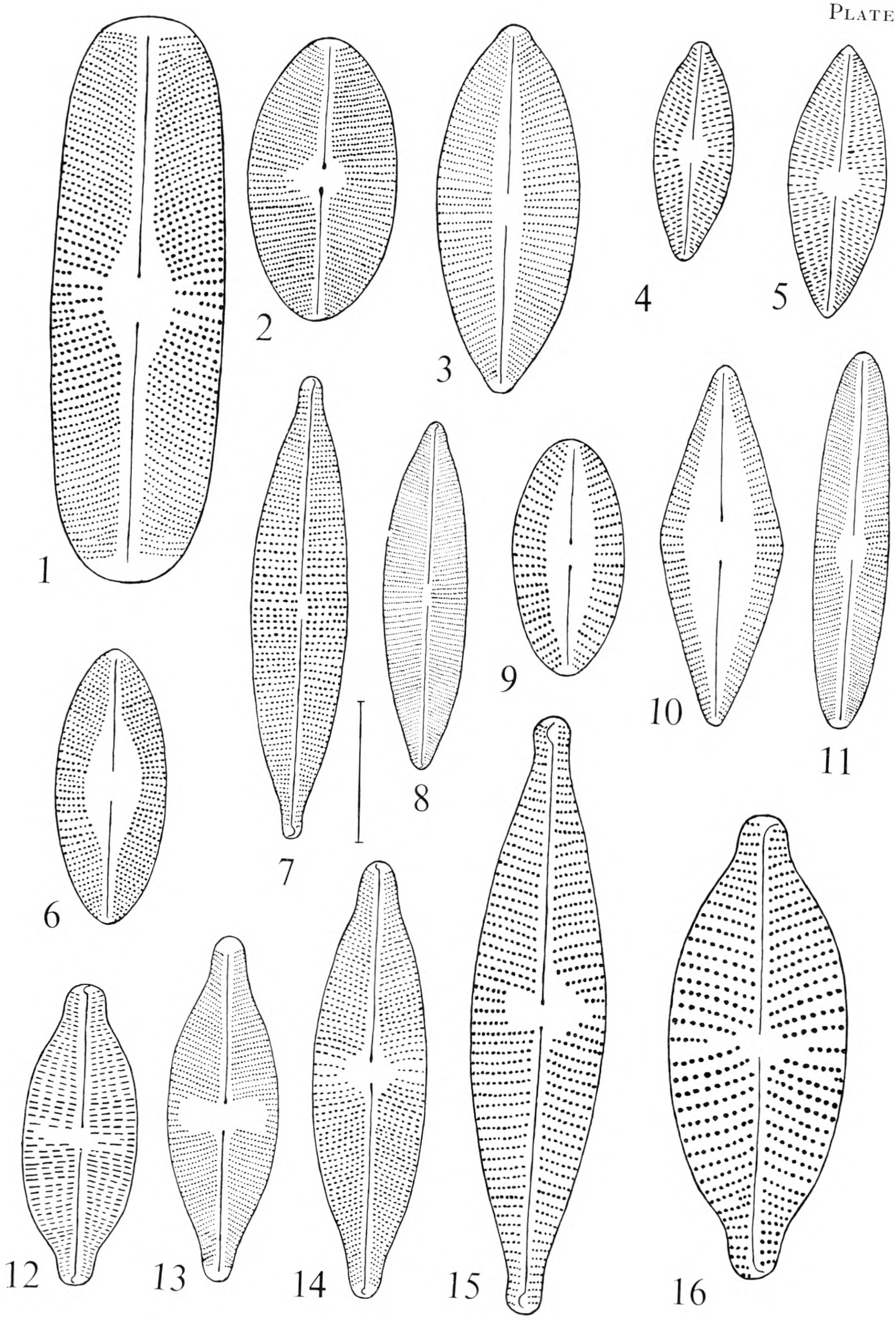
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Plate XIII.

Fig. 1. Navicula omegopsis Hust.
2. — akimensis nov. spec.
3. — densa Hust.
4. — adampeensis nov. spec.
5. — ashantiensis nov. spec.
6. — grundtvigii nov. spec.

Scale 10 μ.

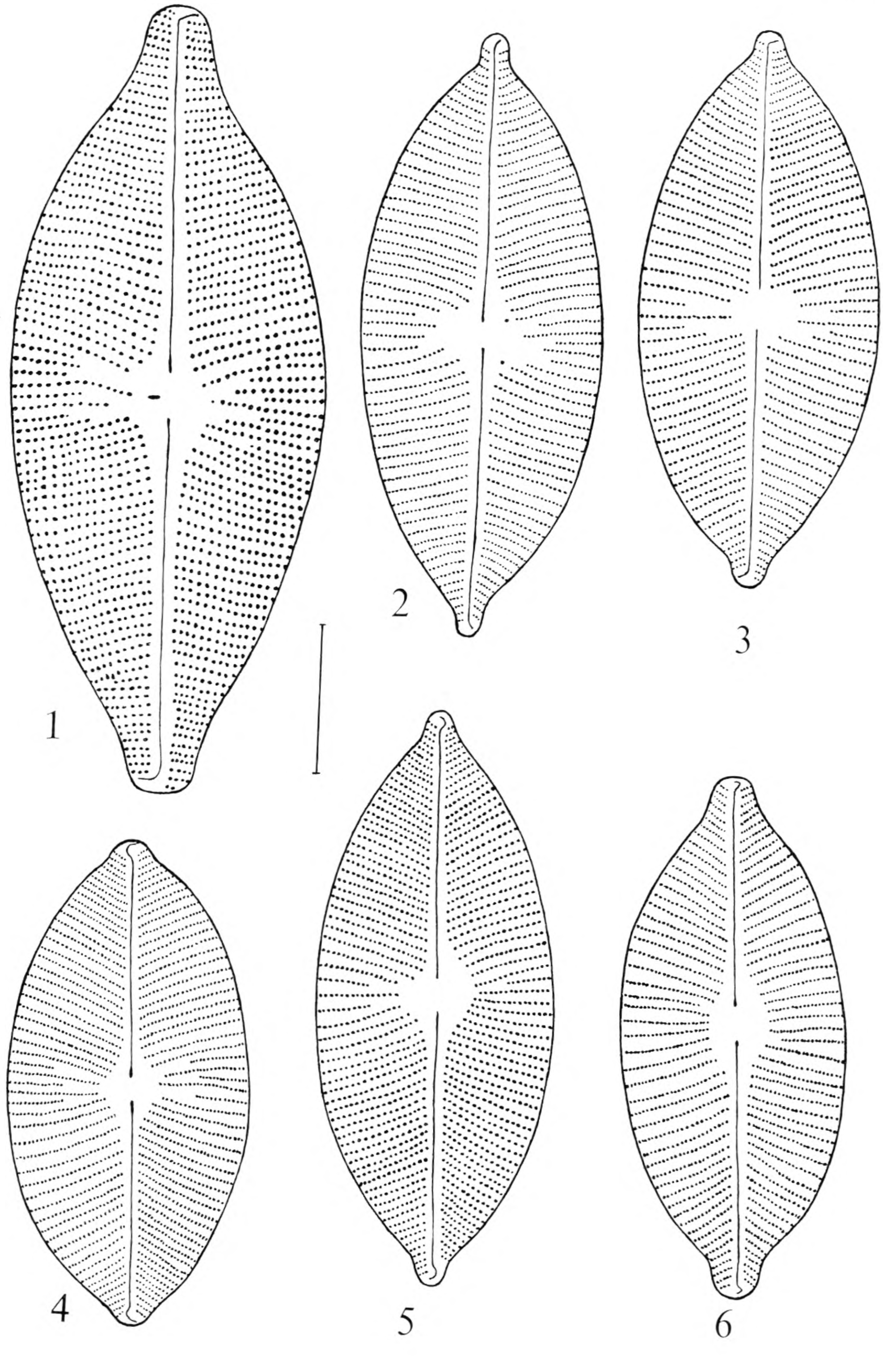
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Plate XIV.

Fig. 1, 2, 3. Navicula quadripartita Hust.
4. — bansoensis nov. spec.
5. — exiguiformis Hust.?.
6, 7, 8. — constans Hust. var. symmetrica Hust.
9. — suhinensis nov. spec.
10. — exigua (Greg.) O. Müller var. signata Hust.
11. — carstensenii nov. spec.
12. — meyeri nov. spec.
13. — exiguiformis Hust.
14. — exiguiformis Hust.?.
15. — asanwinsoensis nov. spec.

Scale 10 μ.

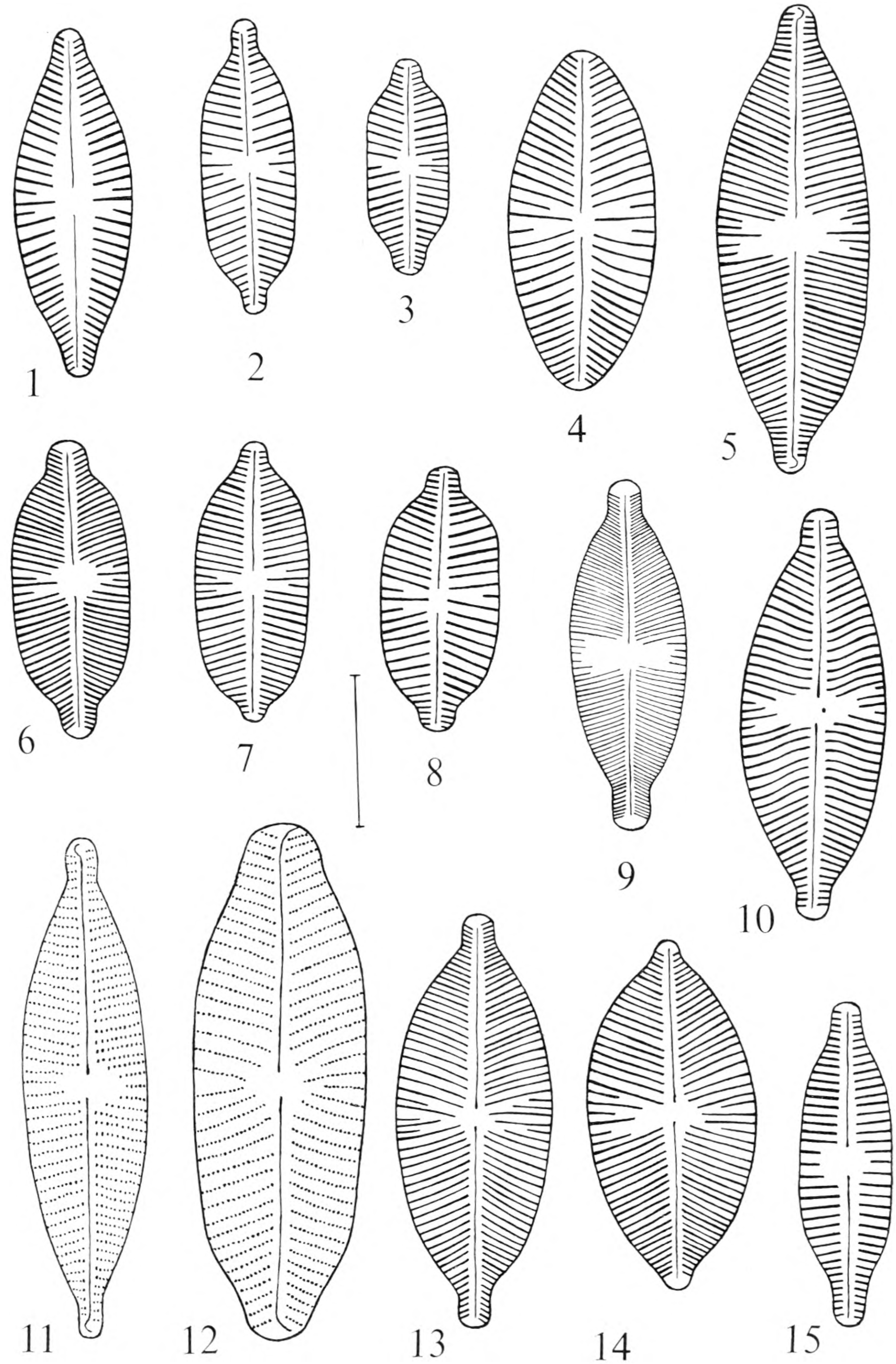
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Plate XV.

Fig. 1. Navicula nagbogensis nov. spec.
2. — zanoni Hust.
3. — manguini Guermeur.
4. — sepasiensis nov. spec.
5. — moerckii nov. spec.
6. — carloffii nov. spec.
7. — dodowaensis nov. spec.
8. — humjibreensis nov. spec.
9. — tainensis nov. spec.
10, 11. — fauta Hust.?.
12. — abraensis nov. spec.
13. — ammophila Grun.
14. — hungarica Grun.
15. — costulata Grun.

Scale 10 μ.

Plate XV.

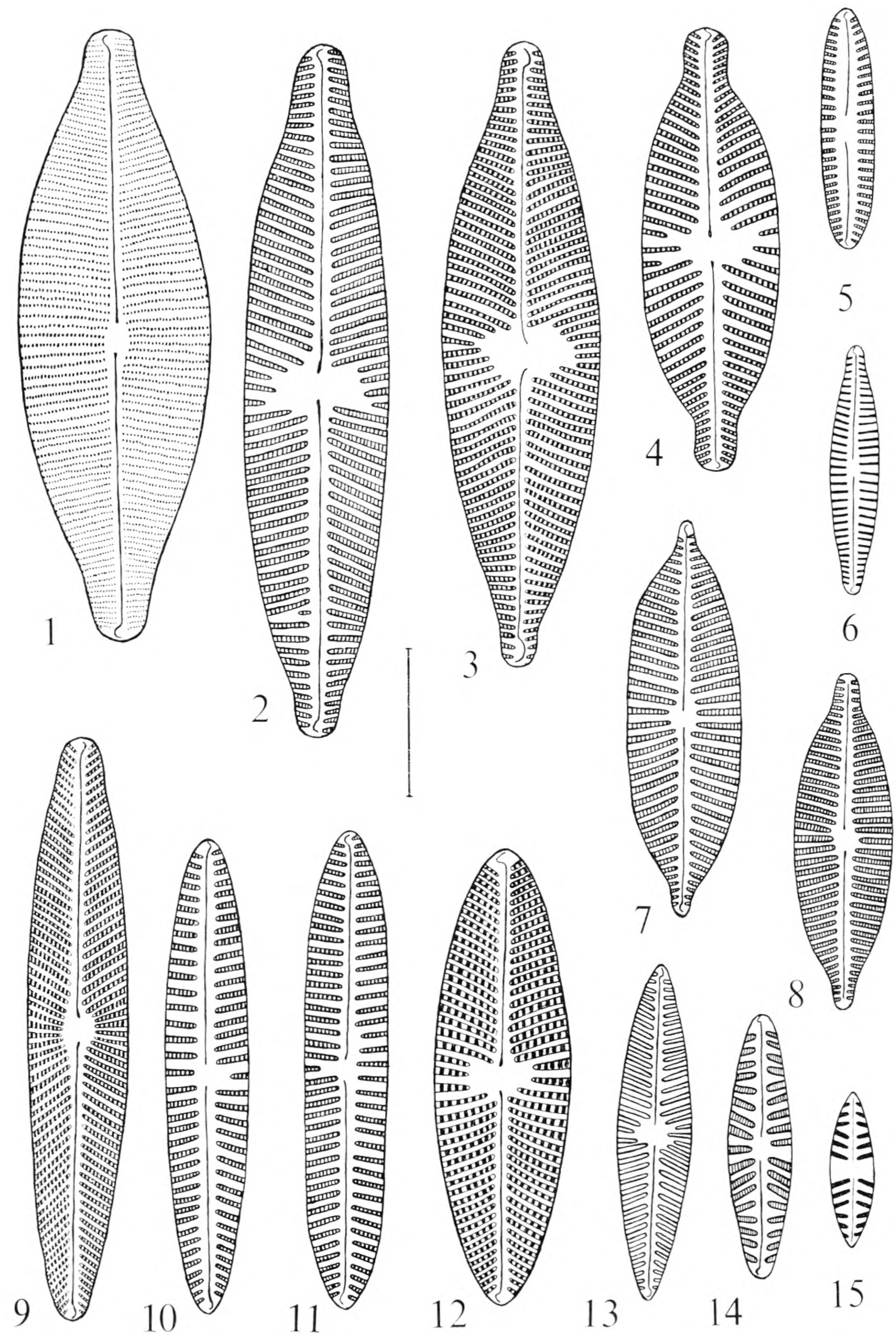

Plate XVI.

Fig. 1.	Navicula feuerborni Hust.
2, 3.	— — fo. africana nov. fo.
4.	— paludosa Hust.
5.	— decussis Østrup.
6.	— pseudolagerstedtii Cholnoky.
7.	— bicephala Hust.
8.	— longicephala Hust.
9.	Pinnularia molaris Grun.
10.	— interrupta W. Smith var. jaculata Manguin.
11, 15.	— braunii (Grun.) Cleve.
12.	— mesolepta (Ehr.) W. Smith. ?
13.	— takoradiensis nov. spec.
14.	— nsuaemensis nov. spec.
16.	— mesolepta (Ehr.) W. Smith.

Scale 10 μ.

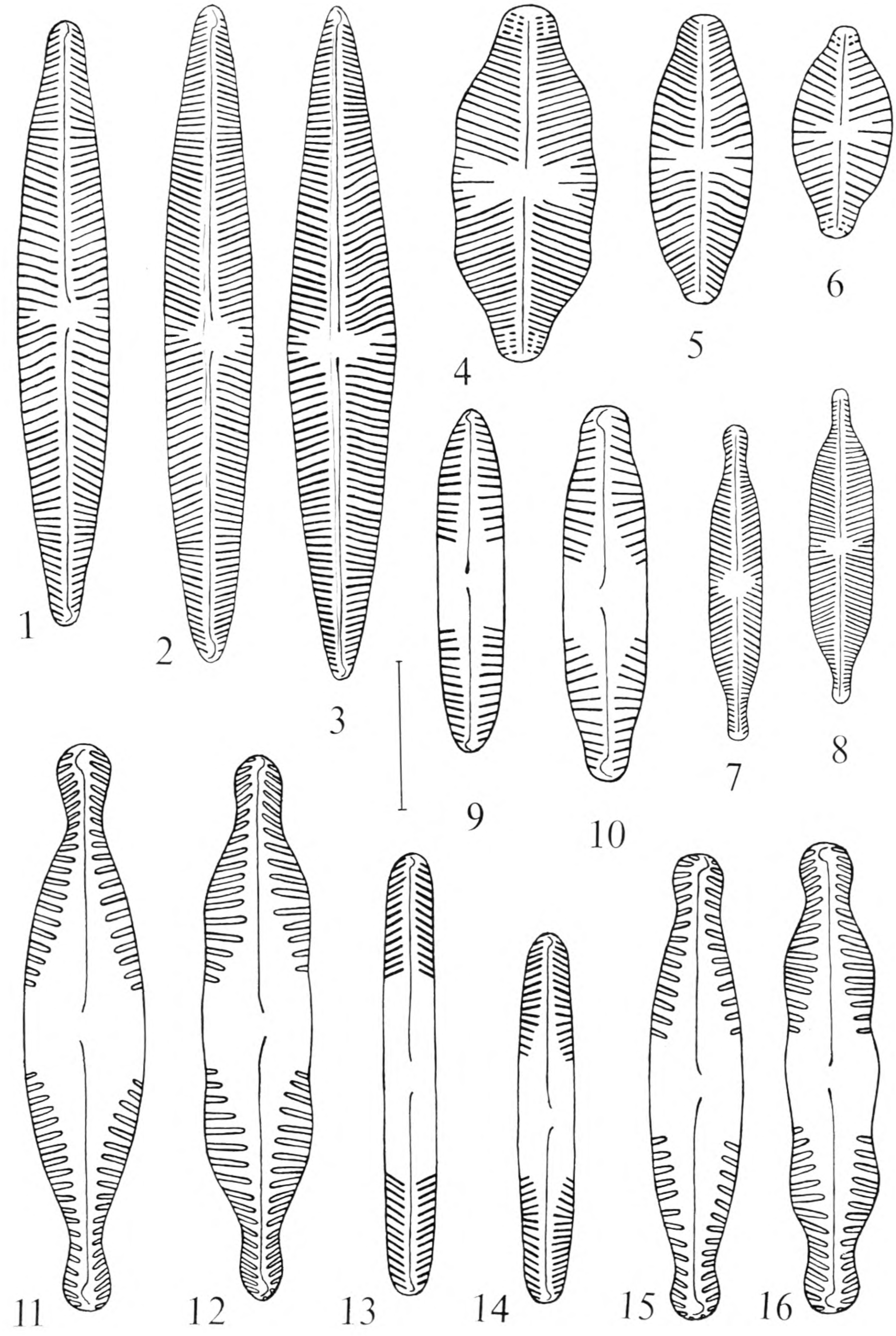
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Plate XVII.

Fig. 1. Pinnularia nunguaensis nov. spec.
2. — — forma.
3. — parva (Greg.) Cleve var. lagerstedtii Cleve fo. interrupta Petersen.
4. Caloneis bosumtwiensis nov. spec.
5. Pinnularia suhinensis nov. spec.
6. — acoricola Hust.?.
7. — agogoensis nov. spec.
8. — odaensis nov. spec.
9. — gibba Ehr. var. sancta Grun.
10. — montana Hust.
11. — acoricola Hust.?.

Scale 10 μ.

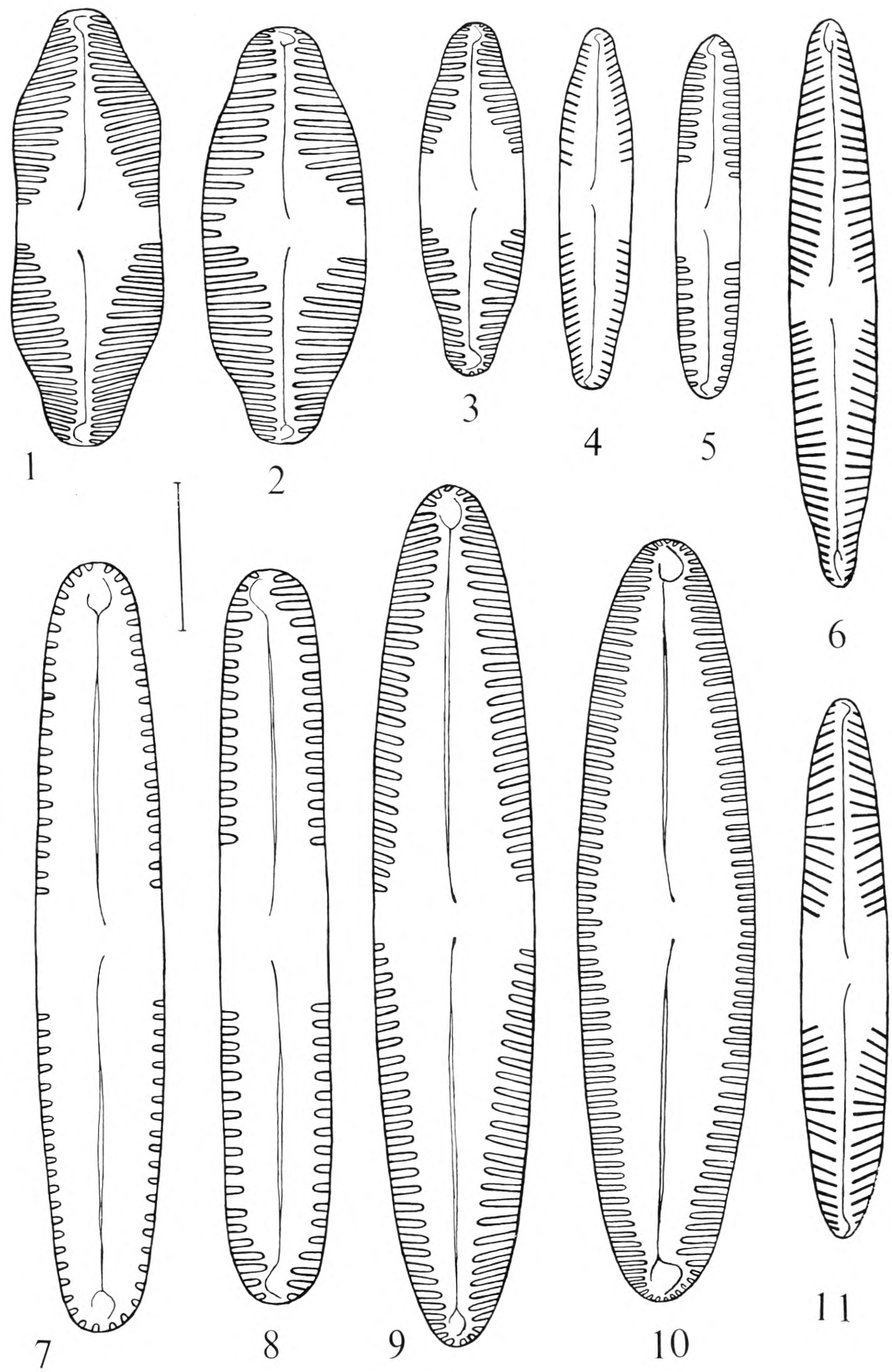
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Plate XVIII.

Fig. 1. Pinnularia polyonca (Bréb.) O. Müller.
2. — gibba Ehr. fo. subundulata Mayer.
3. — lawsonii nov. spec.
4. — otiensis nov. spec.
5. — mansiensis nov. spec.
6. — sp.
7. — obscura Krasske.
8. — dubitabilis Hust.
9. — sp.
10. — mankesimensis nov. spec.
11. — tafoensis nov. spec.

Scale 10 μ.

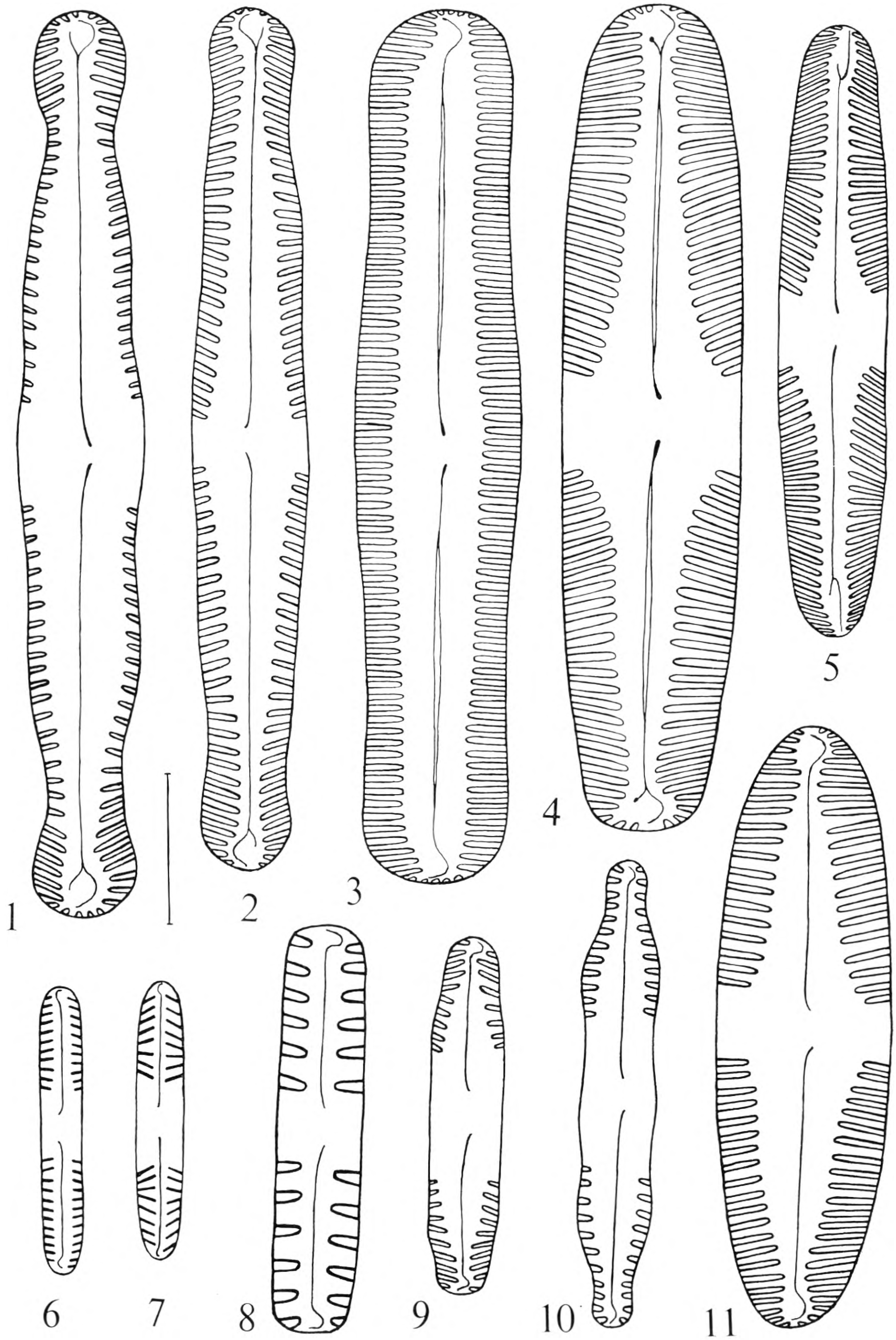
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Plate XIX.

Fig. 1. Pinnularia bogosoensis nov. spec.
2. — — forma.
3. — tomentoensis nov. spec.
4. — rivularis Hust.?.
5. — suchlandti Hust.
6. Amphora abuensis nov. spec.
7. — ayensuensis nov. spec.
8. — crameri nov. spec.
9. — luciae Cholnoky.
10. — fontinalis Hust.?.
11. Cymbella ankobraensis nov. spec.

Scale 10 μ.

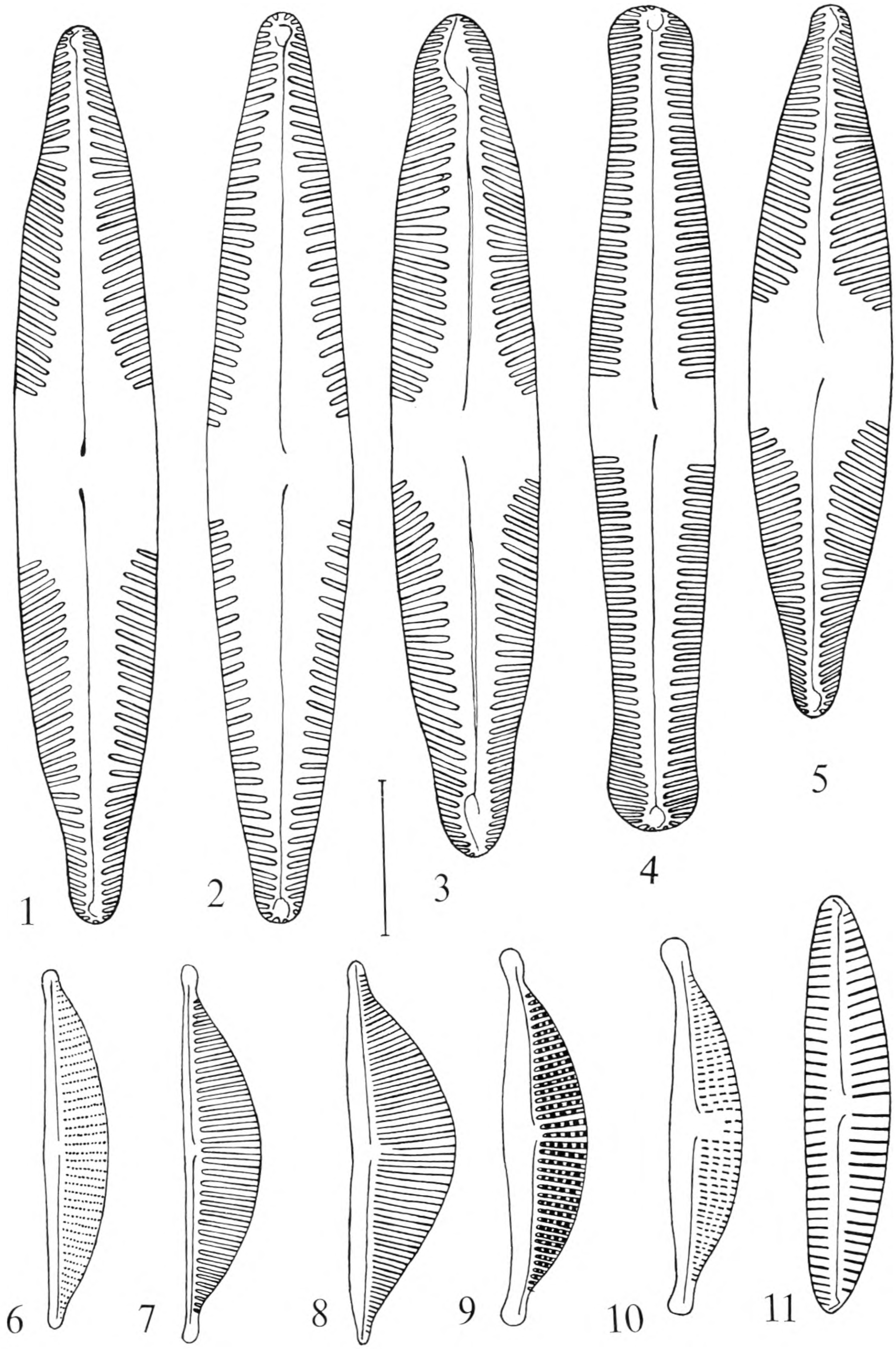
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Plate XX.

Fig. 1. Amphora mansiensis nov. spec.
2. — ovalis Kütz. forma?
3. Cymbella dadwinensis nov. spec.
4. — tainensis nov. spec.
5. — takoradiensis nov. spec.
6. — theronii Cholnoky.
7. Gomphocymbella ruttneri Hust.
8. Cymbella aspera (Ehr.) Cleve var. bengalensis Grun.
9. — moragoensis nov. spec.
10. — raytonensis Cholnoky.
11. — mülleri Hust.

Scales 10 μ.

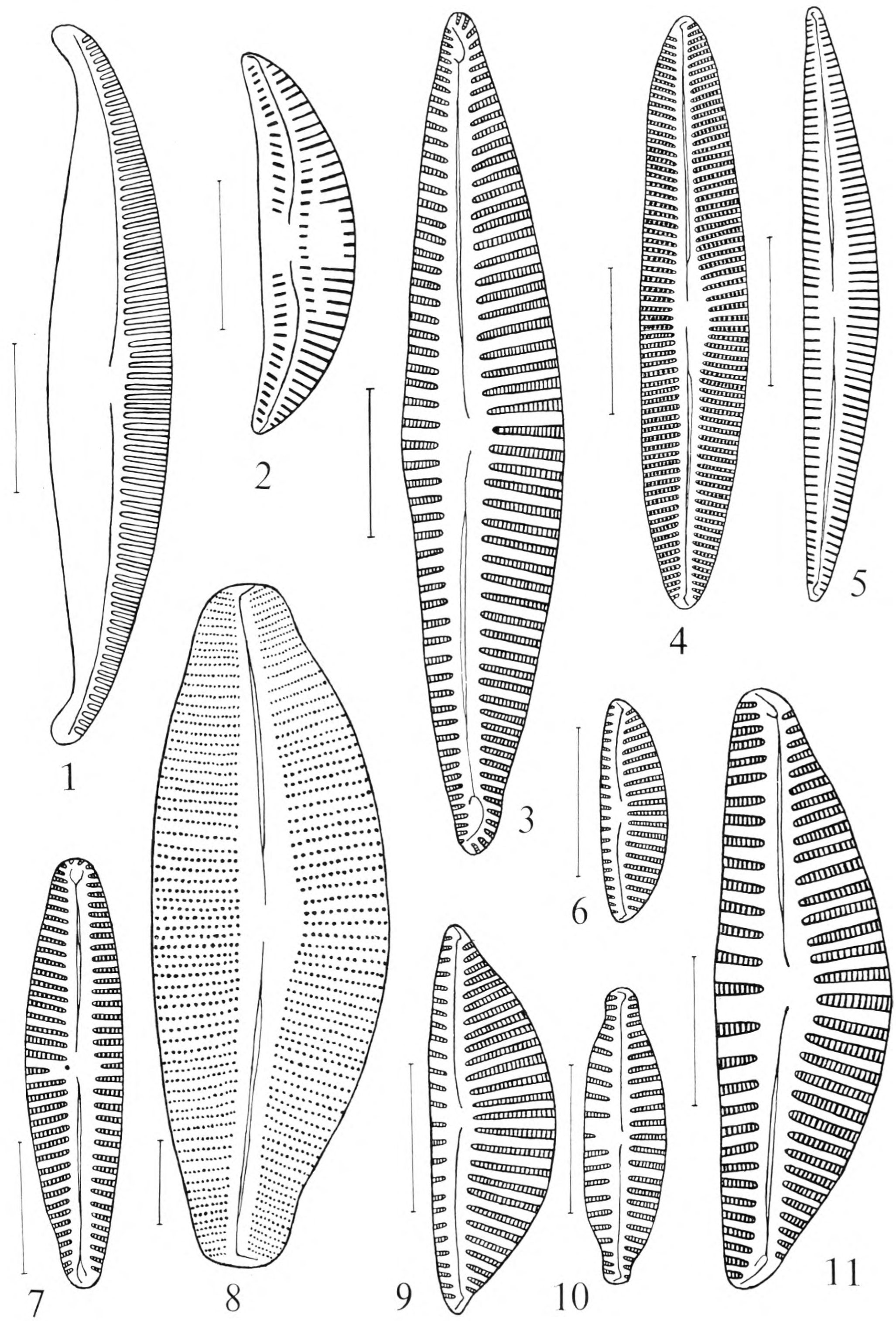
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Plate XXI.

Fig. 1, 2. Gomphonema suhmii nov. spec.
3. — lingulatum Hust.
4, 5. — brasiliense Grun.
6. — africanum G. S. West.
7. — wulasiense nov. spec.
8. — — var. voltaensis nov. var.
9. — — var. nunguaensis nov. var.
10. — farakulumense Foged.
11. — — forma.
12. Nitzschia ovalis Arnott.
13. — ankobraensis nov. spec.
14. Hantzschia amphioxys (Ehr.) Grun. var. africana O. Müller.
15. Nitzschia amisaensis nov. spec.
16. — nunguaensis nov. spec.
17. — mankesimensis nov. spec.

Scales 10 μ.

Plate XXI.

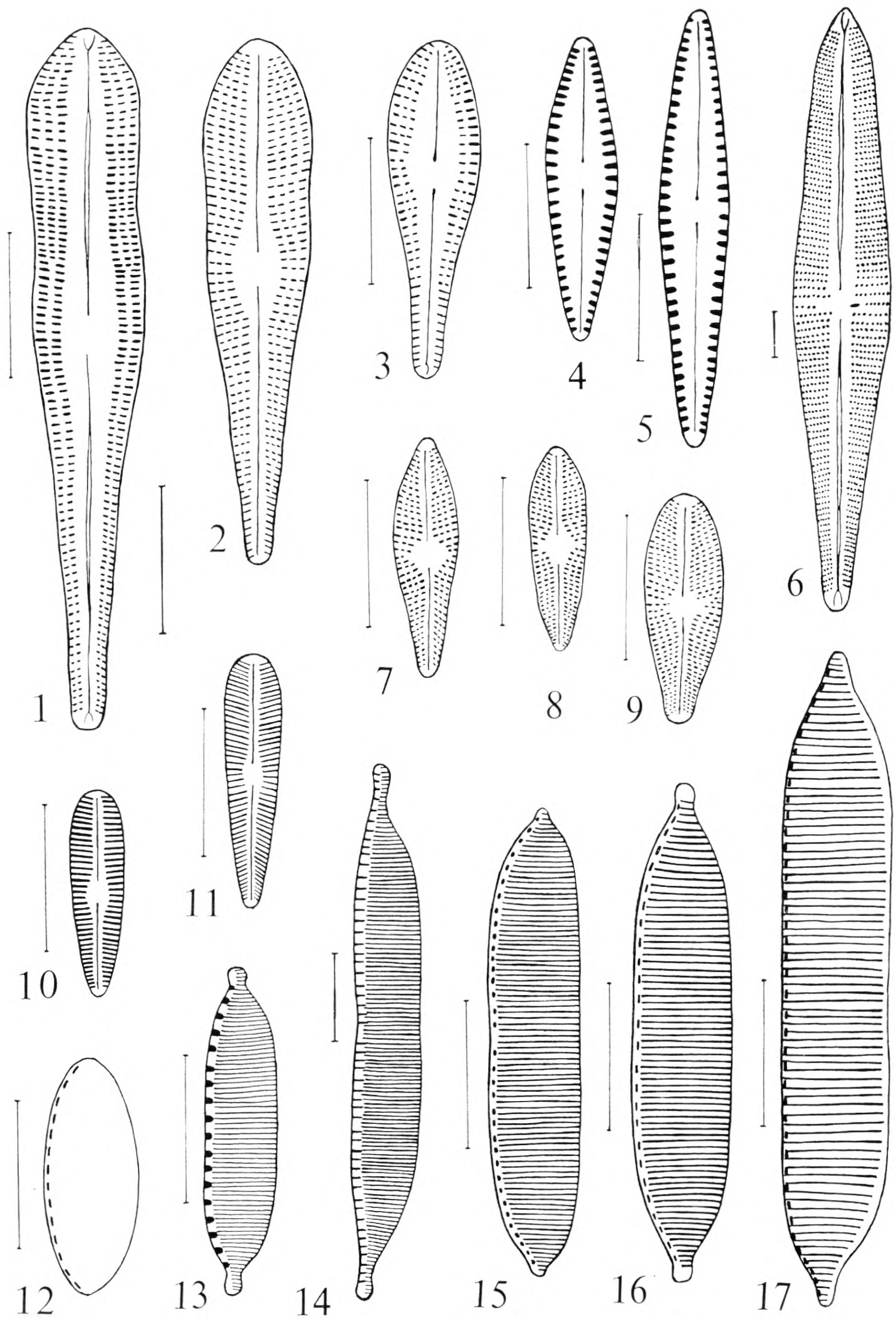

Plate XXII.

Fig. 1. *Nitzschia pretoriensis* Cholnoky.
2. — *aketechiensis* nov. spec.
3. *Hantzschia distincte-punctata* Hust.
4. *Nitzschia bansoensis* nov. spec.
5. — *vedelii* nov. spec.
6. — *nagbogensis* nov. spec.
7. — *abraensis* nov. spec.
8. — *abonuensis* nov. spec.
9. — *schiellerupii* nov. spec.
10. — *mamataensis* nov. spec.
11. — *voltaensis* nov. spec.
12. — *syrachii* nov. spec.
13. — *lawsonii* nov. spec.
14. — *svedstrupii* nov. spec.

Scales 10 μ.

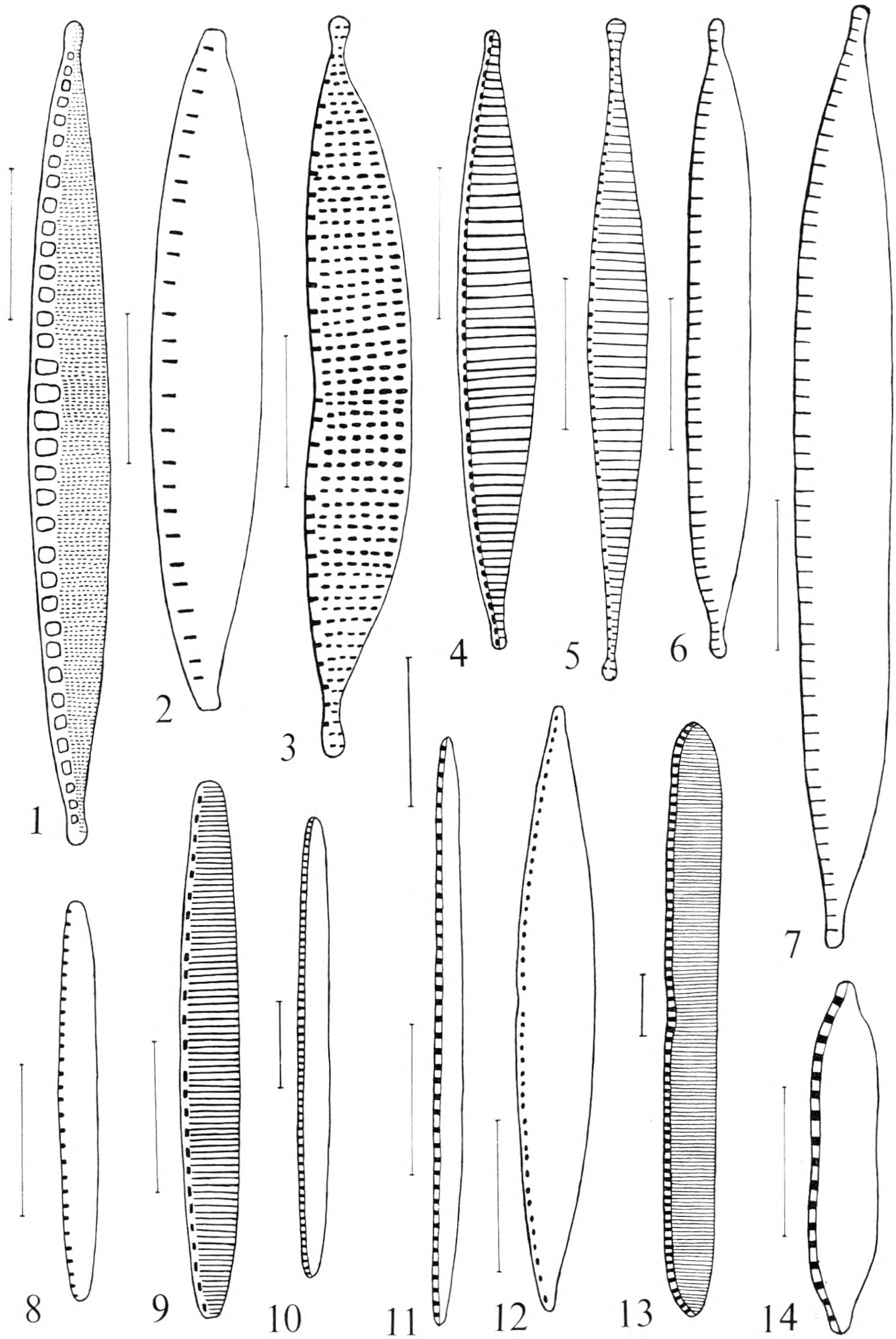
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Plate XXIII.

Fig. 1. Nitzschia tarda Hust.
2. — subvitrea Hust. var. capensis Cholnoky.
3. — plicatula Hust.
4. — sansomei nov. spec.
5. — tonoensis nov. spec.
6. — navrongensis nov. spec.
7. — spiculoides Hust.?.
8. — palea (Kütz.) W. Smith.
9. — obsidialis Hust.
10. — dadwinensis nov. spec.
11. — palea (Kütz.) W. Smith fo. dubia Manguin
12. — paleaeformis Hust.
13. — bosumtwiensis nov. spec.
14. — tainensis nov. spec.

Scales 10 μ.

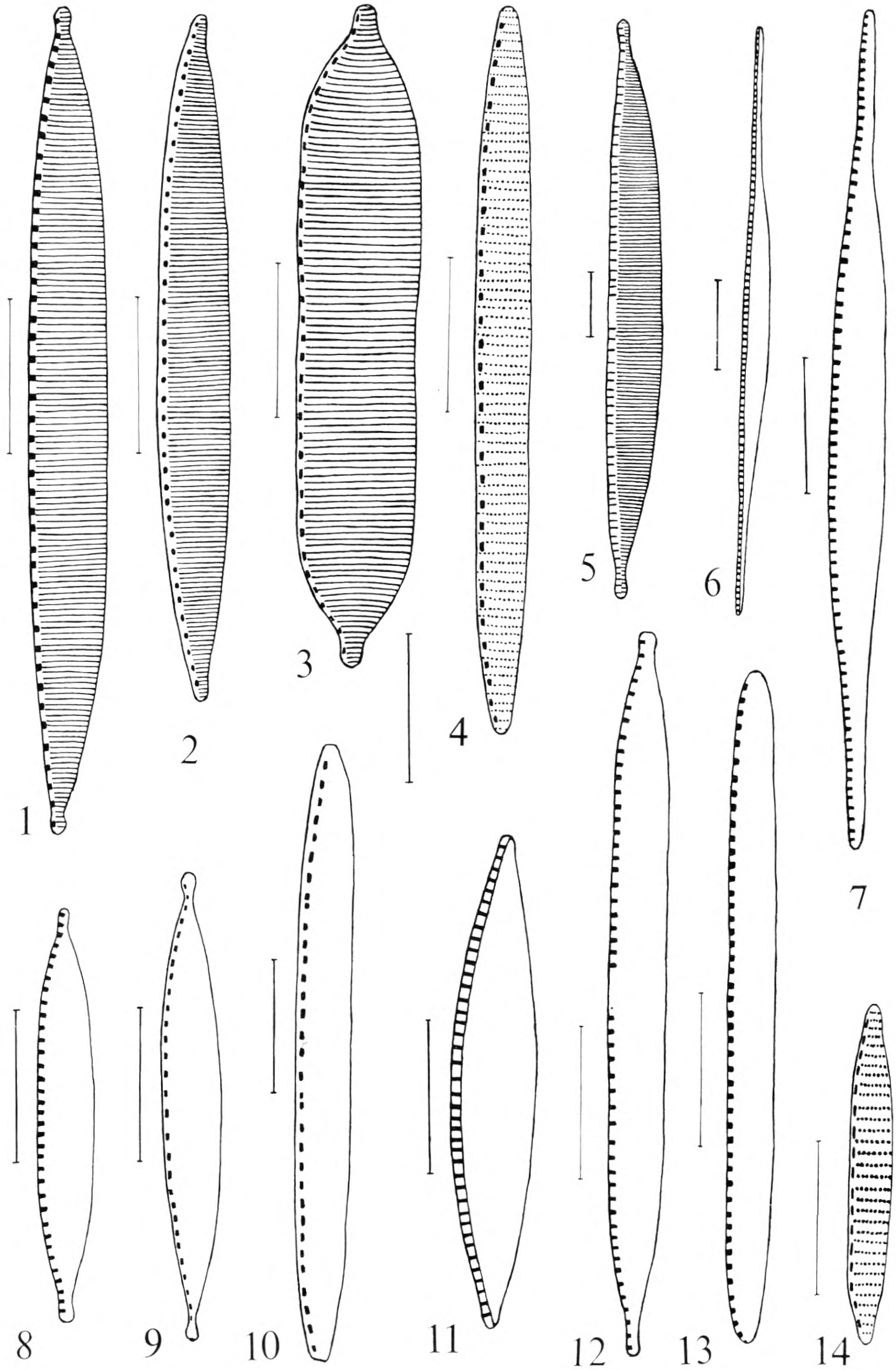

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Plate XXIV.

Fig. 1. Nitzschia krachiensis nov. spec.
2. — adiembraensis nov. spec.
3, 4. — obtusa W. Smith var. scalpelliformis Grun.
5. — ignorata Krasske.
6. — lorenziana Grun. var. subtilis Grun.
7. — apowaensis nov. spec.
8. — chuchiligaensis nov. spec.
9. — densuensis nov. spec.
10. — irresoluta Hust. fo. minor nov. fo.
11. — towutensis Hust.
12. — ofinensis nov. spec.
13. — apropongensis nov. spec.
14. — closterium (Ehr.) W. Smith.
15. — ghanaensis nov. spec.
16. — sakaensis nov. spec.
17. — huniensis nov. spec.

Scales 10 μ.

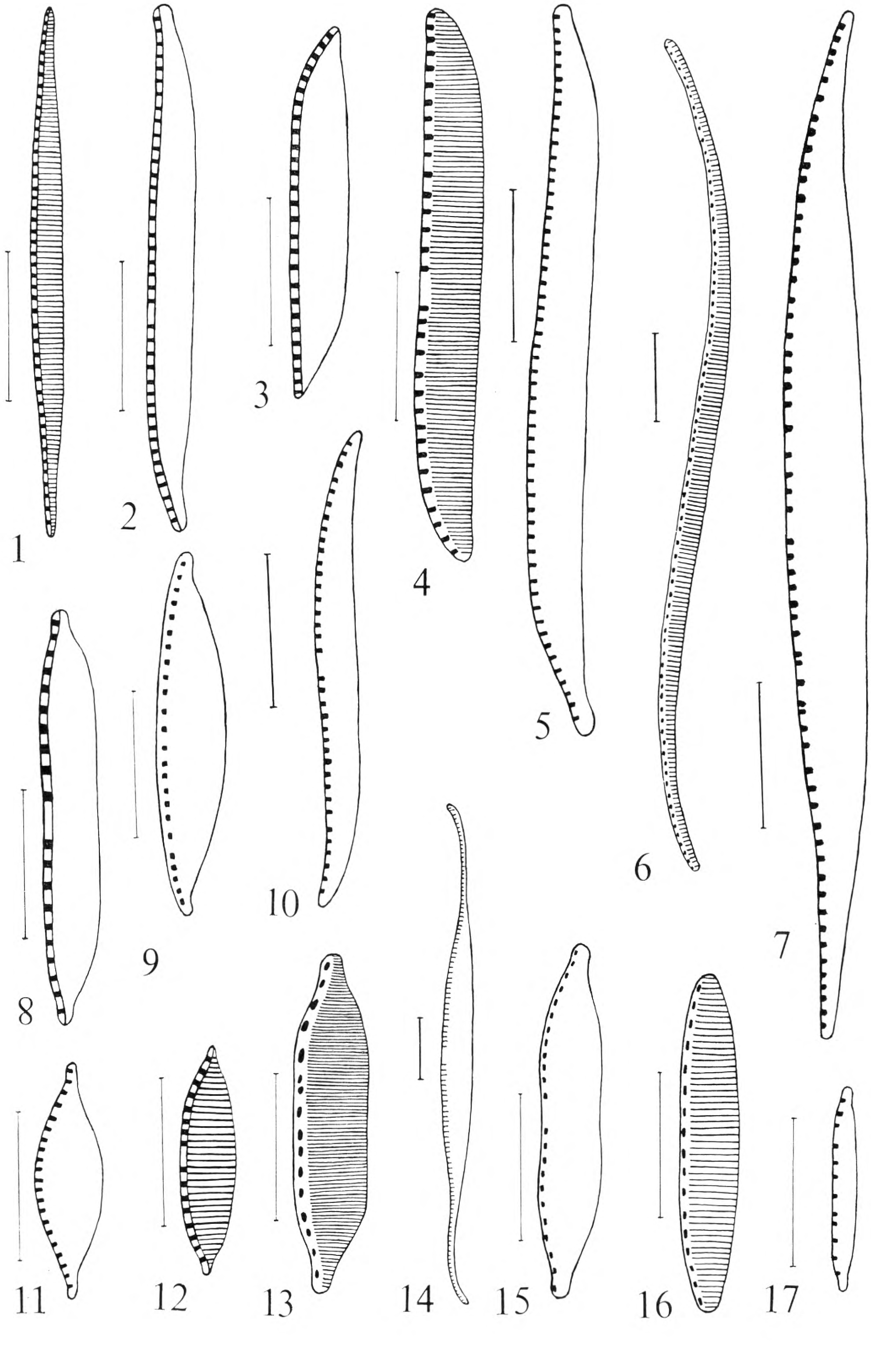
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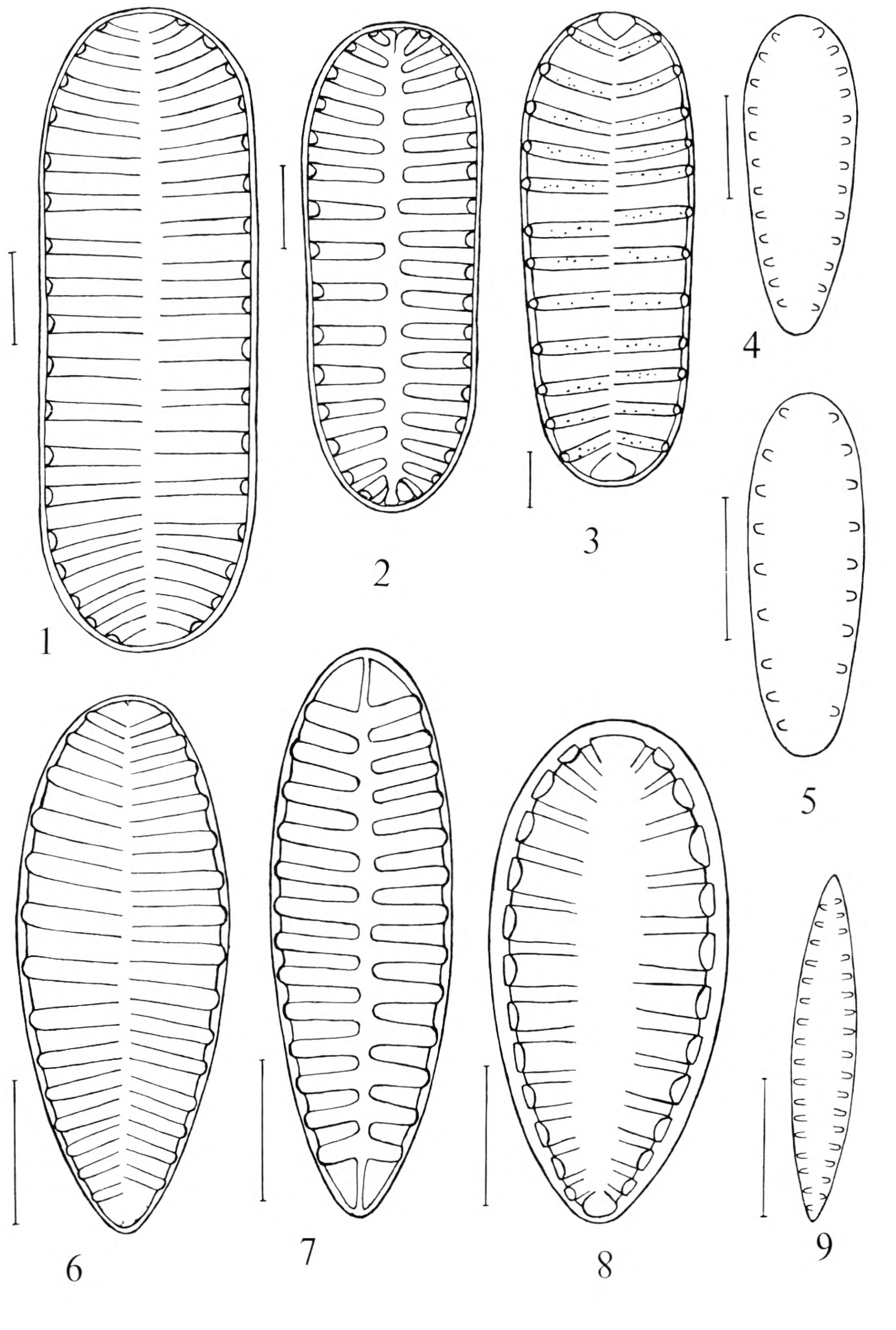
Plate XXV.

Fig. 1. Surirella bonsaensis nov. spec.
2. — esamangensis nov. spec.
3. — agonaensis nov. spec.
4. — takoradiensis nov. spec.
5. — — var. suhinensis nov. spec.
6. — dodowaensis nov. spec.
7. — nagbogensis nov. spec.
8. — sorriensis nov. spec.
9. — delicatissima Lewis var. ghanaensis nov. var.

Scales 10 μ.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INVESTIGATIONS ON THE ORIBATID FAUNA OF NEW ZEALAND

PART I

BY

MARIE HAMMER

København 1966
Kommissionær: Munksgaard

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CONTENTS

Synopsis

The present paper constitutes the first part of a publication of my investigations into the oribatid fauna of New Zealand. 19,000 individuals have been collected from all over the country, evenly distributed, and 130 species have been mentioned, mainly non-pteromorphous species. *Oppia* sensu lato, however, because of its great wealth of species also in New Zealand, has not been included. A small number of pteromorphous genera represented by few species have been described. The occurrence of the species in New Zealand and their biotopes have been briefly mentioned. The 130 species mentioned constitute just under half of those found. The purpose of the investigations is a comparison between the oribatid faunas of New Zealand and South America, which in many respects seem closely related. However, this fact will only be particularly illustrated in the third part, as this can only be done on the basis of a completed description of all the species.

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Preface

In 1960 Colonel J. Stagaard during a stay in New Zealand collected some oribatids for me. Among the about 50 species collected there was a number known to me from South America, and some which were known from the Pacific area. This made me interested in a closer study of the oribatid fauna of New Zealand for the purpose of afterwards making a comparison between the oribatid faunas of South America and New Zealand, as a similarity perhaps might make a contribution in support of Wegener's theory on continental drifts. The Carlsberg Foundation proved to be most obliging and defrayed all expenses for the flight to and the travels in New Zealand. Furthermore the Foundation granted me economic support during the working up of the material collected by me. For this great economic help I want in this place to offer the Carlsberg Foundation my most heartfelt thanks. A month's stay at Honolulu for the purpose of studying the collection of oribatids from the Pacific area found there was rendered possible by a grant from the Danish State Research Foundation, for which I offer my most cordial thanks. The shipping companies of J. Lauritzen and the East Asiatic Company permitted me to send material which I had collected home by the ships of the two companies, for which I am much obliged to both. Furthermore I am indebted to Mr. Niels Haislund, Cand. Mag., for his linguistic revision of my manuscript and to the Rask-Ørsted Foundation for defraying the expenses for this revision.

The present paper is No. 5 in a series of publications on the distribution of oribatids on the southern hemisphere, which have all been given a noble format thanks to the Royal Danish Academy of Sciences and Letters, which undertook the publication, for which I offer the Academy my most cordial thanks. Finally I want to thank the many other persons who have otherwise helped me. First of all I want to thank Colonel J. Stagaard and his family in New Zealand, Ellis and Barbara Stagaard, and the Moulder family, who all showed me the highest degree of hospitality and kindness and took me to the places where I wanted to make collections. The Forest Research Institute at Whakarewarewa, Rotorua, placed at my disposal a comprehensive material of oribatids collected all over the country by Mr. J. Styles, just as New Zealand scientists gave me advice and guidance and took me on excursions. For all the extraordinary hospitality I met with in New Zealand I want to offer my cordial thanks.

Marie Hammer.

Fredensborg, March 1965.

Introduction

As early as 1894 the first oribatid was recorded from New Zealand. This year R. Moniez described *Leiosoma longipilis,* which was found associated with ants.

In 1908 Michael's "Unrecorded Acari from New Zealand" was published, in which the following six species are mentioned:

Oribata Bostocki n. sp. (*Eutegaeus*)
+ *Notaspis spinulosa* n. sp. (*Neotrichozetes*)
+ *Notaspis caudata* n. sp. (*Sellnickia*)
+ *Hermannia phyllophora* n. sp. (*Phyllhermannia*)
+ *Nothrus cophinarius* n. sp. (*Acronothrus*)
Nothrus unguifera n. sp. (?)

The generic names now used are added in parenthesis; the species marked with a + have been found again during the present investigations.

In 1952 Lamb published "A Preliminary List of New Zealand Acarina", which, as regards the oribatids only includes the seven species mentioned above. In 1960 Ramsay described a subfossil oribatid from Hut Valley, and in 1962 the same author wrote a doctor's thesis "The Oribatei of The Brothers, New Zealand" from two small islands, The Brothers, in Cook Strait. This manuscript, which has not been published, deals with the following 25 species, of which Ramsay has given me paratypes of the 23 first mentioned.

– *Acronothrus zealandicus* n. sp.
+ *Arthrodamaeus cryptonotus* n. sp.
+ — *gymnonotus* n. sp.
+ — *sexpilosus* n. sp
– *Phyllhermannia novaezealandiae* n. sp.
+ *Neoliodes nigricans* n. sp.
Oppia novaezealandiae n. sp.
Notobodes brevitarsus n. sp.
Pseudohemileius globosus n. sp.
Liebstadia elongata n. sp.
— *truncata* n. sp.
— *uniova* n. sp.
— *magna* n. sp.
Peleoribates magnisetosis n. sp.
Protoschelobates acetosa n. sp.
Grandjeanobates australis n. sp.
Oribotritia aotearoa n. sp.
Phthiracarus pallidus n. sp.
Hoplophthiracarus australis n. sp.
Notachipteria cuspidata n. sp.
+ *Pelops punctatus* n. sp.
Zealandobates grandis n. sp.
— *parvus* n. sp.
Ceratoppia sexpilosus? n. sp.
Oppia ruakawae n. sp.

As in the present publication I have worked up certain families only, I have consequently not found all the species mentioned by Ramsay by far, but still five out of seven possible. These are marked with a +. The two not found within the families worked up by me are marked with a −.

As Ramsay's manuscript according to the author himself is in need of a revision, and as unfortunately it has not yet been published, I must in what follows confine myself to referring to the list above.

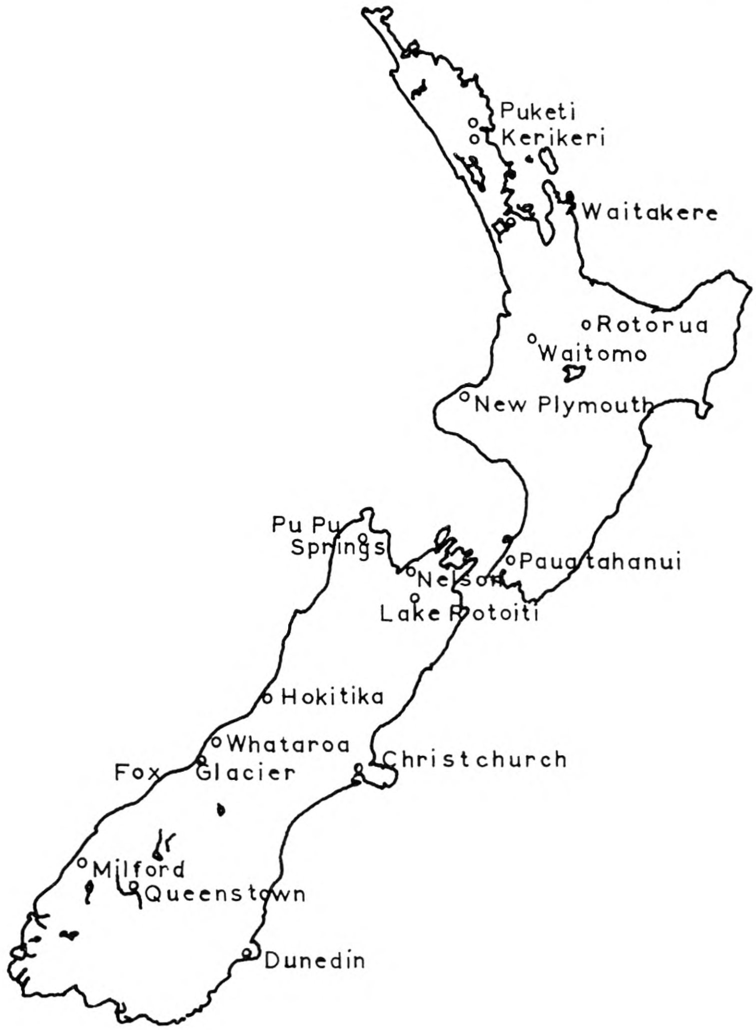
Thus there is still only a number of seven present species of oribatids that have been described from New Zealand. The present material, which includes a total number of about 19,000 individuals, collected in localities distributed on large parts of the country, is so rich in species, perhaps more than 300, that I prefer to divide the publication into two or more parts.

In the present part 130 species have been described which mainly represent species without pteromorphae (wings). However, the very comprehensive genus *Oppia* sensu lato has not been included because of its great richness in species also in New Zealand, which would make Part I too extensive. A few genera represented by few species among the Pterogasterina, are, however, included. The fauna displays an astonishing wealth of forms, which by far exceeds what I have found on the heights of the Andes Mountains. The most divergent forms are apparently found in the dense luxuriant New Zealand forests, whereas the open-country localities seem superficially to remind more of the alpine oribatid fauna of the Andes Mountains. A detailed accounts of the distribution of the species on the various localities is not to be given here, nor will any comparison with the oribatid fauna of South America be made. This will be done later, when all the species found have been described. A brief mention of the localities in which oribatids have been collected is given below.

The localities investigated are indicated from north to south. In connexion with each locality the number of individuals found is stated, as well as the number of samples on an average $^{1}/_{1000}$ sq. m. for the locality in question, but not the number of species, which cannot be stated until the whole material has been worked up.

The North Island:	Individuals	Samples
Puketi (State Forest)...............	218	8: native forest
Keri-Keri..........................	6809	32: scrub, meadow, brook, open country
Waitakere (National Park)..........	966	12: native forest
Rotorua	3907	16: *Manuka* scrub, lake bank, moss
Waitomo	473	13: tree-fern forest, open country
New Plymouth	553	12: native forest
Pauatahanui	470	14: native forest, meadow, etc.
The South Island:		
Pu Pu Springs and Pakawau........	844	9: meadow, *Manuka* scrub, swampy land
Nelson	58	3: lawns, water reservoir
Lake Rotoiti	714	10: *Nothofagus* forest, *Manuka* scrub
Christchurch	142	11: saline meadow, open country, moss
Hokitika	87	4: grass, river bank

The South Island:	Individuals	Samples
Whataroa........................	4	3: meadow
Fox Glacier (National Park)	1472	22: native forest, grass, meadow
Milford (National Park)	1391	25: *Nothofagus* forest
Queenstown.......................	579	10: meadow, lake bank, moss
Dunedin..........................	86	5: penguin's nest, dunes.



It appears from the map above, on which the localities are indicated, that collections have been made fairly evenly all over the country, although certain localities planned had to be left out, partly because of a bus and railway strike, partly because of impassability due to foul weather. On the east coast of the South Island a considerably smaller number of samples were taken than on the west coast. This is connected with climatic conditions. The luxuriant forests on the North Island and along the west coast of the South Island display an infinite number of different biotopes, whereas on the dry eastern side of the South Island it was very difficult to find biotopes with only a little humidity, so that I could already at the collection see that the result must be poor. Indeed, most samples from Christchurch contained no oribatids.

Native forest at West Haven Inlet on the northwest coast of the South Island.

The New Zealand forest (native bush) is extremely exuberant, having a wealth of giant trees (Kauri, Rimu, Totara, Miro, etc.) with an admixture of tree-ferns, lianes, an understorey of numerous species of ferns, all of it with a luxuriant cover of moss, liverworts, and lichens hanging down from trunks and branches. Between the trees there is often water and everywhere the humidity is very great: Puketi, Waitakere, Fox Glacier, and in part Milford. The New Plymouth locality was originally native forest of the same character as the forests mentioned above, but as this forest has been changed into a park with lawns and imported foreign trees, the forest has to some degree changed its character and the humidity seems to be considerably lower. The same applies to the locality Pauatahanui near Wellington, which is a small holiday resort with a remnant of tree-fern forest, meadow, and, amongst other things, a kind of cypress forest. The Waitomo locality represents partly a tree-fern forest in a small, sheltered, narrow valley round the famous caves, partly scattered growth of trees in open country and grass plots, meadow, etc. On the South Island *Nothofagus* is no doubt the commonest tree in the forests, even though there are also tree-ferns and large moss-covered trees (Milford). The Lake Rotoiti locality is also a *Nothofagus* forest, but of a more Northern beech-forest character without the great humidity characteristic of the forest at Milford.

Barren country near Queenstown.

In dry localities we find the "tea tree" or *Manuka* shrub, which will grow to a height of 4–5 metres and has small white flowers. The ground-cover of moss is low and half withered. This biotope is found at Rotorua and around Pu Pu Springs.

Non-forest localities are the following: Keri-Keri, which represents mixed scrub, open country, bog, meadow, and valley with a small brook; Pu Pu Springs with meadow around the spring, farther away *Manuka* scrub; Hokitika with samples from river bank and from grass plots; Whataroa with cattle pen of a meadowy character. At Christchurch some samples were taken partly on dry heights between the town and Lyttelton, partly in salt marshes on the north side of Lake Ellesmere. At Dunedin collections were made in penguin's nests on a high cliff down to the sea, with tussocks of *Phormium tenax*, etc., and on hilly terrain of dunes near the sea. Near Queenstown there are dry, in some places almost desert-like mountains. The forest has been felled to a great extent. In this place collections were especially made on the banks of the large number of lakes and on meadows. At Nelson only a few samples were taken on a lawn and beside the water reservoir of the town.

As the present investigations of the New Zealand oribatid fauna are intended to serve for a comparison with the oribatid fauna of South America, I have found it necessary as far as possible to picture all the species found, also those previously described, rather than only stating the specific name. The difference between the species within a number of genera is so small and the variation in return is often rather wide, so that a figure of each species is necessary. All drawings have been made on the basis of material collected in New Zealand.

List and Descriptions of the Species Found

Nannhermannia acutisetosa n. sp.; fig. 1.
Colour brown. Length about 0.56–0.58 mm.

This species highly reminds of *N. nana* (Nic.), but it deviates in the following characters: the tip of the rostrum protrudes as a short nose. The lamellar hairs, which are very short and bent, are much thinner than the rostral hairs. The interlamellar hairs, which are broad, are much shorter than in *N. nana*, not longer than their mutual distance. The rounded ridge on either side behind the pseudostigmata is smooth without tubercles and the posterior protuberances, which are much like those of *N. nana*, are separated by a long distance, about half as long as the crest. There is no deep furrow issuing from the posterior margin of the propodosoma, only a low impression in the middle of which a few very small pits can be seen. The pits in the middle field of the propodosoma are small and scattered, about five in a transverse row in the anterior part and about three to four in the narrow part in the middle. Pits, but not so distinct, can be seen also laterally to the middle field. The crests behind the pseudostigmata do not reach the anterior margin of the hysterosoma. The hairs of the hysterosoma are broad and the tip very pointed (hence the specific name), fig. 1 a. The sculpture of the femora is not distinct, consisting of low ridges which more or less form an irregular reticulation. The pits of the hysterosoma are round and of different size, the interspaces being usually a little longer than the diameter of the pits.

Puketi: Five specimens in dead leaves; one in moist moss.

Waitomo: Three specimens in dead leaves.

New Plymouth: Numerous in dead leaves and moss.

Pauatahanui: Many in moist moss and grass at the foot of a fern tree.

Nanhermannia tenuicoma n. sp.; fig. 2.
Colour brownish. Length about 0.51 mm.

The rostral hairs are situated on the dorsal side of the rostrum; they are smooth and bent downwards. The lamellar hairs are slightly bent and reach beyond the insertion of the rostral hairs. The interlamellar hairs are the longest. They are situated rather far posteriorly. The pseudostigmatic organs are characteristic by having a distinct clavate almost disk-shaped head set with short papillae. The stalk is smooth and about twice as long as the head. The sculpture of the propodosoma is strong and consists of "scales" arranged in more or less transverse rows. The scales seem to be striated due to a distinct punctuation. Between the scales there are clear round pits. In the posterior part of the propodosoma the transverse rows have been converted into irregular ribs surrounding light holes of different size and shape. The scaly pattern is found everywhere on the propodosoma except on the tip of the rostrum, which is smooth. The crests on the posterior border of the propodosoma have four to five irregular tubercles. Fig. 2a shows the crest from another specimen. The sculpture of the hysterosoma, which consists of deep round pits of different sizes arranged more or less in oblique rows, is found also on the anterior border. The hairs are very thin, especially towards the tip and they are proportionately long. They are directed medially. The hysterosoma, which is very slender, has almost parallel lateral sides. The sculpture of the femora is like that of the propodosoma. This species has much in common with *N. quadridentata* Balogh (1961). It deviates, however, in the shape of the crests, in the sculpture of the propodosoma, and in the very long and thin hairs of the hysterosoma.

Waitakere: One specimen in moist moss and grass in native forest; one individual in moist moss under *Manuka* shrub.

Rotorua: One specimen in moist moss under *Manuka* shrub; one near Mirror Lake in moist moss.

Waitomo: A few specimens in thick moss on a log.

Pu Pu Springs: Many specimens at the edge of the spring in meadow vegetation of moss, grass, water cress, etc.

Lake Rotoiti: A few individuals in thick moss on a log.

Queenstown: Many individuals at Lake Mohe on a small hillock with dense moss in a wet meadow.

Hypochthonius ? *luteus* Oudms.; fig. 3.
Colour light yellow. Length about 0.60 mm.

The two individuals found differ from *H. luteus* in several ways. First of all by having symmetrical fields or spots both on the propodosoma and on the anterior half of the hysterosoma. These fields have a delicate meander pattern. Outside the fields an almost similar meander pattern can be seen, i.e. on the anterior border of the hysterosoma and along the lateral border of the latter. It may be a kind of secretion. The pseudostigmatic organs have 14–16 branches. The hairs of the hysterosoma have a delicate unilateral trim connecting the minute scales of the hair (fig. 3b). In the integument between the two segments there are four small pores, much like hair pores or pores for secretion. The rostrum is serrate, not only at the tip, which is shown in fig. 3a, but also laterally. The shoulder is prominent.

Waitakere: Two specimens in moist moss and grass under shrub on the outskirts of the native forest.

Eniochthonius minutissimus (Berl.); fig. 4.
Colour yellowish-light brown. Length about 0.38 mm.

Keri-Keri: One specimen in a dense green luxurious carpet of low ferns and moss by a brook in deep shadow.

Waitakere: 7 specimens in liverwort and moss on a dead trunk in native forest.

Pu Pu Springs: Two individuals at the edge of the spring in a wet meadow grown with moss, grass, water-cress, etc.

Brachychthonius jugatus Jac. v. *suecica* Forssl.; fig. 5.
Colour white-yellowish. Length about 0.17 mm.

Rotorua: Many specimens in a lawn at Whakarewarewa; one specimen in luxurious moss under *Manuka* shrub in the thermal area.

Brachychthonius novazealandicus n. sp.; fig. 6.
Colour light brown. Length about 0.18 mm.

The rostrum distinctly has a deep incurvation on either side behind the rostral hair, as present also in *B. rostratus* (Jac.) (1936). The rostral hairs are rather long, in *B. rostratus* not discernible. The lateral ridges of the propodosoma are well developed. The lamellar and the interlamellar hairs are short. The pseudostigmatic organs are very long and slender with about 7–8 rows of secondary bristles. In *B. rostratus,* which has a much shorter pseudostigmatic organ, there are only 4–5 rows of secondary bristles. The sculpture both of the propodosoma and the hysterosoma differs from that of *B. rostratus,* although there is some resemblance. The spots in the middle of the hysterosoma are in *B. rostratus* divided into two, and also the lateral sculpture is different, in *B. rostratus* consisting of clusters of oval spots. In *B. novazealandicus* the sculpture of the lateral sides bears a resemblance to *B. berlesei* Willm., which has large spots with many more details. In Segment I there is laterally a semicircular ridge opening medially. This is present also in *B. rostratus.* Segment III differs from all *Brachychthonius* species so far known to me by having laterally on either side a spot in which 6 small holes along its lateral border can be seen. Similar holes can be seen in the three anterior median spots and in the four following pits and irregularly scattered behind the latter. The punctate spots in fig. 6 are different from the sculpture and look more like the light spots in *Liochthonius.* The spots and curves with a double contour are yellow-reddish and are probably at a deeper level, the contours as a contrast more greenish than round the other spots. The hairs of the dorsal surface of the hysterosoma are tiny anteriorly, longer in the middle of the hysterosoma, and short along the posterior border. D 1 is foliate. There is a deep incurvation at the posterior end of the hysterosoma.

Rotorua: One specimen in slightly moist moss on a slope with fern at Mirror Lake.

Fox Glacier: 12 individuals in dead leaves in native moist forest; one in thick moss and dead leaves.

Liochthonius fimbriatissimus (Ham.); fig. 7.
Colour white-yellowish. Length about 0.18 mm.

Lake Rotoiti: 12 specimens in moist moss in *Nothofagus* forest.

Liochthonius altimonticola (Ham.); fig. 8.
Colour pale orange. Length about 0.185 mm.

Waitakere: One specimen in dead leaves.

New Plymouth: One individual in moist *Selaginella* on a trunk.

Lake Rotoiti: Four individuals in thick moss on a rotten log.

Christchurch: 14 specimens in thin moss on a vertical slope, in shadow.

Milford: One specimen in thick moist moss in *Nothofagus* forest.

Liochthonius altus (Ham.); fig. 9.
Colour pale orange. Length about 0.22 mm.

Rotorua: Three specimens in thin layer of moist moss and small ferns under *Manuka* shrub in the thermal area; at Mirror Lake two specimens in moist moss on a slope with ferns and tall trees.

Upper Takaka: Several individuals in moist moss on a slope in *Nothofagus* forest.

Fox Glacier: Three specimens in dead leaves in *Nothofagus* forest.

Milford: Several individuals in dead leaves in *Nothofagus* forest.

Liochthonius idem n. sp.; fig. 10.
Colour pale orange. Length about 0.20 mm.

L. idem is closely related to *L. rigidisetosus* v. *curtus* Ham. (1962 a). The hairs of the dorsal surface of the hysterosoma are, however, shorter, and the distance b 2–b 2 is also shorter. It bears a close resemblance also to *L. scalaris* (Forssl.) (1942), *L. altus* (Ham.) (1958) and several others. It has no special characters characteristic of it. The rostral hairs, which are situated at some distance behind the tip of the rostrum, are almost twice as long as their mutual distance. The lamellar hairs are about two thirds of their mutual distance. The interlamellar hairs are a little more than half as long as their mutual distance. The dorsal surface of the propodosoma slopes from the exopseudostigmatic hairs towards the rostrum at several steps, which is indicated by four rows of transverse lines. The distance between the light spots between the interlamellar hairs is a little longer than the width of the spots. The latter are of approximately the same width. The pseudostigmatic organ has a short club with outstanding bristles. The hairs of the dorsal surface of the hysterosoma are shaped like peach leaves, but rather thin. A 1 and b 1 are shorter than b 2 and c 2.

The distances b 1–b 1, b 2–b 2, and c 1–c 1 are approximately the same (hence the specific name), a 1–a 1 is longer, c 2–c 2 shorter.

Rotorua: Two specimens in the thermal area (STAGAARD coll.).

Liochthonius saltaensis (Ham.); fig. 11.
Colour white-greyish. Length about 0.20 mm.

Rotorua: Many specimens in a lawn with thick moss at the Forest Research Institute at Whakarewarewa; one specimen at Mirror Lake in moist moss and small ferns on a slope with tall trees.

Cosmochthonius semiareolatus n. sp.; fig. 12.
Colour yellowish. Length about 0.285 mm.

C. semiareolatus has so much in common with *C. plumatus* Berl. and *C. lanatus* (Mich.) that it is sufficient to mention the differences. *C. lanatus* is reticulate on the dorsal surface of the hysterosoma. In *C. plumatus* the sculpture consists of irregular small points, whereas *C. semiareolatus* is covered with big round pits, which are especially regular on the posterior part of the hysterosoma. The pits are here larger than the interspaces. On Segment I the pits are of different sizes. On Segments II–III they are missing (hence the specific name). On the posterior part of the propodosoma there are some very big pits, which are not completely symmetrically arranged. In the middle of the propodosoma there are small pits. The rostrum is converted into a lace of narrow longitudinal holes, behind which about eight broad pits in two transverse rows can be seen. The rostral hairs, which are thick brushes, are situated on the tip of a lateral ridge. The lamellar, the interlamellar, and the exopseudostigmatic hairs have apparently branched secondary hairs situated in circles along the bifurcate stem. The hairs of the hysterosoma are much broader than in *C. lanatus* and *C. plumatus*. Those of Segment III are almost as broad as their mutual distance. The hairs are also much longer than in the two other species. F 1 and f 2 reach by one third beyond the posterior border of the hysterosoma. In *C. plumatus* the long hairs of Segment IV have alternately long barbs and much shorter ones. In *C. semiareolatus* all the barbs are of the same length apart from being evenly shorter towards the tip of the hair. The hairs along the posterior border of the hysterosoma are bushy. From the ventral side a spine-like projection protrudes below the shoulder region. This may be due to slight pressure from the cover glass as it can be seen only in one of the two specimens found. Leg I has two claws, a thick one and a thin one. Unfortunately I am unable to see whether Legs II, III, and IV have two or three claws.

Lake Rotoiti: Two specimens in moist-wet moss from a spring in *Nothofagus* forest.

Thrypochthonius excavatus (Willm.); fig. 13.
Colour yellowish-light brown. Length about 0.52 mm.

Keri-Keri: A few specimens in wet moss on a stone in a small stream.

Rotorua: Numerous in wet moss and liverworts on the edge of a pond at Whakarewarewa.

Pauatahanui: One specimen in moist moss and liverworts on a slope in a forest.

Pu Pu Springs: One individual at the edge of the spring in moss, grass, water-cress, etc., moist to wet.

Queenstown: A few in dripping wet moss in a spring at Lake Moke.

Mucronothrus nasalis (Willm.); fig. 14.
Colour light brown. Length about 0.80 mm.

Nelson: Two adults and nine nymphs in wet moss in running water at the water reservoir of the town.

Pu Pu Springs: Two adults at the edge of the spring in wet moss, grass, and water-cress.

Lake Rotoiti: One adult and several nymphs in dripping wet moss in an oozing spring locality in *Nothofagus* forest.

Queenstown: Numerous in soaked moss from a spring at Lake Moke.

Milford: A few in soaked moss from a mountain side with oozing water, in *Nothofagus* forest; many individuals in dripping wet moss taken from a stone in an icy brook in the *Nothofagus* forest.

Fossonothrus novaezealandiae n. sp.; fig. 15.
Colour light brown. Length about 0.72 mm.

The anterior lateral projection in front of Leg I is not so pronounced as in *F. latus* Ham. (1962a, Plate III, fig. 11) and the posterior projection is broader, not so pointed. The rostral hairs, which are situated on the ventral border of the rostrum, are very thin, clear, smooth, and bent dorsally. The lamellar hairs are also very thin, clear, and longer than their mutual distance, which is approximately the same as that of the rostral hairs. The lamellar ridges are anteriorly strongly bent, forming almost a semicircle before they in a curve run backwards towards the exopseudo-stigmatic hairs. The interlamellar hairs, which also are extremely thin, are longer than half their mutual distance. Round their base there is a broad chitinous ring. The exopseudostigmatic hair is situated laterally to this ring and surrounded by another ring so that both seem to be situated in a plate common to them. The middle of the propodosoma is densely punctate. A faint keel can be seen on either side running from the base of the lamellar hair obliquely medially and backwards, meeting in the middle at some distance behind the lamellar hairs. Similar keels go from the base of the lamellar hairs in a curve backwards and laterally to the interlamellar hairs. The field within these keels is of greyish colour due to the dense punctation. The hysterosoma has a straight anterior border, undulating lateral sides and the posterior end is rounded apart from an incurvation on either side behind h 2. The two medial longitudinal ridges are straight and reach anteriorly almost the anterior border of the hysterosoma. At their posterior end there is no transverse ridge connecting them as in *F. latus*. The integument within the longitudinal ridges is whitish and completely smooth. Laterally to the middle field the integument is a little yellowish, becoming darker towards the lateral sides of the hysterosoma, where it is punctate. The hairs, which are situated as shown in fig. 15, are clear and very thin, especially towards the tip, which is often broken off. Some of the hairs are missing in the only specimen found. The fissure ia is situated between c 1 and c 2, in *Trimalaconothrus* between c 2 and c 3. The ventral side agrees with the description given for *F. latus* except that the epimeric formula is: 3:1:3:3(?) and that the posterior border of Epimere IV is a little less convex than in *F. latus*. The oblique lines laterally to the genital field in *F. latus* cannot be seen. The tarsi have three claws, the middlemost one of which is the strongest and the shortest.

Keri-Keri: One specimen in wet moss taken from a flat stone in a brook, in deep shadow.

Trimalaconothrus opisthoseta n. sp.; fig. 16.

Colour yellowish-light brown. Length about 0.51 mm.

The propodosoma is much narrower than the hysterosoma. The rostrum is highly arched and the rostral hairs, which are situated on short apophyses, are situated on the dorsal side rather far posteriorly, immediately in front of the anterior end of the lamellar ridges. The rostral hairs, which are thin, smooth, and curved, reach only a short distance beyond the tip of the rostrum. The lamellar ridges are slightly undulating and run for a long distance close to the lateral side of the propodosoma. Immediately behind the rostral hairs they bend at right angles medially, but do not meet in the middle. The lateral projection between Leg I and Leg II is very broad and the propodosoma is here twice as broad as off the lamellar hairs. The latter, which are smooth, thin, and shorter than their mutual distance, are without any connection with the lamellar ridges. The interlamellar hairs are almost as long as their mutual distance, thin and smooth. The exopseudostigmatic hairs are rather long. The cerotegument of the propodosoma is densely punctate. Beneath it some light spots can be seen, i.e. laterally to the lamellar hairs, along the lamellar ridges, and between the interlamellar hairs. The hysterosoma has almost parallel lateral sides and a slightly arched anterior border. The posterior end is rounded with a faint incurvation behind h 2. The hairs of the dorsal side of the hysterosoma are thin, smooth and of very different length, c 1, d 1 and e 1 being especially long. The distances c 1–c 1, d 1–d 1, and e 1–e 1 are approximately the same. C 1–c 2 is twice as long as c 2–c 3. There are no longitudinal ridges. Across the posterior end of the hysterosoma there is a curved ridge, which is most distinct in the middle. The cerotegument consists of rather big, irregular, longish meshes forming a reticulation. Inside the meshes a fine punctation can be seen. The ventral side (see fig. 16a): the anterior "noselike" projections on the mentotectum are short. The lateral hairs of the coxisternae III and IV are very long, the other hairs very short. The genital field is a little shorter than the anal field. There are four pairs of genital hairs, viz. three shorter ones in the anterior half of the plates and a longer one close to the posterior border. The posterior pair is directed forwards. The position near the posterior border has given the species its specific name. Both the anal and the adanal hairs are long.

PS 3 and ps 2 are long and thin, all the hairs are smooth. All tarsi have three claws, the middlemost one of which is by far the strongest.

Waitakere: Three specimens in slightly moist moss in *Manuka* shrub.

Fox Glacier: Two individuals in dead moist leaves and moss in native forest.

Milford: 7 individuals in slightly moist moss and dead leaves in the *Nothofagus* forest.

Trimalaconothrus platyrhinus Ham.; fig. 17.
Colour yellowish-light brown. Length about 0.53 mm.

This species is closely related to *T. opisthoseta* and all possible combinations between the two species were found in the specimens from Milford.

Waitomo: One specimen in thick moss on a log in native forest.

New Plymouth: One individual in moss and grass in a lawn under trees; one specimen in moss on a trunk; four individuals in dead leaves, débris and ferns on swampy ground.

Milford: A few individuals were found in dead *Nothofagus* leaves. One specimen has a short rostrum, short hairs c 1, d 1, and e 1, otherwise like *T. opisthoseta*; another from the same sample has a longer rostrum and short hairs.

Trimalaconothrus oxyrhinus Ham.; fig. 18.
Colour light brown. Length about 0.53 mm.

Fox Glacier: One specimen in moist dead leaves in *Nothofagus* forest at Lake Matheson.

Trimalaconothrus angustirostrum n. sp.; fig. 19.
Colour yellowish-light brown. Length about 0.44 mm.

T. angustirostrum has four pairs of hairs on the genital plates, the posterior one of which is situated close to the posterior border and directed forwards as in *T. opisthoseta, T. platyrhinus,* and *T. oxyrhinus*. It deviates in several characters from the three species just mentioned. The propodosoma is very narrow, tapering towards the tip of the rostrum. The lamellar ridges are almost straight and the lamellar hairs are situated far posteriorly. The hairs of the dorsal surface of the hysterosoma are rather short and taken as a whole situated as in the above-mentioned species. The middle of the hysterosoma is apparently at a higher level than the lateral sides. This is indicated by a thin line. The middle field is light greyish and finely punctate. A short distance from the lateral border there is a longitudinal ridge on which d 2 is situated. It can be seen best in a dorsal view. The posterior end of the hysterosoma measured from the incurvation behind h 2 is rather long and forms a kind of "tail". Behind d 1 there is a curved band of light spots and a few smaller spots between c 1 and d 1. A reticulate cerotegument as found in the above-mentioned species has not been noticed. The ventral side is shown in fig. 19a. All tarsi have three claws, the middle one of which is much stronger than the lateral ones.

Waitakere: Two specimens in thin liverworts on a log in native forest.

Trimalaconothrus longirostrum n. sp.; fig. 20.

Colour greyish-yellowish. Length about 0.48 mm.

The rostrum is unusually long and the rostral hairs, which are situated on the ventral border of a lateral ridges, are thick, short, and do not reach the tip of the rostrum. The projecting rostrum is bordered posteriorly by the lateral ridges just mentioned, which bend medially behind the rostral hairs, but they do not meet in the middle. The lamellar ridges are strongly S-shaped, the anterior ends bending at sharp angles medially and posteriorly to the lamellar hairs. The latter are situated far posteriorly. They are very thin, smooth, and twice as long as their mutual distance, which is shorter than that of the rostral hairs. The interlamellar hairs are at least as long as the lamellar hairs, smooth, but thicker than these. The lateral protuberance between Leg I and Leg II is prominent. The cerotegument of the propodosoma is greyish and finely punctate. Below the cerotegument the skin seems to be finely pitted. The propodosoma and the hysterosoma are approximately equally broad at the transition. The anterior border of the hysterosoma is straight, the lateral borders are slightly convex. The hysterosoma is narrowest anteriorly and has its greatest width across f 2–f 2. The posterior end is rounded. There is a very faint incurvation behind h 2. There are no longitudinal ridges on the hysterosoma. The hairs of the hysterosoma are rather short, thin and smooth, e 2 being the longest. The distance c 1–c 1 is longer than d 1–d 1 and shorter than e 1–e 1. C 1–d 1 is much shorter than d 1–e 1. The cerotegument is smooth or extremely finely punctate. The integument seems to be faintly pitted, but I am not sure. The ventral side, fig. 20a. The mentotectum has very broad anterior projections. The coxisternal hair formula is :2 ?(3):1:3:1 (?). The genital and the anal field are of approximately the same length. The posterior border of the genital field is straight. There are 6 (? 7–8) pairs of genital hairs, the anterior ones being situated at a shorter mutual distance than the posterior ones. The fissure iad is situated medially to a transverse ridge in the anterior part of the anal plates. The adanal hairs are short. Anal hairs have not been noticed. Ps 3 is situated unusually far posteriorly, close to ps 2. All tarsi have three claws the middle one of which is slightly thicker than the lateral ones.

Puketi: One specimen in luxurious moss on a trunk of a *Rimu* tree.

Trimalaconothrus novus (Selln.); fig. 21.

Colour light brown to brown. Length about 0.57 mm.

The specimens differ from *T. novus* in the same way as the specimens from Chile do (Hammer 1962a, p. 19), i.e. in being pitted on the tip of the rostrum. The genital and the anal plates are likewise pitted both in the specimens from Chile and in those from New Zealand.

Queenstown: Two individuals in soaked moss, grass, and low plants in a spring locality at Lake Moke.

Trimalaconothrus crispus Ham.; fig. 22.
Colour light brown. Length about 0.50 mm.

Although the two specimens found in New Zealand differ from the only specimen found in South America I am rather sure they represent the same species. A comparison with *T. crispus* (Hammer, 1962 a, p. 19, Plate III, fig. 9) shows the great resemblance. The specimen from South America is, however, smaller (0.43 mm) and is white. These two characters may perhaps be due to its being a young individual. As the specimens from New Zealand both have stiffened in an oblique position, it has not been possible to give a description of the ventral side.

Keri-Keri: One specimen in moist moss and liverworts on a stone post.

New Plymouth: One specimen in thick moss on a lawn under tall trees.

Trimalaconothrus sacculus n. sp.; fig. 23.
Colour light brown. Length about 0.40 mm.

The propodosoma is narrower than the hysterosoma at the transition. The tip of the rostrum is slightly arched. The anterior half of the propodosoma has almost parallel sides. The projection between Leg I and Leg II is rather pointed at the tip. The rostral hairs, which are situated on the ventral border of the rostrum, are tiny. The lamellar ridges, which are equally broad throughout, make a sharp bend off the interlamellar hairs, then they run in a faint curve forwards and turn off the lamellar hairs at right angles medially to the base of the latter. The lamellar hairs are so thin that they are hardly discernible, and they are shorter than their mutual distance. Also the interlamellar hairs are very thin, especially at the tip. They are smooth and about as long as their mutual distance. The exopseudostigmatic hairs are tiny. Between the lamellar ridges distinct light punctures on a greyish ground can be seen. The hysterosoma has a straight anterior border. The lateral sides are parallel between c 3 and cp. Then the sides diverge as far as to e 2, where the hysterosoma has its greatest width. The posterior end is broad as compared with the narrow anterior end and reminds of a sack. Immediately behind the anterior border there is a faint line, which laterally to c 2 turns at a right angle backwards and proceeds to cp as a ridge. A continuation of this ridge runs as a faint line along the lateral sides of the hysterosoma. The thin longitudinal lines further medially indicate only a slightly different shade of the integument. The hairs of the dorsal side are of different lengths, most of them being very short. Only e 2 and h 2 are moderately long. They are extremely thin and smooth. The distances c 1–c 1 and d 1–d 1 are the same, e 1–e 1 is one and a half times as long. C 1–c 2 is twice to three times longer than c 2–c 3. C 2 and cp are situated on the lateral short ridges. C 3 seems to sit on an apophysis. The integument of the hysterosoma has also small light punctures, which are not so dense as on the propodosoma. The sculpture of the propodosoma and the hysterosoma consists of small almost equally big round luminous spots on a greyish background, the distance between the spots being slightly longer than the diameter of the spots. The ventral side, fig. 23 a. The mentotectum without anterior projections. Coxisternal hair formula:

3:1:3:3, all the hairs are very short. The genital field is a little shorter than the anal field. Its posterior border is straight. Along its border there is a greyish frame, whereas the middle is yellowish and covered with cerotegument of the same structure as on the dorsal side of the mite. There are six short genital hairs, the five anterior ones of which are situated on the anterior half of the plates, the sixth a short distance behind the fifth. The adanal hairs are likewise short. The anal hairs, which can be seen a little behind ad 3 are about half as long as the latter. Ps 3 is no longer than the adanal hairs. Ps 2, which is extremely thin at the tip, is twice to three times longer. The integument behind and along the anal field is finely irregularly striated. All tarsi have three equally strong and very slender claws.

Keri-Keri: One specimen in wet moss on a flat stone in a small stream under tall trees.

Nelson: One individual in wet moss from the water reservoir of the town.

Milford: A few individuals in wet moss on a stone in a brook through the *Nothofagus* forest; one in mosses on the bank of the fjord.

Zeanothrus n. gen.

Zeanothrus is in most characters similar to *Trimalaconothrus*, but it deviates in the following ones: The anterior border of the hysterosoma is distinctly arched and this arch continues backwards behind the latero-anterior border of the hysterosoma. Coxisterni I and II from the two sides are separated by a narrow slit, Coxisternum III not fully separated anteriorly, Coxisternum IV completely separated.

Zeanothrus elegans n. sp.; fig. 24.

Colour white-yellowish. Length about 0.43 mm.

The propodosoma is short as compared with the hysterosoma, and it is much narrower than the latter at the transition. The rostrum, which is slightly arched, is broad. The anterior half of the propodosoma has almost parallel sides; then follows a slight incurvation on either side, after which the sides diverge in front of the interlamellar hairs and finally run more or less parallel to the posterior border. The lamellar ridge covers from above the lateral incurvation, starting laterally to the lamellar hair and running straight to the point where the propodosoma is broadest and then continuing almost to the posterior border of the propodosoma. Anteriorly it seems to merge with the ridge which borders the tip of the rostrum. The rostral hairs are very thin, smooth, and curved. The lamellar hairs are extremely thin and almost as long as their mutual distance. They are situated rather far anteriorly at the same mutual distance as the rostral hairs. The interlamellar hairs, which are almost as long as their mutual distance, are smooth. The exopseudostigmatic hairs are long and very thin. The sculpture of the propodosoma consists of low scaly impressions between which there are small yellow pits. The integument, which is finely punctate, appears greyish. Medially to the lamellar ridges there are some indistinct lines within which there are glandular cells. The lateral sides of the hysterosoma are slightly convex and the posterior end is rounded with a hardly discernible incurvation behind h 2. The anterior border projects as a broad tongue, covering the middle of the posterior part of the propodosoma. Laterally the border of this tongue runs backwards, ending laterally to c 3. The hairs of the dorsal side of the hysterosoma are very thin, curly and smooth. Their length is different. C 2 is very short, those at the posterior end of the hysterosoma are much longer. The distance c 1–c 1 is the same as d 1–d 1. E 1–e 1 is longer. C 1–c 2 is almost twice as long as c 2–c 3. The sculpture consists of low, more or less regular hexagonal depressions, which form a kind of reticulation. This can best be seen in profile. In a dorsal view small yellowish tubercles can be seen, which seem to be situated on the edges of the meshes. They are likewise situated more or less regularly in hexagonal figures. The ventral side, fig. 24 a (as seen through the mite). The mentotectum has no anterior projections, but is divided by an anterior short slit into two broad lobes. The coxisternal ridges bo 2 do not join in the middle, Coxisterna I and II being separated by a longitudinal narrow slit. Coxisternum III from the two sides are separated posteriorly by two convex ridges, which almost touch in the middle. They do not reach the anterior border of Coxisternum III. Coxisternum IV from the two sides are separated by a slit, which is broadest posteriorly. The coxisternal hair formula is: 3:1:3:3. The genital field is considerably longer than the anal field; its posterior border is concave. There are 5(?6) rather long genital hairs, most of them situated in the anterior half of the plates. The anal hairs, which are situated off ad 2, are rather long. The adanal hairs are very long and smooth. Behind and along the posterior end of the anal field the integument is finely irregularly striated. All tarsi have three equally strong claws.

Rotorua: One specimen in dry moss on the ground under *Manuka* shrub in the thermal area; several individuals in thick moist moss also under *Manuka* shrub.

Malaconothrus keriensis n. sp.; fig. 25.

Colour light yellowish brown. Length about 0.48 mm.

The anterior half of the propodosoma is more or less quadrangular with parallel lateral sides and a slightly arched anterior border. The projection between Legs I and II is very broad and the posterior part of the propodosoma is almost twice as broad as the anterior part, but in spite of this, it is narrower than the hysterosoma at the transition. The rostral hairs, which are situated on the dorsal side at some distance from the anterior border, are thick and bushy, curved ventrally and about half as long as their mutual distance. The lamellar hairs, which are situated on short transverse ridges, which are the distal end of the lamellar ridges, reach just beyond the anterior border of the rostrum. They are bent ventrally. The lamellar hairs are smooth and longer than their mutual distance. The lamellar ridges are S-shaped, parallel at their anterior end behind the lamellar hairs and rather broad. The interlamellar hairs and the exopseudostigmatic hairs, which are of the same length, are smooth and considerably shorter than half their mutual distance. The cerotegument of the propodosoma consists of very small grains which appear as a fine greyish punctation. The hysterosoma has parallel lateral sides, a slightly arched anterior border, and a semicircular posterior end with a very faint incurvation behind h 2. A short distance from the lateral side there is a longitudinal undulating broad ridge. The medial longitudinal ridges are very faint, most distinct at their posterior end. The hairs of the dorsal side are rather short, smooth, and very thin at the tip. The distance c 1–c 2 is the same as c 2–c 3. C 1–c 1 is almost one and a half times longer than d 1–d 1. D 1–d 1 and e 1–e 1 are approximately the same and about half of h 1–h 1. The cerotegument is greyish and very finely punctate. The ventral side, fig. 25a. The mentotectum has "noselike" projections anteriorly. The epimeric formula is: 3:1:3:3. The hairs are very rough and pectinate. Some are missing in all the specimens found. The genital plates, which are much longer than the anal plates, have a strongly concave posterior border. There are six pairs of coarse, pectinate genital hairs situated at approximately the same mutual distance except the posterior one, which is situated in the middle between the fifth and the posterior border. The adanal hairs, which are situated in the anterior two thirds of the plates, are very long and pectinate. The anal hairs are very thin. They are situated off ad 2. Ps 2, ps 3, and h 3 are thick and pectinate.

Keri-Keri: 8 specimens at the Keri-Keri fall (STAGAARD coll.).

Malaconothrus zealandicus n. sp.; fig. 26.
Colour light yellowish brown. Length about 0.42 mm.

The propodosoma is almost conical, narrowest anteriorly and broadest off the interlamellar hairs. It is narrower than the hysterosoma at the transition. The projection between Leg I and Leg II is hardly indicated. The rostral hairs, which are situated on the anterior border of the rostrum, which is almost flat, are thin and smooth. The lamellar hairs, which are situated at the same mutual distance as the rostral hairs, are very thin, smooth, and bent backwards. The lamellar ridges do not reach the lateral sides of the propodosoma, but are situated more dorsally. They are very narrow and only slightly bent. The interlamellar hairs, which are almost as long as their mutual distance, are smooth. The exopseudostigmatic hairs are rather strong. The cerotegument is densely punctate. At the transition between the propodosoma and the hysterosoma there is on either side a small angular projection. The anterior border of the hysterosoma is straight, the lateral sides are parallel. The posterior end is rounded with a faint incurvation behind h 2. Along the lateral sides there are rather strong ridges, whereas the medial longitudinal ridges are very faint. Most of the hairs of the dorsal side are moderately long and smooth. At the posterior end of the hysterosoma they are much shorter and thinner, i.e. h 1, h 2, and ps 1. The distance c 1–c 1, d 1–d 1, and e 1–e 1 is approximately the same. The cerotegument is densely and finely punctate. The ventral side, fig. 26a. The mentotectum has no anterior projections. The epimeric formula is: 3:1:3:3(?). Most of the hairs are very short, longest laterally on Epimeres III and IV. The genital and the anal field are of approximately the same length; the border between them is straight. There are four pairs of genital hairs, which are smooth and rather short. The three anterior ones are situated at approximately the same mutual distance, the posterior one at twice that distance from the third one. The adanal hairs are longer than the genital hairs. They are smooth. Ad 1 is longer than ad 2 and ad 3. The anal hairs are almost as long as the adanal hairs. In profile a rounded lobe from the lateral side of the hysterosoma can be seen between Leg III and Leg IV, fig. 26b.

Rotorua: Four specimens in wet moss on a stone in a pond at Whakarewarewa.

Pauatahanui: Several individuals in moist liverworts and moss in the forest.

Nelson: One specimen in wet moss at the water reservoir of the town.

Milford: A few individuals in wet moss on a stone in a brook in the *Nothofagus* forest.

Malaconothrus indifferens n. sp.; fig. 27.

Colour yellowish light brown. Length about 0.50 mm.

The propodosoma is narrower than the hysterosoma at the transition. The anterior part of the propodosoma has slightly curved lateral sides as far as the projection between Leg I and Leg II. The posterior part is very broad. The projection is broad with rounded lateral sides. The rostrum is arched. The rostral hairs are situated on the dorsal side. They are thin, smooth and the tip is bent ventrally. They are a little longer than their mutual distance. The lamellar ridges are bent medially both posteriorly and anteriorly, where they join in a pointed arch. In the middle they are also bent medially, thus forming two broad curves on either side. A narrow ridge runs from the lamellar ridge to the base of the lamellar hair. The latter is thin, smooth and shorter than the distance to the other one. The interlamellar hairs, which are much longer, are thin and smooth. The cerotegument consists of tiny equally large, very small grains, which appear as a coarse, but distinct punctation. The hysterosoma is scutiform with parallel lateral sides, a slightly arched anterior border and a rounded posterior end with barely indicated incurvations behind h 2. The lateral longitudinal ridges are distinct, the medial ridges barely indicated. Across the posterior end there is a ridge. The hairs of the dorsal side are short, smooth, and very thin. The distance c 1–c 1 is slightly longer than d 1–d 1 and e 1–e 1. The cerotegument is extremely finely punctate. The ventral side, fig. 27a. The mentotectum with very short anterior projections. The genital and the anal field are of approximately the same length. The border between them is straight. There are four pairs of rather long and smooth genital hairs. The anal hairs are tiny. The adanal hairs are short and smooth.

Waitomo: One specimen in dead leaves.

Nelson district: Four individuals in a swampy area along the sea at Pakawau.

Queenstown: One specimen in soaked moss on a clay slope in the forest and one in wet moss and grass in a swamp by Lake Moke.

Camisia segnis (Herm.) v. *nova* n. var.; fig. 28.

Colour light brown. Length about 0.75 mm.

The specimens found in New Zealand deviate a little from the figure and description of *C. segnis* (Herm.) by Sellnick and Forsslund (1955). Thus it is a little smaller (*C. segnis* 0.90 mm) and is yellowish light brown (*C. segnis* earth brown).

The interlamellar hairs are very long and reach a good distance beyond the distal end of the lamellar apophyses. The lateral sides of the hysterosoma are not undulating. The two longitudinal ridges on the dorsal side of the hysterosoma are connected anteriorly between d 1–d 1. The posterior border of the hysterosoma is only slightly concave and pn 1 cannot be seen in a dorsal view. K 1 is much longer than pn 3. The epimeric formula is 3:1:3:3. The medial hair of Epimere IV has a bigger hair-pore than the other hairs, which may be due to an apophysis, as described by Sellnick and Forsslund for *C. segnis*. There are nine pairs of genital hairs. The three anal hairs are not situated on the posterior half of the anal plates, but more anteriorly, almost in the middle. An 3 is situated approximately off ad 3, an 1 off ad 2. The distance from the anterior end of the anal plates to an 3 is only a little longer than from an 1 to the posterior end of the anal plates. Pn 1 are situated on the ventral side close behind the transverse posterior end of the anal field. They are bent ventrally. All tarsi have three claws. The specimens from New Zealand agree with those found in South America (Hammer 1958, Plate VII, fig. 30).

Rotorua: A few specimens in the thermal area (Stagaard coll.); one specimen in dry moss in the same locality; one specimen was found on leaves in the understorey in Redwood forest at Whakarewarewa.

Nothrus biciliatus C. L. Koch; fig. 29.
Colour light brown. Length about 0.84 mm.

Keri-Keri: Many individuals in moss on a lawn.

Waitakere: A few specimens in moss and liverworts on a trunk.

Rotorua: A few in moss and grass on a lawn.

Waitomo: One specimen in moss and lichens on a trunk; one in moss and liverworts on the ground.

Nothrus silvestris Nic. var. *anauniensis* Canestrini & Fanzano; fig. 30.
Colour brown. Length about 0.76 mm.

Epimeric formula of the specimen examined is 6(8):5:5:5. Ad 1 is broader than ad 2 and ad 3. Op 1 is broad like the hairs of the dorsal side although shorter, op 2 is an ordinary hair.

Keri-Keri: Five specimens in thin moss and liverworts on the ground.

Novonothrus n. gen.

The tip of the rostrum with a fissure as in *Nothrus*. Behind the tip of the rostrum there is a round hole which seems to be covered dorsally by a thin ?membrane. Behind the rostral hairs there is on either side a light "window", likewise covered by a hyaline cover. Propodosoma with a broad lateral protuberance in front of Leg I. Exopseudostigmatic hairs present. Below the pseudostigmata numerous small glands. The pseudostigmatic organs are long and flagelliform. Epimeres I–IV fused with those from the opposite side. Aggenital hairs absent. The posterior border behind the anal field almost round.

Novonothrus flagellatus n. sp.; fig. 31.

Colour clear brown. Length about 0.92–1.00 mm.

The rostrum is rather narrow with a broad lateral protuberance in front of Leg I. Behind the tip of the rostrum, which is split, there is a big light spot (fig. 31 a), on the posterior border of which there is a curved ridge. On the lateral end of it the rostral hairs are situated. The latter are hyaline, rather broad and smooth. They are a little shorter than their mutual distance. Behind the rostral hairs there is on either side a light field like a window covered dorsally by hyaline integument. The lamellar hairs which have the same appearance and length as the rostral hairs, are situated immediately behind the windows. On the lateral border of the rostrum there are three short hairs(!). The interlamellar hairs are short and broad. The pseudostigmatic organs are very long, flagelliform, and smooth. The exopseudostigmatic hairs are tiny. The sculpture of the propodosoma consists of a distinct reticulation. Between the pseudostigmata there is a broad and deep groove with the same kind of reticulation. The hysterosoma has a slightly curved anterior border, almost parallel lateral sides, which diverge a little towards the posterior third of the hysterosoma, where it is broadest. The posterior end is semicircular though with a slight incurvation off pn 3. The middle of the dorsum is at a higher level than the lateral sides. This is especially distinct in the anterior half indicated by a broken line. The hairs are arranged as shown in fig. 31. All the hairs are of approximately the same length and appearance, i. e. hyaline, broadest at the tip and with a middle rib with side branches; fig. 31 b shows pn 1. Pn 2 are situated in the middle plane. The sculpture consists of dark, more or less round spots arranged in regular rows on a ground of shining gold. At a deeper level the spots seem to be connected mutually, fig. 31 c. At a more superficial level the spots are yellow with a dark dot in the middle, the surroundings are light brown. Fig. 31 d shows the ventral side. The epimeres from the two sides are fused. The epimeric hair formula is 9:5(6):6:5. The lateral sides of the genital plates are faintly chitinized off the light transverse band. There are nine pairs of genital hairs, viz. six along the medial border, one in the middle of the anterior end, and two at the latero-posterior border. Aggenital hairs are absent. The praeanal plate is narrow with parallel sides. The anal plates are rounded at both ends and the medial part seems to be split off by a curved line. There are two pairs of anal hairs. The adanal plates are fused with the aggenital plates, though with a deep incurvation at the transition. There are three pairs of adanal hairs. Op 2 is an ordinary hair, whereas op 1 is clavate like those of the dorsal side of the hysterosoma. The same is the case with pn 3. The margin behind the anal field is round. The sculpture of the ventral side reminds of that on the dorsal side. Fig. 31 e shows the mandible, which besides the two teeth at the tip has four broad teeth and behind them two smaller, but pointed teeth. Fig. 31 f shows the palp and the maxilla (in oblique view). All tarsi have only one claw, which has a tiny but distinct tooth a little above the middle of the dorsal edge.

Puketi: Two specimens in dead leaves and moss on the ground.

Waitakere: Three individuals in liverworts and moss on a dead trunk.

Milford: One individual in dead leaves in the *Nothofagus* forest.

Novonothrus pupuensis n. sp.; fig. 32.
Colour brown. Length about 1.05 mm.

Immediately behind the tip of the rostrum there is a round light spot covered by a hyaline membrane. The fissure in the rostrum does not go all the way through the hyaline cover, only about two thirds. The rostral hairs, which are situated on short apophyses, are broad and bent slightly medially. Behind the rostral hairs there is a light field, which is not so distinct as in the preceding species. The lamellar hairs, which also are situated on short apophyses, sit on the end of two longitudinal low keels stretching from the pseudostigmata to the lamellar hairs. Their mutual distance is longer than that of the rostral hairs. The lamellar hairs resemble the rostral hairs. On the lateral sides of the rostrum there is on either side a crest-shaped protuberance, the anterior border of which forms a short transverse ridge, which is situated a short distance behind the lamellar hairs. The interlamellar hairs are broad and hyaline, and only the middle rib is distinct. The pseudostigmatic organs are thin and slightly serrate, especially in their distal third. They are longer than their mutual distance. Behind the pseudostigmata there is on either side an almost circular spot surrounded on three sides by a low ridge and open medially. These spots are at a deeper level than the surroundings and the integument is here covered with small tubercles, and not reticulated as in the middle of the propodosoma. Between the pseudostigmata there is a deep broad groove with three to four longitudinal rows of round pits. The anterior border of the hysterosoma is almost straight. The hysterosoma is broadest in its posterior third. The posterior end is truncate. The middle of the dorsum is arched. The hairs are arranged as shown in fig. 32. They are broad and hyaline, but with a distinct middle rib. Fig. 32a shows pn 2. K 1 is very long and thin and situated on low apophyses. The sculpture of the hysterosoma consists of round light spots of different size on a brown ground, fig. 32b. Many smaller spots are especially gathered round the hair pores. The ventral side: all epimeres from the two sides are fused. The appearance is almost as shown in fig. 31d for *N. flagellatus*, except that the epimeric formula is 6(5):4:4(3):5, and the position of the genital hairs are different. Of the nine pairs of genital hairs seven are situated along the medial border, one close to the third from the anterior end and one at the latero-posterior border. There is no faintly chitinized band across the genital plates. There are two pairs of anal hairs, three pairs of adanal hairs, and no aggenital hairs. Op 2 is an ordinary hair, op 1 is broad and hyaline, pn 3 probably also hyaline, but as the hairs are clear as glass with a distinct middle rib it is extremely hard to tell whether you see the clear "shadow" or only the middle rib. The epimeres are finely punctate, the ventral plate reticulate. All tarsi have only one claw. There is no tooth on the outer edge of the claw.

Pu Pu Springs: Numerous in soaked moss, grass, and water-cress on the edge of the spring under low *Manuka* shrub.

Heminothrus traversus n. sp.; fig. 33.

Colour dark brown. Length about 1.17 mm.

According to van der Hammen (1959) the species described below belong to the genus *Heminothrus* as they have no longitudinal ridges on the dorsal side of the hysterosoma.

The rostral hairs, which are situated on the lateral sides of the projecting rostrum, are longer than their mutual distance. Behind the tip of the rostrum there is a transverse ridge in front and behind which the integument is distinctly punctate. The lamellar hairs, which are situated on short apophyses on a thin ridge, are almost twice as long as their mutual distance and set with fine rounded secondary bristles. The interlamellar hairs are shorter than their mutual distance and ? smooth. The pseudostigmatic organs are rod-shaped, slightly flattened at the tip and serrate distally. The integument of the propodosoma has deep round pits, and is so coarsely punctate between the pits that the pits seem to be surrounded by a ring of tiny slightly oblique pits. This is especially distinct in the posterior part of the propodosoma. There is no longitudinal groove between the pseudostigmata. Along the posterior border of the propodosoma there are four swellings, the lateral ones being bigger than the medial ones. In front of the latter the surface slopes down towards the middle of the propodosoma. The hysterosoma has a straight anterior margin and evenly curved, tongued lateral sides, and it is broadest across the middle. Across the posterior end, which is pointed, there is a transverse ridge or fold (hence the specific name) connecting the base of pn 2 and continuing laterally to k 1. The posterior end, which thus is cut off from the remaining part, is pointed. The hairs of the dorsal side of the hysterosoma are short, stiff, and smooth. Pn 2 are situated unusually close together. Pn 1, pn 2, pn 3, and k 1 are situated on low apophyses. The sculpture consists of big light punctures irregularly scattered in the middle of the hysterosoma. The ventral side: Epimere I and Epimere II are fused in the middle with those from the opposite side. Epimeres III are in their posterior third separated by a slit. Epimeres IV are completely separated. The epimeric formula is 3:1:3:4. The epimeres are finely punctate and provided with small tubercles along the apodemata. There are 34 pairs of rather long genital hairs. Two pairs of anal hairs and three pairs of adanal hairs. Behind the anal field the ventral plate is drawn out into a tail, the posterior end of which can be seen in a dorsal view. Op 2 is situated at the base of this tail, op 1 laterally to its posterior end. Femora I–II have deep pits. The hairs of the femora are uneven. All tarsi have three equally strong claws. No adhering dirt.

Rotorua: Three individuals in moss and liverworts on a slope at Lake Tarawera.

Waitomo: A few in dead leaves under a hanger.

New Plymouth: A few in moss and grass on a lawn; several in dead leaves on a slope in native forest.

Pauatahanui: Several in dead leaves in a forest of ?cypresses; a few in liverworts and moss in the forest.

Christchurch: Several individuals in low plants on the road-side; several specimens in oozing water on a rock side on the mountain between Christchurch and Lyttelton.

Waitakere: One specimen in moss and grass in native forest.

Heminothrus microclava n. sp.; fig. 34.

Colour dark brown. Length about 0.87 mm.

The protrusion on the rostrum is very low. The rostral hairs, which are situated at the base of the protrusion, are about one and a half times longer than their mutual distance. They are smooth and thinner than the lamellar hairs. The latter are situated on low apophyses, which are connected by a straight ridge, which laterally to the base of the lamellar hairs bends slightly posteriorly. The lamellar hairs, which are almost twice as long as their mutual distance, are barbed and thin at the tip. The interlamellar hairs, which are as long as their mutual distance, are smooth and thin at the tip. They are situated off the posterior border of the pseudostigmata. The latter have a very small opening, which is directed outwards. The pseudostigmatic organs consist of a very thin stalk, which becomes evenly thicker and ends in a tiny clavate head. Laterally on the propodosoma there is on either side a long protuberance in front of Leg I, and in the middle of the propodosoma there is a somewhat elevated middle field separated from the lateral protuberances by a groove. There is no longitudinal groove between the pseudostigmata. The posterior part of the pitted middle field has three low swellings with two low incurvations from the posterior border. The protuberances and the middle of the propodosoma are distinctly pitted. The rostrum and the middle field are densely punctate between the pits. The hysterosoma has a slightly curved anterior border, even lateral sides, and a rounded posterior end. It is broadest across the middle. The hairs are long, smooth, and thin at the tip, which is often turned outwards. C 1 reaches beyond the base of d 1, and d 1 reaches the base of d 2, d 2 the base of e 1. The distance d 2–d 2 is as long as e 1–e 1 and a little longer than d 2–e 1. Pn 2 is bent ventrally. Between the hairs pn 1 there is a ridge. The hairs on the posterior border are situated on low apophyses. The integument is smooth. The ventral side: Epimeres I, II, and III from the two sides are fused, Epimeres IV separated by a very narrow slit. The epimeres, which are very dark, are densely punctate and along the apodemata there are two rows of rounded dark tubercles. It is very difficult to see the hairs of the epimeres; they are extremely small. The genital plates have a transverse faintly chitinized band. There are about 23–24 pairs of genital hairs. In the adanal plates there is a deep incurvation behind the praeanal plate with a pointed protruding tip at either side of the incurvation. There are two pairs of anal hairs and three pairs of adanal hairs. The fissure in the anal plates is situated close to the anterior anal hair. Op 1 and op 2 are situated on low apophyses. They are as long as the hairs of the dorsal end of the hysterosoma. The posterior border of the opening for the genital-anal field is almost round. Femora I–II with deep pits proximally, changing to indistinct reticulation distally. Femur II has a medial broad protuberance with three hairs on it. The hairs of the femora are uneven, the tip often turned outwards. All tarsi have three claws, the middle one of which is slightly stronger than the lateral ones.

Lake Rotoiti: Several specimens in soaked moss in a spring in *Nothofagus* forest.

Platynothrus major n. sp.; fig. 35.

Colour dark brown. Length about 1.07 mm.

Characteristic of this species are the two lateral swellings on the propodosoma with the very deep incurvation between the anterior border of the swelling and the lamellar hairs. The latter, which are thick and set with papillae in longitudinal rows, are longer than their mutual distance and situated on low apophyses which are connected by a ridge. The rostral protrusion is low. The rostral hairs are long, smooth, and thin especially at the tip. The pseudostigmatic organs are rather short, thickest near the tip, and uneven or scaly. The sculpture of the propodosoma consists of a dense punctuation on the tip of the rostrum and further backwards until a short distance behind the transverse ridge between the lamellar hairs. Further posteriorly the integument is densely pitted with small punctures between the pits. There is no longitudinal groove between the pseudostigmata, but a broad hollow between the interlamellar hairs. The hysterosoma is broadest across its middle; the posterior end is truncate. There are two very distinct longitudinal ridges without pits or punctures along them. The hairs are yellowish, uneven, and pointed at the tip. E 2 and f 2 are situated unsusually close together. The sculpture, which can be seen only within the longitudinal ridges, consists of indistinct transverse lines with irregularly scattered small pits. This pattern does not reach the longitudinal ridges laterally, but stops a short distance from the ridges. The ventral side: The epimeric hair formula is: 3:1:3:4. There are about 35 pairs of genital hairs. Across the genital plates there is a distinct light band. Epimeres II form together medially a tongue, which projects posteriorly between Epimeres III and reaches the anterior border of the split between Epimeres IV. All tarsi have three almost equally strong claws.

Upper Takaka, Nelson district: Several individuals in moss and dead leaves on a slope in *Nothofagus* forest.

Lake Rotoiti: One individual in moist moss and small ferns on a rotten trunk in *Nothofagus* forest.

Platynothrus tenuiclava n. sp.; fig. 36.

Colour dark brown. Length about 0.95 mm.

P. tenuiclava resembles *P. altimontanus* Hammer (1958); it is, however, smaller (*P. altimontanus* 1.22 mm). The pseudostigmatic organs are long and slender, usually slightly curved and equally thick throughout (in *P. altimontanus* short and thick at the tip). The rostral protrusion on which the rostral hairs are situated, seems to have a deep incurvation on either side. The rostral hairs are thin and long, about two and a half times longer than their mutual distance. The lamellar hairs, which are situated on low apophyses connected by a straight ridge, are uneven and as long as their mutual distance. The interlamellar hairs are as long as the lamellar hairs. The integument is pitted and densely punctate between the pits. In front of the lamellar hairs there are no pits, only punctures. There is no longitudinal groove between the pseudostigmata, but a hollow between the interlamellar hairs and further tapering anteriorly. There are four swellings at the posterior border of the propodosoma of which the lateral ones are the biggest. The hysterosoma has two faint, but broad longitudinal ridges indicated mostly by two rows of pits cutting into the ridges from the lateral and the medial sides. Between the ridges there are big punctures or small pits irregularly scattered. Laterally to the ridges the punctures are very indistinct. Laterally there is on either side a broad belt with an indistinct pattern of light and darker spots. The hairs of the dorsal side are stiff, almost smooth; those on the posterior border are slightly bent and provided with secretion at the tip. The distance c 1–c 1 is slightly longer than c 1–c 2, and c 2–c 3 is shorter than c 1–c 2. C 1–c 1 is a little longer than c 1–d 1. C 1–c 1 is approximately the same as d 1–d 1 and only half of d 2–d 2 and e 1–e 1. The ventral side: The epimeric hair formula is 3:1:3:4. There are about 25 pairs of genital hairs. The tubercles on either side of the apodemata are very small. The epimeres are densely punctate. Femora I–II are densely pitted on their proximal half. The hairs of the femora are stiff, uneven and slightly bent. On the medial side of Femur I there are two hairs (in *P. altimontanus* three hairs). Coxa III has three dorsal hairs (*P. altimontanus* four). All tarsi have three equally strong claws.

Keri-Keri: Found most frequently singly in wet moss on a stone in a brook; in moss on the ground; in moss on a trunk; in moss and needles under a fir; in moss at the edge of a swamp, etc.

Rotorua: Several specimens in liverworts and small plants in the thermal area; many in moss and grass on a lawn.

Nelson: A few in moss and grass on a lawn.

Waitakere: Many individuals in moss and grass in a garden.

Platynothrus peltifer (C. L. Koch); fig. 37.
Colour dark brown. Length about 0.83 mm.

Found at Keri-Keri, Rotorua, New Plymouth, Pauatahanui, Waitangi, Christchurch, Dunedin, Waitakere, Fox Glacier and Milford, usually in moist places, i.e. on lawns, in moist moss, at the edge of a pond, near streams, in meadows, but never in the forest (in the three last-mentioned localities the species was found in a garden and at the road-side).

Acronothrus cophinarius (Mich.); fig. 38.
Colour light brown. Length about 1.13 mm.

It is not necessary to add much to Michael's detailed description (1908, p. 142, Plate 19, figs. 13–16). Fig. 38 will, however, show that Michael has overlooked almost entirely the hairs of the dorsal side of the hysterosoma, which must be ascribed to the poor technique of that time. On the latero-anterior border of the hysterosoma there is on either side a long apophysis carrying a hair, c 3 as long as the interlamellar hair, and in the middle two short hairs, c 1. At a short distance behind the latter there are two similar short hairs, probably d 2. Along the lateral border of the hysterosoma there is a light groove and in it in the anterior third of the groove two short hairs, cp and e 2 are situated, separated by some distance. The posterior apophyses and long hairs are well described by MICHAEL. Fig. 38 a shows the ventral side, which MICHAEL figured very summarily. The lateral borders of the genital field are hardly discernible. The epimeres carry together 9 pairs of hairs, most of them flat and equally broad throughout. There are 8 pairs of thick and short genital hairs. On the posterior margin a pore can be seen, but I cannot tell whether there is a hair there. There are two pairs of aggenital hairs, both situated close to the lateral border of the genital plates. There are three pairs of anal hairs, which are situated rather close together in the middle of the plates. The three pairs of adanal hairs are longer than the anal hairs and distributed at longer intervals. Further laterally ps 1, ps 2, and ps 3 can be seen. On the posterior border there are two apophyses, each with rather a short hair, which is mentioned by MICHAEL and which cannot be seen in a dorsal view. The right one in fig. 38 a is still surrounded by the nymphal apophysis. Fig. 38 b shows a hair from Tibia I; it has four rows of rounded tubercles. Fig. 38 c shows a papilla from the medial side of Genu II.

Rotorua: Numerous in dead, slightly moist leaves under *Manuka* shrub in the thermal area; a few in moist moss and low ferns in the same locality.

Palmerston North: One nymph in dead leaves in Anzac Park (STYLES coll.).

Waitakere: Four adults and a few nymphs in liverworts and moss on a dead trunk.

Acronothrus brachyrostrum n. sp.; fig. 39.
Colour clear brown. Length about 0.90 mm.

A. brachyrostrum deviates from *A. cophinarius* (Mich.) by its smaller size, by its darker colour, and by a few more features, which will be evident from the following. The rostrum is much shorter than in *A. cophinarius,* broad and rounded. The difference between the rostra of the two species is seen best in a ventral view. The interlamellar hairs are situated on bent ridges. The ridge which connects the pseudostigmata, is strong, dark, and curved. The propodosoma is densely punctate between the lamellar apophyses and the posterior curved ridge. The propodosoma and the hysterosoma are not so distinctly separated as in *A. cophinarius.* The hair on the latero-anterior border of the hysterosoma projects beyond the pseudostigma and not much further, i. e. it is shorter than in *A. cophinarius.* In fig. 39 the middle of the dorsum is at a deeper level than normally due to a shrinkage. For the same reason the hysterosoma is too narrow in the figure and the groove along the lateral sides more open. The space between the posterior apophyses is deep, concave, in *A. cophinarius* more square.

The apophyses are bent slightly medially, in *A. cophinarius* they diverge. The ventral side, fig. 39a. The figure clearly shows the differences between the two species. The genital field is distinctly separated from the surrounding plate and is of a lighter colour than the latter. The hairs on the epimeres are thick and pointed and the integument of the epimeres is densely punctate. There are eight pairs of genital hairs and on the posterior border a pore; two pairs of aggenital hairs close to the lateral border of the genital field; three pairs of anal hairs situated in the middle of the plates. There are apparently only two pairs of adanal hairs, which are situated almost in the middle of the adanal plates. Further laterally there are three pairs, viz. ps 3, ps 2 and ps 1, and below the dorsal posterior apophyses there are two rather short ventral hairs on short apophyses, h 3. All tarsi have three equally strong claws. The mite is completely covered with dirt and secretion.

Keri-Keri: One specimen in a crevice with water (STAGAARD coll.).

Rotorua: One individual on a mountain (STAGAARD coll.).

Lake Rotoiti: One specimen in dead leaves in *Nothofagus* forest.

Fox Glacier: Very common in thick moss and dead leaves, but usually in small numbers, in native forest.

Milford: Often present in the samples, but usually as a single individual in dead leaves and moss in *Nothofagus* forest.

Acronothrus caudalis n. sp.; fig. 40.

Colour chestnut brown. Length about 1.80 mm.

A. caudalis can easily be distinguished from the two preceding ones by having the posterior apophyses fused into a short tail. The lamellar apophyses are thin and directed slightly outwards. The lamellar hairs are thinner than those of *A. cophinarius* and *A. brachyrostrum*. The interlamellar hairs are thin and straight. They reach beyond the tip of the rostrum. The pseudostigmatic organs are withdrawn into the pseudostigmatic cups as in all *Acronothrus* species. The pseudostigmata are not connected by a curved ridge. There is no distinct sculpture on the propodosoma although small scales and streaks of short lines can be seen. In front of the base of Leg I there are short light cracks. The anterior border of the hysterosoma is a straight line, whereas the posterior end is rounded, ending in a short bifurcate tail. The length of the mite is measured from the tip of the rostrum to the point where the tail divides. The two middle hairs, c 1 near the anterior border are situated on long apophyses. They are thin and smooth and reach beyond the base of the interlamellar hairs. The latero-anterior hairs, c 3, which also are situated on apophyses, are short and bent medially. Along the lateral sides there are three pairs, cp, e 2 and f 2, all of them short and smooth and apparently situated on apophyses. The hairs in the middle of the dorsal side, d 2, are situated on long and narrow apophyses. They are very thin and long and are directed forwards, but they do not reach those in front of them. Several fissures can be seen. The middle of the hysterosoma is separated from the lateral sides by a broad band of small chitinous tubercles, which are arranged in about 8–9 longitudinal rows. The band is faintly developed where it runs transversely at the anterior end of the hysterosoma and it is missing posteriorly. Laterally to this band there is on either side a ridge, which weakens posteriorly and disappears below the dorsal surface of the hysterosoma towards the tail. The latter is composed of four apophyses on each half corresponding to the three posterior ones in *A. cophinarius* and the one on the ventral side (cp. fig. 38 a and fig. 40 a). The apophyses of the tail usually carry the nymphal skin with longer apophyses and long hairs. The ventral side is shown in fig. 40 a. In spite of the mite being cleaned it is extremely difficult to see all the hairs, and there may be more than those figured. The genital field is well separated from the surrounding plates apart from a short indentation into the latter near the posterior border of the genital plates. There are 9(?8) genital hairs (I am not sure of the pore on the anterior tip). There are two pairs of aggenital hairs situated close to the lateral border of the genital field. Three pairs of thin anal hairs, which are situated in the middle of the plates, three pairs of broad adanal hairs, viz. two in the anterior half of the plates and one on the posterior tip. Further laterally there are three thick hairs corresponding to ps 3, ps 2, and ps 1. All tarsi have three equally strong claws. Femur I has at least eight long outer or dorsal apophyses, four medial or ventral ones, all with long, serrate, thick, and curved hairs. Genu I has six outer apophyses in three pairs and two medial ones with similar hairs as on Femur I; besides it has one distal apophysis situated between the two on the distal pair. This is longer than the others and it carries two hairs, viz. a short broad one posteriorly and in front of it a much thinner and a little longer hair, which is bent backwards. Tibia I has four outer or dorsal apophyses in two pairs and two medial shorter apophyses, besides one stronger distal apophysis with three hairs, viz. a broad posterior one and two longer thin ones, one stronger than the other. Tarsus I has 12 or more dorsal apophyses arranged in pairs, the ventral ones are very short. Leg II has the same number of apophyses and the same appearance of the hairs. Details are hard to discern as still some foreign matter adheres to all hairs in spite of the mite being cleaned. This mite usually carries a whole mountain of dirt on its back, attached to the long medial hairs.

A. caudalis is closely related to *A. nukuhivae* Jac. (1934), but differs among other characters in having only one tail, *A. nukuhivae* has two tails.

Christchurch: Two specimens in slightly moist moss and low plants on a vertical slope with oozing water.

Fox Glacier: Found usually singly in several samples taken in the native forest in thick moss and dead leaves; and in moss and grass along the road through the forest.

Milford: Found singly or in small numbers in several samples from thick moist moss and dead leaves in native forest.

Austronothrus n. gen.

Austronothrus agrees with the diagnosis for *Acronothrus* by Jacot (1934, p. 218). To separate it from the latter the following characters will be added: The propodosoma is almost as long as the hysterosoma. The hysterosoma is well defined. There are 14 pairs of hairs on the dorsal surface of the hysterosoma (in *Acronothrus* 10 pairs). The posterior end of the hysterosoma is rounded and there are no long apophyses posteriorly. On the ventral side Epimeres IV are separated by a deep slit, which also cuts halfway through Epimeres III.

A. curviseta n. sp.; fig. 41.
Colour light brown. Length about 0.83 mm.

The rostrum is protruding, but the protrusion seems to sit on the dorsal surface and not on the anterior border as in *Acronothrus.* The rostral hairs, which are situated on short apophyses, are parallel, directed forwards, equally broad throughout and a little longer than their mutual distance. There are two very strong lamellar apophyses, which are very broad at the base, tapering towards the tip and inclining. Their lateral side is curved and elongated backwards and this elongation forms a right angle to the broad base. The apophyses are not connected by a ridge. The lamellar hairs are broad and set with hyaline rounded tubercles. They cross in front of the rostrum. The interlamellar hairs, which also are broad and hyaline, are situated on apophyses, which are no longer than broad. The interlamellar hairs reach the base of the lamellar apophyses. The pseudostigmatic organs are short, globular and do not reach beyond the pseudostigmata. In the middle of the propodosoma there is a middle field which is slightly darker than the surroundings. The integument is densely punctate, also outside the middle field. The propodosoma and the hysterosoma are separated only by a faintly chitinized white groove, which varies in width, widening off the strong hairs and narrowing between the latter.

The hysterosoma is as broad as the posterior part of the propodosoma. The lateral sides are slightly undulating. The posterior end of the hysterosoma is semicircular. On the anterior border of the hysterosoma there are six strong hairs situated on low apophyses. The hairs c 1, c 2, and c 3 are broad and hyaline. The two lateral ones are longer than those in the middle and the latter are arranged by twos at rather a short mutual distance. In the middle of the hysterosoma there is a long field stretching from the anterior border to the posterior end of the hysterosoma. It is narrow anteriorly with almost parallel sides until it widens in its posterior third. The field is indicated by a faint line. Along its lateral border there are three very long and broad hyaline hairs situated on apophyses corresponding to d 1, d 2, and e 1. They are directed laterally in a big curve and their tip almost reaches the lateral border of the hysterosoma. The distance between the two anterior hairs, d 1–d 2, is shorter than that between the second and the third, d 2–e 1, sometimes only half of it. Between d 1 and d 1 there is a line cutting off the anterior part of the long middle field. The integument of the middle field has small clear punctures. Along the lateral sides of the hysterosoma there are six equally long and strong broad hairs, arranged as shown in fig. 41, i.e. cp almost off d 1, e 2 off e 1 and four on the latero-posterior border. I am not sure of the interpretation of these four hairs. On the posterior border there are off the posterior end of the middle field two short apophyses, each carrying a long, broad and hyaline hair and beneath them two longer apophyses with a somewhat longer hair, which usually meet in a big curve and cross. The posterior border on either side of the two dorsal apophyses is tongued. The ventral side is shown in fig. 41 a. Epimeres I and II are fused. Epimeres III are halfway separated by a slit and Epimeres IV are completely separated. The genital field is triangular, narrow anteriorly, broad posteriorly. It is well defined. There are eight pairs of genital hairs, all situated along the medial margin at approximately the same mutual distance. There are two pairs of aggenital hairs, which are situated near the latero-posterior border of the genital field. The anal and adanal plates are distinct, anteriorly overlapping the praeanal plate. There are two pairs of anal hairs, which are situated in the middle of the plates (*Acronothrus* from New Zealand so far found has three pairs). There are three pairs of adanal hairs, viz. two in the middle of the plates and one at the posterior end. Laterally to the anal field there is on either side a tongued ridge with two hairs, ps 3 and ps 2 and behind the anal field there are two long hyaline hairs, ps 1, on short apophyses. Further laterally there are longitudinal ridges which run to the posterior border, then medially. The integument of the ventral side is faintly granulate, on the genital plates more coarsely granulate. Most of the hairs can hardly be discerned as they are hyaline. At the anterior end of the anal and adanal plates there is a fissure, one pair also laterally to the adanal plates and in the ventral plate. The legs resemble those of *Acronothrus*. The apophyses are, however, much shorter, the hairs also shorter and more bushy. Femur I is long. It has four medial apophyses with thick hairs, five dorsal apophyses and one distal lateral apophysis, behind which there are two small thin hairs without apophyses. Genu I is short with a medial, a dorsal, and a lateral apophysis, besides distally an apophysis with a short broad hair or papilla. Tibia I, which is the shortest of the joints, has likewise a medial, a dorsal, and a lateral apophysis besides a much stronger distal apophysis with three thin hairs. Tarsus I has no true apophyses. All tarsi have three equally strong claws, which are distinctly serrate on their outer edges.

Keri-Keri: One specimen in moss on the ground in deep shadow near a brook.

Rotorua: Six individuals in the State Forest at Whakarewarewa (STYLES coll.).

New Plymouth: One specimen in moss and grass on a lawn in deep shadow.

Himatangi: Three specimens in the "Treelands" (STYLES coll.).

Palmerston North: One specimen on the ground in a forest (STYLES coll.).

Holonothrus[1] Wallwork, the type species being *foliatus* from Macquarie Island (1963).

Propodosoma and hysterosoma separated, equally broad at the transition. Lamellar and interlamellar apophyses present. Pseudostigmatic organs globular, withdrawn into deep cups. 13 pairs of hairs on the dorsal surface of the hysterosoma. No long posterior apophyses. No separation between the aggenital plates and the

[1] Published after the manuscript was finished.

lateral plates round the anal field. 3 equally strong claws. There are eight pairs of genital hairs, two pairs of aggenital ones, two pairs of anal and three pairs of adanal hairs.

Holonothrus pulcher n. sp.; fig. 42.
Colour light brown. Length about 0.55 mm.

The tip of the rostrum, which can be seen between the lamellar apophyses, is rounded. The rostral hairs, which are not situated on apophyses, are thin, smooth, bent forwards and about as long as their mutual distance. The lamellar hairs are situated on very long apophyses with a broad base, the lateral part of which continues backwards for a distance like the length of the apophysis. The apophyses incline. They are a little longer than the distance between their distal end. The lamellar hairs are thick, strongly bent medially and backwards, the tip reaching beyond the base of the opposite lamellar hair. The interlamellar hairs are situated on rather short apophyses on a curved ridge running from the medial border of the pseudostigmata medially and forwards towards the medial side of the prolongation from the lamellar apophyses. Their lateral margin forms a sharp edge. The interlamellar hairs, which are bent in a big curve, are rather thick and hyaline. Another ridge connects the pseudostigmata, running backwards and medially from the medial side of the pseudostigmata, in the middle of the propodosoma forming a double longitudinal row of small tongues each including a clear round little hole. The space within the ridges and the lamellar apophyses is distinctly punctate. The pseudostigmata are laterally surrounded by a ridge, which as a faint line continues backwards to the posterior border of the propodosoma. The pseudostigmatic organs are spherical and completely hidden within the cups as in *Acronothrus* and *Austronothrus*. The anterior border of the hysterosoma is one and a half times longer than across the posterior end. It has sharp latero-anterior corners, whereas the latero-posterior border is evenly curved, forming a broad rounded curve on either side between which the rounded posterior end projects. There are 11 pairs of hairs of equal length and shape on the dorsal surface, viz. three pairs on the anterior border (c 1, c 2 and c 3), three pairs in the dorsal middle (d 1, d 2 and e 1) and five pairs more or less along the lateral sides (cp, e 2, f 2, f 1 and h 1). C 2 and c 3 on the anterior border are situated far laterally at a mutual distance half as long as the distance to c 1. All these hairs are smooth, broad, but tapering towards the tip. The distance between d 1 and d 2 is only half as long as that between d 2 and e 1. The lateral hairs are situated approximately off d 1, off e 1, and at a level half way between e 1 and the posterior end of the hysterosoma. The last two hairs, f 1, h 1, are situated in the latero-posterior curve. Besides these 11 pairs there is one pair, h 2, different from the former. They are situated on short apophyses on the posterior part of the latero-posterior curved border. These hairs are curved, a little longer than the others and much thicker, being set with rounded hyaline tubercles in several longitudinal rows. These hairs are however, variable in shape, being much thinner in some specimens. The thirteenth pair (h 3) from the dorsal surface can be seen only in a ventral view (see fig. 42a). The sculpture of the hysterosoma consists of an indistinct reticulation with low holes, which may appear as low tubercles. On either side of the lateral border of the hysterosoma the lateral sides can be seen as a broad swelling. Behind the anterior corner of the hysterosoma there is a long fissure. In the posterior third of the hysterosoma there is a small round pore. The mite is covered by a thin layer of secretion, but dirt and foreign matter only adhere to the thick hairs of the femora. The ventral side is shown in fig. 42a. The epimeric hair formula is 4:3:2:3. Some of the hairs are tiny, others long and strong. All epimeres are densely punctate. The genital field is well indicated except the latero-posterior border, which has a faintly chitinized swelling. There are eight pairs of long and thin genital hairs, all situated along the medial margin at the same mutual distance. There are two pairs of aggenital hairs situated on either side of the swelling on the genital frame. The aggenital plates are not separated by a transverse groove from the lateral plates behind them as in *Acronothrus* and *Austronothrus*, although this groove may be indicated by a perhaps slightly fainter chitinization than the surroundings. The praeanal plate is distinct. There are two pairs of anal hairs and three pairs of adanal hairs, all of them moderately long and strong, pointed at the tip. Further posteriorly there are three pairs on short apophyses. They are situated close to the border of the strongly tapering posterior end of the hysterosoma. The two posterior ones are situated close together on either side of the pointed posterior end of the hysterosoma and laterally to them, but at a deeper level there is on either side a short hair on a low apophysis. It is the above-mentioned thirteenth hair from the dorsal surface, h 3. Long fissurae can be seen at the anterior end of the anal and the adanal plates, between the latter and the lateral plates. The legs resemble the legs of *Acronothrus* in many ways. The apophyses are, however, much shorter and found only medially on Femora I–II and on the outer side of Femur II. The apophyses carry feathered hairs, whereas most other hairs are thin, short, and smooth. All tarsi have three equally strong claws. Both Genu I and II and Tibia I and II have dorsally a hair pore with more than one hair as found in *Acronothrus* and *Austronothrus*.

Puketi: Two specimens, one in thick moss on a trunk, the other in dead *Kauri* leaves and moist moss on the ground.

Waitakere: Four individuals in liverworts and small ferns on a log.

Hermanniella clavasetosa n. sp.; fig. 43.

Colour brown. Length about 0.62 mm.

In the only specimen found the rostral hairs are missing. The lamellar hairs, which are situated on a transverse ridge with protruding lateral edges, are thick, clavate, covered with minute bristles and longer than their mutual distance. The interlamellar hairs, which are as long as the lamellar hairs and of the same appearance, are situated on short apophyses. The integument between them is wrinkled, forming a groove on either side between the interlamellar hair and the middle field. The pseudostigmatic organs are thread-shaped, thinnest at the tip. The hysterosoma is covered with homogeneous dark tubercles arranged regularly in undulating oblique rows. Below this cerotegument light round spots of slightly different sizes can be seen, all of them with a luminous dot in the middle. All the hairs of the dorsal side are slightly clavate and covered with scaly bristles (fig. 43a). The hairs of the legs are thick and set with minute bristles.

Waitomo: One specimen in liverworts, moss, and dead leaves in the tree-fern forest along a river.

Hermanniella microsetosa n. sp.; fig. 44.
Colour brown. Length about 0.72 mm.

The rostral hairs are smooth and pointed and about two thirds as long as their mutual distance. The lamellar hairs are a little uneven, parallel, and as long as their mutual distance. They are situated on short apophyses. The interlamellar hairs, which are one and a half times longer than the lamellar hairs, smooth and pointed at the tip, are situated on apophyses, which are a little stronger than those of the lamellar hairs. The integument between them is wrinkled. The pseudostigmatic organs, which are thread-shaped, coarser than the interlamellar hairs and set with minute bristles, are slightly S-shaped. The posterior part of the propodosoma behind the curved ridge in front of the pseudostigmata is darker and at a higher level than the anterior part of the propodosoma. The sculpture of the hysterosoma consists of numerous deep, small punctures arranged rather regularly in oblique rows. The punctures are smaller than the hair pores and luminous. The hairs of the hysterosoma are barely discernible, the hair pores, however, slightly brownish and thus easy to see. The hairs on the posterior border are as long as the rostral hairs and, like the latter, smooth, pointed, and whitish. The hairs on the legs are a little rough.

Keri-Keri: Two specimens in a dense very luxurious carpet of small ferns and mosses near a brook in a deep cleft; two individuals in moss on a dead trunk; three in mosses on the ground; and several in dead leaves.

Hermanniella longisetosa n. sp.; fig. 45.
Colour brown. Length about 0.90 mm.

The rostral hairs are thin and smooth, approximately as long as their mutual distance. The lamellar hairs, which are situated on a transverse ridge, are slightly uneven, thin, and at least twice as long as their mutual distance. The interlamellar hairs, which are situated on apophyses, are bent forwards and ventrally. They are smooth, very thin at the tip, and about twice as long as their mutual distance. The pseudostigmatic organs, which are curved outwards and forwards, are thread-shaped, slightly thinner at the tip and almost smooth. They are shorter than their mutual distance. A curved transverse line in front of the pseudostigmata is the anterior border for the posterior part, which is at a higher level than the rostrum. The cerotegument of the hysterosoma consists of numerous very small cones (fig. 45a), each with a luminous dot in the middle of their base. The cones are arranged round light round spots, thus forming a reticulate pattern (fig. 45 b). Each of the light spots has a luminous dot similar to that of the cones. The light spots are arranged irregularly, the distance between them varying much. Below the round spots other indistinct light spots without a luminous dot (indicated by dotted circles) can be seen. The hairs of the dorsal side of the hysterosoma are rather long (hence the specific name). They are smooth and almost equally thick throughout. Those on the posterior border of the hysterosoma are much longer, smooth, very thin at the tip and situated on short apophyses. The hairs of the legs are rather long, stiff, and slightly uneven.

Keri-Keri: One specimen in a slightly moist layer of lichens and mosses on a dead branch on the ground in deep shadow; several individuals in moss on a dead trunk and in dead leaves, in deep shadow.

Waitakere: Two specimens in liverworts and small ferns on a dead trunk.

Hermanniella diversisetosa n. sp.; fig. 46.

Colour brown. Length about 0.94 mm.

The rostral hairs are smooth and about half as long as their mutual distance. The lamellar hairs, which are situated on a higher level than the rostral hairs, are slightly uneven and a little longer than their mutual distance. The interlamellar hairs are as usually within this genus situated on apophyses. They are slightly rough and about twice as long as their mutual distance. The pseudostigmatic organs, which are a little more than half the length of their mutual distance, are filiform, tapering at the tip, and set with minute bristles on their distal two thirds (fig. 46 a). The middle field, which is at a higher level than the surroundings, is bordered anteriorly by a curved transverse line in front of the pseudostigmata. The cerotegument consists of small dark cones with a luminous dot in the middle of their base (fig. 46 b). At a deeper level there are some rather narrow but deep light holes surrounded by brown meshes, forming a coarse reticulate pattern. A luminous dot can be seen in the middle of each hole. The light holes are arranged in irregular oblique rows. The hairs of the dorsal side of the hysterosoma are of different shape (hence the specific name). There are seven pairs of stiff, rough hairs, almost spiniform, one pair of short and thick clavate hairs, situated at the posterior end of the hysterosoma, and behind the clavate hairs two thin hairs shaped like small brushes, slightly clavate at the tip, which is set with secondary bristles. On the posterior border of the hysterosoma there are six pairs, two of which are small brushes as described above. They are situated by twos close together on short apophyses. The remainder on the posterior border are stiff, slightly rough, and perhaps a little thinner than those on the dorsal surface. The hairs of the legs are stiff and rough.

New Plymouth: One specimen in native forest in moist dead leaves and branches, under tree ferns.

Phyllhermannia foliata n. sp.; fig. 47.

Colour brown-light brown. Length about 0.57 mm.

The rostral hairs are very thin, variable in length, usually about half as long as their mutual distance, in some specimens, however, almost as long as their mutual distance. The lamellar hairs, which usually are tiny, smooth, and pointed, are sometimes about half as long as their mutual distance. The interlamellar hairs are broad, foliate, set with minute bristles. They are situated on an arch between the pseudostigmata. The arch is pointed in the middle and this tip fits into a semilunar plate immediately in front of it. The latter is a part of a long curved ridge situated in front of the arch just mentioned. The posterior part of the propodosoma behind the arch is densely punctate, although indistinctly in the middle and the dots disappearing towards the posterior border of the propodosoma. The punctate field is in some specimens divided into two halves separated by a broad furrow, broadest anteriorly. This character is combined with long rostral and lamellar hairs so they may form a variety (found at Waitakere). Near the posterior border of the propodosoma there are two dark scales connected by a faint line. The pseudostigmatic organs, which are about half as long as their mutual distance, are rod-shaped, though compressed at the tip. The hairs of the dorsal side of the hysterosoma are foliate, broadest across the middle and set with minute bristles in many rows. The femora are reticulate. The hairs of the legs are not foliate except a few on Femur I and Genu I.

Keri-Keri: A few individuals were found in several localities near Keri-Keri, mainly in moist grass, mosses, and lichens.

New Plymouth: Numerous individuals in moist grass and dense mosses in native forest.

Waitakere: A few specimens in liverworts and mosses on a dead trunk; in moist dead leaves and in similar biotopes.

Phyllhermannia mollis n. sp.; fig. 48.

Colour light brown. Length about 0.50 mm.

The rostral hairs are very short, pointed and smooth. The lamellar hairs are very thin and about half as long as their mutual distance. The interlamellar hairs are broad and short brushes, directed backwards. They are situated on a transverse ridge with a tip in the middle. Near the posterior border there are two low tubercles, which are connected with the transverse ridge by a faint line. A strong ridge can be seen on either side laterally to the pseudostigmata. It has at its posterior end a tooth which corresponds to a similar tooth on the anterior margin of the hysterosoma. A curved ridge in front of the arch with the interlamellar hairs is present also in this species, but developed only laterally, in the middle as a faint line. The pseudostigmatic organs are about as long as the distance between the interlamellar hairs. They are club-shaped, flattened distally, and with secondary branches within the flat distal end (fig. 48a). The posterior part of the propodosoma is densely punctate. The hysterosoma is a regular oval, which is more than twice as long as the propodosoma.

All the hairs are short, soft brushes, almost round of shape, hyaline and hence difficult to see. The hair pores are, however, luminous, which makes it easy to find the insertion of the hairs. The hairs are set with minute bristles in many longitudinal rows, but only on their exterior side (fig. 48b). There is no sculpture to be seen on the dorsal surface of the hysterosoma. The femora are reticulate.

Waitakere: About 20 specimens, most of them nymphs, were taken in liverworts and mosses on a dead trunk together with *P. foliata*; a few adults and numerous nymphs were found in liverworts and mosses on a dead trunk in the humid tree-fern forest.

Phyllhermannia rubra n. sp.; fig. 49.

Colour dark mahogany red. Length about 1.08 mm.

P. rubra differs from the two preceding ones by its long and very broad propodosoma and its short almost circular hysterosoma. The rostrum is conical. The rostral hairs, which are smooth and thin, are as long as their mutual distance. The lamellar hairs are not situated so far laterally as in the preceding species. They sit on a transverse ridge. They are broad, slightly fringed and foliate. At a short distance behind the lamellar hairs the lateral sides of the propodosoma suddenly diverge, forming a broad curve in front of Leg I. This part of the lateral border is slightly serrate. The whole body is heavily chitinized, and along the lateral side of the propodosoma it is provided with crests and tubercles, i.e. a protruding broad toothlike crest between Legs I and II. Laterally to the pseudostigmata there is a strong ridge, which is almost parallel to the lateral sides. Posteriorly it ends in a blunt tooth corresponding to a similar one on the anterior margin of the hysterosoma. The interlamellar hairs, which are bent backwards, are foliate, tapering at the tip and with longitudinal stripes. They are situated on the anterior border of a densely punctate middle field, which laterally does not reach the pseudostigmata. On its posterior part there are two short scales. The pseudostigmatic organs are thin and filiform, thinnest at the tip. They are a little more than half as long as their mutual distance. The hairs of the dorsal side of the hysterosoma are hyaline and hence difficult to see. They are foliate with blunt tips, which are the broadest parts, and more or less spoon-shaped. Their distal end has indistinct longitudinal stripes or ribs. The posterior border itself seems to be thickened, probably because it is bent slightly inwards (fig. 49a–c). There is no sculpture on the dorsal side of the hysterosoma. Almost all parts of the legs are nicely and regularly reticulate. Some of the hairs of the legs are short and foliate. Femur I is unusually long and reaches with more than half its length beyond the tip of the rostrum.

New Plymouth: Two specimens in dead moist leaves under fern trees.

Pu Pu Springs: One individual in dripping wet mosses, grass, and watercress at the edge of the spring.

Puketi: One individual in luxurious mosses on the trunk of a *Rimu* tree.

Fox Glacier: One specimen in dead leaves at Lake Matheson.

Phyllhermannia phyllophora (Mich.); fig. 50.
Colour dark mahogany red. Length about 1.10 mm.

As MICHAEL (1908, p. 140, Plate 20, figs. 17–23) probably did not bleach his specimen and consequently could not see details, he has not drawn the lamellar and the interlamellar hairs, nor the hairs of the dorsal side of the hysterosoma except those on the posterior border. His figures are, however, fully sufficient to characterize this beautiful species. Fig. 50a shows a hair from the hysterosoma, fig. 50b a similar one in profile. Fig. 50c shows Leg I. Some of the hairs of the legs look like the "wings" of flying fish and have a pattern as delicate as butterfly scales.

Keri-Keri: 13 individuals in dead leaves and débris under trees.

Waitomo: Several adults and a few nymphs in dead leaves in deep shadow under trees; one specimen in thick moss in native forest.

New Plymouth: One specimen in *Selaginella* and moss on a trunk, in native forest.

Puketi: One adult in dead, wet *Kauri* leaves and mosses on the ground.

Liodes nigricans (Ramsay); fig. 51. (= *Neoliodes nigricans* Ramsay p. 5).
Colour mahogany red. Length about 1.26 mm.

Although I have seen only a paratype of *L. nigricans*, there can be no doubt that my specimens from New Zealand belong to this species. Across the rostrum there are two transverse ridges and behind them a longitudinal furrow, which goes backwards to a level off the pseudostigmata. This furrow divides the middle of the propodosoma into two halves, which are finely reticulate. Between the pseudostigmata the integument is covered with small irregular tubercles and folds. The pseudostigmatic organs, which are clavate, are dark on the distal anterior part, greyish posteriorly. Behind the pseudostigmata there is an outward directed sharp point. The sculpture of the anterior part of the hysterosoma consists of low tubercles set close together like a pavement. In the middle and at the posterior part of the hysterosoma there are low meandering wrinkles. Along the lateral sides and along the posterior end there are dense wrinkles. Fig. 51a shows the ventral side; fig. 51b Leg II; fig. 51c the tritonymph. All tarsi have three equally strong claws, which are distinctly serrate on the outer border. Most of the hairs on the tarsi are slightly clavate, some bent at the tip, which makes them look clavate; others are very broad at the base, pointed at the tip and at the same time the lateral sides are rolled medially, thus forming a longitudinal groove. Femur II is reticulate on its distal third, faintly reticulate in the middle, and proximally there are transverse dark bands. Genu II is distinctly reticulate. Tibia II has irregular longitudinal and oblique dark bands; near the anterior border it is reticulate. Tarsus II has irregular dark spots. Femur I has regular round pits distally, the pits being much smaller proximally. Some of the pits are crossed by a dark "bridge", especially in the middle of the joint.

Keri-Keri: Two adults and a nymph at the Keri-Keri falls (STAGAARD coll.).

Scapheremaeus ? patella (Berl.); fig. 52.
Colour dirty light brown. Length about 0.36 mm.

The only specimen found resembles *S. patella* (Berl.) very much, but deviates in a few characters, i.e. in its much shorter length (*S. patella* collected by me in Firenze, Italy, is 0.49 mm), in its much thicker hairs not only of the dorsal surface of the hysterosoma, but also of the legs, and in having no reticulation between the lamellae. It has a long dark spiniform hair distally on Tibia I, which is present also in my specimen of *S. patella*; the solenidion of Tibia I is strongly bent, almost sickle-shaped.

Rotorua: One specimen and a skin in a thin layer of dry moss on the ground under *Manuka* shrub in the thermal area.

Scapheremaeus insularis n. sp.; fig. 53.
Colour light brown. Length about 0.42 mm.

The rostral hairs are thin and bent medially. The lamellar hairs, which are situated on the tip of very long apophyses, are short, black brushes. The apophyses are as long as their mutual distance distally. Posteriorly the apophyses are much broader and their mutual distance is only half as long as between the distal ends. The lamellae are indicated by a thin line. The space between them is reticulate immediately behind the apophyses, further posteriorly there are irregular dark folds and tubercles. Interlamellar hairs are absent. The pseudostigmatic organs are black and ball-shaped. The anterior border of the hysterosoma is slightly arched and the shoulder pronounced. The middle of the middle field is at a higher level than the surroundings, evenly sloping towards the lateral sides of the hysterosoma. The middle field is irregularly reticulate, having irregular "islands" of different sizes and shapes in a darker netting (fig. 53a). The middle field is surrounded by a dark, tongued border. The marginal field is striped with radiating broad dark bands, the distal end of which form black tubercles all the way round. On the tongued border there are three pairs of black thick hairs, which are situated on apophyses, more than half the length of the hairs (fig. 53b), viz. one on the anterior border, two on the lateral border in the posterior half of the middle field. On the posterior border of the hysterosoma there are three pairs of similar thick black hairs, and in the marginal field there is one pair near the posterior border. On the shoulder a much thinner, pin-shaped hair can be seen, and some distance behind it another pin-shaped hair. On either side of the light spot on the anterior border there is a square field bordered by irregular tongues and bands. The legs have three claws, the middle one of which is the strongest and set with small scales in longitudinal rows dorsally in its proximal half. The lateral claws are very thin and short. Tibia I has a dorsal long black club. The solenidion is bent forwards and ventrally round the tarsus in a big sling. Also solenidion I of Tarsus I is bent forwards and ventrally. Most of the hairs of the tarsus end in a small flat knob. Tarsus II has dorsally a strong stiff hair, which ends in a flat round disk.

Keri-Keri: One specimen in moist-wet luxurious moss on the ground.

?*Scapheremaeus emarginatus* n. sp.; fig. 54.

Colour light brown. Length about 0.33 mm.

On the anterior border of the rostrum there are two apophyses, but no rostral hairs, which must be very thin or absent as I cannot see them. Further backwards there are two other apophyses with the tiny lamellar hairs. The lamellae are hardly developed, although a faint longitudinal ridge runs from the pseudostigmata to a level with the lamellar hairs. Laterally to the latter there is a stronger ridge with a small tip on the lateral border. Between the faint lamellae there are about five transverse rows of light holes hidden under an irregular netting of faint ribs. Between the pseudostigmata the pattern is very irregular, dissolved into faint ribs and probably varying from specimen to specimen. Interlamellar hairs absent. The pseudostigmatic organs are black and ball-shaped. On the anterior part of the propodosoma there are strong ribs, which form an irregular reticulation.

The anterior border of the hysterosoma is slightly arched and the shoulders are pronounced. There is no marginal zone and the lines drawn in fig. 54 along the lateral sides are at a deeper level and go all the way round. There are seven pairs of hairs on the dorsal side of the hysterosoma, viz. one behind the shoulder and one at some distance behind the first, two in the middle of the hysterosoma a little posteriorly and three along the posterior border. Those on the posterior border are situated in small pockets surrounded by a thick ridge. The hairs, which are situated on apophyses, have a short stalk with a black round tip; most of them are usually missing and the hairs in fig. 54 have been drawn from several specimens. The hysterosoma is arched and the middle slopes towards the lateral sides. The sculpture consists of oblong light spots of different size, arranged in such a way that they form at the same time transverse, longitudinal, and oblique rows. The integument is greyish between the light spots. The latter are smaller towards the lateral sides, more irregular, radiating, and the netting thicker. The sculpture of Legs I–II is an irregular reticulation with strong ribs. Tarsi I–II are smooth. Femora III–IV are also heavily reticulate. Tibia I has no thick club dorsally. All tarsi with only one claw. I do not think that this species is a true *Scapheremaeus*, as it has no marginal zone.

Rotorua: One specimen in moist moss under ferns and tall trees at Mirror Lake.

Milford: Four individuals in thick moist moss and dead branches in *Nothofagus* forest.

Scutovertex minutus (C. L. Koch); fig. 55.

Colour dark mahogany red. Length about 0.60 mm.

The sculpture of the dorsal side of the hysterosoma consists of an irregular system of convolute folds with light irregular spots in between; it is completely covered by secretion. Fig. 55a shows a short pin-shaped hair from the shoulder; fig. 55b a hair from the dorsal surface, in front view and in profile.

Keri-Keri: Two specimens in moss and grass on a lawn. At Rotorua, Waitomo, New Plymounth, and at Nelson it was likewise found only in moss and grass on lawns and at road-sides, often in large numbers on lawns.

Metabelba obtusus n. sp.; fig. 56.
Colour light brown. Length about 0.43 mm.

M. obtusus bears a close resemblance to *M. papillipes* (Nic.), but can be distinguished from the latter by its lash-shaped interlamellar hairs. The rostrum is rounded. The rostral hairs and the lamellar hairs are both curved medially and reach beyond the tip of the rostrum. The rostral hairs are thinner than the lamellar hairs and situated far laterally, the lamellar hairs on the dorsal side at a slightly shorter mutual distance than the rostral hairs. Both are smooth. The projection between Legs I and II has a sharp triangular tooth, the anterior border of which is directed obliquely outwards and forwards. The interlamellar hairs are lash-shaped like the pseudostigmatic organs, but shorter. They reach beyond the anterior margin of the hysterosoma. The pseudostigmatic organs are a little longer than their mutual distance. On the posterior border of the propodosoma there are two triangular tubercles opposite two similar ones on the anterior margin of the hysterosoma. The hysterosoma is circular. The hairs of the dorsal surface are situated in two longitudinal rows, the distance between the rows is longest off the third pair of hairs. The hairs are dark-brown to blackish, at the base white or clear. They are radiating, slightly curved and almost equally thick throughout (hence the specific name). On the anterior part of the hysterosoma there are light spots in rows. The ventral side, fig. 56a. The genital and the anal field are separated by a short distance. On the anterior border of the genital plates there is a big round lobe on which the two anterior genital hairs are situated. The medial part of the plates are reticulate or, rather, full of round light spots. There are 5–6 pairs of genital hairs (6 on the right side in fig. 56a). The anal hairs are situated on the anterior half of the plates. Figs. 56b, c, d, e show Tibiae and Genus I–IV with the hairs protecting the solenidion of Tibiae II–III.

Keri-Keri: Very common but usually in small numbers in moss on the ground, in moss on trees, in dead leaves, in moss at the edge of a swamp; most numerous in moss and liverworts on the road and on a stone-post in deep shadow.

Rotorua: Several specimens in wet moss on a stone in a pond at Whakarewarewa.

New Plymouth: Three specimens in moss and clover on a lawn.

Pedrocortesia rotoruensis n. sp.; fig. 57.
Colour brown. Length about 0.87 mm.

The anterior part of the propodosoma right to the tip of the rostrum has deep, distinct, big, round pits, which form a coarse reticulation. There is a blunt tooth at the anterior end of the ridge, which runs from the anterior border of the pseudostigma to the latero-posterior corner of the reticulate field. In the posterior part of the propodosoma there are the same ridges, which are so characteristic of *Pedrocortesia*, viz. a curved ridge connecting the teeth and two shorter ridges running from the pseudostigmata to the curved ridge. Interlamellar hairs have not been observed, although there is a big clear hair pore near the pseudostigmata. The pseudostigmatic organs are very slender and have a narrow serrate membrane along the border. They are broadest distally and they are almost as long as their mutual distance. The two pairs on the posterior border are situated on short apophyses rather close together. They are smooth, but covered with secretion. The medial ones are curved and about 3–4 times longer than the lateral ones. The distance between them is shorter than their length. The distance between the lateral and the medial hair is approximately three times longer than the lateral hair. The sculpture of the hysterosoma consists of pits, which are longish in the anterior part of the hysterosoma, rounder and arranged in regular oblique rows posteriorly. The distance between the pits is at least half the length of the diameter of the pits. The integument has extremely fine dark undulating lines over the pits. The ventral side has broad folds very similar to those shown in fig. 58 b for *P. luteomarginatus*. There are 7 pairs of genital hairs, 3 pairs of anal hairs. Tibia I and Tarsus I, fig. 57 a, are both characteristic by having a tiny solenidion besides a longer one. The tarsus has parallel sides and it is about twice as long as it is broad. The claws are situated on a stalk, which is about half as long as the claws. The middle claw is only a little stronger than the lateral ones.

Rotorua: One specimen in the thermal area (Stagaard coll.).

Pedrocortesia luteomarginata n. sp.; fig. 58.

Colour brown. Length about 0.75 mm.

Along the anterior border of the propodosoma there is a rather broad, almost hyaline or yellowish membrane with large pits (hence the specific name). The pits immediately behind the yellowish margin are also very large. More posteriorly they are smaller, round, and arranged more or less in transverse rows. In the posterior part of the field the pits are very irregular and indistinct with broken transverse ridges between them. There is a distinct sharp tooth on either end of the curved ridge in front of the pseudostigmata and opposite them a similar tooth. Short interlamellar hairs are present. The pseudostigmatic organs, which are at least as long as the distance between the interlamellar hairs, are broad and flat at the tip and surrounded by a dark and soft membraneous edging. The two pairs of hairs on the posterior border of the hysterosoma are situated on apophyses. The medial ones bend towards each other and ventrally. They are a little longer than their mutual distance and thick, but it is hard to tell whether this is due exclusively to a thick layer of secretion. The lateral ones are about one third as long and are situated at a distance about three times their length from the medial ones. In front of them there is a deep fissure and further anteriorly a small lateral swelling. Another faint swelling in seen in front of the lateral glandular opening. As always within this genus the sculpture is irregular on the anterior part of the hysterosoma. Further posteriorly the pits, which are round, are arranged in regular rows. They are surrounded by small dark grains, fig. 58 a. The posterior part of the ventral side is shown in fig. 58 b. There are 7 pairs of genital hairs, and 3 pairs of anal hairs. The aggenital hair is situated near the posterior border of the genital field. Ad 1 and ad 2 are situated close together near the lateral border of the anal field, ad 3 further laterally. Tarsus I has not been studied as the claws and some of the hairs are missing.

Milford: Four specimens in thick moist moss on dead branches in tree-fern forest.

Pedrocortesella gymnonotus(Ramsay); fig. 59. (=*Arthrodamaeus gymnonotus* Ramsay p. 5). Colour brown. Length about 0.52 mm.

The following species, which have 5 pairs of hairs on the dorsal side of the hysterosoma, clavate pseudostigmatic organs, a distinct pitted sculpture of the hysterosoma, 7 pairs of genital hairs, two pairs of anal hairs, I shall establish as species belonging to *Pedrocortesella,* although with some doubt, as there are small differences, i.e. displacement of the posterior pair of hairs of the hysterosoma, an incurvation in the posterior end of the hysterosoma, a common frame between the genital and the anal field, etc. These different characters are not all present in one species, as will appear from the following. All these species carry the nymphal skin on the dorsum like *Pedrocortesia* and *Pedrocortesella.* In *P. gymnonotus* both the rostral and the lamellar hairs are very thin. The rostral hairs, which are situated on the lateral border of the propodosoma, just reach the tip of the rostrum. The lamellar hairs, which are situated on the dorsal side, cross in front of the rostrum. The middle of the dorsal part of the propodosoma is irregularly reticulate. In the meshes there are pits, in the middle of which a clear point can be seen. This reticulation is present almost to the posterior border of the propodosoma, though more irregular in that part, where the reticulated area is narrowest and it is missing behind the tip of the rostrum, where there is a light spot with a projecting tip from its posterior border. There are no teeth in the middle, where the area is narrowest as in *Pedrocortesia.* The interlamellar hairs are very short and situated near the pseudostigmata. The pseudostigmatic organs are clubs, broadest near the tip. They are set with greyish scales and they are as long as the distance between the interlamellar hairs. The hysterosoma is oval and has an incurvation at the posterior end. The sculpture consists of light round pits surrounded by brown frames or meshes, above which some small longish brown granules can be seen. At a deeper level a distinct yellow dot appears in the middle of the light pits, the pits thus reminding of fried eggs. A short distance behind the anterior border of the hysterosoma there is a small group of dense small pits, each with a light dot. A similar group is present medially to the fissure im. The five pairs of hairs along the posterior end of the hysterosoma are very thin, almost invisible. Three pairs are situated on the lateral sides, one pair at the posterior end and one on either side of a ventral incurvation, which can be seen also in a dorsal view. The fissurae ia, im, and ip are long. Between Epimeres II and III there is laterally an incision, fig. 59a. The genital and the anal field are very close together. There are 7 pairs of genital hairs, two pairs of anal hairs. Adanal hairs could not be seen. Along the genital and the anal field there are some dark chitinous thickenings and also some short transverse ones off the genital field. Most of the ventral side is pitted like the dorsal side of the hysterosoma. Fig. 59 b shows Tibia and Tarsus I. The latter is short and broad. The protuberance distally on the tibia is half the length of the tarsus. The stalk of the claws is almost as long as the claws and as the protuberance of the tibia. The middle claw is about three times broader than the lateral ones. A thick layer of secretion covers all surfaces.

Milford: Three adults and a nymph in thick moist moss on dead branches in the tree-fern forest.

Pedrocortesella sexpilosus (Ramsay); fig. 60. (= *Arthrodamacus sexpilosus* Ramsay p. 5).

Colour brown. Length about 0.57 mm.

The sculpture of the propodosoma consists of rather regular deep pits, which are biggest in the middle of the propodosoma, smaller and irregularly deep on the rostrum and in the posterior part of the broad middle field. Behind the middle field the dorsal surface slopes downwards and this part, which is at a lower level, has irregular faint ridges with only a few light dots. The pseudostigmatic organs are slender, but flat clubs set with pointed scales. They are a little longer than half their mutual distance. The sculpture of the middle of the hysterosoma consists of round light pits of almost the same size and with a mutual distance of approximately the length of their diameter. In their middle there is a light grey spot. The secretion covering them forms a reticulation of irregular, tongued, more or less hexagonal brown meshes, which often run across the pits, fig. 60 a, b. This reticulation is very indistinct. The pits are very small along the border all the way round. Along the outer border they are represented by narrow slits. At the posterior end of the hysterosoma there is an incurvation from the ventral side. The dorsal side is heavily chitinized over the incurvation. There are three pairs of short, thin, and smooth hairs on the latero-posterior border of the hysterosoma, and one at the posterior end. The fifth pair projects from the ventral side. The ventral side has not been figured. The genital and the anal field are close together. The whole ventral side is covered with clear pits like the dorsal side. Fig. 60 c shows Tibia and Tarsus I. The stalk carrying the claws is almost as long as the latter. The claw in the middle is the strongest.

Keri-Keri: One specimen in luxurious carpet of low plants, ferns and mosses near a brook in deep shadow.

New Plymouth: One individual in moist *Selaginella* on a trunk in native forest.

Pedrocortesella cryptonotus (Ramsay); fig. 61. (= *Arthrodamaeus cryptonotus* Ramsay p. 5).

Colour light dirty brown. Length about 0.50 mm.

This species is easily distinguished by its beautiful pattern on the dorsal side of the hysterosoma, consisting of hexagonal pits in the corners of which dark round tubercles or grains are situated, sometimes two close together, one for each of the neighbouring cells, sometimes one grain common to two cells, fig. 61 a. This hexagonal pattern gives the mite a chequered appearance. The pattern is regular only in the middle of the hysterosoma. Along the lateral sides there is an irregular reticulation without distinct tubercles. The middle field of the propodosoma has a similar pattern as the hysterosoma, but more irregular. The pits are deep and the surrounding meshes look like strong folds. The pseudostigmatic organs have a broad and flat, almost disk-shaped head. The disk-shaped head is partly due to a broad greyish soft edging. The strong, curved, transverse ridge in front of the pseudostigmata is partly due to the slightly posterior view in which the drawing was made. The posterior end of the hysterosoma is pointed. Across the posterior end there is a transverse ridge and laterally to it the fissure ip can be seen cutting in a curve deep into the integument, issuing from a small lateral protuberance. Along the latero-posterior end of the hysterosoma there are three pairs of strongly curved, short, smooth hairs. The distance between them is different on the two sides. No hairs can be seen at the posterior end of the hysterosoma as in the two preceding species. On the ventral side there are, however, two pairs of forwards directed hairs at the posterior end. The posterior hair from the dorsal side has thus been displaced to the ventral side, fig. 61 b. On the ventral side there is laterally a short incision between Epimeres II and III. The genital and the anal field touch and have a common frame. There are 7 pairs of genital hairs and two pairs of anal hairs. The ventral side is everywhere covered with deep light pits, for which reason the tiny hairs are difficult to see. Fig. 61 c shows Tibia and Tarsus I. The distal protuberance of the tibia is short. Distally on the short and broad tarsus there is a short protuberance, in which the solenidia and a protecting hair are situated. This hair is thicker than the other hairs. There are three very strong claws, the middle one of which is the strongest. The outer edge of the claws are finely serrate. The stalk is about half as long as the claws. The mite is completely covered with secretion.

Lake Rotoiti: One specimen in soaked moss and liverworts in a spring locality in *Nothofagus* forest.

Milford: 3 individuals in thick moss on the ground and on dead branches in *Nothofagus* forest.

Pedrocortesella latoclava n. sp.; fig. 62.

Colour brown. Length about 0.82 mm.

P. latoclava is distinct from the three species described above by its size, its short and broad pseudostigmatic organs, and by its sculpture. The middle field of the propodosoma has regular round pits, most distinct across the middle of the field, more indistinct on the rostrum and in the posterior part of the field. Irregular reticulation can be seen between the pseudostigmata. The pseudostigmatic organs are situated in deep dark cups. They have a flat dark broad head, which is not much longer than the stalk. The hysterosoma is very broad, semicircular in the anterior half, slightly pointed at the posterior end, which projects as a small tail. The middle of the hysterosoma within the faint circular line seems to be at a higher level than the surroundings. Along the latero-posterior border there are three pairs of short, smooth hairs. At the posterior end there is one pair, which is displaced to the ventral border and directed forwards. I have not been able to see a fifth pair. The sculpture of the hysterosoma consists of regular round light pits, the distance between which is a little shorter than their diameter. In their middle there is a large greyish spot surrounded by a light yellow ring, fig. 62a. On the brown ground a dark reticulation can be seen round the pits, fig. 62a, corresponding to the reticulation in fig. 60a, which is due to the secretion. The fissure ip is situated close to the latero-posterior border. The genital and the anal field have a common frame as in *P. cryptonotus*. As the latter and *P. latoclava* have several characters in common, which are not present in the other above-mentioned species of *Pedrocortesella*, i.e. the posterior dorsal hair displaced to the ventral side, ip long and reaching the lateral border, the posterior end of the hysterosoma pointed, the claws serrate on their outer edge, these two species may belong to a separate genus. Fig. 62b shows Tibia and Tarsus I. All the claws are strong, the middle one being the thickest. The outer border of the claws is faintly serrate. The stalk is short.

Milford: One specimen in wet mosses on a stone in *Nothofagus* forest.

?*Pedrocortesella nigroclava* n. sp.; fig. 63.

Colour clear brown. Length about 0.84 mm.

This big species of which only one specimen without tibiae and tarsi has been found is easily distinguished by its deep black pseudostigmatic cups and short, black, thick, and clavate pseudostigmatic organs, the head of which just reaches beyond the cup. The rostrum has radiating stripes with pits between them. The transverse ridge across the rostrum may be due to the difference in the level between the rostrum and the middle field. The latter has faint pits in oblique rows. The interlamellar hairs are short and thick. Behind the pseudostigmata there is a bent ridge with a tip directed outwards. The middle of the hysterosoma seems to be at a higher level than the lateral surroundings. The middle is decorated with light round pits on a brown ground, the distance between the pits being so short that the dorsum appears reticulate. The lateral sides are faintly radially striated. Behind the anterior border there is no sculpture except a faint dark line. The fissurae ia and im are rather short, ip are long, situated close together near the posterior end. Only two pairs of hairs have been observed on the dorsal side of the hysterosoma, viz. two tiny thick staffs close together at the posterior end and on the latero-posterior border a much thinner similar staff. At a deeper level there are two thin bent hairs projecting from the ventral side. This does not, however, mean that there are no more hairs. The mite is very dark and strongly chitinized and the hairs tiny and therefore extremely difficult to see. The genital and the anal field touch, but have no common frame. There are 7 pairs of genital hairs. The sculpture consists anteriorly of dark longitudinal bands running across the epimeres. Posteriorly there are dark folds directed more or less obliquely towards the posterior part of the genital field and then turning laterally.

Along the latero-posterior end there are pits as on the dorsal side. In a ventral view besides the two bent hairs on the posterior border furthermore a similar pair more anteriorly can be seen. This mite carries on its back larva and nymphal skins.

Keri-Keri: One specimen in thin moss and lichens on a tree.

?*Pedrocortesella* sp.; fig. 64.
Colour brown. Length about 0.63 mm.

As only one defective specimen was found in which the posterior end is broken and all legs are missing, it will not be established as a new species. The rostral hairs are missing. The anterior part of the propodosoma has light pits in oblique rows, the posterior part irregular transverse folds. The pseudostigmatic organs are short flat black clubs. The sculpture of the hysterosoma consists of light round pits, which are a little longer than their mutual distance. They cover the whole dorsal surface right to the anterior border, which is very unusual, as the anterior part normally has no or very irregular pits. The pits are very small towards the lateral border. In the middle of the pits a round greyish spot can be seen at a deeper level, fig. 64a. The fissure ip is longer than ia and im. Only two pairs of short bent hairs have been observed on the posterior border. As the posterior end, where the posterior hairs usually are situated, is missing, there will probably be at least tree pairs of hairs on the posterior border. The ventral side shows that the whole surface is densely pitted. The genital and the anal fields touch, each with their own frame.

New Plymouth: One specimen in moss and white clover on a lawn.

Fosseremus quadriperititus Grandjean; fig. 65.
Colour greyish light brown. Length about 0.24 mm.

Found at Keri-Keri, Rotorua, Waitomo, Pauatahanui, Queenstown, Waitakere, and Milford in moss on the ground, in dead leaves, in liverworts, and in dripping wet moss on a slope with oozing water, etc., singly or a few together.

Eremulus flagelliger Berl.; fig. 66.
Colour greyish light brown. Length about 0.31 mm.

In spite of the much smaller size than measured by Berlese for *E. flagelliger* (0.41 mm), I do think that the specimens from New Zealand represent *E. flagelliger* Berl.

Keri-Keri: One specimen in moss on the ground under trees and tall vegetation.

Rotorua: One specimen in liverworts and moss on a slope at Lake Tarawera.

New Plymouth: One individual in moss on a trunk in native forest.

Eremulus serratus n. sp.; fig. 67.
Colour light brown. Length about 0.39 mm.

E. serratus differs first of all from the preceding species by its colour, its considerably larger size, its broader hysterosoma, and by its pseudostigmatic organs, which are set with short spines like the teeth of a saw (hence the specific name). The lamellar hairs are straight. The lateral sides of the lamellae are sharp keels with small pits. The number of pits in each transverse row between the lamellae is 5–6, not including those on the lamellae. In *E. flagelliger* there are only a few and bigger pits in each row. Anteriorly the lamellae are curved, convex laterally, and the distance between them longer than further posteriorly in front of the interlamellar hairs, where the lamellae are parallel. Between the pseudostigmata there are several pits, but not in regular rows, and on the lateral sides of the propodosoma there are much larger pits. The pseudostigmatic organs are flagelliform as usual within this genus. The spines, which are found on the distal two thirds of the flagellum, are short, broad at the base with short anterior edge and not outstanding, fig. 67a. The hairs of the dorsal surface of the hysterosoma are rather thick and dark in most of their length, the tip, however, suddenly very thin, crooked, and white. Several are missing, as they easily break.

Fox Glacier: Four individuals in dead leaves in native forest; three specimens in moss, grass, and low vegetation at the road-side in native forest.

Suctobelba falcata Forssl.; fig. 68.

Colour light brown. Length about 0.235 mm.

Rotorua: Found in several samples, especially numerous in moist moss and small ferns under *Manuka* shrub in the thermal area.

Pauatahanui: One specimen in thick moss, grass, and small plants in a forest of tree ferns.

Lake Rotoiti: Several individuals in thick moss in *Nothofagus* forest; a few in moss and lichens in *Manuka* shrub.

Waitakere: Several individuals in liverworts and small ferns on a log in native forest; a few in moss in the drier *Manuka* shrub.

Suctobelba subcornigera Forssl.; fig. 69.

Colour light brown. Length about 0.20 mm.

Found at Keri-Keri, Rotorua (Lake Tarawera), Pu Pu Springs, Christchurch, Queenstown, and Milford in wet moss, in dry moss, in liverworts, in dead leaves, etc., most numerous in Pu Pu Springs in almost dry moss under *Manuka* shrub.

Suctobelba nasalis Forssl.; fig. 70.

Colour light brown. Length about 0.22 mm.

The specimens from New Zealand agree in all details with Forsslund's description (1941, p. 295, fig. 11) except that the rostrum is covered dorsally by granules.

Keri-Keri: In moss and dead leaves, in liverworts, *Selaginella*, usually only a few together; also found on the border of a swamp.

Rotorua: One specimen in liverworts under *Manuka* shrub in the thermal area; one on a lawn at the Forest Research Institute; several individuals in moist liverworts and moss on a slope at Lake Tarawera.

Waitomo: Two specimens in liverworts, moss and dead leaves in tree-fern forest.

Milford: A few individuals in thick moss, white clover, and grass.

Suctobelba longicurva n. sp.; fig. 71.

Colour light brown. Length about 0.245 mm.

The rostrum projects, but not so much as in *S. nasalis* Forssl. Behind the rostral hairs there is a deep incision followed by a pointed tooth, which is directed forwards and which is broad at the base across which there is a curved line. The tooth, however, is very often or always divided into three parallel teeth situated close together and in such a way that usually only the anterior one can be seen in a dorsal view. In front of them, separated by the deep incision, there is a broad apical lobe, which is directed outwards and ventrally, figs. 71 a–c. The tectopedial fields are very long, about twice as long as the rostrum in front of them. The bridge between the tectopedial fields has faint meshes anteriorly. The lamellar knob is almost circular with small tubercles anteriorly. It is open posteriorly. The lamellar hairs are very long. The lamellae are faintly developed, mainly as small single tubercles. The interpseudostigmatic ridges are narrow, separated by a great distance, and they almost touch the pseudostigmata. They are connected by a thin line, which as an arch reaches the open posterior part of the lamellar knob. There are no tubercles on the bridge between the tectopedial fields. The pseudostigmatic organs are clavate, when bent showing a short, thick, rounded, and smooth head, when stretched out ending in a slender, pointed head. The four teeth on the anterior border of the hysterosoma are approximately the same size. The two medial ones are situated a little further posteriorly. They continue backwards as faint keels for a very short distance. The hairs of the dorsal side of the hysterosoma are long, curved (hence the specific name) often reaching the base of the following one.

Found at Keri-Keri, Rotorua, Waitomo, Pauatahanui, Pu Pu Springs, Queenstown, Puketi, Waitakere, Fox Glacier, and Milford, usually a single individual or a few in the samples; most numerous in slightly moist moss under *Manuka* shrub at Waitakere.

Suctobelba plumata n. sp.; fig. 72.

Colour very light brownish. Length about 0.185 mm.

The rostral hairs are situated on either side of the two longitudinal ridges on the rostrum at the point with the longest distance between the ridges. From this point the ridges incline both anteriorly and posteriorly. Between the ridges the integument is covered with granules. The rostral hairs are not so strongly geniculate as in most *Suctobelba* species. Immediately behind the rostral hair there is a broad apical lobe directed outwards and ventrally. It is separated from the rostral teeth by a deep incision, which is rounded at the base. The rostral teeth, 2–?3, fig. 72 a are broad, slightly pointed, parallel, and are separated only by a narrow slit. They are directed towards the tip of the apical lobe, i.e. forwards. The tectopedial fields are rather narrow, between them a few small tubercles can be seen, both near the lamellar knob and anteriorly. The lamellar knob is divided into two, each of them with lateral lobes. The lamellar hairs, which are situated in the posterior lobe, are short. The lamellae are not developed. The interpseudostigmatic ridges are broad and very distinct, but almost without a posterior tooth or lobe opposite the medial tooth of the hysterosoma. They are connected by irregular lines running to the posterior part of the lamellar knob. The pseudostigmata have a broad lobe posteriorly. The organs have a short, broad, clavate head. On the anterior border of the hysterosoma there are four teeth, the lateral ones being slightly bigger than the medial ones. All of them are pointed and continue backwards as long double keels. The hairs of the dorsal side look like small feathers (hence the specific name). The number of side branches varies considerably. There are 6 pairs of feathered hairs. The posterior hairs are short, tiny bristles.

Rotorua: Many individuals in slightly moist moss and dead leaves under *Manuka* shrub in the thermal area.

Waitakere: 6 specimens in slightly moist moss in *Manuka* forest.

Fox Glacier: 8 individuals in slightly moist moss in native forest at Lake Matheson.

Suctobelba nondivisa n. sp.; fig. 73.

Colour light brown-brown. Length about 0.25 mm.

This species is easily recognised by the tectopedial fields, which are not separated except for a short distance posteriorly (hence the specific name). Laterally the tectopedial fields are bordered by ridges, which, however, are broken. The middle of the propodosoma is bare. It is bordered anteriorly by a faint curved line. The rostrum projects a little. Below the rostral hairs there is a small pointed apical tooth and behind it a broad lobe directed outwards. Further posteriorly there is a very long, pointed tooth, directed forwards and reaching beyond the lobe and beyond the rostral hair. It has a very broad base, fig. 73a. Near the latero-posterior border of the tectopedial fields there are two deep hollows. The lateral sides of the propodosoma are rounded. Both the propodosoma and the hysterosoma are broader and rounder than usual for *Suctobelba*. The lamellar knob is round, although slightly pointed anteriorly. The inner hole is big, and its posterior border is indistinct. The lamellar hairs are extraordinarily long. Laterally to the lamellar knob there are a few tubercles. The lamellae are narrow, but well developed proximally. Distally they do not reach the lamellar knob, but run more posteriorly to the line connecting the interpseudostigmatic ridges with the posterior border of the lamellar knob. The interpseudostigmatic ridges are very narrow and are situated close to the pseudostigmata. Only their posterior end is distinct. The pseudostigmata have a long posterior ridge, which almost reaches the posterior end of the interpseudostigmatic ridge. On its posterior border there is a lobe or tooth corresponding to the lateral tooth of the hysterosoma. The pseudostigmatic organ is clavate, in a dorsal view often thick and round at the end, but when laid bare the head is slender and pointed at the tip, figs. 73b, c. The lateral sides of the propodosoma off the pseudostigmata are very rough, densely set with small pointed tubercles. The medial teeth on the anterior border of the hysterosoma are very short. They hardly reach beyond the anterior border. The lateral ones are considerably bigger and continue for a short distance backwards as faint keels. The lateral and the medial tooth from each side are situated rather close together. The hairs of the dorsal side are very long, the tip extremely thin and curved into a hook. The integument of the propodosoma and the hysterosoma is finely punctate.

Found at Keri-Keri, Rotorua, Waitomo, New Plymouth, Pauatahanui, Pu Pu Springs, Queenstown, Waitakere, and Milford, most numerous at Rotorua in moist moss and decaying leaves under *Manuka* shrub in the thermal area and in slightly moist moss at Waitakere, both in native forest and in *Manuka* shrub.

Zeasuctobelba n. gen.

Zeasuctobelba bears a close resemblance to *Suctobelba*, but deviates in the following characters: It has no rostral teeth, but an ordinary lateral tip. The tectopedial fields are often more or less obliterated. There are 10 pairs of hairs on the dorsal side of the hysterosoma. On the ventral side there is a slit or groove in the anterior border behind the camerostome. The distal joint of the palp is drawn out into a thread, which is bifurcate at the tip.

Zeasuctobelba quinquenodosa n. sp.; fig. 74.
Colour light brown. Length about 0.20 mm.

The anterior part of the propodosoma is triangular, the tip of the rostrum is very pointed. On either side of the tip of the rostrum there is a sharp strong tip, which is directed forwards and slightly ventrally, fig. 74a. The lateral sides of the propodosoma are rough with strong keels. A short distance behind the tip of the rostrum there are two longitudinal ridges, which are situated close together, touching in the middle, diverging at both ends. At their anterior end the rostral hairs are situated. They are bent and thickest proximally, probably due to short secondary bristles. The tectopedial fields are distinct only medially and posteriorly. Laterally they do not reach the outer tectopodial ridge and their border is indistinct. At their anterior end and halfway between them there is a third field. Between the tectopedial fields there are a few big tubercles. The lamellar knob is angular, slightly concave laterally. The rather long and thin lamellar hairs are situated behind the middle of the knob. Lamellae are not developed. The interpseudostigmatic ridges are dark, greyish, and very well defined. Their posterior part is broadly lobate. Between the medial border of the pseudostigmata and the posterior end of the tectopedial field there is a faint ridge. The pseudostigmata have a lateral protuberance on the posterior border of which there is a lobe corresponding to a lateral tooth on the anterior border of the hysterosoma. The pseudostigmatic organs have in a dorsal view an almost round head, which when laid bare is a long broad club, fig. 74b. The lateral side of the posterior part of the propodosoma ends in a narrow tap, different from the lobe in *Suctobelba*. Opposite it there is a small lobe. Tectopedium IV ends distally in a sharp tooth. The anterior border of the hysterosoma has four teeth, the lateral ones being long, pointed, vertical blades, which continue for a long distance backwards on the hysterosoma. The medial ones are short and broad tubercles, which, however, may vary a little and sometimes be more slender and pointed. The two medial tubercles together with the interpseudostigmatic ridges and the lamellar knob, all dark greyish are very conspicuous and have given the mite its specific name. The 6 pairs of hairs on the dorsal side are very long and each of them reaches the base of the following one. Those at the posterior end are considerably shorter. The integument is densely punctate. The ventral side, fig. 74c: A membrane seems to cover most of the ventral side. Anteriorly the membrane projects into a tongue on either side of the camerostome, but most of the borders are invisible. Laterally it seems to project beyond the base of Leg II, and medially there seems to be two almost longitudinal edgings. Behind the camerostome there is a broad longitudinal groove, reaching posteriorly the middle of Epimere I. Epimeres III and IV from each side are fused. Apodemata I are narrow, Apodemata II are very broad with a triangular tip projecting into Epimere II. In front of Acetabulum I there is on either side a broad hollow, which likewise seems to be covered by a thin, almost invisible membrane. A broad curved ridge runs across the hysterosoma in front of the genital field. The genital and the anal fields are equally large. There are 5 pairs of genital hairs, two pairs of anal hairs and three pairs of adanal hairs. The fissure iad is long, parallel to the anal field. The mandibles are very slender. The palps extremely long, the distal joint drawn out into a thin thread, which is bifurcate distally. All tarsi are monodactyle.

Nelson: 12 individuals (Stagaard coll.).

Lake Rotoiti: Many specimens in wet *Sphagnum* and thick moss in a spring locality in *Nothofagus* forest.

Fox Glacier: Several individuals in moss and liverworts on the ground and on trees in native forest; a few in thick moist moss on the ground in native forest at Lake Matheson.

Milford: A few in thick moist moss on the ground in native forest; a single individual in liverworts on a decayed log under trees on the sea shore.

Zeasuctobelba trinodosa n. sp.; fig. 75.
Colour light brown to brown. Length about 0.29 mm.

This species of which only two specimens were found is distinguishable from *Z. quinquenodosa* by its short lateral teeth on the anterior border of the hysterosoma, the short hairs of the dorsal surface and its larger size. As both specimens are in an oblique position details cannot be shown. The lamellar knob and the two broad medial tubercles on the anterior border of the hysterosoma have given the species its specific name. The pseudostigmatic organs are slender clubs.

Keri-Keri: Two specimens in moss and pine needles and dead leaves at the foot of a dead pine tree.

Zeasuctobelba nodosa n. sp.; fig. 76.
Colour light brown. Length about 0.195 mm.

The rostrum is rounded and has on either side a lateral tip, which is directed ventrally and in a dorsal view appears like a dull protuberance. In a ventral view a somewhat bigger tip can be seen further posteriorly, fig. 76a. The rostral hairs, which are situated on the outer side of the two longitudinal ridges, are evenly curved forwards and set with secondary bristles proximally. The longitudinal ridges diverge posteriorly. The tectopedial fields are very indistinct. Posteriorly they almost touch the lamellae. Medially they are separated by a long distance, which is broadest off their anterior ends. There are two deep hollows medially in the tectopedial fields, at different levels, the medial ones being more superficial. The lamellar knob is narrow without an inner hole. The lamellar hairs are situated at the base of the knob, which is merged with the lamellae. The latter are well developed from the medial side of the pseudostigmata almost to the lamellar knob, where they are often faint. They have a small round protuberance on their anterior border near the lamellar knob. The lamellar hairs are short and thin. The interpseudostigmatic ridges are distinct only at the posterior ends, which are shaped as a round lobe. Anteriorly they reach the lamellae at the lamellar knob. A pore for the interlamellar hair can be seen between the lamella and the interpseudostigmatic ridge. The pseudostigmata have on their posterior border a round lobe. The pseudostigmatic organs carry on a thin stalk a long lanceolate head, which is smooth, the end being drawn out into a thin thread. The anterior margin of the hysterosoma is faintly chitinized and greyish medially without teeth. Laterally there is a short blunt tooth off the lobe on the pseudostigma. The hairs of the dorsal side are short and smooth. The ventral side, fig. 76a. The posterior part of the camerostome is hidden under a membrane in which there is a longitudinal groove with a round hole in its middle. The solenidion of Tarsus I is very broad, long and curved, those of Tibia and Tarsus II also very broad. Tarsus IV with two bifurcate hairs ventrally. For further details see under *Z. quinquenodosa*.

Waitakere: 14 specimens in liverworts and moss on a log in the forest.

Suctobelbila dentata (Hammer); fig. 77.
Colour dirty brown. Length about 0.195 mm.

Waitakere: One specimen in liverworts, moss, and débris on the ground.

Machuella ventrisetosa Hammer; fig. 78.
Colour brown. Length about 0.20 mm.

Keri-Keri: 12 individuals in mosses on a slope above a small brook in deep shadow.

Rotorua: Two specimens in moist liverworts and moss on a slope at Lake Tarawera.

Hydrozetes lemnae (de Coggi); fig. 79.
Colour brown. Length about 0.49 mm.

Keri-Keri: One specimen in wet moss on a stone in a brook; one in moss on the edge of a swamp and one specimen in thick dead *Selaginella* in a shadowed deep cleft.

Rotorua: Numerous in wet moss on a stone in the edge of a pond.

Pu Pu Springs: A few individuals in wet moss, *Lemna*, water-cress on the edge of the spring.

Queenstown: A few individuals in soaked moss on the bank of Lake Hayes.

Carabodes ornatissimus n. sp.; fig. 80.

Colour golden-yellowish. Length about 0.35–0.51 mm.

The rostral hairs are smooth and very thin, and less than half as long as their mutual distance. The lamellar hairs, which almost meet at the tip of the rostrum, are slightly serrate. The interlamellar hairs are so long that they reach the base of the lamellar hairs; they are rather thick and smooth. The pseudostigmatic organs have a short round head, which is hollow ventrally. In this hollow there are many small bristles, all directed distally. Between the propodosoma and the hysterosoma there is no broad and deep groove, only a narrow furrow. The shoulders are prominent with a deep incurvation anteriorly and posteriorly. A short distance behind them there is a small swelling, which is smooth. The lateral borders and the posterior border are tongued. The hairs of the dorsal surface are extremely thin, rather long and a little curly. The sculpture of the propodosoma and the hysterosoma consists of round spots, which are different-sized and not arranged in a regular pattern, though often in undulating rows. They are yellowish-golden and only slightly darker than the ground. The spots on the propodosoma are a little bigger than those on the hysterosoma. They have an irregular border and seem to be divided into sections like a transverse cut of an orange, fig. 80a. In the centre there is a light point. Between the spots numerous fine lines seem to radiate in all directions. This very fine structure makes the whole surface look like hammered gold. On the tip of the rostrum a few small pits can be seen, laterally on the lamellae there are larger pits. Femora I–II have deep round pits ventrally. There is apparently a difference in size according to the sex, the females being considerably bigger than the males (0.35–0.38 versus 0.48–0.51 mm). This species is very variable, not in the sculpture or the hairs of the hysterosoma, but as regards the length of the lamellar and the interlamellar hairs. In some specimens the interlamellar hairs are not even half the length shown in fig. 80 and much thinner. There may be two different species which I am unable to separate.

Lake Rotoiti: 16 specimens in thick moss and lichens in *Manuka* and *Nothofagus* forest.

Puketi: 14 individuals in thick moss on a trunk; one in moss on the ground.

Waitakere: Two specimens in liverworts on a trunk in native forest.

Carabodes variabilis n. sp.; fig. 81.

Colour light brown to brown. Length about 0.45–0.50 mm.

As *Carabodes variabilis* varies as much as *C. ornatissimus* as regards the length and thickness of the lamellar hairs, the shape of the rostrum and its size, it is difficult to tell what is typical. At the first glance *C. variabilis* resembles *C. ornatissimus* very much. Mainly the differences between the two species will be mentioned. The rostral hairs are short and bent. The lamellar hairs, which are situated in a hollow at the end of the lamellae, are equally thick throughout, serrate, and do no reach the base of the rostral hairs; in some specimens they are very thin. The interlamellar hairs are thin, smooth, and rather short. The pseudostigmatic organs have a short round head which is black at the distal border. The bristles in its ventral hollow are thin. The distance between the proximal part of the lamellae is proportionately much longer than in *C. ornatissimus*. There is no broad collar groove, only a narrow furrow between the propodosoma and the hysterosoma. The latter has prominent shoulders almost as in *C. ornatissimus*. The hairs of the dorsal side of the hysterosoma are very short, smooth, and thin. The distance between the hairs of the medial pairs is much longer than in *C. ornatissimus*. The sculpture is different, too, and this character is the best at the first glance to separate the two species. The sculpture consists of angular, more or less pentagonal grey spots, which lie so close together that a fine-meshed yellow reticulation is formed round them. This reticulation is present only on the hysterosoma. On the propodosoma the spots are round and the distance between them is longer. Here the spots are arranged more or less in transverse rows. At the tip of the rostrum there are small pits, on the lamellae larger pits.

Fox Glacier: Very common in liverworts, mosses, dead leaves on the ground, and in mosses on the trunks in native forest.

Milford: Several individuals in liverworts, moss, and dead leaves on rotten branches and on the ground in *Nothofagus* forest.

Austrocarabodes n. gen.

Austrocarabodes is very similar to *Carabodes*, but differs by having 14 pairs of hairs on the dorsal side of the hysterosoma. The rostral hairs are situated behind the tip of the rostrum. Ventral side with a sternal plate. Epimeric hair formula: 3:1:3:4. There are four pairs of genital hairs, two pairs of anal hairs. The medial border of the anal plates with a thin transversely striated membrane. The medio-posterior border of the anal plates ending in a sharp tip. Femur and genu of all legs with strong spines. All tarsi with one claw with a deep indentation in the inner border. The palp has 5 joints, the proximal one being very short as in *Carabodes*. The mite is covered with a layer of secretion. Type species: *A. ensifer* (*Carabodes ensifer* Selln. 1931, p. 717, fig. 20–21).

Austrocarabodes maculatus n. sp.; fig. 82.

Colour brown. Length about 0.58 mm.

The rostrum projects a little beyond the tip of the lamellae. The rostral hairs, which are situated a good distance behind the tip of the rostrum rather close together, are very long, bent in a semicircle outwards, forwards, and medially against each other, thus forming a circular ring. They are unilaterally slightly rough, covered with secretion or papillae and are equally broad throughout. In their middle there is a rib. In young individuals the hairs are very delicate with a hyaline smooth membrane on either side of the rib. The lamellae, which are shaped as in *Carabodes*, have the lamellar hairs on their tip. The latter, which resemble the rostral hairs, are bent medially and almost touch the tip of the rostrum. The interlamellar hairs are situated at some distance from the lamellae, not close to them as usual for *Carabodes*. From their base a thin ridge runs obliquely backwards, disappearing under the lamellae. The interlamellar hairs, which are bent forwards and outwards in a curve, are similar to the rostral and the lamellar hairs except that they have a double rib. The pseudostigmata, which project a little beyond the lateral border of the lamellae, are twisted like a horn and the inner side is reinforced by chitinous ribs. The pseudostigmatic organs as in *Carabodes* are thickest at the tip and dorsally set with thick, almost clear bristles. The tip of the organs is slightly bent. Between the pseudostigmata there is a line bordered with chitinous tubercles and behind it the integument is at a deeper level, thus forming here a kind of "collar" as in *Carabodes*. The latero-anterior border of the hysterosoma is well chitinized and forms a small slightly angular shoulder, which anteriorly does not project beyond the pseudostigma, posteriorly a little. The anterior border of the hysterosoma is slightly arched, the lateral sides almost parallel and the posterior end rounded. There are 14 pairs of hairs on the dorsal side, viz. 5 medial, 5 submarginal, and 4 postero-marginal ones. All the hairs resemble those on the propodosoma. The sculpture of the propodosoma and the hysterosoma is alike, consisting in low round spots arranged in undulating rows. They are not much darker than the surroundings and not easy to discern. The ventral side, fig. 82 b. The sternal plate is broadest between Epimeres III, where it is triangular. The epimeric hair formula is 3:1:3:4. The hairs are very long and thin. The integument of the epimeres is reticulate. A short distance in front of the genital field there is a distinct curved ridge. The genital and the anal field are almost equally long, the latter perhaps slightly bigger, both are more or less quadrangular with rounded corners. The distance between them is slightly longer than the length of the anal plates. There are 4 pairs of genital hairs, situated at the same mutual distance. The anal plate has two thin hairs, both situated rather far posteriorly. The medial posterior border of the anal plate is drawn out into a thin tip. Ad 1–ad 3 are broad and rough. Femora I–II are clavate, Femur II with four spines (one is missing in fig. 82 c). The distal ventral side of Femur II is densely punctate. Genu I, fig. 82 c has a broad blade-shaped spine laterally, medially a spine and a thick hair. Tibia and Tarsus I are joined densely together and look as if fused. At the base of the claw there is a short broad spine. The claw is strong and has at the inner border a big indentation, in this way forming a tooth proximally. All the hairs round the claw are hookshaped, curved at the tip. All femora and genus have spines, as shown in fig. 82 c. Femora III–IV with a broad ventral keel. On Genu I there is medially a barbed strong spine, besides the short lateral blade-shaped one. The whole body is covered with secretion.

Keri-Keri: A few specimens in moss and lichens on a tree; also a few in dead leaves and débris.

New Plymouth: One individual in dead leaves in native forest.

Lake Rotoiti: Three specimens in moss and dead leaves in *Nothofagus* forest.

Waitakere: 7 specimens in liverworts and moss in decayed wood and in moss on the ground in native forest.

Milford: One specimen in liverworts on a dead branch; one in thick moss, both in *Nothofagus* forest.

Austrocarabodes elegans n. sp.; fig. 83.
Colour brown to mahogany red. Length about 0.50 mm.

A. elegans is distinct from *A. maculatus* by its very long hairs, which is almost the only distinct difference found after a careful examination. A few more characters will be mentioned. The rostral hairs are very long and often cross in front of the rostrum. The lamellar hairs meet at the tip of the rostrum. There is apparently no ridge from the base of the interlamellar hairs obliquely backwards to the lamellae. The interlamellar hairs are almost vertical before they bend outwards and backwards and they are so long that in spite of their bent shape they reach beyond the lamellae, ending in a thin slightly bent tip. The line indicating the anterior border of the collar is faint. The pseudostigmatic organs have clear secondary bristles. The anterior border of the shoulder is often smooth and separated from the posterior half by an incurvation. The hairs of the dorsal side of the hysterosoma make a very nice pattern. All the hairs are strongly curved and so long that they reach the base of the following one. The two of the anterior medial pair are proximally erect, turning medially, then in a long curve turning laterally and finally again medially. The second pair are directed laterally, the third pair medially. The fourth and fifth pair cross in a large curve and so does the fourth postero-marginal one. The sculpture of the propodosoma and the hysterosoma consists of very indistinct small greyish spots, which are not clearly defined. The secretion layer has so fine a pattern that it seems to be extremely finely punctate. This can be seen only in light specimens. The ventral side resembles that of *A. maculatus*.

Keri-Keri: A few specimens in a cleft with water (Stagaard coll.); two individuals in thin moss and grass on wet soil near a brook.

Lake Rotoiti: 6 individuals in dead *Nothofagus* leaves; two in moist moss; one in soaked moss in a spring locality, all in *Nothofagus* forest; 5 specimens in moss and lichens in *Manuka* and *Nothofagus* forest, drier.

Fox Glacier: 11 specimens in moss and dead leaves in native forest; one in moss on a tree; 8 individuals in moss, liverworts, and grass in a ditch through *Nothofagus* forest.

Milford: 9 specimens in thin layer of liverworts on a rotten log; two specimens in dead *Nothofagus* leaves, and four individuals in wet moss in the same forest.

Austrocarabodes nodosus n. sp.; fig. 84.
Colour light brown-brown. Length about 0.52 mm.

The projecting rostrum is shorter than in the preceding species. The rostral hairs are shorter than in *A. elegans* and the lamellar hairs are short and do not reach the tip of the rostrum. They are serrate and set with small granules, which can be seen only when laid bare, fig. 84a. There is a distinct ridge between the lamellae and the interlamellar hairs, but only visible in young light specimens. A transverse ridge in the posterior border of the propodosoma is divided into three parts, the medial one of which is situated farther forwards, nor is this feature always distinct. The hairs of the dorsal side of the hysterosoma are shorter than in *A. elegans* and they seldom reach beyond the base of the following one. At the posterior border of the hysterosoma they do not cross as in *A. elegans*. The sculpture consists of round, dark knots of different size, but well indicated on a light brown ground. They are not arranged regularly in a pattern. At a certain level a light dot in the middle of the spots can be seen surrounded by a darker ring, whereas the outer surroundings appear slightly lighter. The ventral side, fig. 84b, agrees in most characters with that of *A. maculatus*. The sternal plate is faintly chitinized in young individuals. Between the genital and the anal field there is a curved transverse ridge. From Acetabulum IV a ridge runs obliquely backwards, then medially in a pointed angle, thus forming a tooth, which is directed laterally. The ridge is indicated as a faint line in *A. maculatus*. The aggenital hairs are thin, the adanal hairs have a middle rib.

Keri-Keri: Two specimens in moist—wet luxurious moss near a brook.

Fox Glacier: Many individuals in dead leaves and small ferns in native forest; several at Lake Matheson in dead leaves and in moss and many in liverworts, moss, and grass in a ditch near the coast, in a forest.

In the genus *Austrocarabodes* we must probably include the following species:

Carabodes costulatus Balogh 1958, p. 17; 1960, p. 92, figs. 6–8. Angola.
— *angulatus* — 1958, p. 18. Angola.
— *sordidus* — 1958, p. 18. Angola.
— *celisi* — 1958, p. 19. Belgian Congo.
— *longulus* — 1958, p. 19. East Africa.
— *imperfecta* Sellnick, 1959, p. 119, fig. b. Southeastern Polynesia.
— *albidus* Balogh 1960, p. 22, figs. 23–24. Madagascar.
— *lunarius* — 1962, p. 423, figs. 15–16. Madagascar.
— *cellularis* — 1962, p. 423, figs. 17–18. Madagascar.

Unfortunately some of the descriptions are without figures and the descriptions too short, but all the species have 14 pairs of hairs on the dorsal side of the hysterosoma.

Nodocepheus dentatus Hammer v. *barbatus* n. var.; fig. 85.

Colour light brown. Length about 0.22 mm.

The specimens from New Zealand deviate from the type specimen (Hammer 1958, p. 65, Plate XIX, fig. 75) in having feathered (barbate) lamellar hairs. Besides being feathered the lamellar hairs are considerably longer and in some specimens cross in front of the rostrum. The hairs of the dorsal side of the hysterosoma are slightly longer, especially those on the shoulder.

Found at Keri-Keri, Rotorua, Pauatahanui, Nelson district (Upper Takaka), Lake Rotoiti, Queenstown, Waitakere, Fox Glacier, and Milford, in mosses and liverworts also in dripping wet moss in oozing water. Often several together, viz. at Waitakere in moss and liverworts on a dead trunk.

Pseudotocepheus foveolatus n. sp.; fig. 86.
Colour light brown. Length about 0.66 mm.

Pseudotocepheus was established by Balogh (1960 p. 23, the type species being *P. pauliani*, Madagascar. Generic characters: 10 pairs of hairs on the dorsal side of the hysterosoma, 3 pairs of genital hairs, the fissure iad situated in front of the anal field. Otherwise as in *Tetracondyla* Newell. This is a very short diagnosis and information about more characters would be a great help. Some of the given characters may not be of generic value, and *P. foveolatus* does not agree in all characters. The rostrum is evenly rounded. The rostral hairs, which are situated far laterally, reach by half their length beyond the tip of the rostrum. They are uneven. The same holds good of the lamellar hairs, which are considerably longer and very thin towards the tip. They are situated distally on the end of the narrow lamellae, which are almost parallel, diverging slightly towards the pseudostigmata. The lamellar hairs reach by more than half their length beyond the tip of the rostrum. The interlamellar hairs, which are situated off the anterior border of the pseudostigmata, are very long and thin, especially towards the tip, and reach beyond the base of the lamellar hairs. Between the interlamellar hairs a slightly darker field can be seen, bordered laterally by straight lines and ending posteriorly in two rounded knobs, which do not reach the anterior border of the hysterosoma. The pseudostigmatic organs are short oblong clubs, fig. 86a. They are greyish, which probably is due to minute bristles. On the posterior border of the pseudostigmatic cups there is a broad tooth corresponding to a much smaller tooth on the latero-anterior border of the hysterosoma. The propodosoma is everywhere covered with small round pits. Between the pits the integument is densely punctate. The anterior border of the hysterosoma has in the middle several small round tubercles, laterally the above-mentioned teeth. There are 10 pairs of flexible hairs on the dorsal side, arranged as shown in fig. 86. They are very long, extremely thin at the tip and smooth. Two fissurae can be seen near the lateral border. Due to the punctation of the integument the pits of the dorsal side look like small asterisks with radiating punctate lines, fig. 86b. The ventral side is shown in fig. 86c. Apodemata I–II are long, Apodemata III short and separate Epimeres III and IV only halfway. The genital field is brown and without sculpture, the anal field is light and has minute pits. There are three pairs of genital hairs, one pair of aggenital hairs, two pairs of anal and three pairs of adanal hairs. The fissure iad is not, however, praeanal, but situated off the anterior anal hair at some distance from the lateral border of the anal field. I wonder if a praeanal iad is necessarily a generic character. In *P. pauliani* Balogh iad is praeanal and situated in front of ad 3, in *P. longus* Balogh (1960, p. 25, fig. 29) it is also praeanal, but situated behind ad 3. If it is a generic character *P. foveolatus* does not belong to *Pseudotocepheus*. The integument of the ventral side is pitted and punctate between the pits. The mandible is normal, fig. 86e.

All legs are monodactylous. Fig. 86d shows the distal end of Leg I. There is a small indentation on the outer border of the claw, forming a low edge or tooth behind the indentation. Tibia and tarsus are completely separated, also in the palp. Fig. 86f shows the maxilla and palp.

Keri-Keri: Four specimens in dead leaves and moss near a brook under tall trees.

Rotorua: 12 individuals in moss and leaves on the ground.

Pu Pu Springs: 6 individuals in almost dry moss under *Manuka* shrub.

Pseudotocepheus punctatus n. sp.; fig. 87.

Colour light brown-brown. Length about 1.06 mm.

The rostral hairs, which are situated far laterally on the dorsal side of the rostrum, are thin, smooth, and reach in a curve beyond the tip of the rostrum. The lamellar hairs, which are situated at a mutual distance only half as long as that of the rostral hairs, and a good distance in front of the lamellae, are rather thin, straight, slightly uneven and reach beyond the tip of the rostrum. The lamellae, which have a straight and sharp outer margin, an indistinct medial border, are parallel. They reach only a little more than halfway to the tip of the rostrum. The interlamellar hairs are stiff, thicker than the lamellar hairs, and uneven. They are situated at the same mutual distance as the lamellar hairs. The pseudostigmatic organ has a small lanceolate head, fig. 87a, on a thin stalk. It is bent outwards, then backwards and finally forwards in a curve. The exopseudostigmatic hair is tiny. Between the interlamellar hairs there are two longitudinal rows of dark tubercles and at the posterior border of the propodosoma there are two rounded lobes, which reach into the concave anterior border of the hysterosoma. There is no tooth on the posterior border of the pseudostigmata, but a broad chitinous ridge connecting the pseudostigmata. The dorsal surface of the propodosoma is densely punctate, whereas the lateral sides are covered with small round tubercles. The anterior border of the hysterosoma is very narrow, concave in the middle and on either side with a big tooth. There are 10 pairs of hairs on the dorsal side, which are arranged as shown in fig. 87, i.e. more or less in two longitudinal rows and differently from the position in *P. foveolatus*. The hairs are rather thick, almost equally thick throughout, slightly bent, stiff, and uneven. Those on the posterior half of the hysterosoma are longer than the anterior ones. The hairs on the posterior border are more flexible. The integument is densely punctate, the punctures being smaller than those on the propodosoma. The ventral side is shown in fig. 87b. There are three pairs of genital, one pair of aggenital, and three pairs of adanal hairs. The fissures iad are praeanal and in the figure not symmetrical. One is situated in front of ad 3, the other slightly more posteriorly, behind ad 3. The aggenital, the adanal, and the anal hairs are long and thin. On the epimeres there are small pits and larger light fields, whereas the ventral plate is densely punctate. Fig. 87c shows the distal end of Leg I. There are two small teeth dorsally on the claw, the distal one hardly being visible. The spines of the tarsi are much longer than those in *P. foveolatus* and the hairs are curly. The famulus is long and slender. Fig. 87 d shows the maxilla and the palp.

Milford: 6 specimens in dead leaves in *Nothofagus* forest; one in moss on the ground in the same locality; 7 individuals in liverworts on a dead rotten trunk.

Pseudotocepheus tenuiseta n. sp.; fig. 88.
Colour light brown. Length varying from 0.78 to 1.02 mm. A small specimen is figured in fig. 88.

This species reminds so much of *P. punctatus*, that I shall mention only the differences. In front of the base of the lamellar hairs there are two small dark lobes. The interlamellar hairs are slightly feathered. The pseudostigmatic organs have a very slender head, fig. 88 a. The hairs of the dorsal side of the hysterosoma are thinner and much longer, especially those on the posterior border. Their distal third is so thin, that it is hardly visible. The hairs are smooth. On the ventral side the fissure iad is praeanal and situated off ad 3. Tarsus I reminds much of that of *P. punctatus*, solenidion II is not, however, so greatly curly, but bent forwards and upwards in an even curve. On the outer border of the claw there is a small distal tooth.

Fox Glacier: 6 specimens in thick moss, small ferns, and dead leaves in native forest.

Pseudotocepheus curtiseta n. sp.; fig. 89.
Colour dark brown. Length about 1.32 mm.

Although only one specimen was found and several of the hairs of the dorsal side of the hysterosoma are missing, it will be established as a new species, as it is very characteristic, first of all by having broad, dark, almost black, lateral keels on the propodosoma and several longitudinal lines both on the propodosoma and the hysterosoma. The rostral as well as the lamellar hairs are thin, slightly barbed or uneven, and curved towards each other. Both of them are inserted near the anterior end of the rostrum. The lamellar hairs are situated at the anterior end of a middle field, which is at a higher level than the lateral surroundings. The lamellae, which do not reach so far anteriorly as to the base of the lamellar hairs, are bent slightly medially anteriorly. Their lateral border is a sharp edge, sloping down medially, the medial border not being clearly defined. The dark lateral keels continue backwards to the pseudostigmata. The interlamellar hairs, which are situated at some distance in front of the pseudostigmata, are directed forwards and outwards. They are stiff and not much longer than their mutual distance. The pseudostigmata are rather small. The pseudostigmatic organs have a small and narrow lanceolate head, which is very pointed at the tip. The stalk is very thin. The pseudostigmatic organs are directed outwards and then forwards. There is no tooth on the posterior border of the pseudostigma, but a broad ridge, which seems to continue below the two very faintly developed posterior lobes. On the latero-anterior border of the hysterosoma there is on either side a big tooth. There are 10 pairs of dorsal hairs, arranged as shown in fig. 89. Four pairs are missing. Those which are present are short and stiff. The hair pores are very distinct. The hairs on the posterior border are shorter than those on the dorsum. Several faint longitudinal lines can be seen laterally and partly near the anterior border. On the right side there is a large area porosa but as areae porosae are not found within the *Otocepheidae* and it is present only on one side of the hysterosoma, it is an abnormity. The integument is densely punctate, very finely in the hysterosoma, more coarsely in the propodosoma. The ventral side: There are three pairs of genital hairs, viz. one anteriorly and two near the posterior border. One pair of aggenital hairs, two pairs of anal hairs and three pairs of adanal hairs. The fissure iad is praeanal, situated off ad 3 or a little behind it. The ventral side is densely punctate. On Tarsus I the solenidia I and II are equally long and as long as the ordinary hairs. The famulus is rather long, thickest at the tip. The tarsal spines are well developed. There is no secondary tooth on the dorsal edge of the claw.

Keri-Keri: One specimen in thick luxurious moss and low ferns by a small brook in deep shadow.

Plenotocepheus n. gen.

Propodosoma and hysterosoma elongate, separated dorsally by a distinct line. In the middle of the posterior border of the propodosoma there are two condyles, laterally on the anterior margin of the hysterosoma a big tooth. Lamellae developed only as faint keels. No translamella. There are 14 pairs of hairs on the dorsal surface of the hysterosoma (plenus = full; here it means full of hairs). There are three pairs of genital hairs, one pair of aggenital hairs, two pairs of anal and three pairs of adanal hairs. The fissure iad is situated in front of the anal field or close to the anterior border of the latter. Mandibles of normal chelate form. Palp with 5 segments. Legs monodactylous. Tibia and tarsus not fused.

Plenotocepheus mollicoma n. sp.; fig. 90.

Colour light brown. Length about 0.83 mm.

The tip of the rostrum is broad and rounded. The rostral hairs, which are situated on the dorsal surface at some distance from the lateral border, are smooth, very thin towards the tip, and reach in a curve beyond the broad tip of the rostrum. The lateral sides of the rostrum form a long even curve diverging in front of Acetabulum I. The lamellar hairs, which are situated at some distance in front of the faintly developed lamellae, are directed outwards and then in a large curve medially crossing in front of the rostrum. They are thin and smooth. Between their bases two round lobes can be seen. The lamellae, which are chitinous folds rather than ridges, are slightly S-shaped, almost meeting at a short distance behind the lamellar hairs. The interlamellar hairs, which are very short and thin, are situated not far from the posterior border of the propodosoma. The exopseudostigmatic hairs are still smaller. The pseudostigmata open dorsally. There is no tooth on their posterior border, but a broad list opposite the latero-anterior tooth of the hysterosoma. The pseudostigmatic organs are lanceolate, very pointed at the tip and the head not much longer than the stalk and only about twice as broad. Between the interlamellar hairs there is a groove on either side of which there is a round condyle touching the anterior margin of the hysterosoma. In some specimens they are connected by a broad list and seem to fuse. The lateral sides of the propodosoma are covered with round tubercles. Laterally to the lamellae there are dark chitinous spots with a dense punctation in between. The integument between the lamellae is densely punctate. The hysterosoma is oval apart from the narrow anterior end near the anterior margin. The latter is almost straight, slightly undulating in the middle and with a broad lateral tooth. There are 14 pairs of hairs on the dorsal side of the hysterosoma arranged as shown in fig. 90. The hairs are flexible, smooth, and very thin, especially towards the tip. They are so long that all of them reach beyond the base of the following one, some of them with about half their length. The integument is densely punctate. The ventral side, which is shown in fig. 90a, has the same appearance as in *Pseudotocepheus*. There are three pairs of genital hairs, one pair of aggenital, two pairs of anal, and three pairs of adanal hairs, all long. The fissure iad is praeanal, situated behind ad 3 (in fig. 90a it is adanal on the right side of the figure). The integument of the ventral side is likewise densely punctate. Fig. 90b shows the distal end of Leg I. The tarsal spines are short. The famulus is rather long. Solenidion I is bent backwards, Solenidion II forwards. The claw has no secondary dorsal tooth. Fig. 90c shows the maxilla and the palp.

Keri-Keri: Three specimens in luxurious moss and small ferns by a brook in deep shadow; three individuals in moss, débris, and dead leaves in the same locality.

Plenotocepheus delicatissimus n. sp.; fig. 91.

Colour light brown. Length about 0.68 mm.

Both the rostral and the lamellar hairs are uneven or slightly barbed. The former are situated far laterally on the dorsal surface of the rostrum, the latter distally on the narrow lamellae. The lamellar hairs are as long as the parallel part of the lamellae and they reach by half their length beyond the tip of the rostrum. The lamellae, which are slightly S-shaped, reach the pseudostigmata posteriorly. Their lateral border is tongued, their medial border with light pits cutting into it. The integument between the lamellae is anteriorly covered with light pits, which are much smaller than those in the medial border of the lamellae. Posteriorly the pits are apparently replaced by small round tubercles. Between the interlamellar hairs only a dense punctation can be seen. The interlamellar hairs, which are situated on a level a short distance in front of the pseudostigmata, are uneven, very long and reach the tip of the rostrum. Behind the interlamellar hairs there are two oblong figures, each of them ending posteriorly in a round condyle, separated by rather a long distance. In the middle of the anterior border of the hysterosoma there are two condyles or folds, which, however, are not situated opposite those on the posterior border of the propodosoma, but more medially at a shorter mutual distance. Thus they do not form the characteristic pattern of *Tetracondyla* with contiguous condyles in twos. The pseudostigmatic organs are short and the head is in a dorsal view a rounded club, in profile it is lanceolate, fig. 91 a. On the posterior border of the pseudostigmata there is a rounded keel corresponding to an opposite tooth on the latero-anterior border of the hysterosoma. The hysterosoma is oval apart from the anterior border, which is straight, with the above-mentioned teeth and condyles. There are 14 pairs of hairs on the dorsal side of the hysterosoma. The hairs, which are arranged as shown in fig. 91, are slightly uneven, flexible and very long and thin. Some are as long as the mite. The integument is covered with small pits arranged in regular rows. The ventral side does not differ much from the ventral side of *P. mollicoma*. The epimeres are decorated with distinct big pits. There are three pairs of genital hairs, viz. one on the antero-medial border and two near the posterior border. Off the lateral border of the genital field there is on either side a broad, but not very distinct tooth situated on the chitinous line running backwards to Acetabulum IV. On the posterior part of the ventral side behind the genital field there are small pits like those of the dorsal surface of the hysterosoma. Ad 3 is situated off the anterior border of the anal field or a little in front of it. The fissure iad is adanal and situated near the anterior border of the anal field parallel to the lateral border. The adanal hairs are almost twice as long as the anal hairs. The distal end of Leg I resembles that of *P. mollicoma*. Solenidion I is not, however, bent so strongly backwards and the tarsal spines are a trifle shorter. The claw has no dorsal tooth.

Keri-Keri: Two specimens in débris and dead leaves near a brook in deep shadow.

Neotocepheus n. gen.

Propodosoma and hysterosoma elongate, separated by a distinct line. The posterior border of the propodosoma with two medial condyles and a lateral tooth on either side. The anterior border of the hysterosoma with a lateral tooth on either side. Lamellae developed as faint keels. No translamella. 12 pairs of hairs on the dorsal side of the hysterosoma. There are three pairs of genital hairs, one pair of aggenital hairs, two pairs of anal and three pairs of adanal hairs. The fissure iad is praeanal. Legs monodactylous. Tibia and tarsus not fused.

Neotocepheus colliger n. sp.; fig. 92.

Colour light brown. Length about 1.08 mm.

The anterior half of the propodosoma almost to Acetabulum I is a broad cone. Laterally on the propodosoma there are on either side three round knots, the posterior one being hidden under a broad projection, which continues on the dorsal side as a lateral longitudinal keel. In profile the projections give the impression that the mite carries a collar (hence the specific name). The rostral hairs, which are thin and slightly feathered, meet in front of the tip of the rostrum. The lamellar hairs are long, slightly feathered, and cross in front of the rostrum. The interlamellar hairs, which are thicker and shorter than the lamellar hairs and coarsely barbed, are directed outwards and slightly forwards. They are situated on a level a short distance in front of the pseudostigmata. The lamellae, which do not reach the lamellar hairs, are faint keels with a distinct lateral border and sloping towards the medial border, which is not well defined. Between the lamellae there is a longitudinal groove bordered by dark small tubercles. The groove ends posteriorly at the posterior margin of the propodosoma, the posterior part disappearing beneath two round condyles, which are situated close together. The pseudostigmata, which are reinforced by chitinous ribs, open upwards and outwards. The pseudostigmatic organs, which are as long as the interlamellar hairs, are bent slightly forwards at a short distance from the pseudostigmatic cup. The proximal part is rather thin, but distally to the bend it widens, and then tapers towards the tip. Behind the pseudostigmata there is a broad tooth corresponding to a similar one laterally on the anterior border of the hysterosoma. The latter tooth overlaps the former. At the transition between the propodosoma and the hysterosoma the mite is very thin. The integument of the propodosoma is densely punctate dorsally, whereas laterally to the lamellae it is covered with round tubercles. Round Acetabulum I it is smooth. The integument of the hysterosoma is likewise densely punctate, but finer than in the propodosoma. There are 12 pairs of dorsal hairs. The hairs are rather long, stiff and set with minute scattered barbs. Two pairs on the latero-posterior border are considerably shorter than the others. The ventral side, fig. 92a. On the epimeres some scattered small dark chitinous spots can be seen. The epimeric hair formula is 3:1:3:2. There are three pairs of genital hairs, one pair of aggenital hairs, two pairs of anal and three pairs of adanal hairs. The fissure iad is situated in front of the anal field and off ad 3. The integument of the ventral side is densely punctate. Fig. 92b shows Tibia and Tarsus I.

Puketi: Four specimens in moss and dead *Kauri* leaves.

Eutegaeus. According to Trägårdh (1931) the diagnosis for *Eutegaeus* is as follows "Pteromorphae very narrow, transparent, projecting forwards from the anterior margin of the hysterosoma near the lateral corners. Lamellae very large and almost horizontal. Claws monodactyles, large". This diagnosis fits for the following five species. In the material from New Zealand there are several species of *Eutegaeus* and related genera in which the shape of the hairs of the dorsal side seems to be a most important specific character. It is not, therefore, necessary to repeat for each species characters which are not important for the identification.

Eutegaeus membraniger n. sp.; fig. 93.
Colour mahogany red. Length about 0.85 mm.

The rostral hairs are short and bent medially. The lamellar hairs, which are situated between two broad teeth distally on the anterior end of the cuspis, are thin, curved and have on their outer side a membrane, which stops a short distance in front of the tip (see fig. 93a, b). They are about twice as long as the width of the lamella off the insertion of the lamellar hair. The lamellae are almost equally broad throughout. They reach the tip of the rostrum. The translamella is an indistinct line. The distal part of the lamellae in front of the translamella is smooth, the middle part reticulate; further backwards the lamellae are longitudinally striped approximately to a level off the interlamellar hairs. The latter, which are situated behind a short curved ridge almost off the anterior border of the pseudostigmata, resemble the lamellar hairs. They are as long as their mutual distance. Between the interlamellar hairs there is a longitudinal indistinct wrinkle. The pseudostigmatic organs are filiform, a little thinner at the tip. They reach by half their length beyond the pteromorphae. The latter, which are parallel with curved lateral side and almost straight inner side, reaches a level off the translamella. They are covered with a thin layer of secretion, and without any sculpture. The hysterosoma is circular apart from the straight anterior border. Immediately behind the pteromorpha there is a small projection. There are 5 pairs of hairs on the dorsal surface of the hysterosoma and 3 pairs along the posterior border. They are situated as shown in fig. 93. 5 pairs are shaped as the lamellar and the interlamellar hairs with a thin hyaline membrane along the outer side, leaving the tip of the hair free, fig. 93a–b. On the posterior border of the hysterosoma there are two low tubercles or apophyses with a tiny thin hair and laterally to them there are on either side two very short bent hairs. The whole mite is usually covered with dirt and foreign matter. Fig. 93c shows the ventral side. The hairs of Epimeres III and IV are of very different length. There are 5 pairs of genital hairs.

Fox Glacier: Four adults and several nymphs in dead leaves in native forest; three specimens in dead leaves at Lake Matheson.

Milford: 6 adults and several nymphs in dead leaves in *Nothofagus* forest.

Eutegaeus curviseta n. sp.; fig. 94.
Colour mahogany red. Length about 0.95 mm.

The rostral hairs are lyrate, thin, and smooth. The lamellar hairs, which are situated between two broad, but pointed teeth, the outer one of which usually is bent downwards and therefore appears dull, cross in front of the tip of the rostrum. They are thick and apparently unilaterally finely serrate, but this may be due to adhering secretion threads. The space between the lamellae is narrowest in its middle. The lamellae are smooth distally, reticulate in the middle, and longitudinally striped in their posterior part. They reach a little beyond the tip of the rostrum. The translamella is narrow. The interlamellar hairs are longer than the lamellar hairs and reach beyond the translamella. They are strong and unilaterally serrate. There is a faint chitinization in front of their base and a stronger one behind. The latter continues backwards as a longitudinal ridge parallel to the one from the other interlamellar hair. The pseudostigmatic organs are short and slightly clavate, at the tip provided with tiny scales. The pteromorphae are directed slightly outwards and their distal lateral part bent ventrally. The 5 pairs of hairs on the dorsal side are long and curved, the three posterior ones bending ventrally round the latero-posterior border. They are slightly serrate in their proximal half. On the posterior border there are in the middle two low tubercles, each with a tiny stiff hair and laterally to them on either side two almost invisible hairs. The mite is covered with secretion and adhering dirt.

Rotorua: Four adults and a few nymphs in slightly moist moss and dead leaves in the thermal area.

Fox Glacier: One specimen in moss and dead leaves in native forest; 9 adults and several nymphs in thick moist moss in native forest at Lake Matheson.

Milford: Several adults and nymphs in dead leaves in *Nothofagus* forest.

Eutegaeus radiatus n. sp.; fig. 95.
Colour chestnut brown. Length about 1.04 mm.

The rostral and the lamellar hairs are smooth and curly. The lamellae are very broad and irregularly reticulate, the distal part, however, more or less smooth. The translamella is narrow. The space between the lamellae is narrowest anteriorly. The interlamellar hairs are smooth and apparently as long as their mutual distance, perhaps somewhat longer, as they are erect and therefore difficult to measure. The pseudostigmatic organs are filiform, though thinnest at the tip. The 5 pairs of dorsal hairs just reach beyond the outlines of the hysterosoma. They are arranged almost in a circle, radiating (hence the specific name). The two hairs on the posterior border are situated close together on small apophyses or tubercles, which almost touch. They are approximately as long as the posterior ones of the dorsal surface. On the latero-posterior border there are two tiny hairs on either side.

Waitakere: One specimen in moss and a little grass in deep shadow.

Eutegaeus stylesi n. sp.; fig. 96.
Colour chestnut brown. Length about 1.03 mm.

The rostral hairs are curly and thin. The lamellar hairs are also very thin, especially at the tip. They are curly, smooth, and about as long as their mutual distance. They are situated between two broad teeth distally on the cuspis. The sculpture of the lamellae is indistinctly reticulate. The translamella is a narrow line. The space between the lamellae is narrowest anteriorly. The interlamellar hairs are apparently as long as their mutual distance and smooth. The pseudostigmatic organs are rather short, filiform, though tapering towards the tip. The 5 pairs of hairs on the dorsal surface are long and thin, slightly curved. The posterior ones reach beyond the outlines of the hysterosoma with about half their length. The two hairs on the posterior border are unusually long, smooth, and very thin. They are situated on small apophyses, which do not touch. Further laterally there are two tiny hairs on either side. This species is named after Mr. J. Styles, Entomologist at the Forest Research Institute, Whakarewarewa, who collected the two only specimens found.

Lake Taupo, National Park: Two specimens in dead leaves of *Nothofagus* at the Waipahihi stream.

Eutegaeus pinnatus n. sp.; fig. 97.
Colour chestnut brown. Length about 0.83 mm.

The rostral hairs, which are bent at right angles a short distance from their insertion, almost meet in front of the tip of the rostrum. They are apparently smooth. The lamellar hairs, which cross in front of the tip of the rostrum, are strong, also smooth. The lamellae, which reach a good distance beyond the tip of the rostrum, are distinctly reticulate, though smooth at the tip. The translamella is narrow. The space between the lamellae has almost parallel lateral borders in its anterior half. The interlamellar hairs, which are situated on short curved ridges, are unilaterally set with minute bristles. They reach beyond the translamella. The pseudostigmatic organs, which are bent at right angles immediately outside the cup, have a disk-shaped head set with minute scales. They do not reach beyond the pteromorphae. The latter are short as compared with the long narrow lamellae and pointed distally. The hysterosoma is unusually long, almost twice as long as the propodosoma. The 5 pairs of hairs on the dorsal surface look like small feathers. They are slightly bent and provided with lateral bristles, which are longest in the distal half. They just reach beyond the outlines of the hysterosoma. The two hairs on the posterior border are also pennate, but shorter than those of the dorsal surface. They are situated on low tubercles. Further laterally there are two tiny hairs on either side. The mite is covered with secretion and dirt.

Rotorua, Rotoehu Forest: One specimen in dead leaves (Styles coll.).

(*Oribata Bostocki* (Mich.), 1908, p. 136, Plate 17, figs. 1–3 is a *Eutegaeus*. It does not, however, agree with any of the above described species.)

Neseutegaeus spinatus Woolley[1]; fig. 98.
Colour brown. Length about 0.34 mm.

The propodosoma and the hysterosoma are of almost the same length, both are very broad. Most of the propodosoma is hidden under the very broad horizontal lamellae, which reach the tip of the rostrum. The lamellae have distally on their medial border a long curved tooth, which meets the opposite one in front of the tip of the rostrum. The latter is "nose-like" and carries the two tiny rostral hairs, the insertion of which can be seen immediately behind the curved teeth. Behind the protruding rostral nose the lamellae almost meet. Between them is a short faint line, the translamella. The space between the curved teeth and the translamella is circular. The lamellar hairs, which are situated in the middle of the distal border of the lamellae, are thick, bent at right angles medially and meeting each other in front of the rostrum, immediately in front of the curved teeth. The sculpture of the lamellae consists of longitudinal, short, broad ribs, which are pointed posteriorly. The space between the lamellae has almost parallel sides in its anterior half, widening evenly towards the posterior border of the propodosoma. The anterior part is half as broad as the posterior part. The interlamellar hairs, which are situated off the anterior border of the

[1] Published after the manuscript was finished (Acarologia VII, fasc. 2, 1965, p. 385.

pseudostigmata and near the lamellae, are rather thick, ?smooth, and shorter than half their mutual distance. In front of them a faint pointed arch can be seen. The pseudostigmata are situated laterally and are directed outwards. Inside the pseudostigma is reinforced by a spiral chitinization. The pseudostigmatic organs, which are bent at right angles immediately outside the cup, are directed obliquely backwards and reach beyond the outline of the pteromorphae. They are long and clavate, broadest at the tip and set with minute bristles in longitudinal rows, fig. 98a. The propodosoma is not separated from the hysterosoma by a line, but at the transition there is on either side a deep incision, thus forming a narrow "waist". On the latero-posterior corner of the propodosoma there is a broad tooth, which fits into the right-angled space formed by the anterior border of the hysterosoma and the medial border of the pteromorpha. The latter is transparent and has an almost straight inner border, a convex lateral border. Behind the pteromorpha an incision can be seen, separating the pteromorpha from the remaining part of the hysterosoma. The hysterosoma is circular, apart from the anterior straight border and is broader than long. On the dorsal side of the hysterosoma there are 5 pairs of hairs, shaped as pointed hair pencils, fig. 98b. On the latero-posterior border there are three pairs of tiny hairs. Grains of secretion adhere to the lamellae, the pteromorphae, to the latero-anterior border of the hysterosoma, and can be seen also between the lamellae. The ventral side is shown in fig. 98c. The sternal plate is broad between Epimeres I, very narrow between Epimeres II. Immediately in front of the genital field it forms a broad transverse band touching the anterior margin of the genital field. Surrounding the latter a darker, faint chitinization can be seen, which laterally proceeds to Acetabulum IV and posteriorly surrounds the anal field. The genital field has 5 pairs of hair pores, hairs cannot be seen. The anal field has two pairs. Ad 1–ad 3 are situated at the same mutual distance. Fig. 98d shows Leg I. The claw is thin.

Fox Glacier: Rather common in humid native forest in thick moss and dead leaves, in liverworts on dead trunks, etc.

Milford: Three specimens in wet moss in *Nothofagus* forest.

Neseutegaeus consimilis n. sp.; fig. 99.
Colour brown. Length about 0.34 mm.

The only difference I can see between *N. consimilis* and *N. spinatus* is the appearance of the hairs of the dorsal surface of the hysterosoma, being rather thin and smooth in *N. consimilis*.

Lake Rotoiti: 6 specimens in dripping wet moss and liverworts in a spring locality in *Nothofagus* forest.

Neseutegaeus latus n. sp.; fig. 100.
Colour brown. Length about 0.34 mm.

N. latus can easily be distinguished from the two preceding ones, first of all by the much broader space between the lamellae (hence the specific name). The space between the curved teeth distally on the lamellae and the translamella is not circular, rather semicircular as the anterior border of the translamella is long and straight. The rostral hairs cannot be seen, only their hair pores. The hairs of the dorsal surface of the hysterosoma are arranged as shown in fig. 100. The two anterior pairs are broad, pointed at the tip and one and a half times longer than the three posterior pairs, which are situated in a semicircle along the posterior border of the hysterosoma. The posterior ones are clavate, broadest near the tip, which is slightly pointed, fig. 100a. The middle of the hysterosoma, limited by the two anterior pairs of hairs, is darker than the surroundings due to a layer of secretion.

Puketi: Two individuals in dead leaves.

Neseutegaeus angustus n. sp.; fig. 101.

Colour dark brown. Length about 0.54 mm.

The space between the lamellae is narrow (hence the specific name), and the space within the lamellar teeth and the translamella is semicircular as in *N. latus*. The rostral hairs are apparently serrate, but this appearance may be due to a thick layer of secretion with deep folds and small grains, which covers the whole animal. The anterior part of the lamellae to a level off the interlamellar hairs is very broad, almost distended. Of the 5 pairs of hairs on the dorsal surface the three anterior ones are almost sickle-shaped, slightly unilaterally serrate, fig. 101a, whereas the two posterior pairs are more complicated. It is very difficult to see what they really look like, sometimes they seem to be more or less bell-shaped, fringed at the distal border, sometimes shaped like a cauliflower, fig. 101b. They are only half as long as the anterior ones.

Rotorua: One specimen in grass in the thermal area.

Puketi: One specimen in dead leaves.

Fox Glacier: Two individuals in grass and low vegetation at the road side in mixed *Nothofagus* forest.

Neseutegaeus distentus n. sp.; fig. 102.

Colour light brown. Length about 0.35–0.38 mm.

This species differs in many ways from the four species described above. The rostrum with the two tiny rostral hairs is covered by a broad "lip", but only the anterior straight border of the latter can be seen in a dorsal view as the very broad distended lamellae cover the lateral parts. On the distal end of the lamellae, which reach slightly beyond the lip, the strong lamellar hairs are situated. They are directed medially, almost meeting in front of the rostrum. The lamellae, which are distended (hence the specific name) are very broad, the space between them consequently being narrow. Off the interlamellar hairs the space widens evenly. A translamella is indicated by the medial lamellar thickening, which at some distance in front of the interlamellar hairs bends slightly medially. In front of this line the lamellae seem to fuse, at the same time sloping down towards the rostrum along an oblique line issuing at the translamella and running almost to the lamellar hair. The pseudostigmatic organs are distinctly clavate with a dark rounded tip. The 5 pairs of hairs of the dorsal surface are shaped as soft narrow pointed pencil-brushes, fig. 102a. The three anterior ones are situated in two diverging rows, the distance between the two anterior ones being only half as long as that between the second and the third. The two posterior pairs are situated in a semicircle within the posterior border of the hysterosoma.

Puketi: 7 specimens in dead humid leaves.

Fox Glacier: 14 individuals in thick moss and dead leaves in native forest, at Lake Matheson.

Milford: Many specimens in moss and dead leaves in *Nothofagus* forest.

Bornebuschia n. gen.

The propodosoma and the hysterosoma are well defined. The rostrum with two deep incisions. The lamellae broad, horizontal. Cuspes broad, surrounding the tongue-shaped middle part of the rostrum. The lamellar hairs situated laterally on long apophyses. The pseudostigmata situated laterally as in *Eutegaeus*. On the latero-anterior border of the hysterosoma there is a broad, but short pteromorpha directed forwards. On the transition between the propodosoma and the hysterosoma there are four pairs of teeth. The genital and the anal field are separated. There are 6 pairs of genital hairs, one pair of aggenital hairs, three pairs of adanal and two pairs of anal hairs. Off the genital field there are two opposite teeth on either side. Legs monodactylous. The mandibles are needle-shaped with a hook at the tip.

Bornebuschia peculiaris n. sp.; fig. 103.

Colour light brown. Length about 0.30 mm.

This very peculiar oribatid mite is named after the late famous Danish soil biologist C. H. Bornebusch, who by his paper "The Fauna of Forest Soil" aroused my interest in the soil fauna.

The middle of the rostrum, which is a broad tongue, consists of a strongly chitinized pointed part and on either side of the latter a semicircular winged membrane on the lateral border of which the rostral hairs are situated. The latter are long and thin and are directed forwards in a curve. On either side of the middle tongue there is a long and pointed tooth separated from the tongue by a deep incision, which is broadest at the bottom off the base of the tongue. The teeth reach the tip of the tongue. The teeth are covered by the broad cuspes, which fuse behind the tongue, forming between them a broad gap into which the tongue fits. The lamellae are broad, horizontal, and they reach together with the cusps the tip of the rostrum. Near the lateral border of the lamellae about one third from the distal end the lamellar hairs are situated on long apophyses. The lamellar hairs are smooth, very thin towards the tip and they reach by almost half their length beyond the tip of the rostrum. Immediately behind the lamellar apophyses there is a distinct transverse line which seems to join that from the opposite side. Approximately in the middle of the space between the lamellae there is a pointed transverse ridge, in front of which the sculpture consists of an irregular reticulation. A fainter reticulation can be seen on the lamellae. The interlamellar hairs, which are situated off the pseudostigmata near the medial border of the lamellae, are smooth and so long that they reach the base of the lamellar hairs. Laterally to their base there is a ridge parallel to the lamellae. On the posterior border of the propodosoma there is a transverse ridge with two blunt teeth corresponding to similar teeth on the anterior border of the hysterosoma. The pseudostigmata are situated laterally and open outwards. The cup is deep and reinforced by a spiral rib. On its posterior border there is a broad tooth corresponding to a tooth on the latero-anterior border of the hysterosoma. The pseudostigmatic organs are long and thin undulating threads with a thin head near the tip, which is drawn out into a thin tip. Tectopedium I ends in a very long and thin tip, which reaches the tip of the rostrum and which is situated close to the lateral pointed part of the rostrum. The hysterosoma is slightly broader than long. Its anterior border is an almost straight line with the above-mentioned four teeth. On its latero-anterior corner the short rounded pteromorphae project forwards as rounded shoulders, the outer part of which is transparent. The posterior half of the hysterosoma is semicircular. There are 5 pairs of hairs on the dorsal surface and three on the latero-posterior border. They are smooth, long, and curved. The two hairs in the middle of the dorsum are directed medially, then forwards. Four pairs radiate and reach beyond the outlines of the hysterosoma. The three on the posterior border are directed forwards. The whole surface of the mite is covered with small grains of secretion. The ventral side is shown in fig. 103a. The sternal plate is broad between Epimeres I, narrow between Epimeres II. Between Epimeres III–IV, which both are small, there is a wide space. Laterally off Apodema III there are two opposite teeth and on the posterior border of Apodema IV there is a tooth corresponding to a narrow keel, directed forwards. The genital and the anal field are separated by a distance half as long as the latter. There are 6 pairs of genital hairs, one pair of aggenital hairs, two pairs of anal and two ? pairs of adanal hairs. It is extremely difficult to see the hairs and hair pores of the ventral side. The mandible is very slender and has a tiny hook at the tip. Another hook may have been broken off as there is a short tip parallel to the one with the hook, fig. 103b. Fig. 103c shows Leg I with one slender claw.

Lake Rotoiti: 10 individuals in dead leaves in *Nothofagus* forest; one specimen in moist moss in the same locality.

Fox Glacier: Two specimens in dead leaves in native forest at Lake Matheson.

Compactozetes n. gen.

The propodosoma and the hysterosoma separated. The hysterosoma at least as broad as it is long. Broad horizontal lamellae, which are fused anteriorly. Tectopedium I very long and broad. The pseudostigmata situated laterally as in *Eutegaeus*. Short rounded pteromorphae projecting from the latero-anterior border of the hysterosoma. The lateral border of the hysterosoma behind the pteromorphae is transparent and the legs can be seen through it. No sternal plate. All hairs extremely small. The genital and the anal field separated. There are 6 pairs of genital hairs, one pair of aggenital, two pairs of anal and three pairs of adanal hairs. Legs monodactylous.

Compactozetes rotoruensis n. sp.; fig. 104.
Colour brown. Length about 0.38 mm.

The rostrum is in a dorsal view concealed under the fused lamellae which form an irregular anterior border, slightly concave in the middle and on either side with a small tubercle, on which the tiny lamellar hair is situated. Distally the lamella ends in a strong tooth. The lamellae are very broad, diverging towards their posterior end. The space between them is thus considerably broader posteriorly. There is no real translamella, though a faint transverse line can be seen immediately behind the tip of the rostrum. The medial thickening of the lamella seems to continue anteriorly as a faint curved line across the distal end of the lamella. The rostrum, which can be seen only in a ventral view, is broadly conical and has laterally a large membranous protuberance ending anteriorly in a broad tooth. The rostral hairs, which are thin and smooth and situated under the fused lamellae, almost meet in front of the tip of the rostrum. The interlamellar hairs, which are situated off the pseudostigmata and close to the medial border of the lamellae, are tiny. The pseudostigmata are situated laterally as in *Eutegaeus*. The cup is reinforced by a spiral rib. The pseudostigmatic organs are slightly broader at the tip, which is flat and set with tiny black scales. Tectopedium I reaches almost as far laterally as the lateral border of the hysterosoma. The sculpture of the propodosoma consists of an irregular reticulation on the lamellae and on Tectopedium I. A similar reticulation can be seen on the anterior part of the pteromorphae. The latter reach the pseudostigmata. The anterior margin of the hysterosoma is straight, the posterior half of the hysterosoma is semicircular. The hysterosoma is broader than long, the pteromorphae included. The lateral border behind the pteromorpha is transparent and Femora III–IV can be seen through it. There are 8 pairs of tiny hyaline drop-shaped hairs, which are hardly discernible. The surface is covered with secretion and wax. The ventral side is shown in fig. 104a. There is no sternal plate. Apodemata II are long and almost meet in front of the genital field, Apodemata III and IV are short. The genital and the anal field are separated by a distance as long as the width of an anal plate. The anal field is triangular. Within the genital field there is on either side at a deeper level a forward directed tooth. There are 6 pairs of genital hairs, two pairs of anal hairs and three pairs of adanal hairs. Fig. 104b shows the mandible. Fig. 104c shows Tibia and Tarsus I. There are two short spines distally on the ventral side of the tibia and one on the tarsus on the ventral side. Similar short spines are present on the tibiae and tarsi of all legs. All legs monodactylous.

Rotorua: Two specimens in slightly moist moss and fern on a slope at Mirror Lake; one individual in grass and *Scirpus* at the soda spring at Lake Rotoehu.

Compactozetes niger n. sp.; fig. 105.

Colour black. Length about 1.10 mm.

C. niger is easily recognisable by its size and its completely black colour, which makes it absolutely impossible to discern any detail before it has been bleached. The rostrum cannot be seen in a dorsal view as the fused lamellae cover the largest part of the propodosoma. The anterior border of the fused lamellae is irregular with keels, small tubercles, and a dense reticulation. The lamellar hairs, which are situated near the anterior border of the lamellae, are very short and thin. Neither rostral hairs nor interlamellar hairs can be seen. The space between the lamellae is almost equally broad throughout. There is a light round spot between the lamellae at a level a little in front of the pseudostigmata. The latter project more than in *C. rotoruensis* and the pseudostigmatic organs are much shorter and rod-shaped. Tectopedium I is long, pointed, and has a "keel" or transverse band in its posterior part. The sculpture of the propodosoma consists of a dense reticulation on the lamellae. On the hysterosoma the reticulation is distinct on the pteromorphae and on the lateral border behind the pteromorphae. The pteromorphae reach the pseudostigmata. Femora III and IV can be seen through the lateral transparent border of the hysterosoma. No hairs, nor hair pores can be seen. The hysterosoma is much broader than the propodosoma. The ventral side is shown in fig. 105a. It is, on the whole, similar to the ventral side of *C. rotoruensis*. It is, however, extremely difficult to see details, and hairs cannot be seen. Tibia and tarsus have short spines as in the preceding species. All legs monodactylous.

Keri-Keri: Two specimens in moist-wet moss on a dead trunk; one individual in moss and dead pine needles.

New Plymouth: 4 specimens in moist dead leaves, ferns, and débris.

Lake Rotoiti: Two specimens in moist dead leaves in *Nothofagus* forest.

Puketi: One specimen in moss and dead leaves on the ground.

Waitakere: Two individuals in moss and a little grass in native forest.

Fox Glacier: Two individuals in dead leaves and ferns in native forest.

Milford: 6 specimens in liverworts and dead *Nothofagus* leaves.

Pterozetes n. gen.

From the anterior border of the pteromorphae there is a very long projection, which is different from that of *Eutegaeus*, which has no true pteromorphae, only an anterior projection. The pteromorphae are broad, the outer border bent ventrally. The lamellae are broad and horizontal, fused anteriorly. Tectopedium I large. Pseudostigmata situated far laterally. The propodosoma and the hysterosoma are separated. The genital and the anal field separated. There are 6 pairs of genital hairs, one pair of aggenital hairs, three pairs of adanal hairs. Anal hairs could not be seen. Legs monodactylous.

Pterozetes novazealandicus n. sp.; fig. 106.

Colour black to brown, mahogany red after bleaching. Length about 0.85 mm.

Pterozetes like *Compactozetes* is very broad and compact. The lamellae, which are fused anteriorly and reach the tip of the rostrum, have parallel medial and lateral sides for most of their length. The space between them is narrow in its anterior two thirds, much broader posteriorly, where the lamellae diverge. The lamellae end distally in a little tip. These tips are connected by the anterior concave border of the lamellae in the middle of which the tip of the rostrum projects, on either side flanked by a tiny lamellar hair. Rostral hairs and interlamellar hairs have not been seen. The pseudostigmata are situated laterally on the posterior part of the lamellae. They are deep cups directed outwards. The pseudostigmatic organ is rod-shaped and directed outwards. It does not reach beyond the lateral border of the anterior part of the pteromorpha. From the medial side of the latter a dorsal lobe or membrane reaches the lateral border of the pseudostigma. Tectopedium I is very broad and has a strong sharp point anteriorly. The sculpture consists of small deep hollows situated so close together that their border form a kind of reticulation. The hollows are arranged in irregular oblique rows and are most distinct on Tectopedium I. The anterior border of the hysterosoma is straight, the posterior half of the hysterosoma is semicircular. The pteromorphae, which are separated from the hysterosoma posteriorly by a short slit, are almost triangular, fig. 106a. On their anterior border there is a long projection which almost reaches the tip of the rostrum. It is pointed at the tip and broadest off the pseudostigmata, where it touches the lateral border of the latter. It is arched in the middle, sloping towards the lateral side and the pseudostigma. Its dorsal surface is densely covered with small tubercles in rows. In spite of being bleached, the mite is so dark that no hairs can be seen on the dorsal surface of the hysterosoma. On the posterior border there are 6 tiny hairs. The ventral side is shown in fig. 106a. From this it is evident that *Pterozetes* is closely related to *Compactozetes*, but due to its strong chitinization and dark colour not many details can be seen. The four spots indicated by broken lines are light spots in the dark surroundings. Anal hairs have not been observed. All tarsi with only one claw. As the only specimen found belongs to the Forest Research Institute, Whakarewarewa, Rotorua, New Zealand I am unwilling to dissect it. For that reason mouth parts and legs have not been studied.

Rotorua: One specimen on leaves in Rotoehu forest (Styles coll.).

Topalia velata n. sp.; fig. 107.
Colour light brown. Length about 0.35 mm.

The genus *Topalia* was established by Balogh (1963), the type species being *problematica*, South Argentine. Balogh mentions as a generic character: Lamellae meeting in the median line. I do not think this is important as the lamellae in none of the species found in New Zealand meet in the middle, but otherwise the species agree with Balogh's description in most characters.

The very long lamellae with straight lateral sides project beyond the tip of the rostrum. A short translamella is present. The distance between the lamellae is anteriorly for a long distance approximately one fourth of the width of the lamella. Posteriorly it widens. Between the pseudostigmata there is a faint, curved arch with two small projections on which the interlamellar hairs are situated. The arch is bordered posteriorly by a ridge. The lamellar hairs, which are situated on the anterior end of the broad cusps in a low incurvation, are very thin and short. The cusps do not touch, but are separated by a very short distance, which is broadest in front of the translamella. Rostral hairs have not been observed. Tectopodium I is very broad and has a few short teeth on its anterior border. The pseudostigmatic cups are very large and open outwards. The pseudostigmatic organ is a long flat club set with short black bristles in most of its length. On the anterior border of the hysterosoma there is a transverse, slightly curved ridge and behind the latter two longitudinal curved ridges, which diverge at both ends and reach halfway across the dorsal surface of the hysterosoma. Between them two hair pores can be seen and further backwards two small light spots. Near the posterior border there are two larger light spots. The latero-anterior border of the hysterosoma projects as a small shoulder, which on its anterior border has a small incurvation from which issues a reinforcement to the hysterosoma. No hairs can be seen apart from two pairs on low apophyses on the posterior border. The sculpture consists of a reticulation with very small meshes and above this the whole mite is covered with a veil with large round to angular meshes dotted with grains of secretion (hence the specific name). The ventral side is shown in fig. 107a. Balogh (1963, fig. 28) figures one pair of teeth directed towards each other between Epimeres II and III on either side of the body. They are not present in *Topalia velata*, whereas the teeth laterally to the genital field are distinct. The genital and the anal field are both surrounded by a broad frame. The anal field is by far the largest. There are four pairs of genital hairs, one pair of aggenital, two pairs of anal, and ?two pairs of adanal hairs. All hairs are extremely small. All legs with only one claw. Leg III and IV are inserted far medially. The mandibles are slender with small chelicerae.

Keri-Keri: Two specimens in moist-wet moss on the ground under tall vegetation.

Waitakere: 8 individuals in liverworts on a dead trunk in native forest.

Topalia clavata n. sp.; fig. 108.

Colour light brown. Length about 0.37 mm.

T. clavata can easily be distinguished from *T. velata* by its short pseudostigmatic organs, which have a disk-shaped head which just reaches beyond the pseudostigmatic cup. It is set with coarse black scales. The lamellar cusps are one third of the length of the lamella, in *T. velata* one fourth. Below the tip of the cusps there is in the middle between the lamellar hairs a semicircular light opening. Rostral hairs have not been seen. The interlamellar hairs are situated on the anterior corners of a quadrangular figure situated between the pseudostigmata. On its posterior border there are a few small indistinct lobes. The sculpture of the propodosoma consists of a fine reticulation, which is very distinct between the lamellae. It is dotted by grains of secretion. The two longitudinal ridges on the dorsal surface of the hysterosoma are much shorter than in *T. velata* and almost parallel.

New Plymouth: One specimen in wet *Selaginella* and moss on a trunk.

Puketi: One specimen in thick wet moss on the ground.

Fox Glacier: One individual in moss on a dead trunk in native forest.

Topalia granulata n. sp.; fig. 109.

Colour light brown. Length about 0.335 mm.

The tip of the cusps is rounded, whereas in the two preceding species it has a slight incurvation, in which the lamellar hair is situated. The lamellar hairs are situated much closer together than in the species just mentioned and the distance between the cusps is very short. The figure between the pseudostigmata is angular with a forward directed point. The pseudostigmatic organs are short clubs set with coarse scales. Between the lamellae there is a fine reticulation. The transverse ridge along the anterior border of the hysterosoma is an angular arch with the lateral ends directed backwards. The two longitudinal ridges fit with their curved anterior end into the bottom of the arch. Further backwards they converge, almost meeting, after which they diverge, forming a figure almost like a keyhole. The whole mite is covered with grains of secretion.

Fox Glacier: One specimen in dense moss in native forest by Lake Matheson.

Tumerozetes n. gen.

The propodosoma and the hysterosoma fused. The propodosoma is swollen (hence the generic name). On the lateral sides of the lamellae there are two more or less vertical and medially concave plates fused anteriorly in the middle plan. They bear the interlamellar hairs. The lamellar hairs are situated on the tip of the long cusps, which reach the tip of the very broad membrane surrounding the rostrum. The pseudostigmata are situated laterally. The pseudostigmatic organs are hyaline with finger-like branches on the end of a long stem. Tectopedium I well developed. Longitudinal ridges, which have a different shape in the different species, are situated at the transition between the propodosoma and the hysterosoma. Pteromorphae as short forwards projecting shoulders. Along the border of the hysterosoma 7 pairs of hairs, on the posterior border furthermore 3 pairs. The genital and the anal field separated. There are 6 pairs of genital, one pair of aggenital, two pairs of anal, and two pairs of adanal hairs. Legs monodactylous. Mandibles normal. Thick solid strings of wax are attached to the lamellar plates, to the lateral sides of the hysterosoma, etc. *Tumerozetes* does not belong to any family known so far but form its own family, the *Tumerozetidae*.

Tumerozetes bifurcatus n. sp.; fig. 110.

Colour light brown. Length about 0.34–0.35 mm.

In a dorsal view two lateral, vertical, and medially concave plates can be seen to rise above the dorsum of the propodosoma. With their ventral edge they are attached to the lamellae, anteriorly they meet on a deeper level. Along their medial margin there is a thin blade, which anteriorly stops immediately in front of the interlamellar hair. The end of the lamellar plates is rounded. The interlamellar hairs are bifurcate and so are the hairs of the dorsal side of the hysterosoma (hence the specific name). Both branches are rather long. In a ventral view, fig. 110a, the tiny rostral hairs, which are situated on small apophyses, can be seen on the background of a broad striated membrane surrounding the rostrum. The lamellar hairs, which are situated on the tip of long cusps, reach beyond the membrane. They are slightly serrate, bent medially, and meet in the middle. In a lateral view, fig. 110b, the interlamellar hairs can be seen dorsally, the lamellar hairs below the wide gap formed by the vaulted lamellar plates. In a slightly oblique dorsal view both the rostral, the lamellar and the interlamellar hairs can be seen, fig. 110c. Across the propodosoma there is an undulating line, behind which the propodosoma is covered by a jellied mass of secretion, which reaches so far backwards that it also covers part of the hysterosoma. Two solid strings of black wax follow the inner side of the lamellar plates and cross in front of the lamellae, fig. 110. The pseudostigmata are situated far laterally and open outwards. Within the cups their sides are lined with numerous small chitinous spines, figs. 110b–c. The pseudostigmatic organ bears on the end of a long hyaline stem an almost invisible flat head reinforced by finger-like branches. The pseudostigmatic organs reach beyond the pteromorphae, which project from the antero-lateral border of the hysterosoma. In the middle of the pteromorpha there is a bifurcate hair. Furthermore 6 pairs of similar hairs are situated along the outer border of the hysterosoma, the two anterior ones on a longitudinal ridge, fig. 110b. Along the inner side of this ridge there is a long black string of wax. At the transition between the propodosoma and the hysterosoma there are two longitudinal ridges of variable length and separated by a good distance. Anteriorly they seem to be merged with the broad dark belt of secretion across the propodosoma. On the posterior border of the hysterosoma there are three pairs of bifurcate hairs. The ventral side is shown in fig. 110a. The genital and the anal field are separated by a distance shorter than the width of the anal plate. The latter is triangular, very narrow anteriorly. There are 6 pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and ?two pairs of adanal hairs. Fig. 110d shows Leg I. Genu I is unusual, being twice as broad in its anterior half as in its posterior half. Ventrally a transverse split can be seen. The solenidion of the genu is as long as femur and genu together. Tibia I has a small spine medially. There is only one thin claw. Femur II is angular. Femora III–IV with a ventral keel which ends distally in a sharp tooth.

Waitakere: 8 specimens in liverworts and moss on a dead trunk in native forest.

Fox Glacier: 20 specimens in thick luxurious moss on a trunk in native forest.

Milford: One individual in thick moss on dead branches in tree-fern forest.

Tumerozetes circularis n. sp.; fig. 111.
Colour light brown. Length about 0.27 mm.

In the description of the following species of the genus *Tumerozetes* only the differences from the type species will be mentioned.

The two lamellar plates are strongly chitinized along all sides. They are semilunar, concave medially. Their dorso-anterior tips, which meet in the middle, are strong teeth. The same is the case with their posterior end, which are broader and more rounded. The two semilunar plates form together with the slightly concave anterior border of the chitinous figure at the transition between the propodosoma and the hysterosoma a circular groove (hence the specific name). The interlamellar hairs are situated in the anterior half of the lamellar plates near the medial border. They are short, ordinary, smooth hairs. The pseudostigmatic organs with a flat head set with hyaline papillae. The chitinous figure at the transition between the propodosoma and the hysterosoma has two long backwards directed "horns" and between the latter, almost in the middle, a transverse ridge, which is situated over a transverse ridge at a deeper level, running between the pseudostigmata. The 7 pairs of hairs along the border of the hysterosoma are thin and short.

Pauatahanui: One individual in thick moist moss in native forest.

Christchurch: Three specimens in moist moss on a steep slope about 2000 feet a.s.l. on the mountain between Lyttelton and Christchurch.

Tumerozetes pumilis n. sp.; fig. 112.
Colour light brown. Length about 0.22 mm.

The lamellar plates in this tiny species are not so strongly chitinized as those of *T. circularis*. Their medial borders do not touch anteriorly but leave a short distance open between the teeth formed by their anterior end. Their medial borders are almost parallel, slightly diverging towards their anterior end, the distance being longest between the interlamellar hairs. Their postero-medial corner ends in a dull tooth. The pseudostigmatic organs are long and have a large flat hyaline head with radiating branches. The chitinous figure at the transition between the propodosoma and the hysterosoma consists of a short narrow anterior part and two long narrow longitudinal ridges running almost to the posterior end of the hysterosoma. The space between them is an oblong oval. Along the lateral sides of the propodosoma there is on either side a string of greyish wax and between the lamellar plates a thick layer of secretion, which also covers most of the hysterosoma.

Waitakere: One specimen in moist liverworts and mosses on a trunk.

Tumerozetes parallelus n. sp.; fig. 113.
Colour light brown. Length about 0.24 mm.

The dorso-anterior part of the lamellar plates meet in the middle after running for a short distance obliquely backwards. Their medial borders, which are parallel, are strongly chitinized in their posterior half, which in an even curve bends outwards towards the pseudostigma, whereas their anterior half is faintly chitinized and almost straight. The chitinous figure between the propodosoma and the hysterosoma is almost H-shaped with a narrow transverse ridge and two short longitudinal ridges, concave laterally. The two long backwards running ridges do not seem to be a continuation of the longitudinal ridges in the H-figure. They are indistinct, parallel, and hardly with a space between them. No wax strings have been noted on the only specimen found.

Milford: One specimen in moist-wet thick moss on a rotten branch in *Nothofagus* forest.

Tumerozetes indistinctus n. sp.; fig. 114.

Colour light brown. Length about 0.23 mm.

The dorso-anterior part of the lamellar plates meet in a curve as in *T. parallelus*. The medial borders of the lamellar plates are in this species, however, indistinct, in their whole length, being faintly chitinized (hence the specific name). They are parallel, ending posteriorly in a long tip, which can be seen close to the lateral sides of the anterior part of the chitinous figure between the propodosoma and the hysterosoma. This tip is, however, only part of a curved ridge as in *T. parallelus,* but indistinct and at a deeper level. The chitinous figure between the propodosoma and the hysterosoma consists of a short rounded anterior part with convex lateral sides and with a few transverse lines and of two long longitudinal ridges with rather a wide space between their anterior third, more or less fused in their posterior two thirds. A solid string of wax can be seen along the anterior border of the lamellar plates in fig. 114, but it is not always present. Taken as a whole, the species is not so strongly chitinized as *T. parallelus*.

Fox Glacier: 5 individuals in thick moss and liverworts on a trunk; one specimen in dead leaves and moss, all in native forest; 4 individuals between the beach and Fox Glacier in grass and low vegetation at the road-side in native forest.

Adhaesozetes n. gen.

All tarsi with an adhesive disc. Propodosoma and hysterosoma separated. Lamellae complicated, consisting of several parts. Cusps well developed. Lamellar and interlamellar hairs present. Pseudostigmatic organs globular. Pseudostigmata concealed under the proximal bowl-shaped part of the lamellae. 12 pairs of hairs on the dorsal surface of the hysterosoma. On the latter faint lists framing oblong figures with blunt opposite directed teeth. The ventral side with lateral lists. The genital and the anal field separated. 6 pairs of genital, one pair of aggenital, two pairs of anal, and three pairs of adanal hairs. All tarsi with three claws, viz. one strong middle claw and two rudimentary lateral ones. Mouth parts of the ordinary form.

Adhaesozetes Barbarae n. sp.; fig. 115.

Colour light brown. Length about 0.44 mm.

The rostrum is broad, conical. The rostral hairs, which are situated on short apophyses, are strong, slightly unilaterally serrate, and bent towards each other in front of the rostrum. The lamellae consist of three parts. The proximal part, which is broadly bowl-shaped, has a posterior lobe or tooth. Its anterior end, which is narrow, has a short branch medially, on which the interlamellar hair is situated. The latter is a short pin. The middle part, which is the most complicated, has a long medial part and a broader lateral part at a deeper level. In the latter a long slit can be seen. A similar slit is situated immediately in front of the pseudostigmatic organ. The third part of the lamella is the long cuspis, into the base of which the medial part of the lamella sends its pointed anterior end. The cusps are approximately as long as the lamellar hairs. The latter, which are two thirds as long as the rostral hairs, are thick and unilaterally serrate. There is no translamella. The pseudostigmatic organs have a ball-shaped head on a short stalk, which does not reach beyond the lamella. Tectopedia I–II well developed. Near the posterior border of the propodosoma there are two bowl-shaped ridges and between the lamellae several faint lines. The hysterosoma is almost equally broad in its whole length and not much broader than the propodosoma. Its anterior border has a low, almost straight middle part and rounded lateral corners. Its posterior border is slightly pointed, ending in two short tips. Immediately in front of the tips there is on either side a small protuberance. Behind the anterior border of the hysterosoma there is a broad figure with a concave posterior margin. Along the lateral sides there is a long narrow figure, which anteriorly ends in a dull tooth corresponding to a similar tooth laterally on the anterior figure. The fissure ia is situated near the lateral border of the anterior figure, im in the posterior part of the lateral figure. There are 12 pairs of hairs on the dorsal side of the hysterosoma. They are very short and thick, slightly clavate. The ventral side is shown in fig. 115a. There is no sternal plate. In front of the genital field there is a transverse list on either side of which there is an inverted U-shaped figure. A short distance behind the latter there is a narrow fissure surrounded by a black frame. The genital and the anal field are separated by a long distance. The anal field is the largest. There are 6 pairs of genital, one pair of aggenital, two pairs of anal, and three pairs of adanal hairs. In the anterior half of the anal plates two tiny holes can be seen. The genital field is situated rather far anteriorly, its posterior border almost off Acetabulum IV. Two lateral ridges run across Epimeres III–IV, ending anteriorly behind Tectopedium II. Laterally to their anterior end there is a strong forwards directed tooth. Along the lateral sides of the ventral plate there are faint lists and almost invisible lines across the ventral plate, i. e. behind the genital field. The sculpture of the ventral side consists of tiny dense undulating longitudinal lines of small punctures. The mouth parts are shown in figs. 115b–d. The legs are moderately long with few and short hairs. Leg I is shown in fig. 115e and the distal end of Leg I, more enlarged, in fig. 115f. There is one strong claw in the middle and on either side a short spine-shaped claw, which does not reach beyond the border of the adhesive disc. This species is named after Mrs. Barbara Stagaard, to whom I am greatly indebted for her helping me in every way during my stay in New Zealand.

Rotorua: One specimen in liverworts and low plants under *Manuka* shrub in the thermal area; one individual in moist moss on a vertical slope with ferns at Mirror Lake.

Clavazetes n. gen.

Propodosoma and hysterosoma elongate, the hysterosoma hardly broader than the propodosoma. They are separated by a straight line. Lamellae present. Translamella absent. Area porosae absent. Pseudostigmatic organs short, clavate. Lamellar and interlamellar hairs present. 10 pairs of hairs on the dorsal side of the hysterosoma. A sternal plate present. Genital and anal field separated by a very long distance. There are three pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. Mandibles of the normal chelate form. Palp four-segmented, femur and genu hardly separated. Femora of all legs with strong feathered hairs. Legs monodactylous. All tarsi with club-shaped hairs.

Clavazetes decorus n. sp.; fig. 116.

Colour light brown. Length about 0.50 mm.

The rostrum is slightly pointed. The rostral hairs, which are situated on the dorsal surface of the rostrum rather far backwards, are thin, smooth, and so long that they reach beyond the tip of the rostrum. The lamellar hairs, which are situated only a short distance behind the rostral hairs, are thicker than the latter. They are pectinate and shorter than their mutual distance. They are situated on the distal end of the narrow lamellae, the lateral border of which is a sharp keel. The lamellae, which are almost parallel in most of their length, bend distally slightly medially. Proximally they partly cover the pseudostigmata, which can be seen immediately in front of the latero-posterior border of the propodosoma. They are small cups, which open outwards. The pseudostigmatic organ consists of a short stalk and a big club-shaped head, which is directed forwards. It is greyish in colour and set with minute bristles. The interlamellar hairs, which are thick and pectinate like the lamellar hairs, are about half as long as their mutual distance. They are situated at a distance from the posterior border of the propodosoma which is shorter than their length. The integument between the lamellae is decorated with pits arranged in regular transverse rows in the anterior half of this field; in the posterior half the pits are smaller and irregularly scattered. The integument is densely punctate between the pits. Low depressions can be seen on the rostrum. At the transition between the propodosoma and the hysterosoma there is a narrow dark trim of chitinous tubercles. The hysterosoma is elongate, oval, though with a straight anterior border. There is no shoulder and the anterior end of the hysterosoma is narrow. There are 10 pairs of hairs on the dorsal surface of the hysterosoma, arranged as shown in fig. 116. The hairs are short, proximally thin, then suddenly widening and broadest at the tip. They are set with minute spines, fig. 116a. The hairs on the posterior border are shorter than those on the dorsal surface and the hair immediately behind the pseudostigma is considerably longer than the others. The sculpture consists of pits, smaller than those on the propodosoma and not arranged regularly in a pattern. Between the pits the integument is densely punctate. The fissure ia can be seen in the strongly chitinized latero-anterior border. The fissure im is found only a short distance behind ia. The ventral side is shown in fig. 116b. The sternal plate is broad but faintly chitinized. The genital field is situated far anteriorly between Epimeres III and IV. It is smaller than the anal field, which is situated close to the posterior border. There are three pairs of genital hairs, viz. one in the middle of the anterior half of the plates, two at the latero-posterior border. The aggenital hairs are situated almost halfway between the genital and the anal field. There are two pairs of anal hairs and three pairs of adanal hairs. Ad 3 is situated in front of the anal field and is an ordinary hair like the other hairs of the ventral side, whereas ad 2 and ad 1 are short, thickest at the tip like the hairs of the dorsal surface of the hysterosoma. The fissure iad is situated in front of ad 2 obliquely to the lateral border of the anal field. The integument has faint pits with a dense punctation in between. All femora have very strong feathered hairs, fig. 116d. The femur has at the junction with the genu a ventral tooth, which fits into a deep incurvation ventrally in the genu. All the tibiae are long, club-shaped, all the tarsi very short and quadrangular with short distal spines and a number of long clavate hairs distally. All legs monodactylous. The number of hairs on the different joints is:

Leg I. femur: 4 strong hairs, a ventral tooth; genu: 1 solenidion, 2 hairs; tibia: 2 solenidia, 4 hairs; tarsus (see fig. 116c; not all hairs on the ventral edge are figured).

Leg II: femur: 4 strong hairs, a ventral tooth; genu: 3 hairs; tibia: 1 solenidion, ? 2 hairs; tarsus not examined.

Leg III: femur: 3 strong hairs, a ventral tooth; genu: 1 hair, a ventral tooth; tibia: 1 solenidion, 1 hair, 1 feathered brush; tarsus: 1 solenidion, 3 pairs of clavate hairs, etc., fig. 116d.

Leg IV: femur: 1 strong hair; genu: 1 hair; tibia: 1 solenidion, 2 feathered brushes; tarsus: 1 solenidion, 1 feathered brush, etc.

Fig. 116e shows the mandible. In the palp the trochanter is short, femur-genu are halfway fused with a faint line separating them. In Hammer 1962a, plate 18, figure 47 shows the skin of an undetermined genus, which I could not identify at that time (?Carabodidae). Without any doubt it belongs to *Clavazetes,* but as the legs are missing it is not possible to establish a new species. It differs from *Clavazetes decorus* in the shape of the hairs of the dorsal surface of the hysterosoma.

Hokitika: One specimen in luxurious moss and liverworts on the river bank in shadow under trees.

Milford: Two individuals in dead leaves under tree-ferns in *Nothofagus* forest.

Bulleremaeus n. gen.

Bulleremaeus seems to be related to *Glanderemaeus* Balogh (1963). It deviates, however, in important characters, as will be evident from the following. The hysterosoma, which is arched, is truncate at the posterior border and has a slightly incurved anterior border. The rostral hairs are feathered. Lamellar and interlamellar hairs are short thick brushes. Pseudostigmatic organs ball-shaped. A thick transverse ridge runs across the propodosoma carrying the lamellar hairs. 12 pairs of hairs on the dorsal surface of the hysterosoma. 6 pairs of genital hairs. Tibia of all legs with a distal angle-bent solenidion ending in a knob (bulla, hence the generic name). All legs with 3 strong claws. Mandibles of normal chelate form. Palp with 5 segments, the distal segment long and narrow.

Bulleremaeus reticulatus n. sp.; fig. 117.
Colour light brown. Length about 0.40 mm.

The rostrum is broadly rounded and the rostral hairs are situated on short apophyses on the dorsal side of the rostrum. They sit rather close together, they are unilaterally feathered and are almost twice as long as their mutual distance. Across the anterior half of the propodosoma there is a transverse ridge from side to side. Behind it the propodosoma widens so much that the posterior part of the propodosoma is twice as broad as in front of the ridge. The lamellar hairs are situated on short apophyses on this ridge, at a mutual distance similar to that of the rostral hairs. They are short thick brushes. There are no true lamellae, but longitudinal folds, which reach the transverse ridge. They cannot be seen in an oblique view. The interlamellar hairs, which are situated in a little triangular field near the posterior border of the propodosoma, are short, thick, and densely feathered, fig. 117a. The pseudostigmatic organs are spherical with a short stalk. They are situated immediately in front of the latero-anterior margin of the hysterosoma, the cups being hidden beneath the latter. The anterior border of the hysterosoma is slightly concave anteriorly. The hysterosoma is truncate at the posterior end, and it is broadest in its posterior half. It is soft and only faintly chitinized. There are 12 pairs of hairs on the dorsal surface; they are not arranged only along the border, but also in the middle of the dorsum. The hair pores are distinct, the hairs hardly discernible short clear pins. The sculpture of the dorsal surface consists of very irregular, but coarse ribs forming a confuse reticulation with irregular indistinct meshes of different size, in which at a deeper level some small light pits can be seen. The sculpture is indistinct in the anterior third of the hysterosoma. Small tubercles and light pits can be seen there. The ventral side is shown in fig. 117b. The genital and the anal field are separated by a distance as long as the width of a genital plate. There are 6 pairs of genital, one pair of aggenital hairs, two pairs of anal and three pairs of adanal hairs, which all are ordinary setae. The fissure iad is situated near the anterior border of the anal field. The sculpture of the ventral side consists of a reticulation which is more regular than that of the dorsal side. The meshes are arranged, i.e. round the anal field, and these meshes are oblong and narrower than more laterally, where they are more open and regular. There is no large gland near the posterior border as in *Glanderemaeus* and the ventral plate does not at an angle reach the posterior border of the hysterosoma. The legs are moderately long. Fig. 117c shows Tibia and Tarsus I. The tibia has a twisted dorsal border with keels. It carries distally a long solenidion, which ends in a knob, and which is bent almost at a right angle a short distance from its insertion. The tarsus is short, triangular. Solenidia I and II are both long and end in a tiny knob. The tarsi with three equally strong claws. Fig. 117d shows Femur and Genu I, fig. 117e shows Tibia and Tarsus III.

Pauatahanui: One specimen in thick moss and liverworts in native tree-fern forest.

Lake Rotoiti: One skin in thick moss on a dead trunk in *Nothofagus* forest.

Bulleremaeus tuberculatus n. sp.; fig. 118.

Colour light brown. Length about 0.40 mm.

This species resembles *B. reticulatus* so much that the only difference I can see is in the sculpture. While *B. reticulatus* has a coarse irregular reticulation on the dorsal surface of the hysterosoma the sculpture in *B. tuberculatus* consists of low round tubercles arranged regularly in rows in the posterior part of the hysterosoma. In the anterior part and in the middle the tubercles are lower and more indistinct, but this may be due to a dorsal view, as sculpture always can be seen best in an oblique view. There are no light pits at a deeper level as in *B. reticulatus*. The sculpture of the ventral plate consists of dense undulating transverse lines radiating from a point between the genital and the anal field and surrounding, e.g., the anal field with numerous lines forming a meandering pattern.

Milford: One specimen in thick moist moss, white clover, and grass at the road-side.

Capillibates n. gen.

Propodosoma and hysterosoma not completely separated. The anterior part of the hysterosoma projecting, concealing the posterior half of the propodosoma. Lamellar hairs are coarse, serrate, interlamellar hairs thick, rod-shaped. Pseudostigmatic organs spherical on a short stalk. 14–?15 pairs of hairs on the dorsal surface of the hysterosoma. Genital field with 5 pairs of hairs. No aggenital hairs (?). Two pairs of anal hairs and three pairs of adanal hairs. All legs tridactylous. Tibiae III and IV with a distal solenidion, which ends in a knob. Mandible of the normal chelate form. Palp with 5 segments.

Capillibates Stagaardi n. sp.; fig. 119.

Colour light brown. Length about 0.23 mm.

The propodosoma is in a dorsal view very short as the posterior half is hidden under the anterior border of the hysterosoma. The tip of the rostrum is very broad, rounded, and the rostral hairs, which are situated on its dorsal surface not far from the anterior border, are as long as their mutual distance, smooth or perhaps slightly uneven. The lamellar hairs, which are situated at a somewhat shorter mutual distance than the rostral hairs, are almost half as long as the rostral hairs, but thick and serrate. In a dorsal view a ridge seems to run from the interlamellar hairs to the rostral hairs and a faint transverse ridge can be seen a little behind the lamellar hairs. The interlamellar hairs, which are situated on the latero-posterior border of the propodosoma and behind the anterior middle border of the hysterosoma, are rod-shaped, thick, and dark due to minute bristles. A ridge issuing from the medial border of the pseudostigma runs to the base of the interlamellar hair and proceeds further forwards, medially disappearing at the point where the propodosoma and the hysterosoma fuse. The pseudostigmatic cups are completely hidden under the latero-anterior border of the hysterosoma. The pseudostigmatic organs have a ball-shaped head on a short stalk. The head is directed forwards and a little outwards. There is no sculpture on the propodosoma. The hysterosoma is oblong, almost one and a half times longer than broad. The posterior end is semicircular, the anterior end narrowing towards the middle of the anterior border and here ending in two tips with an almost semicircular incurvation between them. There are 14–?15 pairs of hairs on the dorsal surface of the hysterosoma. They are arranged as shown in fig. 119. There are especially many at the posterior end. The hairs are very short and slightly bent. The sculpture consists of irregular low tubercles in undulating longitudinal rows, in profile they look much more regular. The tubercles are greyish on a yellow to light brown ground. A thin layer of secretion covers the dorsum. The ventral side is shown in fig. 119a. The genital field is situated immediately behind Apodemata II, i.e. far anteriorly, separated from the anal field, which is the largest, by a distance twice its length. There are 5 pairs of genital hairs, viz. three in an oblique row in the anterior half of the plates, and two near the posterior border. Aggenital hairs cannot be seen. There are two pairs of anal hairs and three pairs of adanal hairs. Ad 3 is praeanal. The fissure iad is situated between ad 3 and the anterior margin of the anal field. Ad 2 and ad 1 are situated on low apophyses on the posterior border of a curved ridge surrounding the posterior end of the anal field and proceeding forwards almost to the insertion of Leg IV. The posterior part of this ridge is especially distinct. The sculpture of the ventral plate consists of minute round tubercles forming a pavement. Figs. 119b, c, and d show respectively Leg I, Genu, Tibia, and Tarsus III, and Leg IV. The tibia has distally on all legs a long solenidion, which in Legs III–IV is L-shaped near its insertion and it ends in a knob. In Tibia I it is directed straight laterally, in Tibia II it is directed forwards. In the dorsal edge of Tarsus I, II, and III there is a proximal slit, in Tarsus IV I have not been able to see it. All legs have three strong claws, the middlemost being slightly thicker than the lateral ones. The claws of Legs III–IV are considerably smaller (shorter and thinner) than those of Legs I–II. The claws are situated on a stalk, which is much longer in Tarsi III–IV than those of Tarsi I–II. Fig. 119e shows the mandible. The palp is five-segmented. The trochanter is short, the femur and the trochanter are as long as the three distal joints together. The tibia is ring-shaped, shorter than long, about half as long as the genu. The tarsus is three times longer than the tibia. This species is named after Colonel Jens Stagaard, who collected some of the material for me.

Capillibates has many characters in common with *Bulleremaeus*, but it deviates in so important characters that they justify the establishment of a new genus. These are the fusion of the propodosoma and the hysterosoma, the greater number of hairs on the dorsal surface of the hysterosoma, only 5 pairs of genital hairs, the appearance of the solenidion of Tibia I–II without a distal knob, etc.

Rotorua: One specimen in moist liverworts and moss on a slope by Lake Tarawera.

Pauatahanui: Three individuals in moist liverworts and moss in a swamp grown with *Scirpus* in the tree-fern forest.

Lake Rotoiti: One specimen in thick moss on a log in *Nothofagus* forest.

Fox Glacier: One specimen between Fox Glacier and the beach in moss and grass at the road-side.

Halozetes (= *Pertorgunia*) *otagoensis* n. sp.; fig. 120.
Colour dirt brown-light brown. Length ♀ about 0.57 mm, ♂ about 0.52 mm.

H. otagoensis seems to be closely related to *Pertorgunia macquariensis* Dalenius & Wilson (1958 (0.81 mm)), but it differs besides in its size and in the number of notogastral hairs, in the shape of the latter, in the cerotegumental pattern, etc. The female, which is shown in fig. 120, is broader and bigger than the male. The rostral hairs, which are situated on the anterior border of the rostrum, are slightly feathered and longer than their mutual distance. The lamellar hairs are short and stiff, about half as long as their mutual distance. They are situated on a dark transverse band and on the distal end of a faintly developed lamellar ridge. The interlamellar hairs, which likewise are situated on a dark transverse band, are thick and considerably longer than the lamellar hairs. Their mutual distance is twice as long as that of the lamellar hairs. The pseudostigmatic organs have a dish-shaped head, which is greyish and is situated on a short stalk. They are bent outwards and forwards. The anterior border of the hysterosoma is pointed in the middle and not completely separated from the propodosoma. It projects anteriorly beyond the pseudostigmata. There are 14 pairs of hairs on the dorsal surface. They are straight pins, equally thick throughout and slightly rough (in the case of *P. macquariensis* only 11 pairs are figured and they are apart from two hairs short and thin, ending in a little hook). The posterior end of the hysterosoma is truncate with two low incurvations, one on either side of a short tongue in the middle. The cerotegument both on the propodosoma and on the hysterosoma consists of black round granules of different size (on *P. macquariensis* of equal size). The ventral side of the female is shown in fig. 120a. Apodemata I are narrow and connected by a thin ridge, Apodemata II medially almost reach a curved ridge situated in front of the genital field, Apodemata III–IV are short. The genital and the anal field, which are approximately equally large, are separated by a distance almost as long as the genital field. The genital field is broad, the anal field long. There are 6 pairs of genital hairs, one pair of aggenital, two pairs of anal, and three pairs of adanal hairs. Behind ad 1 there are short transverse folds opposite the incurvations in the posterior end. The number of hairs of the ventral side is variable and their position asymmetric. Fig. 120b shows Tarsus II of a female. There are three claws the middle one of which is the strongest. On the lateral claws there is a small indentation near the tip. Most of the hairs of the tarsus end in a small globule, which Dalenius and Wilson do not mention for *P. macquariensis*.

In the male, fig. 120c, the lamellar hairs are situated close together. They are twice as long as their mutual distance and twice as long as those in the female, much thicker and rougher. The interlamellar hairs are also longer. The hysterosoma is not so broad and the incurvations in the posterior border are not so pronounced as in those of the female. The ventral side is shown in fig. 120d. It differs from that of the female in having 5 pairs of aggenital hairs (neotrichy). The number of hairs of the ventral side is different on the two halves.

Dunedin, Otago Peninsula: 9 adults and two nymphs in moist dung mixed with grass in a penguin's nest on a slope with *Phormium tenax* by the sea. One individual on the same slope in dense moist vegetation of *Scirpus* in a spring or oozing water.

Sellnickia caudata (Mich.); fig. 121.
Colour light brown. Length about 0.60 mm.

Fig. 121 shows a male, fig. 121a the anterior part of the propodosoma of a female.

Rotorua: Many specimens on green leaves in Rotoehu State Forest (Styles coll.).

Austrogneta multipilosa Balogh; fig. 122.
Colour greyish-light brown. Length about 0.21 mm.

Rotorua: One specimen in slightly moist luxurious liverworts or moss, under *Manuka* shrub in the thermal area.

Austrogneta quadridentata n. sp.; fig. 123.
Colour light brown. Length about 0.25 mm.

The propodosoma is almost as broad as the hysterosoma and only a little shorter. The rostrum is long, the sides slightly curved. The rostral hairs, which are situated on the lateral sides, are uneven and reach beyond the tip of the rostrum. The lamellae are narrow and parallel in their distal two thirds. The proximal third is directed laterally towards the pseudostigma. The parallel parts look like braids having twined lines within their borders. On their distal end there are well developed cusps, which are parallel and almost as long as the distance between the lamellae. From fig. 123a it appears that the lamellar hairs are not situated on the tip of the cusps, but a short distance behind a forwards directed tip. The ridge between the cusps ends anteriorly in a tip. There is no translamella. The lamellar hairs, which are smooth or slightly uneven, reach the tip of the rostrum. The interlamellar hairs, which are tiny, are situated behind the parallel parts of the lamellae. The pseudostigmatic organs have a very thin and rather short stalk with a flat disk-shaped head, broadest at the tip. Fig. 123b shows that the head is pointed at the tip when laid bare. From the lateral border of the pseudostigma a ridge runs in a curve backwards and medially. On its outer border there is a sharp keel corresponding to a pointed tooth on the latero-anterior border of the hysterosoma. Between the pseudostigmata there are two oblong figures, each ending posteriorly in a tooth corresponding to two larger teeth in the middle of the anterior border of the hysterosoma. Between the anterior parts of the lamellae faint pits can be seen. Tectopedium I, which bends ventrally at its anterior end, is reinforced by short transverse lists. There are 13 pairs of hairs on the dorsal surface of the hysterosoma, which are arranged as shown in fig. 123. The lateral teeth of the anterior border have long keels running backwards over the hysterosoma for a long distance, whereas the keels of the medial teeth are short. The ventral side is shown in fig. 123c. Epimeres III–IV are fused. A faintly developed transverse band can be seen a short distance in front of the genital field. On either side of the latter there are faint keels, which anteriorly end in a small pointed tooth corresponding to a somewhat broader tooth in front of it. Near the lateral border there is a very broad tooth, which partly covers Acetabulum IV. A smaller tooth is situated in front of Acetabulum III, it is directed forwards. The genital field is separated from the anal field, which is several times larger than the former, by a distance a little longer than the genital field. There are 6 pairs of genital hairs, viz. three close together at the antero-medial border, two laterally and one at the posterior end. There is one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. The fissure iad is situated parallel to the anterior part of the lateral sides of the anal field. All legs are monodactylous. Fig. 123d shows Leg I, fig. 123e the mandible, which has hardly discernible teeth.

Although this species deviates from the type species *A. multipilosa* Balogh, i.e. in having 6 pairs of genital hairs (*multipilosa* 5 pairs), smooth interlamellar hairs, a well developed Tectopedium I, etc., there are so many common characters, thus the genital field situated behind Acetabulum IV, the teeth of both the dorsal and the ventral side, the number of dorsal hairs, etc., that so far I register it as belonging to *Austrogneta*.

Pu Pu Springs: 85 individuals in dripping wet *Sphagnum*, grass, and watercress on the edge of the spring.

Cultroribula lata Aoki; fig. 124.

Colour light brown. Length about 0.24–0.25 mm.

In the tip of the rostrum there is a fissure with a broad opening behind it. In profile it can be seen that the rostrum is beak-shaped, fig. 124a. The rostral hairs, which are smooth, thin, and long are situated on the posterior border of the opening. The lamellar hairs are longer than the rostral hairs, smooth and considerably thicker. The cusps diverge slightly at the tip. They almost reach the base of the rostral hairs. There is a narrow space between the cusps. The interlamellar hairs are short, thin, and smooth. The exopseudostigmatic hairs moderately long. The pseudostigmatic organs are fusiform, the stalk is three to four times longer than the head. Tectopedium I ends anteriorly in a tiny tip. The anterior border of the hysterosoma is straight, the shoulders are rounded and do not project beyond the anterior margin of the hysterosoma. There are 7 pairs of straight thin hairs on the dorsal surface of the hysterosoma, and 3 pairs on the posterior border. The latter can be seen best in a ventral view. The ventral side is shown in fig. 124b. There are two transverse bands formed by the fused Apodemata II and the fused Apodemata IV. The genital and the anal field almost touch. There are 5 pairs of genital hairs, one pair of aggenital, two pairs of anal, and three pairs of adanal hairs. All legs are monodactylous.

Rotorua: 4 specimens in slightly moist moss and small ferns under *Manuka* shrub in the thermal area.

Cuspitegula n. gen.

Cuspitegula belongs to the *Microzetidae*, but it differs from any other genus within the family by having cusps, which cover the whole dorsal surface of the propodosoma. The propodosoma and the hysterosoma are separated by a faint line. The propodosoma is short and rather narrow, the hysterosoma is broader than long. The rostrum is pointed and has minute rostral hairs. The cusps form together a big shield, which covers the lamellae. The pseudostigmatic organs are ciliate flagella. The hairs of the dorsal surface of the hysterosoma minute. Apodema II from the two sides fused in the middle forming a transverse band. In front of the genital field there is a broader transverse band. There are 6 pairs of genital hairs. All legs monodactylous.

Cuspitegula stellifer n. sp.; fig. 125.

Colour light brown. Length about 0.23 mm.

The anterior margin of the hysterosoma projects in an even curve beyond the anterior border of the pseudostigmata. The posterior part of the lamellae can be seen below the anterior border of the hysterosoma. Anteriorly the lamellae reach some distance beyond the translamella, where their anterior rounded border can be seen. They are apparently bowl-shaped opening medially. Whether this is the correct explanation of this complicated structure I am unable to tell. The cusps reach much further anteriorly than the lamellae. Together with the very short, but broad translamella the cusps form a big triangular shield, slightly rounded posteriorly, which covers the whole propodosoma. The cusps and the translamella are reinforced along their borders by thick edges. The lamellar hairs are situated a little behind the tip of the cusps on the ventral side. In a dorsal view they look like small stars (hence the specific name), but a closer examination reveals that they are not stellate, but thick and bushy, fig. 125a. From their base a line with lateral branches runs backwards. Interlamellar hairs have not been seen. The pseudostigmata are situated far laterally behind the middle of the anterior border of the hysterosoma. They open outwards. The pseudostigmatic organs, which are as long as their mutual distance, flagelliform and unilaterally set with a great number of tiny bristles along their posterior border, are directed outwards, slightly backwards, and then forwards in a large curve. The hysterosoma, which is broader than it is long, has almost parallel sides and a broad rounded posterior end. The anterior border is arched. The pteromorphae are short with rounded latero-anterior edge. There are apparently 7 pairs of hairs on the dorsal surface and perhaps a few on the posterior border, although only one pair can be seen there. The pores are distinct, the hairs absent or minute. The ventral side is shown in fig. 125b. The rostrum is very pointed. The rostral hairs, which are situated on either side of the tip of the rostrum, are tiny. In a ventral view it can be seen that the lamellar hairs are situated in a notch in the lateral thickening of the cusps. On either side of the tip of the rostrum the distal end of the bowl-shaped lamellae projects at a deeper level. The lateral sides of the propodosoma project as far anteriorly as the tip of the rostrum, separated from the latter by a deep incurvation. The sternal plate is narrow. Epimeres III and IV from each side are fused. Apodemata II from the two sides are fused in the middle, forming a transverse band. In front of the genital field following its anterior margin there is a broad transverse band, which laterally goes to Acetabulum IV. The genital and the anal field are separated by a distance as long as the width of a genital plate (too short in fig. 125b, which has been drawn in a slightly oblique anterior view). There are 6 pairs of genital hairs, viz. three in the anterior half along the medial margin, two along the lateral border, and one medially at the posterior end. The fissure iad is hardly discernible, situated between ad 3 and the lateral side of the anal field. All legs monodactylous. Leg I is often concealed between the cuspes and the dorsal side of the propodosoma. Solenidion II of Tarsus I is very broad. The solenidion of Genu and Tibia I is long and bent backwards in a loop. Mouth parts have not been studied.

Keri-Keri: Two specimens in moss on wet ground near a brook, shadowed.

Puketi: One individual in wet leaves and moss on the ground.

?*Physobates monodactylus* n. sp.; fig. 126.

Colour light brown. Length about 0.23 mm.

There is some doubt whether this species belongs to *Physobates* (Hammer 1962a, p. 74), as it deviates in some important characters from the type species *spinipes*, i.e. the presence of area porosae (in *spinipes saculi*) and in having only one claw on all legs (in *spinipes* 3 claws). However, as in most other characters it agrees with the type species I place it provisionally within the genus *Physobates*.

The whole propodosoma is covered with a hyaline shield, arisen by a fusion of the lamellae. On its upper surface the ? smooth and thin lamellar hairs are situated. Through the shield the feathered rostral hairs can be seen, situated close to the tip of the rostrum, and Tectopedium I, which anteriorly ends in a free tip. Interlamellar hairs absent. The pseudostigmata are deep and funnel-shaped. The pseudostigmatic organs are long, more than half their length is concealed below the anterior border of the hysterosoma. The head is lanceolate, greyish in colour due to minute bristles, and the stalk is swollen in its middle, fig. 126a. The hysterosoma is longer than broad. The anterior border is straight in the middle, slightly rounded laterally at the transition to the pteromorphae. The anterior border of the latter is slightly arched medially, straight laterally. The pteromorphae are movable. Areae porosae present. The areae porosae adalares are the largest. The hair pores are distinct. On the posterior border of the hysterosoma there are three pairs of tiny hairs. The ventral side is shown in fig. 126b. It agrees in most characters with the type species, i.e. the short Apodemata I and II and the large light fields in the epimeres. A chitinous band surrounds the genital field as a broad belt attached to Acetabulum IV on either side. There are 5 pairs of genital hairs (the sixth in *spinipes* may be due to a light crack in the anterior margin being mistaken for a hair pore). There is one pair of aggenital hairs (missing in some specimens), two pairs of anal, and two pairs of adanal hairs (in *spinipes* three pairs). The fissure iad is very long and parallel to the lateral side of the anal field. On either side of the latter there are two faint, slightly curved longitudinal lines. In some specimens two brown folds can be seen through the dorsal surface. The legs have much in common with those of *P. spinipes*. Fig. 126c shows Leg II, which has a long spine distally on the genu, a shorter one on the tibia, and a very rough tripartite spine ventrally on the tarsus. The latter is short and very broad proximally, pointed distally (not all the hairs are figured). The legs have only one claw.

Rotorua: One specimen in moss and ferns on a slope with tall trees by Mirror Lake.

Pauatahanui: Two specimens in wet moss and liverworts in a swamp grown with *Scirpus* in native forest.

Upper Takaka: One specimen in dead leaves in *Nothofagus* forest.

Puketi: Two individuals in moss and dead leaves.

Waitakere: One individual in moss and dead leaves.

Fox Glacier: 5 individuals in thick moss on a trunk; 6 individuals in wet moss and liverworts in native forest.

Milford: One specimen in dead leaves in *Nothofagus* forest.

Pelops punctatus Ramsay p. 5; fig. 127.
Colour dark brown. Length about 0.52–0.55 mm.

The tip of the rostrum does not project beyond the tip of the lamellae. The lamellar hairs are distinct and situated a short distance behind the tip of the lamellae. The interlamellar hairs are broad, fringed at the tip and striated. The pseudostigmatic organs, which are rather short, widen evenly almost to their ends, which are slightly pointed. They are set with minute bristles. The anterior border of the hysterosoma is slightly concave in the middle and has a little pronounced lobe laterally on either side. The posterior end of the hysterosoma is very broad. The hairs of the dorsal surface are the same length. They are slightly bent, almost equally thick throughout and a little rough on their outer side, fig. 127a. They are situated as shown in fig. 127. Only 8 pairs can be seen, as those on the latero-posterior border are tiny or missing. The distance m 3–m 3 is unusual long; the same is the case of the distance p 3–p 3. The whole surface is covered with chitinous tubercles and, before cleaning, with heavy tongues of wax. Tibiae I–II have a very strong and broad spine with longitudinal rows of teeth, Tarsus II a similar spine, fig. 127b. The spine is missing in Tarsus I. All legs are monodactylous. The broad and truncate hysterosoma, the long distance between m 3 and m 3 and between p 3 and p 3, the lamellae reaching the tip of the rostrum, and the presence of only one claw are probably characters important enough to establish a new genus.

Keri-Keri: Many specimens, but usually in small numbers in grass, moss, lichens, dead leaves, and on branches under shrubs and trees.

Rotorua: 6 individuals in dead leaves and moss in the thermal area.

Upper Takaka: Two individuals in moist dead leaves in *Nothofagus* forest.

Lake Rotoiti: One specimen in thick moss in *Nothofagus* forest.

Waitakere: A few in moss, dead leaves, and liverworts.

Milford: One specimen in dead leaves in *Nothofagus* forest.

Pelops monodactylus n. sp.; fig. 128.

Colour dark brown. Length about 0.43 mm.

The hysterosoma is very broad and truncate, which is the case also in the preceding species; there is a long distance between the hairs m 3 and between p 3 and the legs have only one claw. These characters are in common with *P. punctatus. P. monodactylus* differs from *P. punctatus* in the following characters. The tips of the lamellae do not reach the tip of the rostrum, they reach only halfway between the translamella and the tip of the rostrum. In profile the pseudostigmatic organs are very slender, smooth and pointed and almost hyaline. In a lateral view they are broader and serrate at the tip, fig. 128a. They reach beyond the translamella. Parallel to the lamella and close to it a long tip attached to a broad transverse ridge can be seen on either side, and further laterally another tip. Tectopedium I is bowl-shaped, heavily chitinized and dark brown. The anterior margin of the hysterosoma is concave in the middle and rather angular laterally, where there is an oblique fold or groove. The anterior margin of the pteromorpha is reinforced by a broad chitinous list. Behind the pteromorpha there is an incurvation and further posteriorly a sharp edge on the lateral side. The hairs of the dorsal surface of the hysterosoma are arranged as shown in fig. 128. They are almost invisible, being hyaline, short, and smooth except for the two hairs m 3, which seem to be bushy. A very distinct pore surrounded by a thick ring, which is not closed laterally, can be seen in front of l 3. The light spot behind the anterior border of the hysterosoma is indistinct. The dorsal surface is covered with thick meshes of secretion between which there are irregular deep holes and tiny chitinous tubercles. This is especially distinct on the pteromorphae. Tarsus II has a strong spine with few teeth, fig. 128b. It is absent in Tarsus I. Tibiae I and II have a smooth and much shorter spine. All legs are monodactylous.

Waitomo: One specimen in dead leaves and moss in tree-fern forest; two individuals in moss and liverworts on a trunk; five individuals in dead leaves under tree outside the forest.

Pauatahanui: One specimen in moist dead leaves in a mixed forest.

Puketi: Two specimens in dead leaves.

Maorizetes n. gen.

Propodosoma and hysterosoma separated. Lamellae fused anteriorly, forming a broad arch with long cusps. Rostral, lamellar, and interlamellar hairs long. Pseudostigmatic organs thin clubs. The hysterosoma is globular. Hairs of the hysterosoma absent or invisible. Genital and anal field touching. 6 pairs of genital hairs. Legs with usually large number of sword-shaped hairs. Legs with three claws. This genus is named after the natives of New Zealand, the Maoris.

Maorizetes ferox n. sp.; fig. 129.

Colour brown. Length about 0.72 mm.

The propodosoma is almost triangular as compared with the broad globular hysterosoma. The lateral sides of the rostrum form an even curve in the middle of which the long and strong, feathered rostral hairs are situated. In their distal third the bristles are outstanding. The very tip of the rostrum has two tiny hyaline tips separated by a fissure, fig. 129a. The lamellae, which are equally broad throughout, form an even arch with the long cuspes on the top. The cusps do not reach the base of the rostral hairs. They end in two tiny teeth, one on either side of the lamellar hair. The latter reaches beyond the tip of the rostrum and is almost twice as long as the cuspis. It is not so coarse as the rostral hair, i.e. set with shorter and finer bristles. The interlamellar hairs, which have the same appearance as the lamellar hairs, are situated close to the medial border of the lamellae near the posterior border of the propodosoma. They reach beyond the tip of the cusps. The pseudostigmatic cups are hidden under the lamellae, where the latter touch the anterior border of the hysterosoma. The pseudostigmatic organs are slender clubs, only slightly thicker at the end and here set with minute bristles. The exopseudostigmatic hairs are feathered and longer than the pseudostigmatic organs. A few light spots can be seen behind the lamellae. Tectopedium I is not developed. The anterior margin of the hysterosoma is straight, otherwise the hysterosoma is globular (in fig. 129 it is a little too broad, pressed by the cover glass). Apart from a stiff seta on the little pronounced shoulder no hairs can be seen. The ventral side is shown in fig. 129b. There is no sternal plate. The genital and the anal field touch, the latter is the largest. There are 6 pairs of genital hairs, viz. four in an oblique row on the anterior half of the plate, two on the posterior half laterally. The three pairs of adanal hairs are situated close to the anal field. A chitinous transverse ridge crosses the anterior border of the genital field and continues to the lateral sides of the hysterosoma. The mandible is very strong, fig. 129c. The maxilla and the palp are shown in fig. 129d. The legs are unusual, having a great number of hairs. There are hairs both of the ordinary form and especial sword-shaped hairs formed as broad blades with a pointed tip. These hairs are fringed on their proximal two thirds. Fig. 129e shows Tibia and Tarsus I. Tibia I has no less than 5 sword-shaped hairs. All legs have three not very thick claws, the middle one being the strongest.

Keri-Keri, Rotorua, Waitomo, New Plymouth, Christchurch, Puketi, Waitakere, and Milford: In all 26 individuals were found in moist moss, grass, lichens, and in dead leaves on the ground, on trunks, etc., usually singly or a few together.

Neotrichozetes spinulosa (Mich.).

N. spinulosa (Mich.) (1908, *Notaspis spinulosa*, p. 137, Plate 18, figs. 5–10) is very characteristic. The hysterosoma has a large number of long hairs, all of which are set with short spines. This species was found several times, but only as a skin or in the larval or nymphal stage. For that reason it has not been pictured. The larva has an immense number of long feathered hairs in curved transverse rows on the hysterosoma, more than 30 in the anterior row. I wonder, therefore, whether there should be more than one species in New Zealand within the genus *Neotrichozetes*.

Keri-Keri: Many nymphs in moist moss on the ground under tall trees near a small brook.

Waitomo: One skin in luxurious moss and liverworts on a trunk in tree-fern forest.

Milford: One larva in wet liverworts on a dead branch on a mountain side with *Nothofagus* forest.

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Explanation of the Figures on the Plates I–XLV

Fig. 1. *Nanhermannia acutisetosa* n. sp.
– 1a. — — hair of hysterosoma.
– 2. — *tenuicoma* n. sp.
– 2a. — — crest on the propodosoma.
– 3. *Hypochthonius*? *luteus* Oudms.
– 3a. — — tip of rostrum.
– 3b. — — hair c 4.
– 4. *Eniochthonius minutissimus* (Berl.).
– 5. *Brachychthonius jugatus* Jac. var. *suecica* Forssl.
– 6. — *novazealandicus* n. sp.
– 7. *Liochthonius fimbriatissimus* (Ham.).
– 8. — *altimonticola* (Ham.).
– 9. — *altus* (Ham.).
– 10. — *idem* n. sp.
– 11. — *saltaensis* (Ham.).
– 12. *Cosmochthonius semiareolatus* n. sp.
– 13. *Thrypochthonius excavatus* (Willm.).
– 14. *Mucronothrus nasalis* (Willm.).
– 15. *Fossonothrus novaezealandiae* n. sp.
– 16. *Trimalaconothrus opisthoseta* n. sp.
– 16a. — — ventral side.
– 17. — *platyrhinus* Ham.
– 18. — *oxyrhinus* Ham.
– 19. — *angustirostrum* n. sp.
– 19a. — — ventral side.
– 20. — *longirostrum* n. sp.
– 20a. — — ventral side.
– 21. — *novus* (Selln.).
– 22. — *crispus* Ham.
– 23. — *sacculus* n. sp.
– 23a. — — ventral side.
– 24. *Zeanothrus elegans* n. gen. n. sp.
– 24a. — ventral side.
– 25. *Malaconothrus keriensis* n. sp.
– 25a. — — ventral side.
– 26. — *zealandicus* n. sp.
– 26a. — — ventral side.
– 26b. — — lateral side of hysterosoma.
– 27. — *indifferens* n. sp.
– 27a. — — ventral side.

Fig. 28. *Camisia segnis* (Herm.) var. *nova* n. var.
– 29. *Nothrus biciliatus* C.L. Koch.
– 29a. — — detail of structure of hysterosoma.
– 30. — *silvestris* Nic. var. *anauniensis* C. & F.
– 30a. — — – — detail of structure of hysterosoma.
– 31. *Novonothrus flagellatus* n. gen. n. sp.
– 31a. — — rostrum with rostral hairs, lamellar hairs and "windows".
– 31b. — — hair PN 1.
– 31c. — — detail of structure of hysterosoma.
– 31d. — — ventral side.
– 31e. — — mandible.
– 31f. — — maxilla and palp.
– 32. — *pupuensis* n. sp.
– 32a. — — hair PN 2.
– 32b. — — detail of structure of hysterosoma.
– 33. *Heminothrus traversus* n. sp.
– 34. — *microclava* n. sp.
– 35. *Platynothrus major* n. sp.
– 36. — *tenuiclava* n. sp.
– 37. — *peltifer* (C.L. Koch).
– 38. *Acronothrus cophinarius* (Mich.).
– 38a. — — ventral side.
– 38b. — — hair of Tibia I.
– 38c. — — papilla of Genu II.
– 39. — *brachyrostrum* n. sp.
– 39a. — — ventral side.
– 40. — *caudalis* n. sp.
– 40a. — — ventral side.
– 41. *Austronothrus curviseta* n. gen. n. sp.
– 41a. — — ventral side.
– 42. *Holonothrus pulcher* n. sp.
– 42a. — — ventral side.
– 43. *Hermanniella clavasetosa* n. sp.
– 43a. — — hair of hysterosoma.
– 44. — *microsetosa* n. sp.
– 45. — *longisetosa* n. sp.
– 45a. — — chitinous tubercle.
– 45b. — — pattern of tubercles.
– 46. — *diversisetosa* n. sp.
– 46a. — — pseudostigmatic organ.
– 46b. — — detail of structure of hysterosoma.
– 47. *Phyllhermannia foliata* n. sp.
– 48. — *mollis* n. sp.
– 48a. — — pseudostigmatic organ.
– 48b. — — hair of hysterosoma.
– 49. — *rubra* n. sp.
– 49a–c. — — hairs of hysterosoma.
– 50. — *phyllophora* (Mich.).
– 50a. — — hair from posterior border of hysterosoma.
– 50b. — — hair from posterior border of hysterosoma in profile.
– 50c. — — Leg I.

Fig. 51. *Liodes nigricans* (Ramsay).
- 51a. — — ventral side.
- 51b. — — Genu, Tibia and Tarsus II.
- 51c. — — tritonymph.
- 52. *Scapheremaeus? patella* (Berl.)
- 52a. — — hair of posterior border of hysterosoma.
- 53. — *insularia* n. sp.
- 53a. — — detail of structure of middle field.
- 53b. — — hair of posterior border of hysterosoma.
- 54. ? *Scapheremaeus emarginatus* n. sp.
- 55. *Scutovertex minutus* (C. L. Koch).
- 55a. — — bristle from shoulder.
- 55b. — — hair from posterior border of hysterosoma.
- 56. *Metabelba obtusus* n. sp.
- 56a. — — posterior part of ventral side.
- 56b. — — Genu and Tibia I.
- 56c. — — Genu and Tibia II.
- 56d. — — Genu and Tibia III.
- 56e. — — Genu and Tibia IV.
- 57. *Pedrocortesia*[1] *rotoruensis* n. sp.
- 57a. — — Tibia and Tarsus I.
- 58. — *luteomarginata* n. sp.
- 58a. — — detail of structure of hysterosoma.
- 58b. — — posterior part of ventral side.
- 59. *Pedrocortesella gymnonotus* (Ramsay).
- 59a. — — ventral side.
- 59b. — — Tibia and Tarsus I.
- 60. — *sexpilosus* (Ramsay).
- 60a–b. — — detail of structure of hysterosoma.
- 60c. — — Tibia and Tarsus I.
- 61. — *cryptonotus* (Ramsay).
- 61a. — — detail of structure of hysterosoma.
- 61b. — — ventral side.
- 61c. — — Tibia and Tarsus I.
- 62. — *latoclava* n. sp.
- 62a. — — detail of structure of hysterosoma.
- 62b. — — Tibia and Tarsus I.
- 63. ? — *microclava* n. sp.
- 64. ? — sp.
- 64a. ? — sp. detail of structure of hysterosoma.
- 65. *Fosseremus quadripertitus* Grandjean.
- 66. *Eremulus flagelliger* Berl.
- 67. — *serratus* n. sp.
- 67a. — — part of pseudostigmatic organ.
- 68. *Suctobelba falcata* Forssl.
- 69. — *subcornigera* Forssl.
- 70. — *nasalis* Forssl.
- 71. — *longicurva* n. sp.
- 71a–c. — — rostral teeth.
- 72. — *plumata* n. sp.
- 72a. — — rostral teeth.

[2] In figs. 57–63 the indications ro and la have been changed.

Fig. 73. *Suctobelba nondivisa* sp.
– 73a. — — rostral teeth.
– 73b–c. — — pseudostigmatic organ in different views.
– 74. *Zeasuctobelba quinquenodosa* n. gen. n. sp.
– 74a. — — tip of rostrum in profile.
– 74b. — — pseudostigmatic organ.
– 74c. — — ventral side.
– 75. — *trinodosa* n. sp.
– 76. — *nodosa* n. sp.
– 76a. — — ventral side.
– 77. *Suctobelbila dentata* (Ham.).
– 78. *Machuella ventrisetosa* Ham.
– 79. *Hydrozetes lemnae* (de Coggi).
– 80. *Carabodes ornatissimus* n. sp.
– 80a. — — detail of structure of hysterosoma.
– 81. — *variabilis* n. sp.
– 82. *Austrocarabodes maculatus* n. gen. n. sp.
– 82a. — — hair of hysterosoma.
– 82b. — — ventral side.
– 82c. — — Leg I.
– 83. — *elegans* n. sp.
– 83a. — — hair of hysterosoma.
– 84. — *nodosus* n. sp.
– 84a. — — lamellar hair.
– 84b. — — ventral side.
– 85. *Nodocepheus dentatus* Ham. var. *barbatus* n. var.
– 86. *Pseudotocepheus foveolatus* n. sp.
– 86a. — — pseudostigmatic organ.
– 86b. — — detail of structure of hysterosoma.
– 86c. — — ventral side.
– 86d. — — Tibia and Tarsus I.
– 86e. — — mandible.
– 86f. — — maxilla and palp.
– 87. — *punctatus* n. sp.
– 87a. — — pseudostigmatic organ.
– 87b. — — ventral side.
– 87c. — — end of Tibia I and Tarsus I.
– 87d. — — maxilla and palp.
– 88. — *tenuiseta* n. sp.
– 88a. — — pseudostigmatic organ.
– 89. — *curtiseta* n. sp.
– 90. *Plenotocepheus mollicoma* n. gen. n. sp.
– 90a. — — ventral side.
– 90b. — — Tibia and Tarsus I.
– 90c. — — maxilla and palp.
– 91. — *delicatissimus* n. sp.
– 91a. — — pseudostigmatic organ.
– 92. *Neotocepheus colliger* n. gen. n. sp.
– 92a. — — ventral side.
– 92b. — — Tibia and Tarsus I.
– 93. *Eutegaeus membraniger* n. sp.

Fig. 93a–b. *Eutegaeus membraniger* hairs of hysterosoma.
– 93c. — — ventral side.
– 94. — *curviseta* n. sp.
– 95. — *radiatus* n. sp.
– 96. — *stylesi* n. sp.
– 97. — *pinnatus* n. sp.
– 97a. — — hair of hysterosoma.
– 98. *Neseutegaeus spinatus* Woolley.
– 98a. — — pseudostigmatic organ.
– 98b. — — hair of hysterosoma.
– 98c. — — ventral side.
– 98d. — — Leg I.
– 99. — *consimilis* n. sp.
– 100. — *latus* n. sp.
– 100a. — — hair of posterior part of hysterosoma.
– 101. — *angustus* n. sp.
– 101a. — — hair of anterior part of hysterosoma.
– 101b. — — hair of posterior part of hysterosoma.
– 102. — *distentus* n. sp.
– 102a. — — hair of hysterosoma.
– 103. *Bornebuschia peculiaris* n. gen. n. sp.
– 103a. — — ventral side.
– 103b. — — mandible.
– 103c. — — Leg I.
– 104. *Compactozetes rotoruensis* n. gen. n. sp.
– 104a. — — ventral side.
– 104b. — — mandible.
– 104c. — — Tibia and Tarsus I.
– 105. — *niger* n. sp.
– 105a. — — ventral side.
– 106. *Pterozetes memorabilis* n. gen. n. sp.
– 106a. — — ventral side.
– 107. *Topalia velata* n. sp.
– 107a. — — ventral side.
– 108. — *clavata* n. sp.
– 109. — *granulata* n. sp.
– 110. *Tumerozetes bifurcatus* n. gen. n. sp.
– 110a. — — ventral side.
– 110b. — — in profile.
– 110c. — — in oblique dorsal view.
– 110d. — — Leg I.
– 111. — *circularis* n. sp.
– 112. — *pumilis* n. sp.
– 113. — *parallelus* n. sp.
– 114. — *indistinctus* n. sp.
– 115. *Adhaesozetes Barbarae* n. gen. n. sp.
– 115a. — — ventral side.
– 115b. — — mandible.
– 115c. — — palp.
– 115d. — — right maxilla.

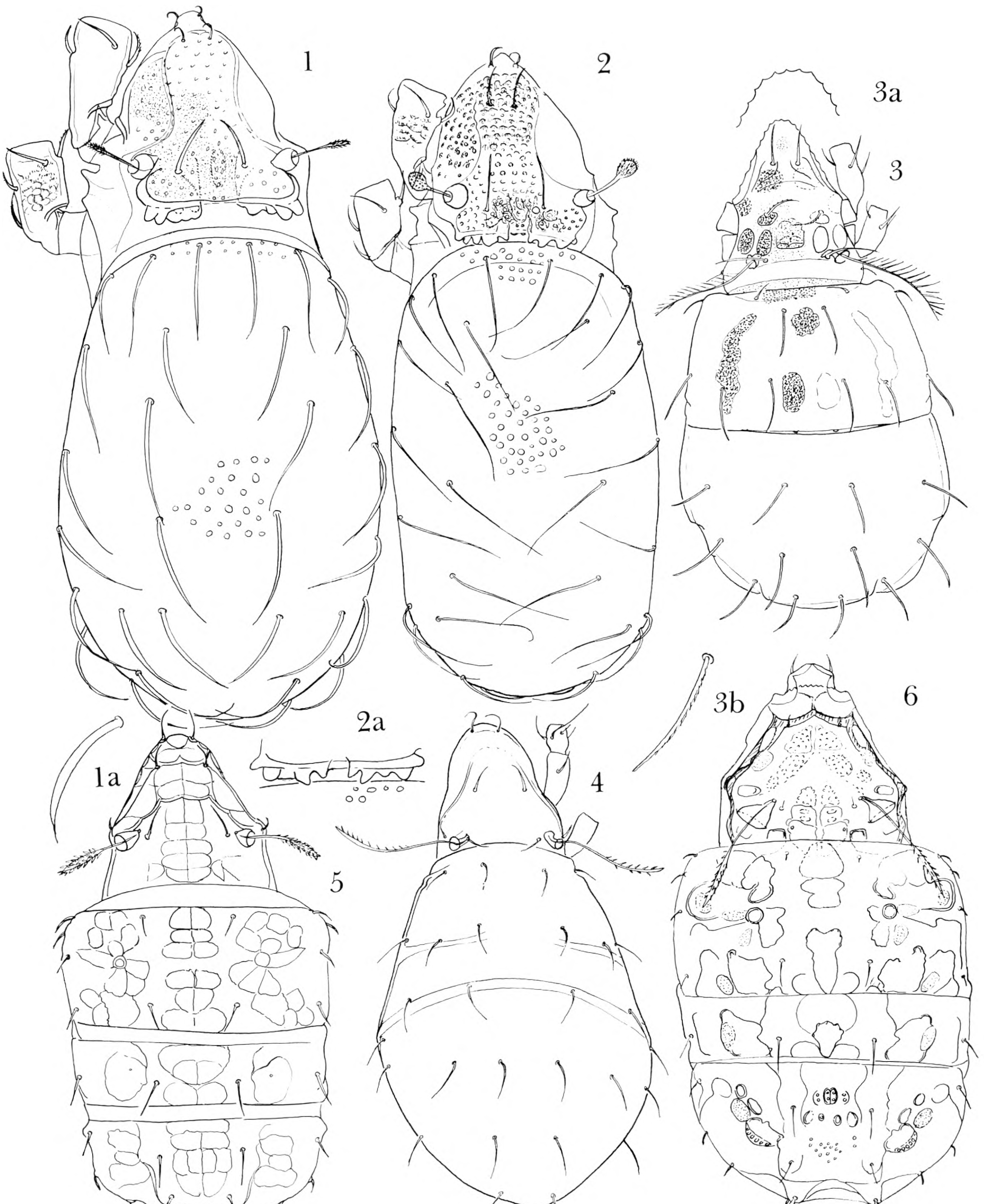
Fig. 115e. *Adhaesozetes Barbarae* left Leg I.
– 115f. — — end of Tibia I and Tarsus I.
– 115g. — — tip of Tarsus I.
– 116. *Clavazetes decorus* n. gen. n. sp.
– 116a. — — hair of posterior border of hysterosoma.
– 116b. — — ventral side.
– 116c. — — end of Tibia I and Tarsus I.
– 116d. — — Leg III.
– 116e. — — mandible.
– 117. *Bulleremaeus reticulatus* n. gen. n. sp.
– 117a. — — lamellar hair.
– 117b. — — ventral side.
– 117c. — — Tibia and Tarsus I.
– 117d. — — Femur and Genu I.
– 117e. — — Tibia and Tarsus III.
– 118. — *tuberculatus* n. sp.
– 119. *Capillibates Stagaardi* n. gen. n. sp.
– 119a. — — ventral side.
– 119b. — — Leg. I.
– 119c. — — Genu, Tibia and Tarsus III.
– 119d. — — Leg IV.
– 119e. — — mandible.
– 120. *Halozetes otagoensis* n. sp. female.
– 120a. — — ventral side, female.
– 120b. — — Tarsus II, female.
– 120c. — — male.
– 120d. — — ventral side, male.
– 120e. — — hair of posterior border of hysterosoma, male.
– 121. *Sellnickia caudata* (Mich.) male.
– 121a. — — tip of propodosoma, female.
– 122. *Austrogneta multipilosa* Balogh.
– 122a. — — ventral side.
– 123. — *quadridentata* n. sp.
– 123a. — — part of lamellae, lamellar hairs and rostral hairs.
– 123b. — — pseudostigmatic organ.
– 123c. — — ventral side.
– 123d. — — Leg I.
– 123e. — — mandible.
– 124. *Cultroribula lata* Aoki.
– 124a. — — propodosoma in profile.
– 124b. — — ventral side.
– 125. *Cuspitegula stellifer* n. gen. n. sp.
– 125a. — — lamellar hair.
– 125b. — — ventral side.
– 126. ? *Physobates monodactylus* n. sp.
– 126a. — — pseudostigmatic organ.
– 126b. — — ventral side.
– 126c. — — Leg II.
– 127. *Pelops punctatus* Ramsay.
– 127a. — — hair of hysterosoma.

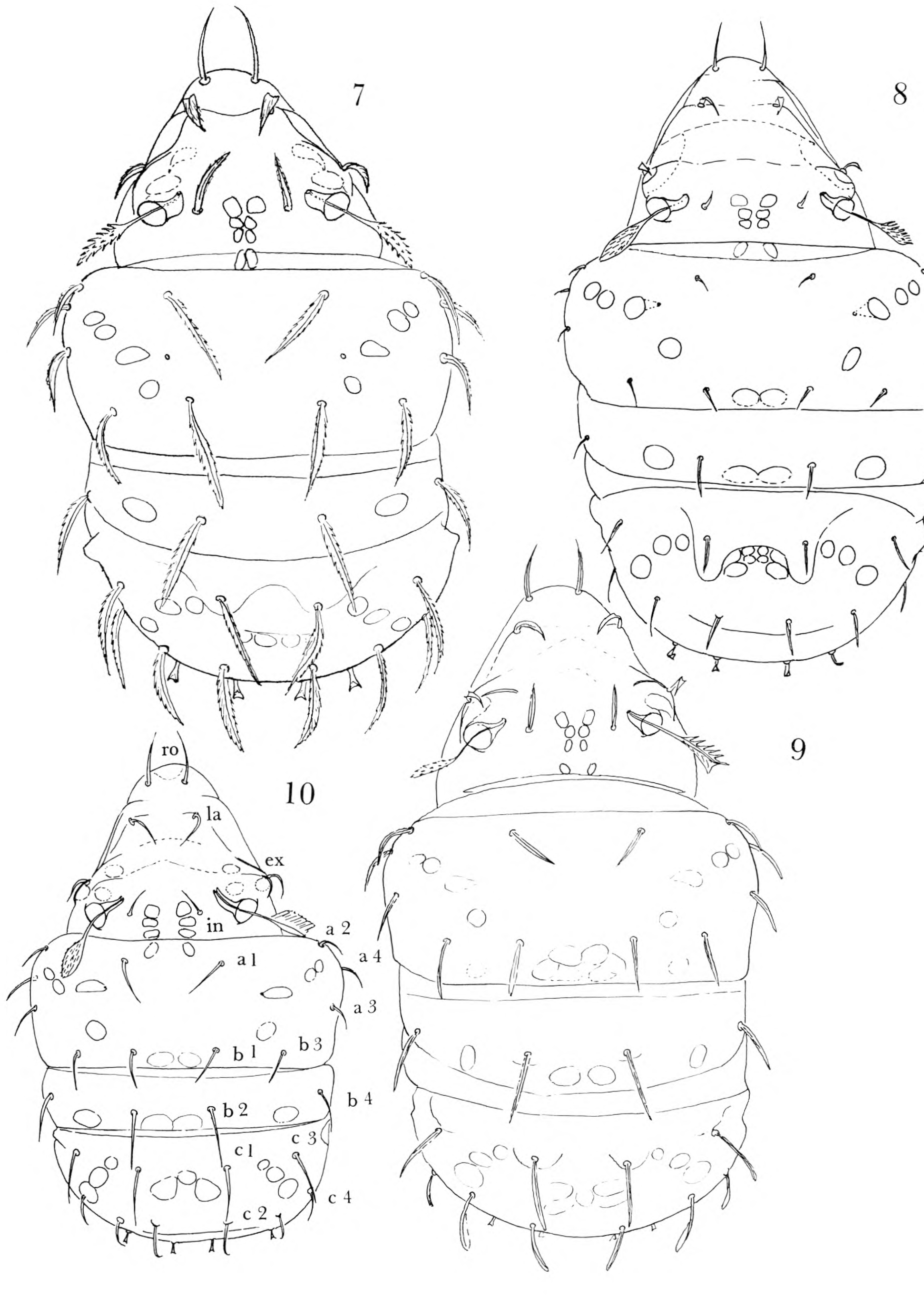
Fig. 127 b. *Pelops punctatus* spine of Tarsus II.
– 128. — *monodactylus* n. sp.
– 128 a. — — pseudostigmatic organ.
– 128 b. — — spine of Tarsus II.
– 129. *Maorizetes ferox* n. gen. n. sp.
– 129 a. — — tip of rostrum.
– 129 b. — — ventral side.
– 129 c. — — tip of mandible.
– 129 d. — — maxilla and palp.
– 129 e. — — Tibia and Tarsus I.

Indleveret til Selskabet den 24. august 1965.
Færdig fra trykkeriet den 31. maj 1966.

PLATES

PLATE I

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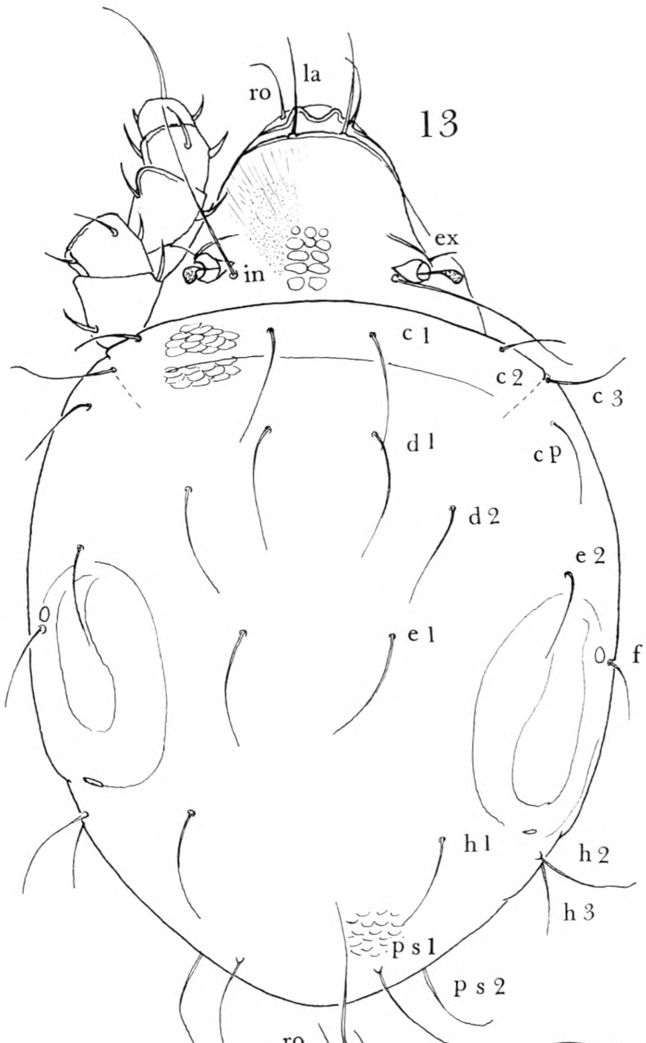
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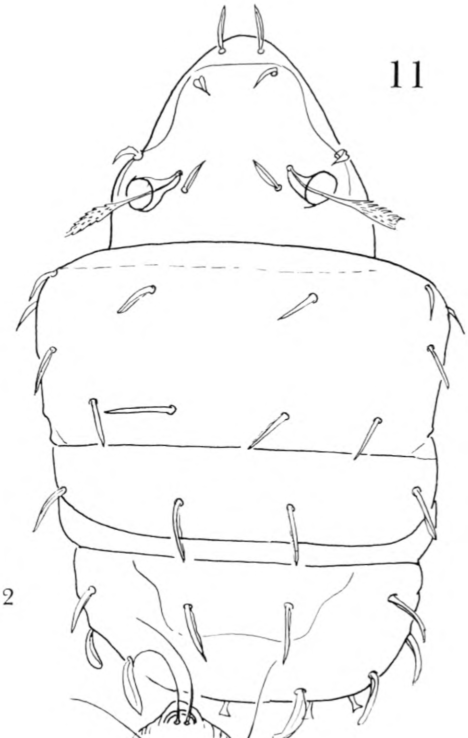

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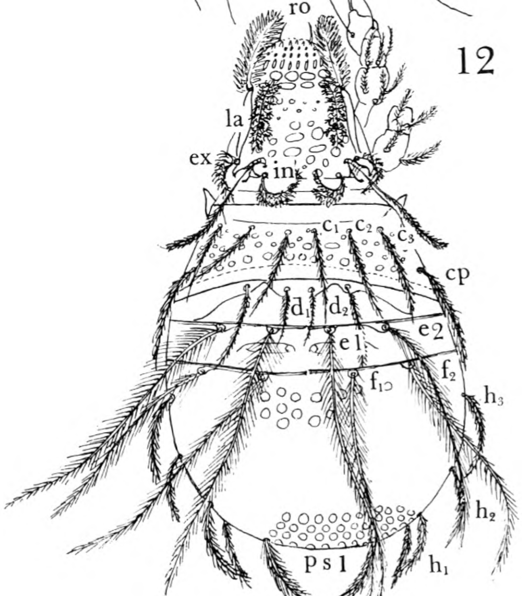
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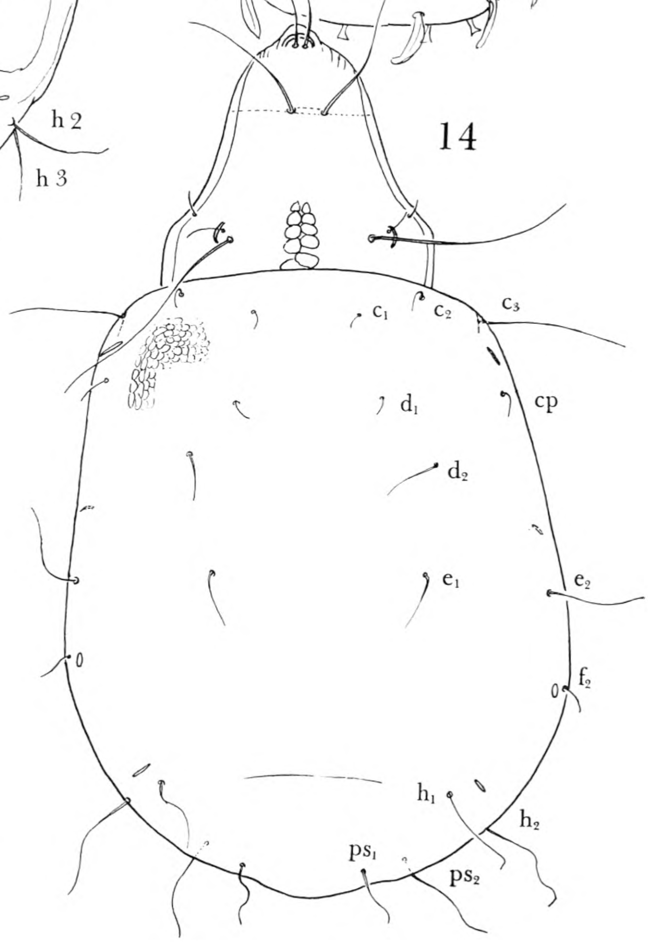
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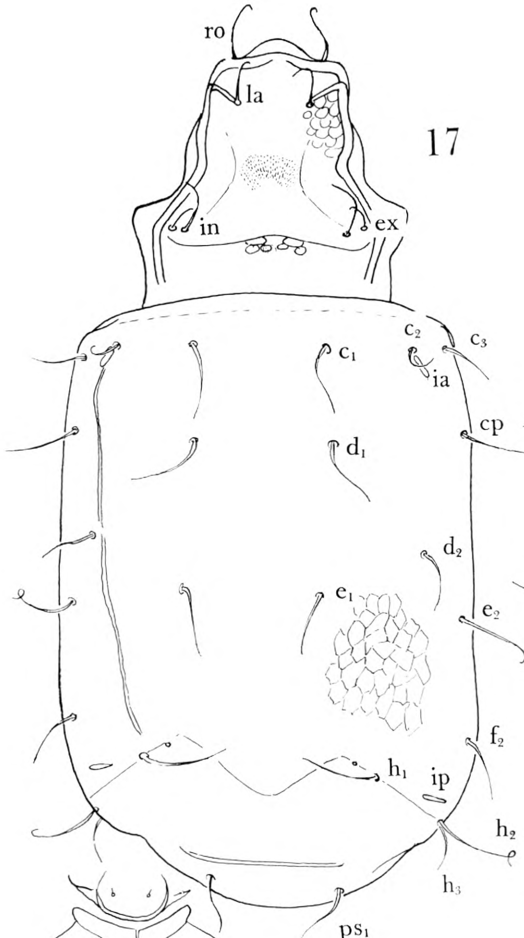
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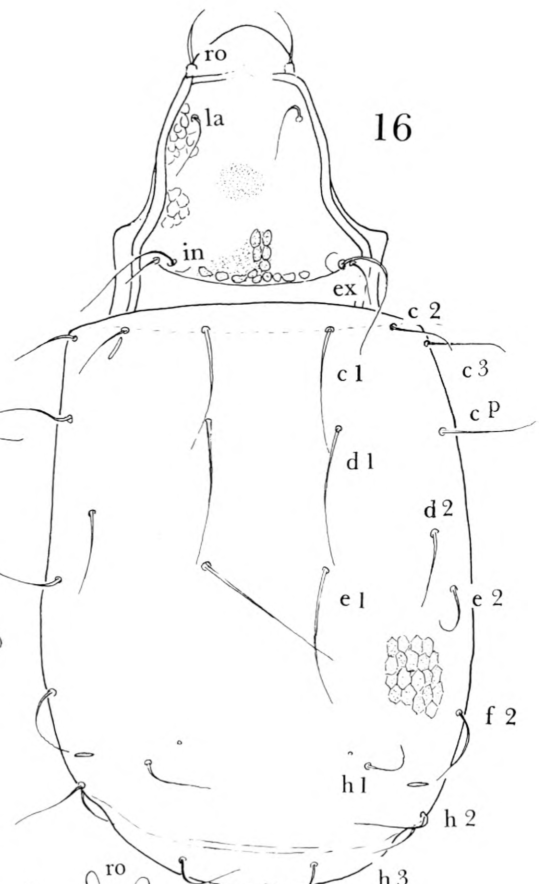
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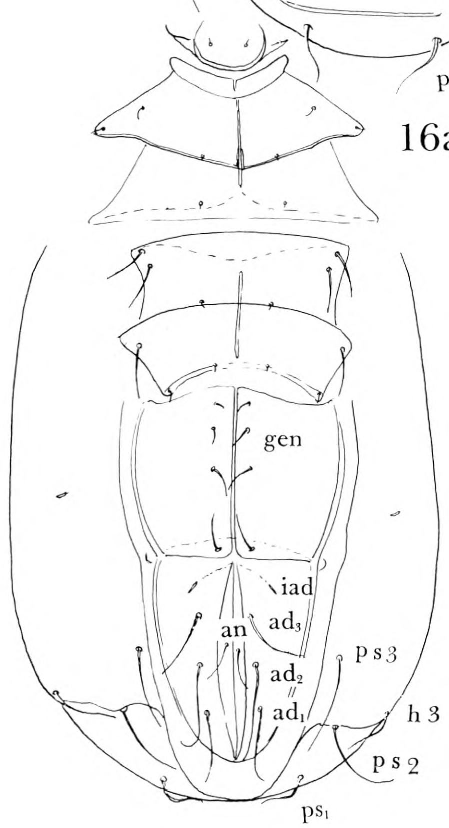
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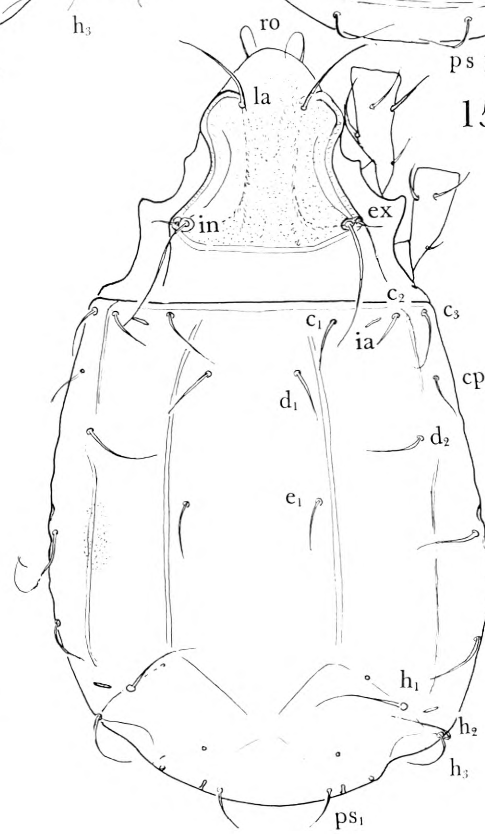
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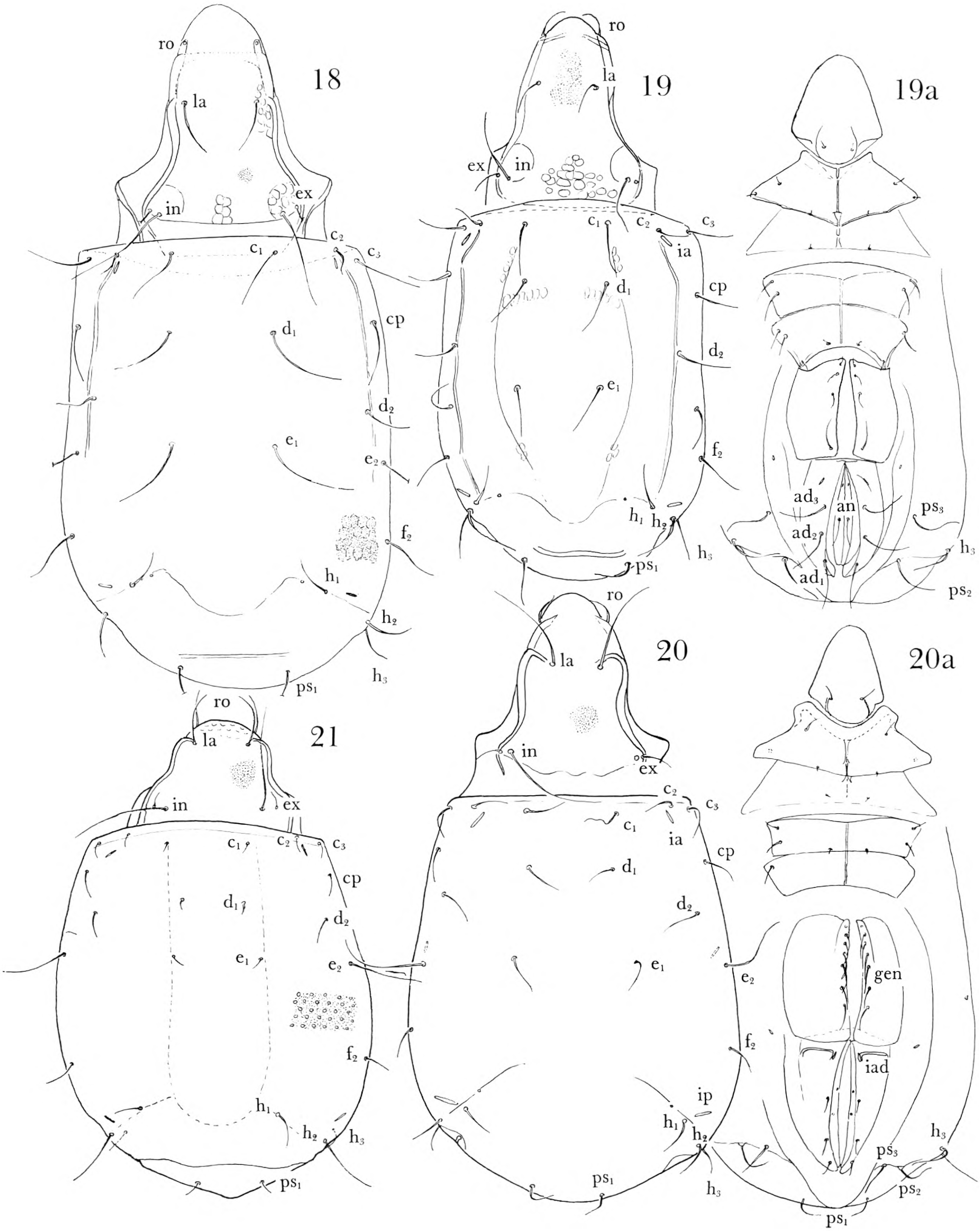
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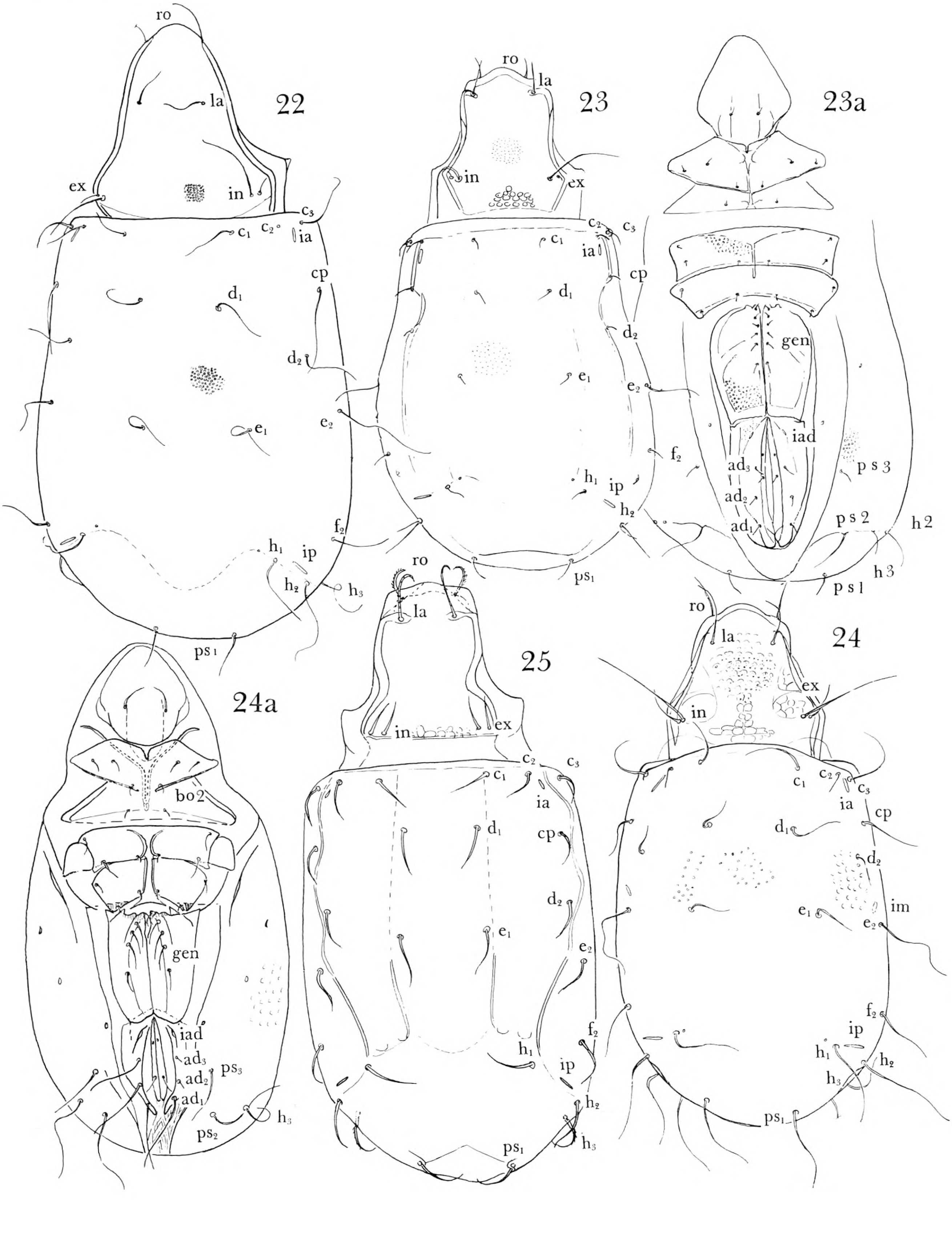
PLATE VI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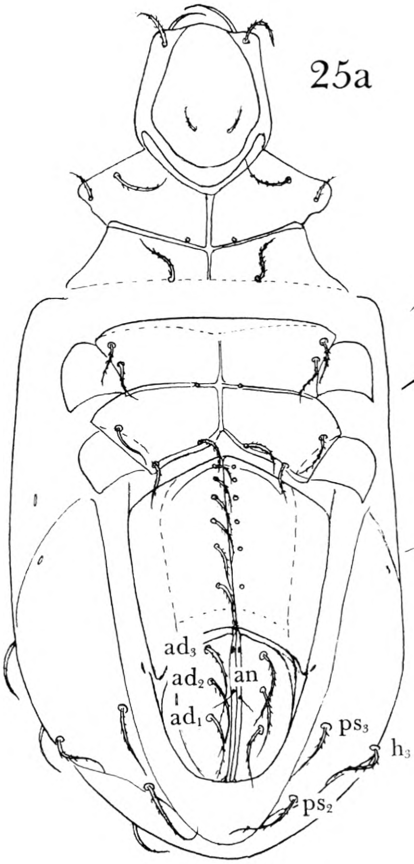

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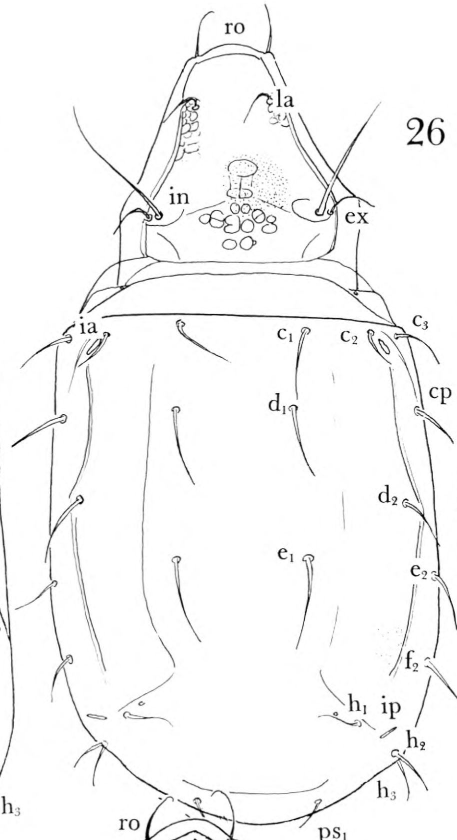

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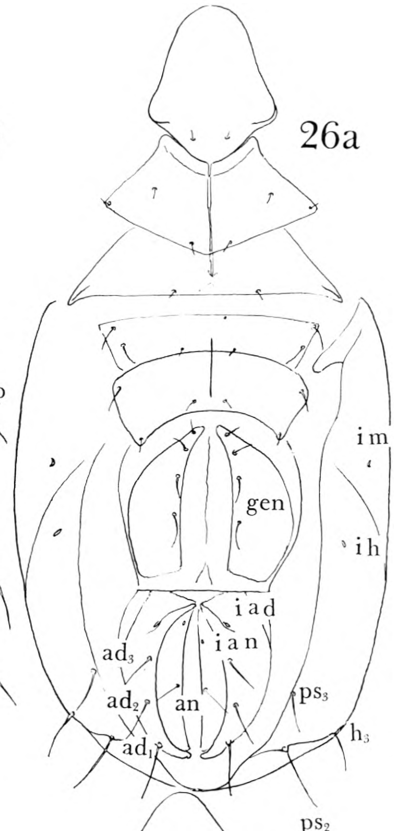

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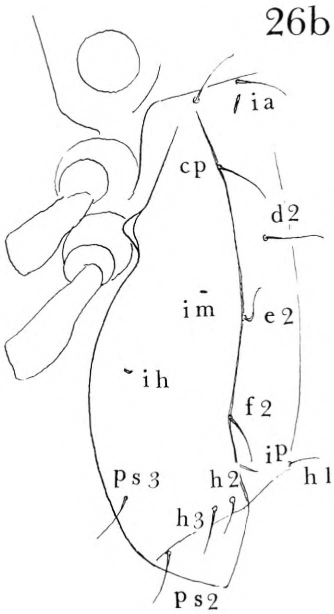

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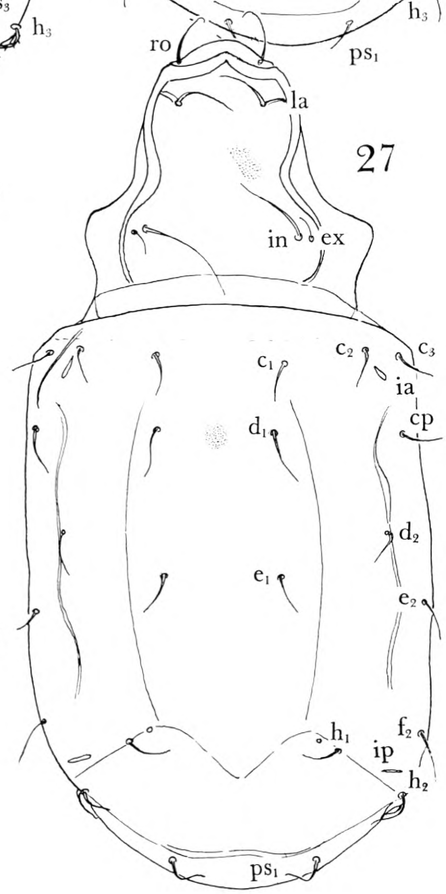

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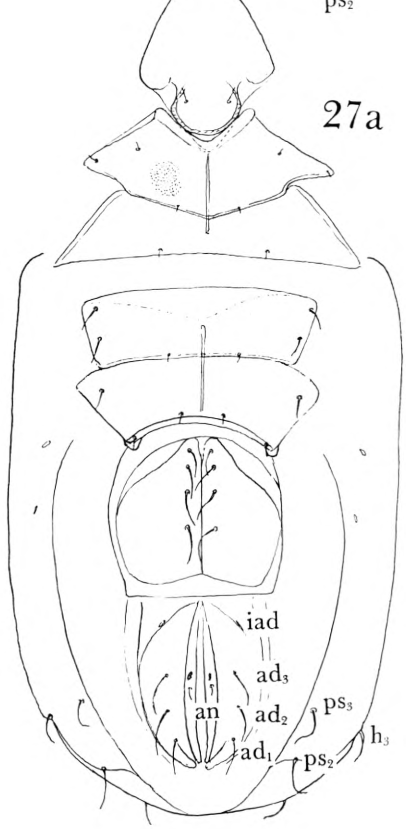

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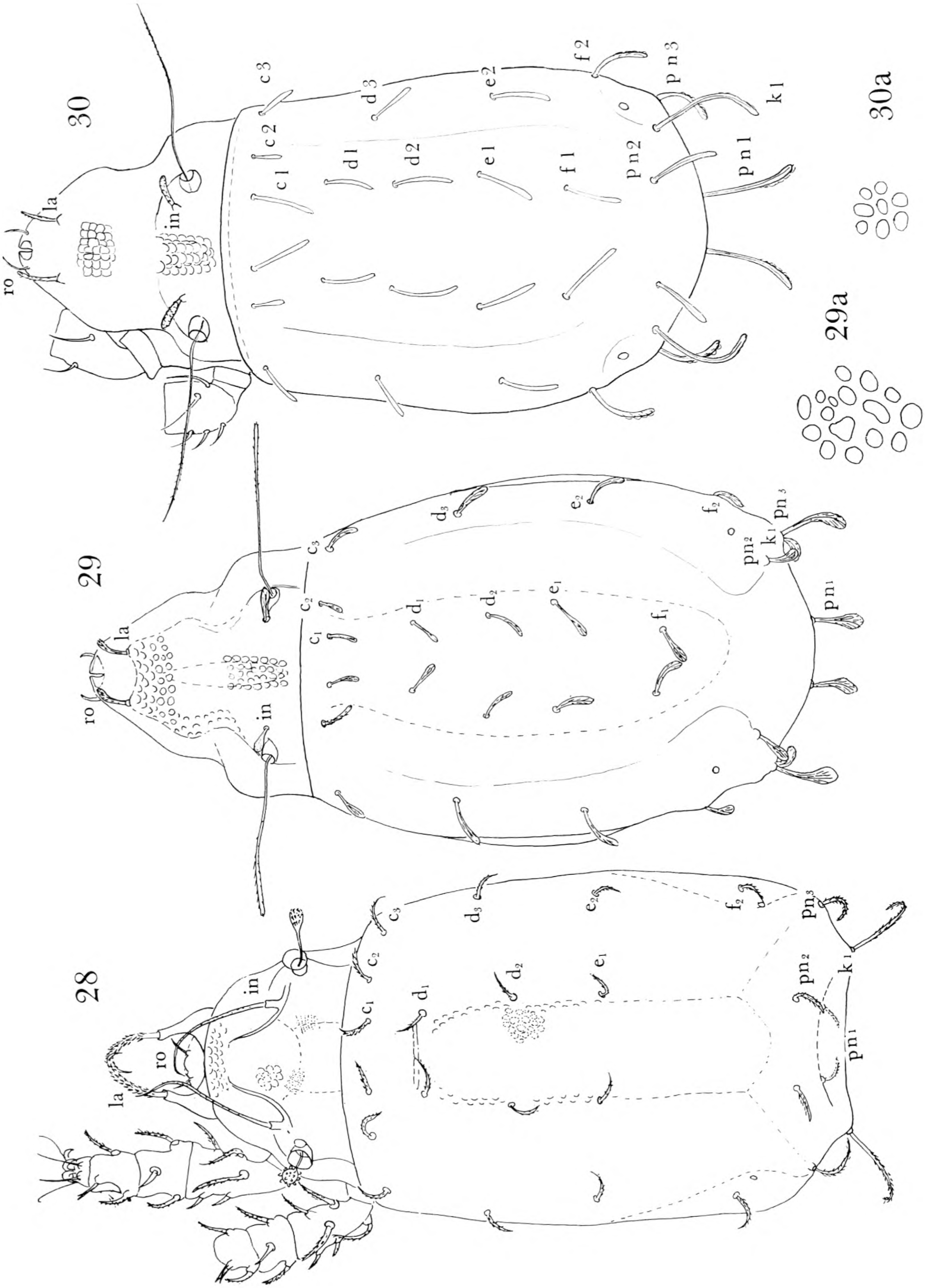
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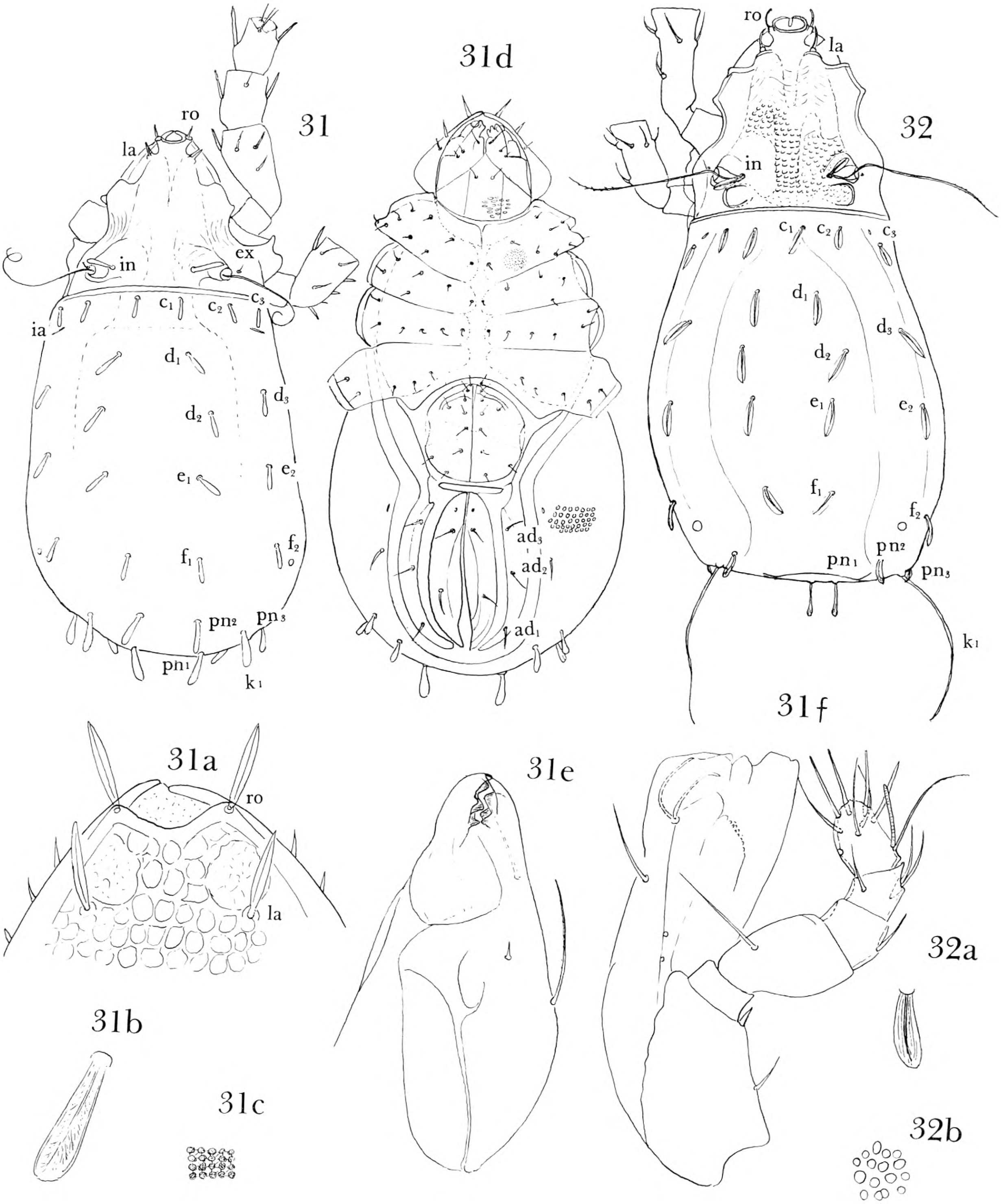
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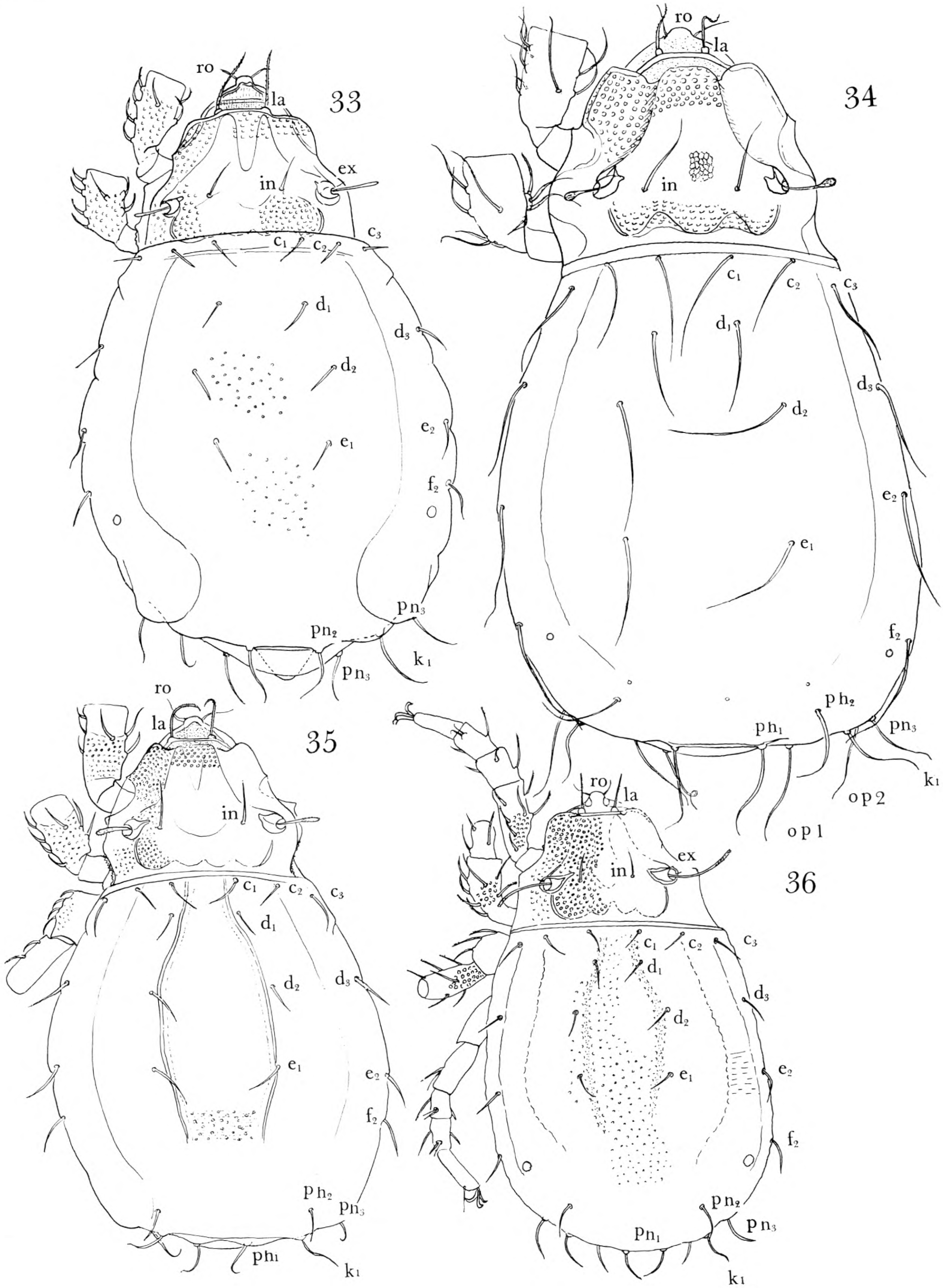
Plate X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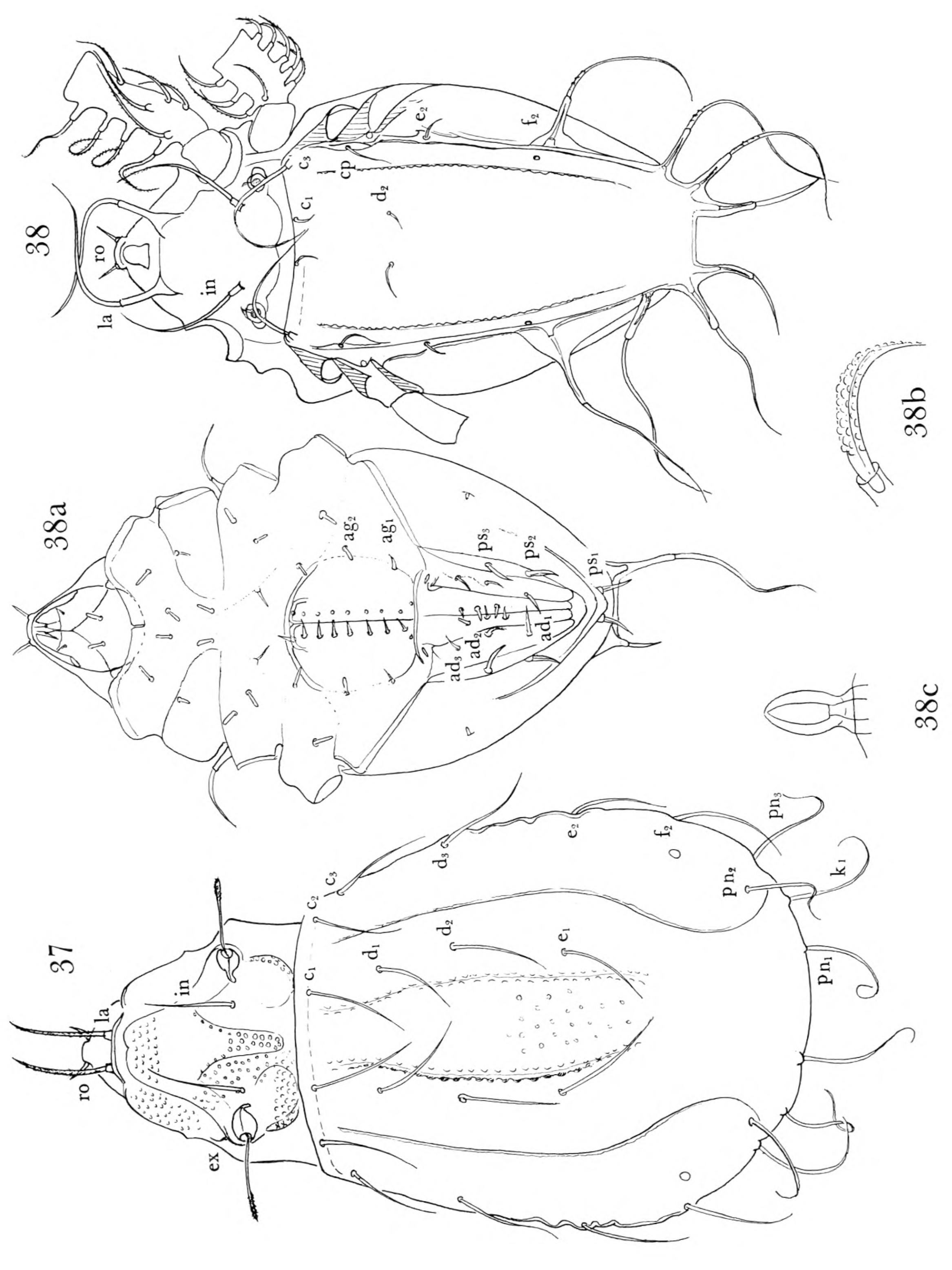
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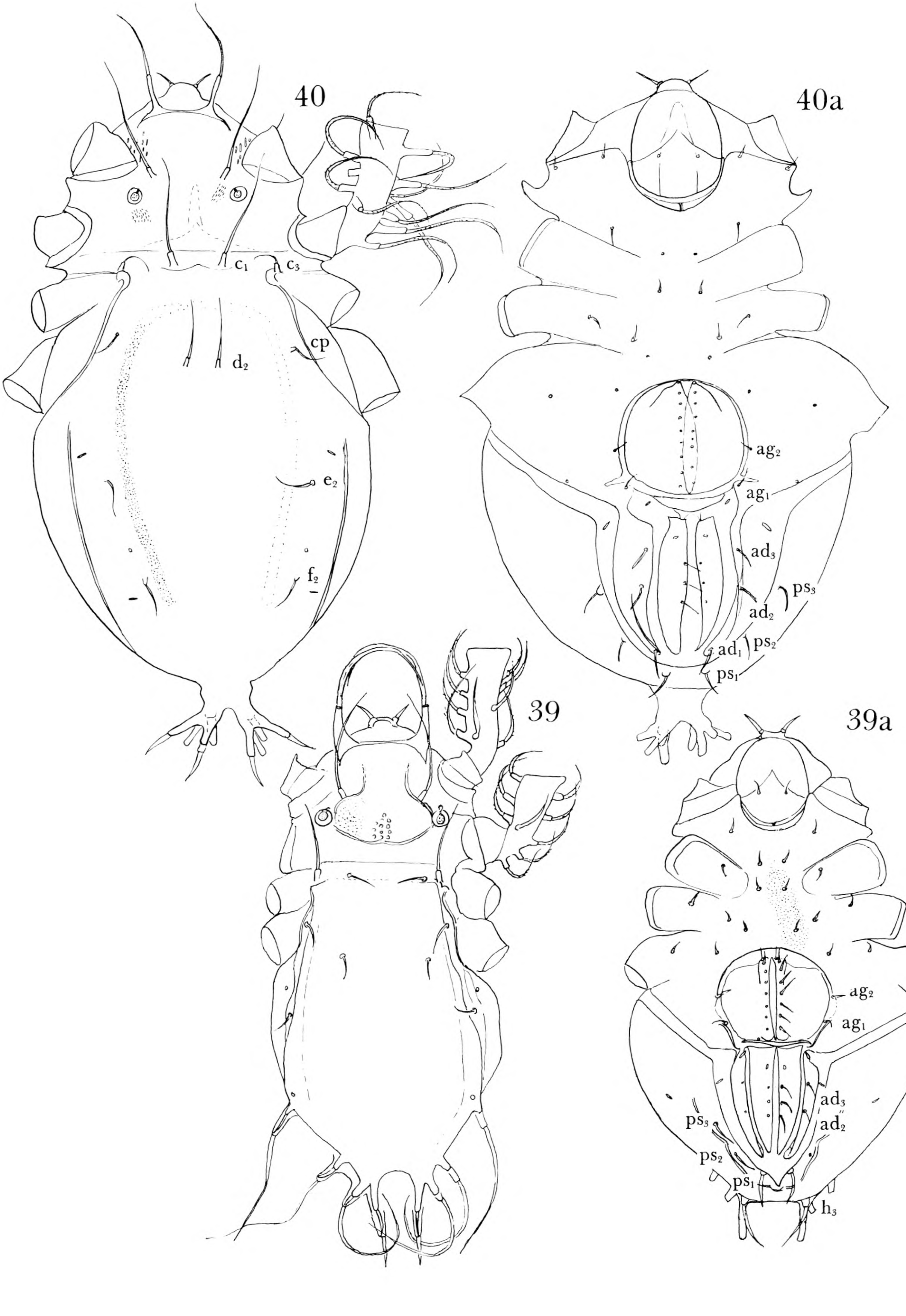

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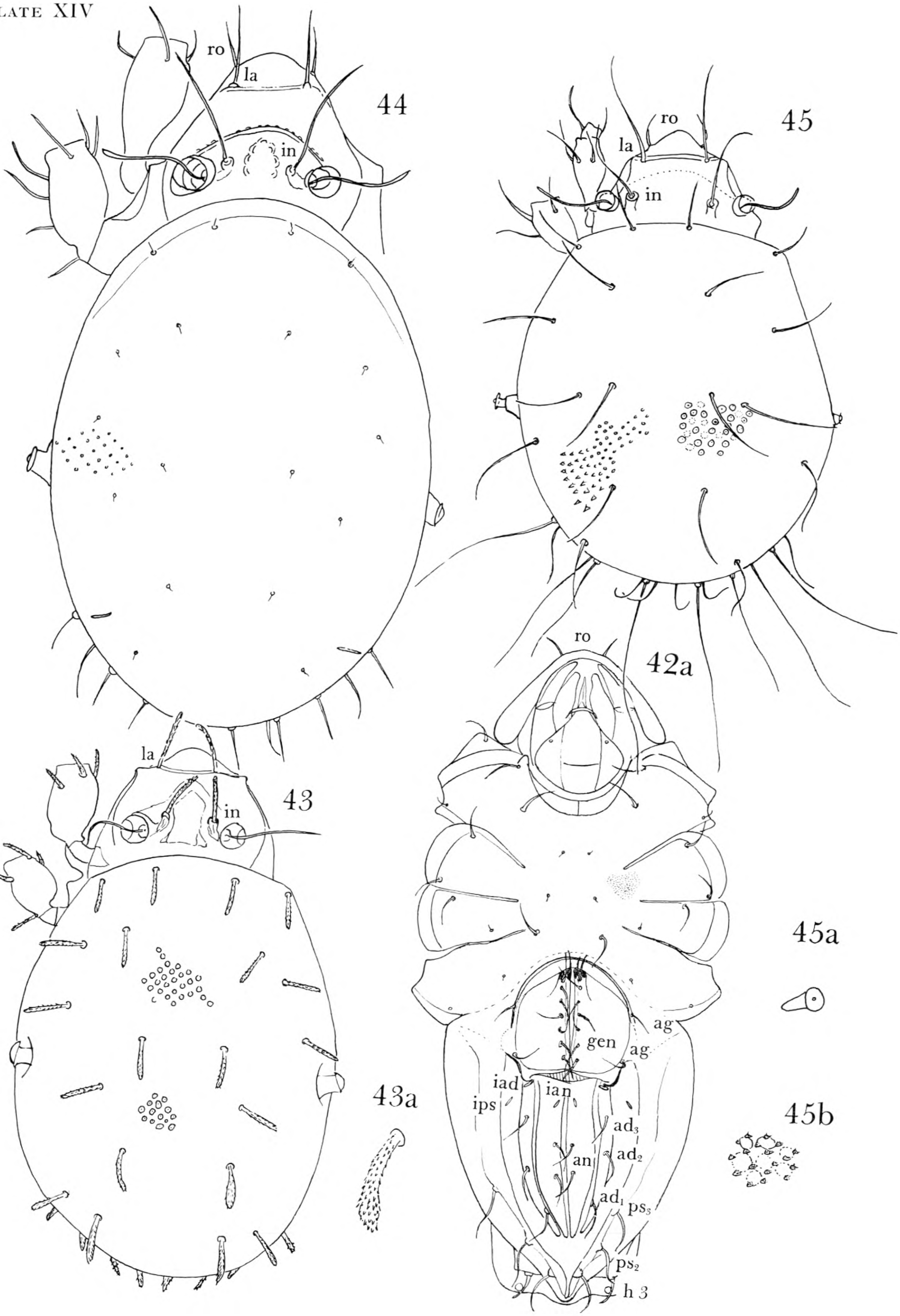
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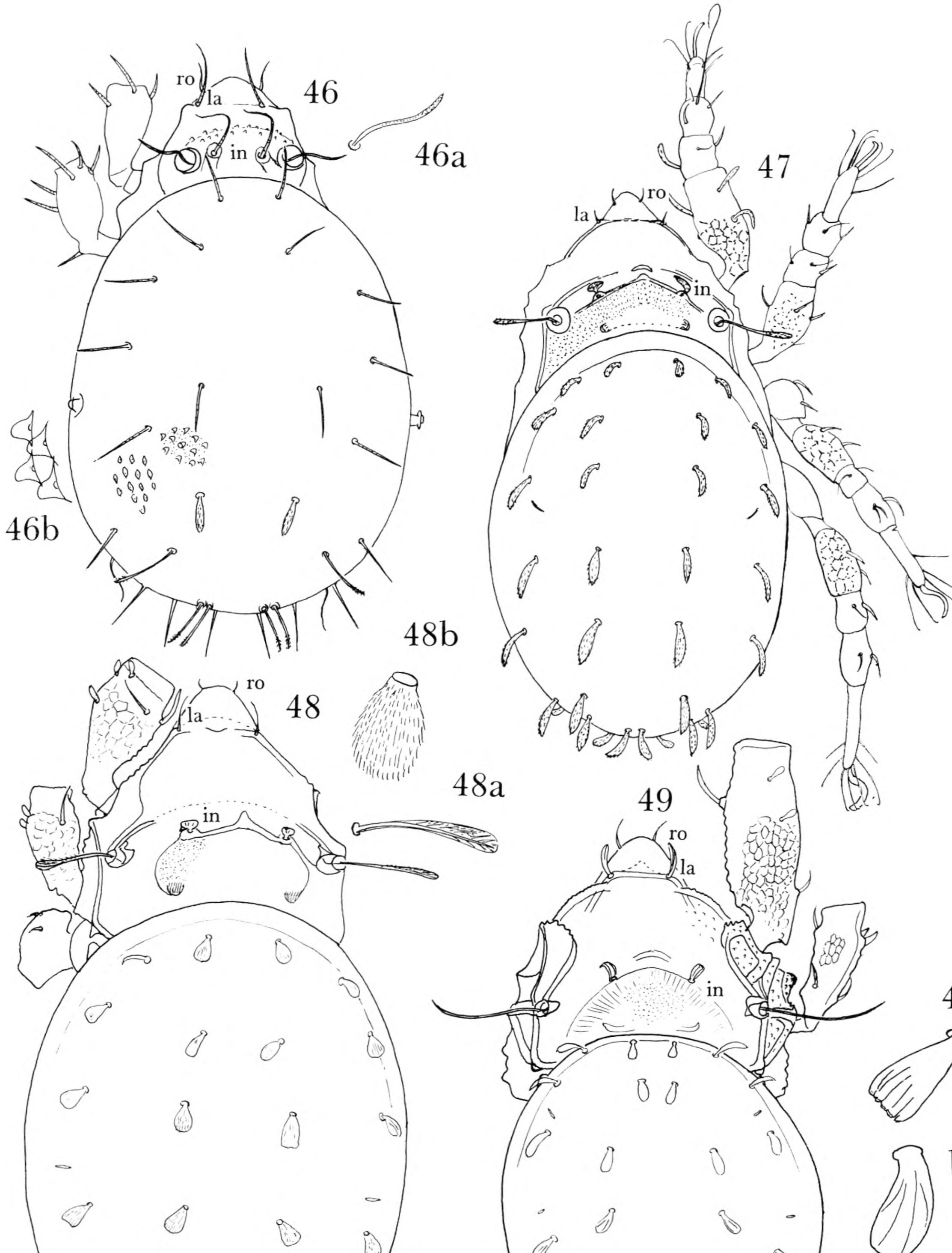
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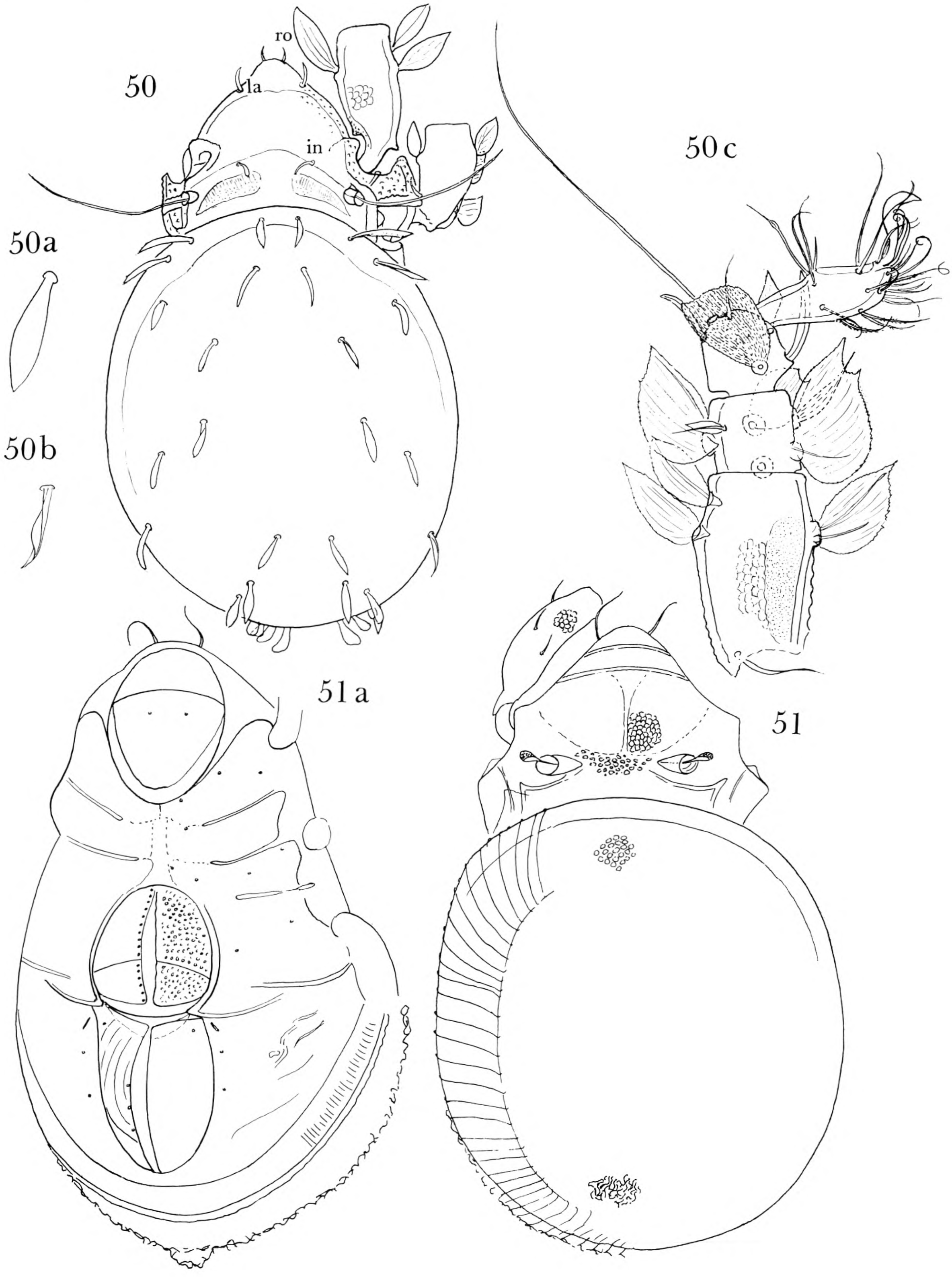
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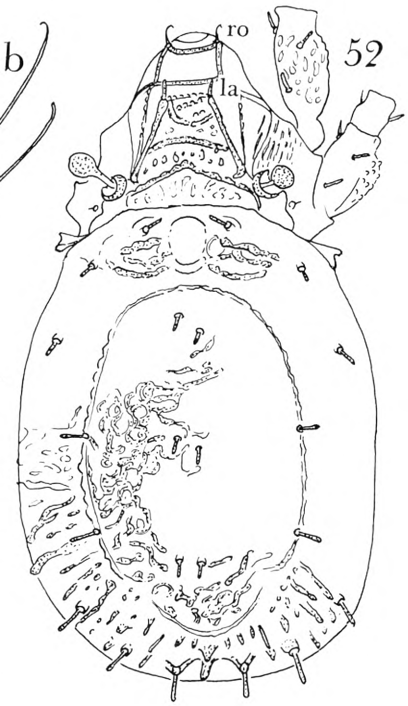

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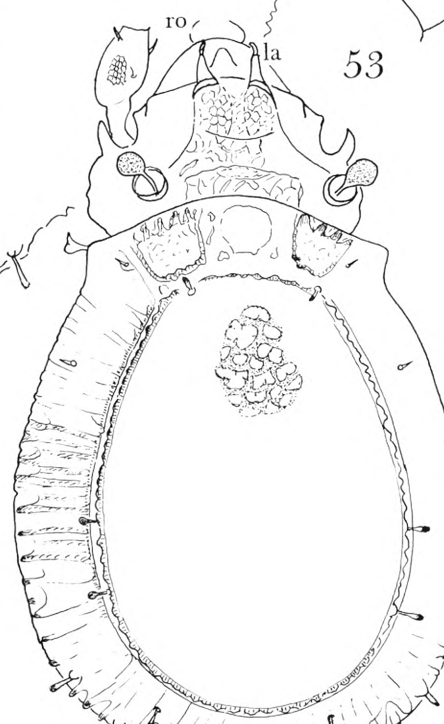

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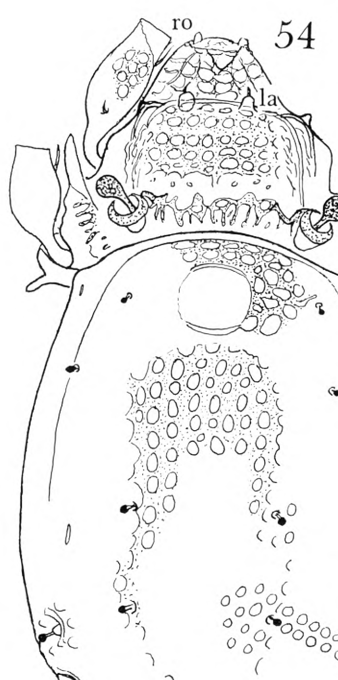

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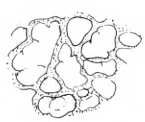

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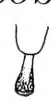

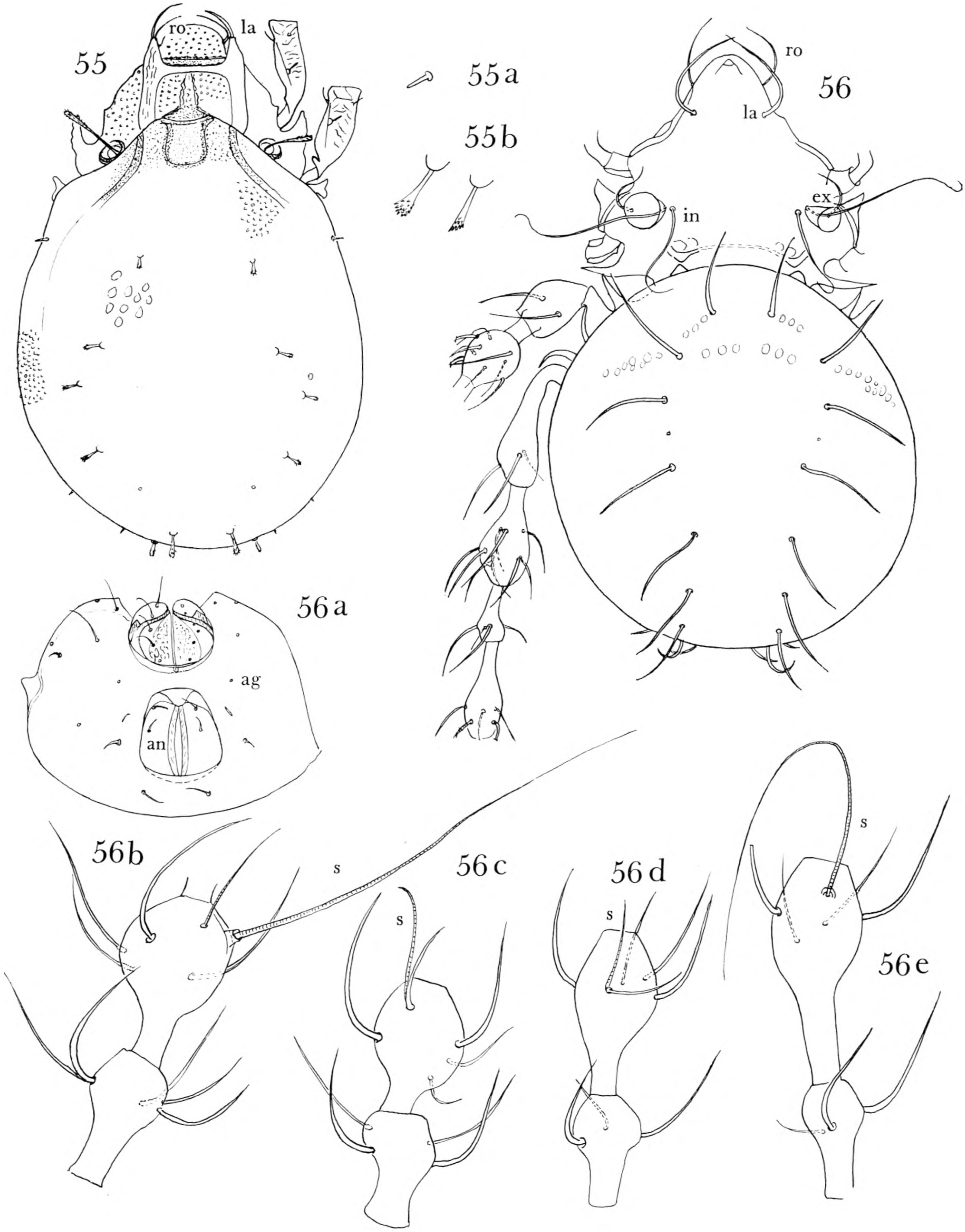
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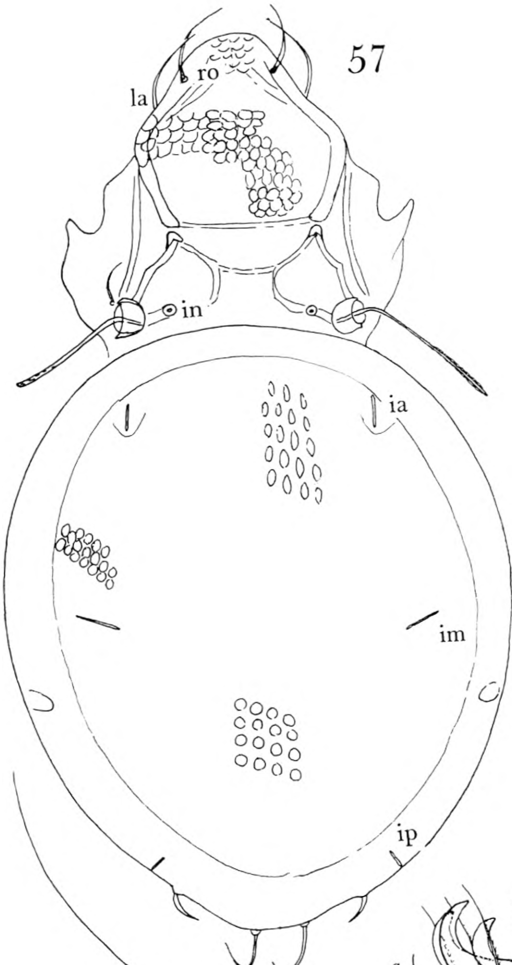

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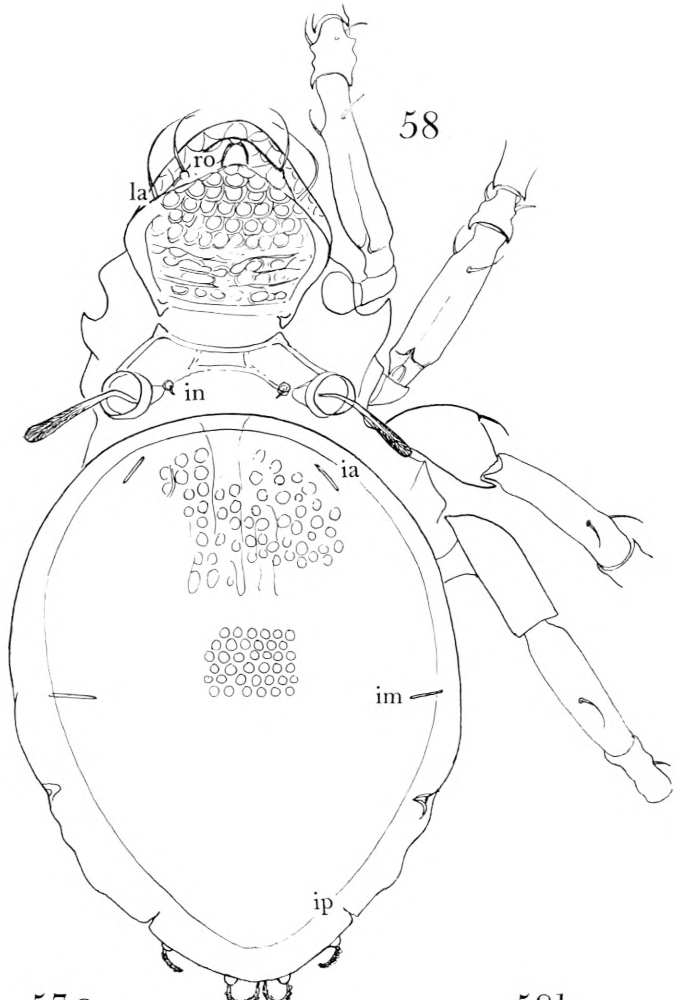

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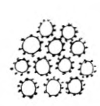

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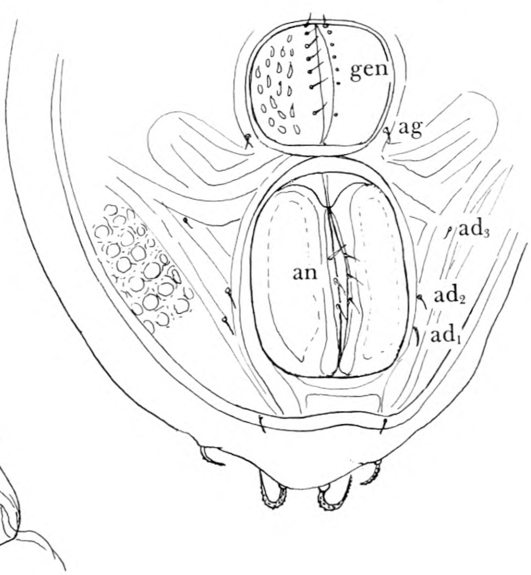

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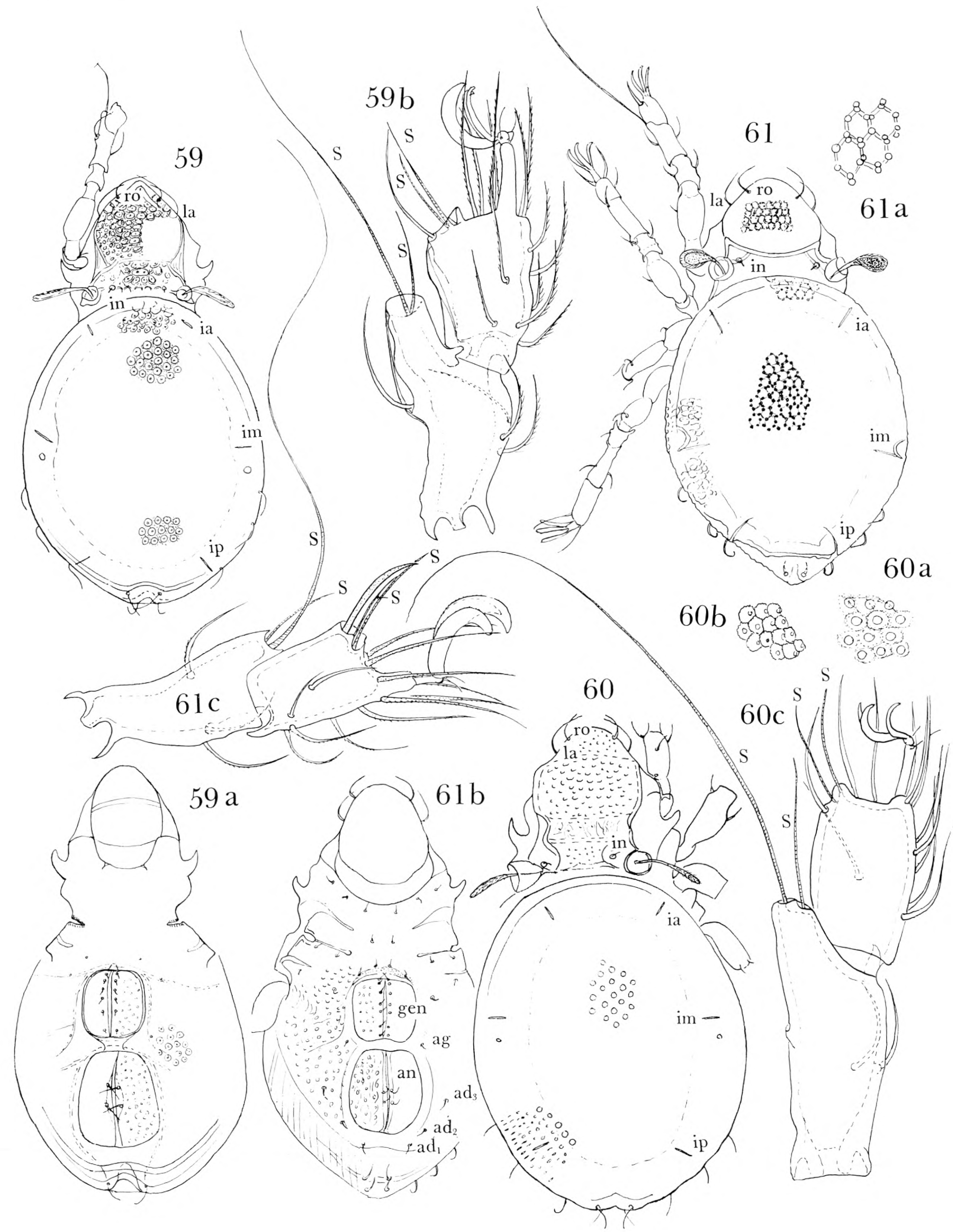

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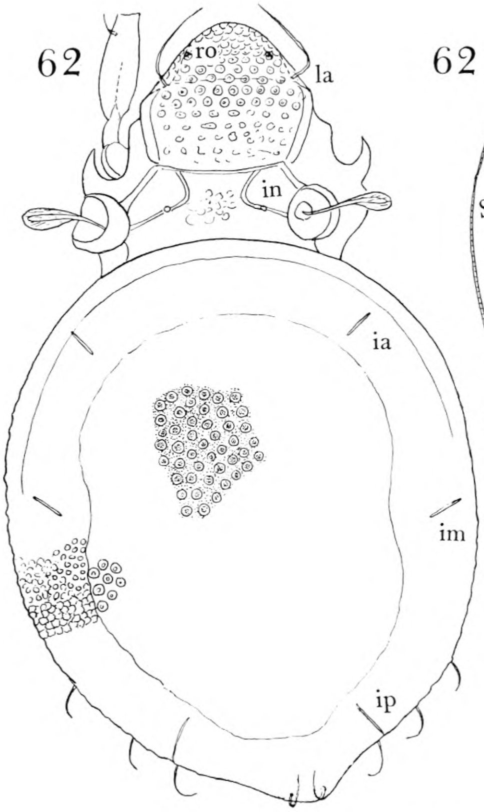
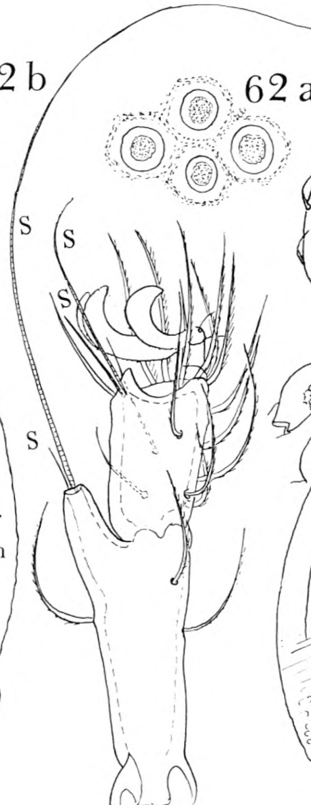
ad1

62

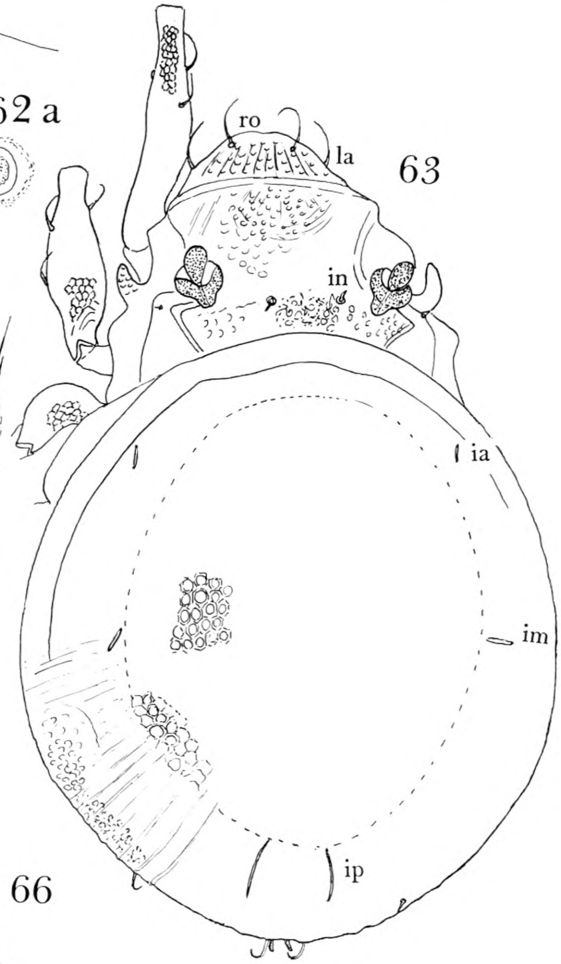


62 b



62 a

63



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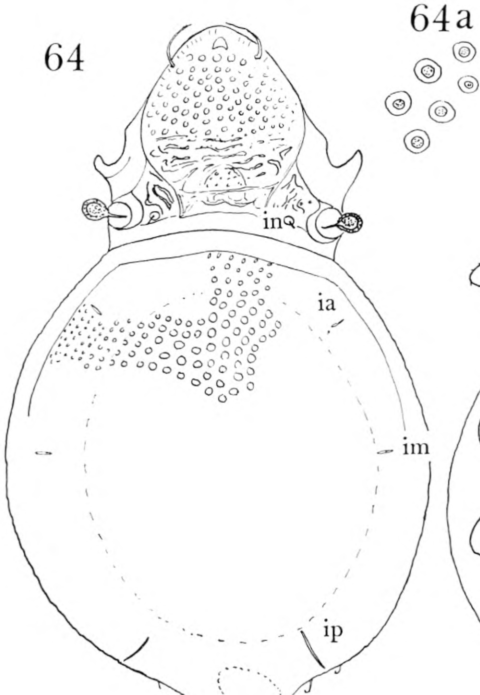

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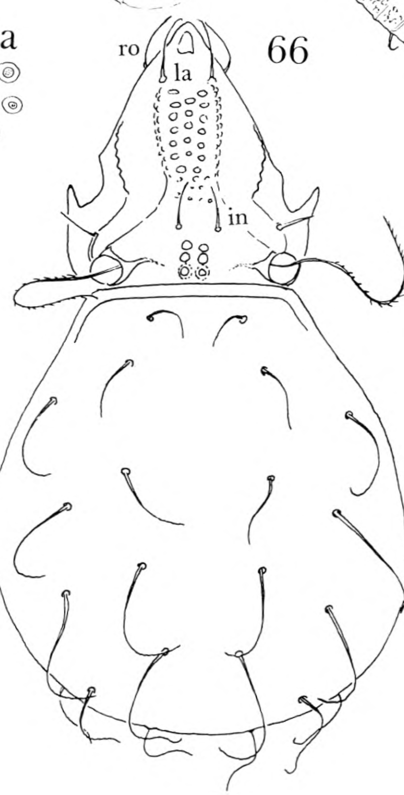

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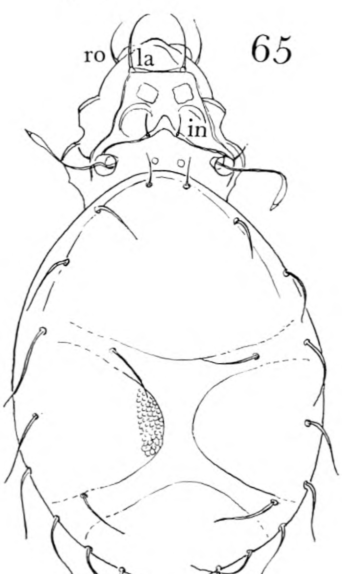

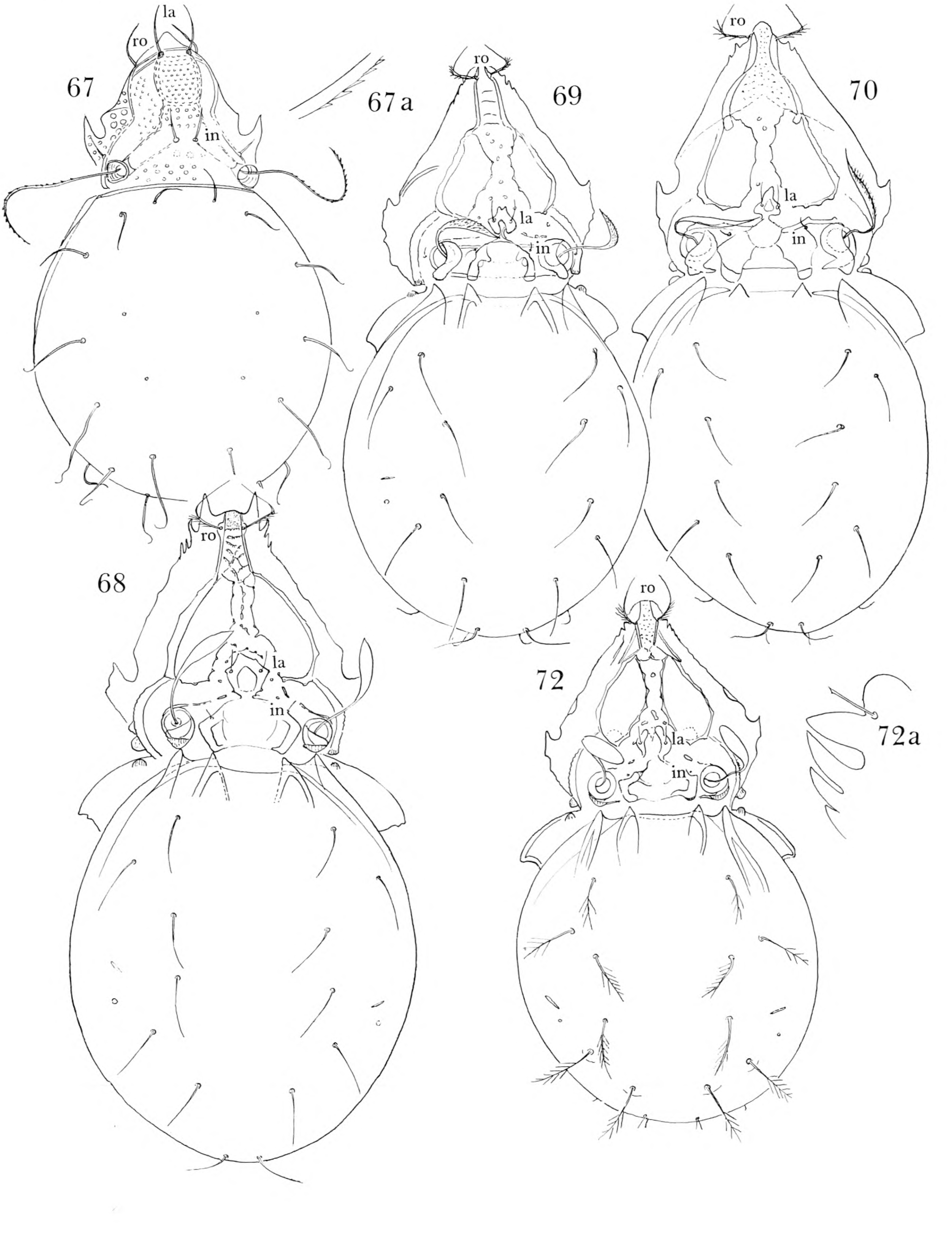
67
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67a
69
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la
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70
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la
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68
ro
la
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72
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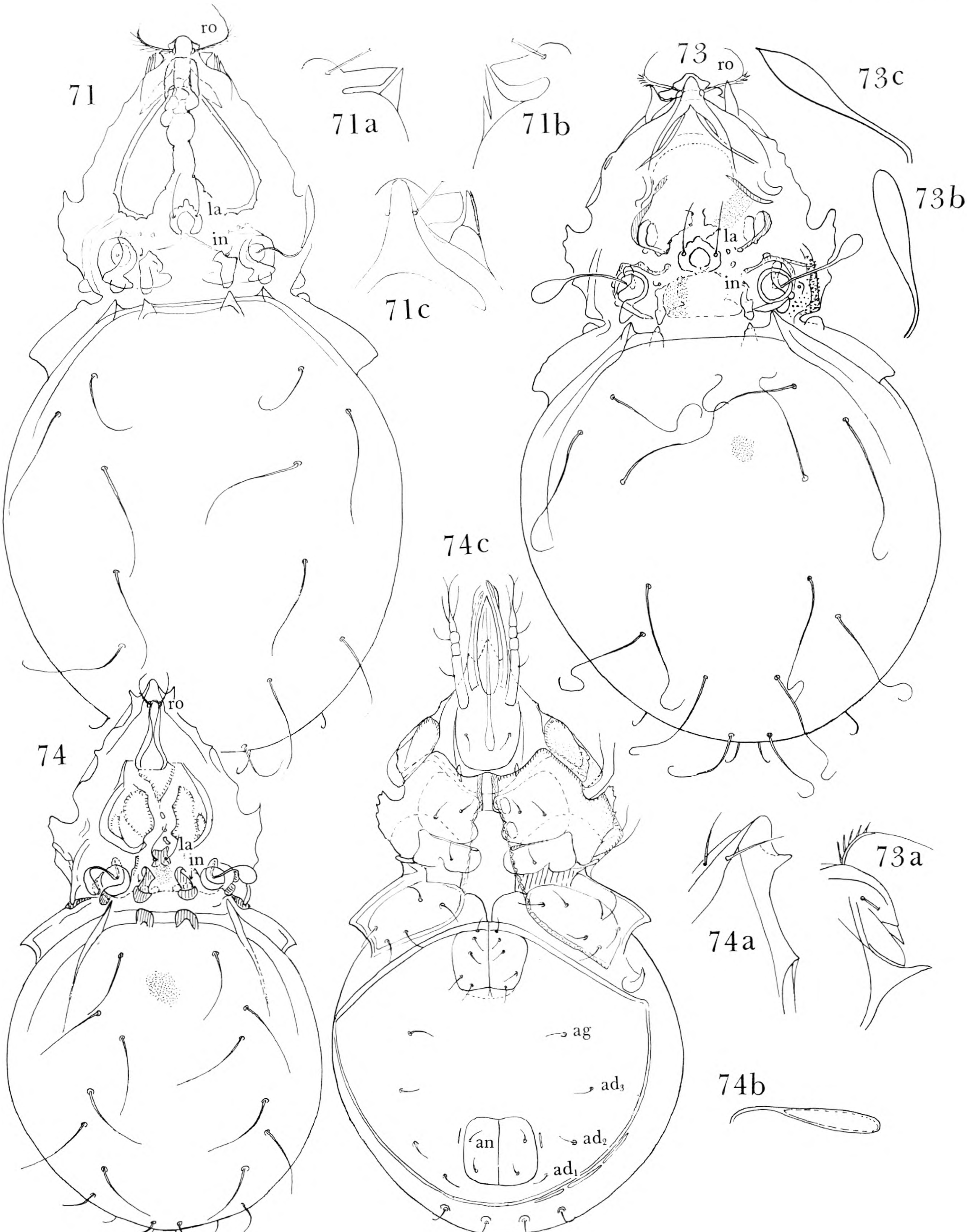
la
in
72a

PLATE XXIII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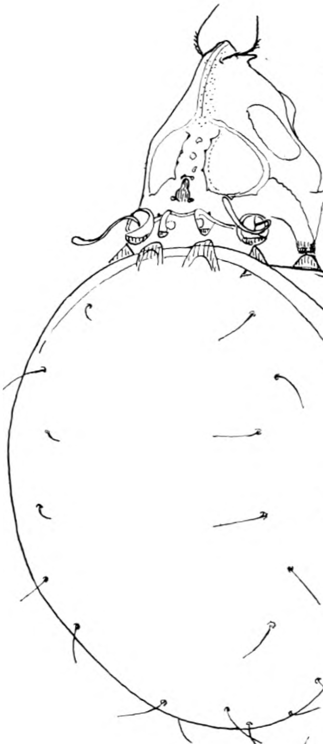

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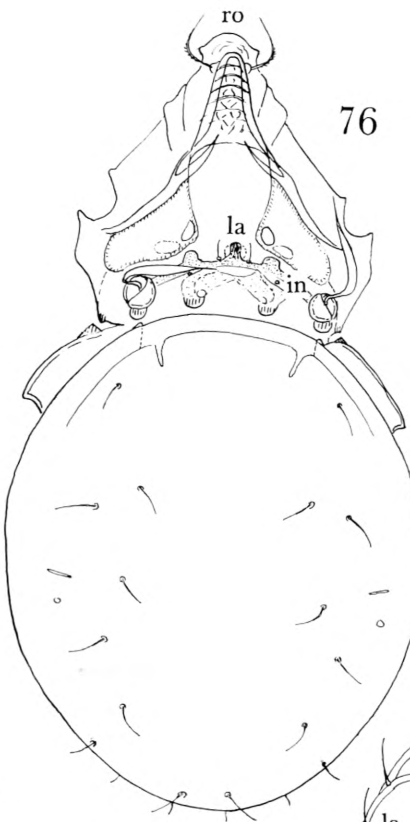

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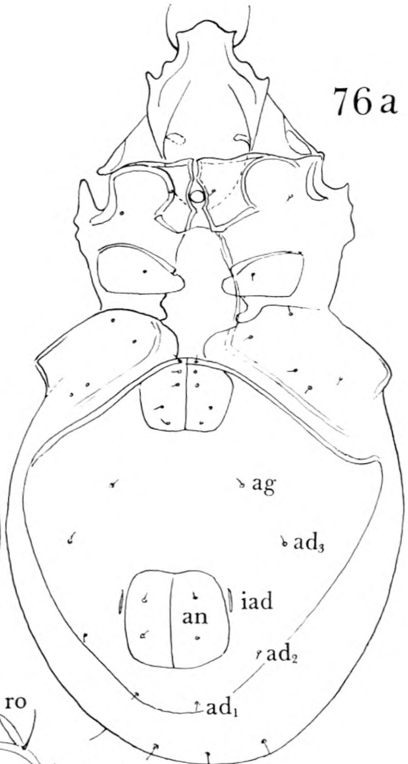

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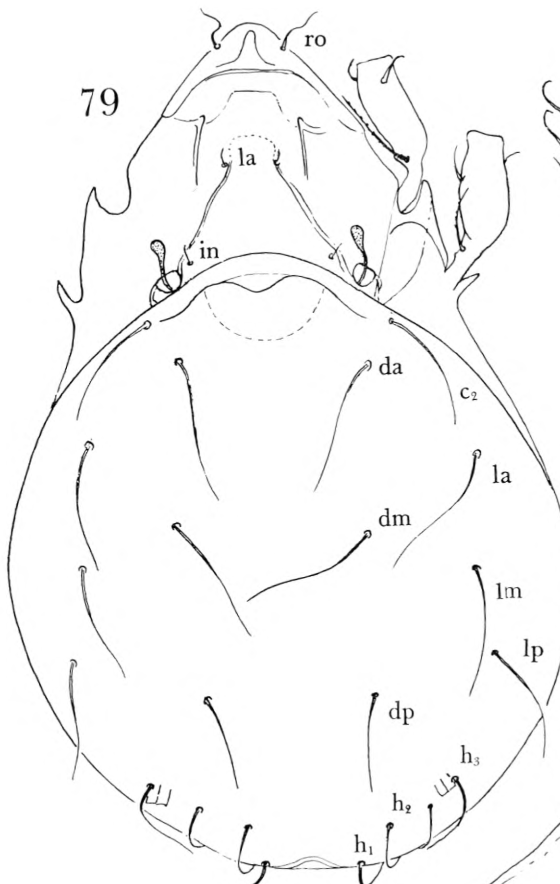
77

78

Plate XXV

79



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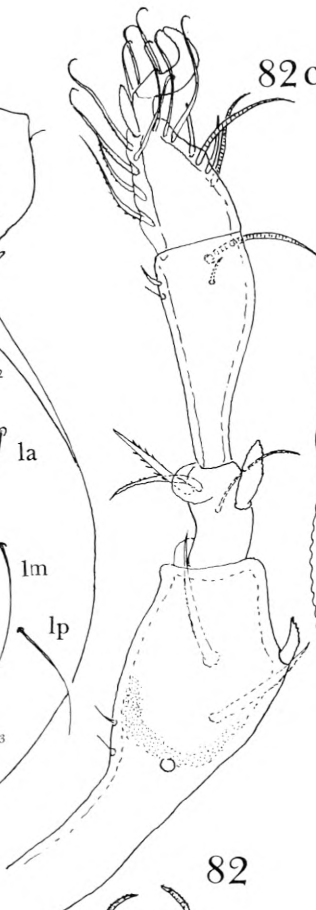

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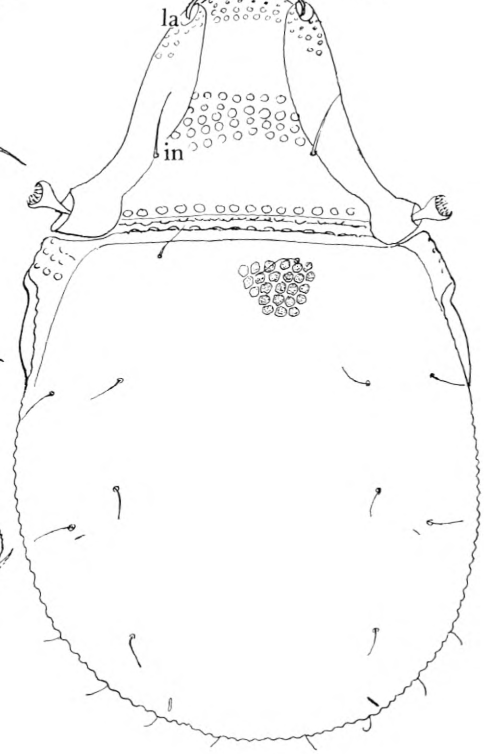

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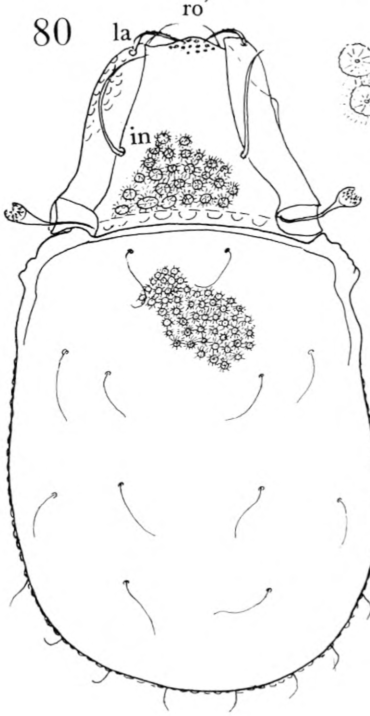

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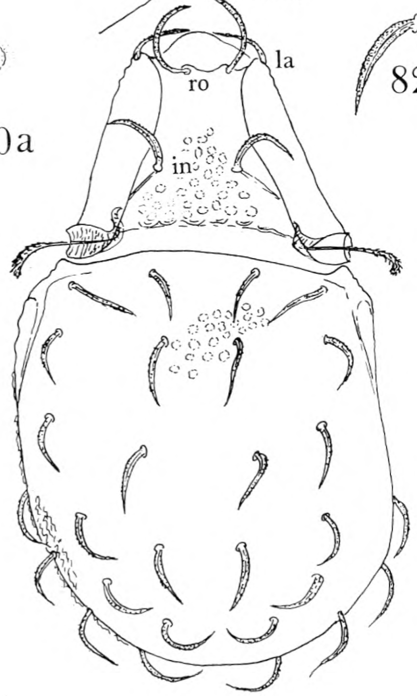

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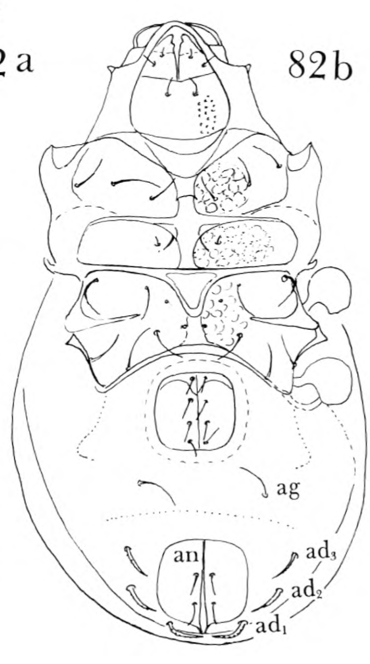

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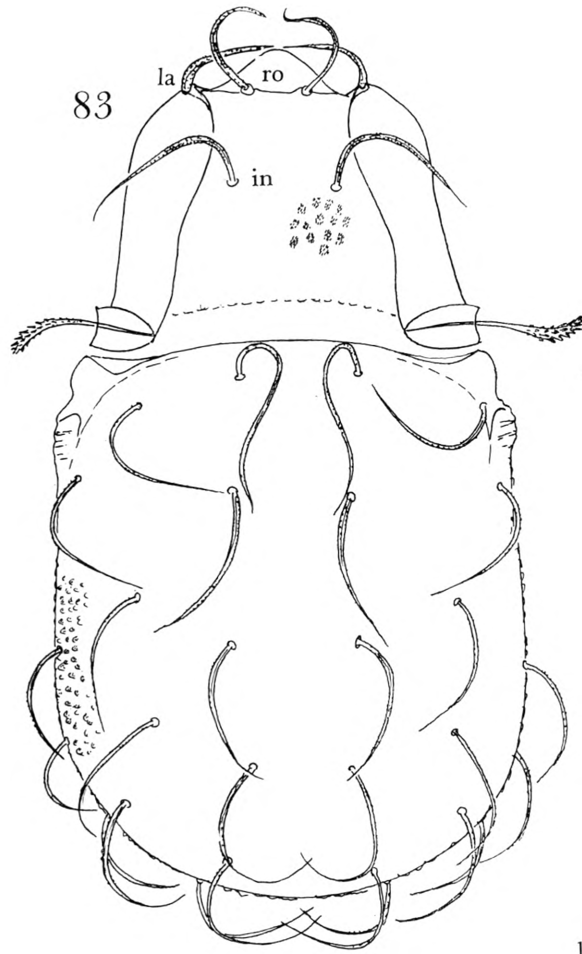

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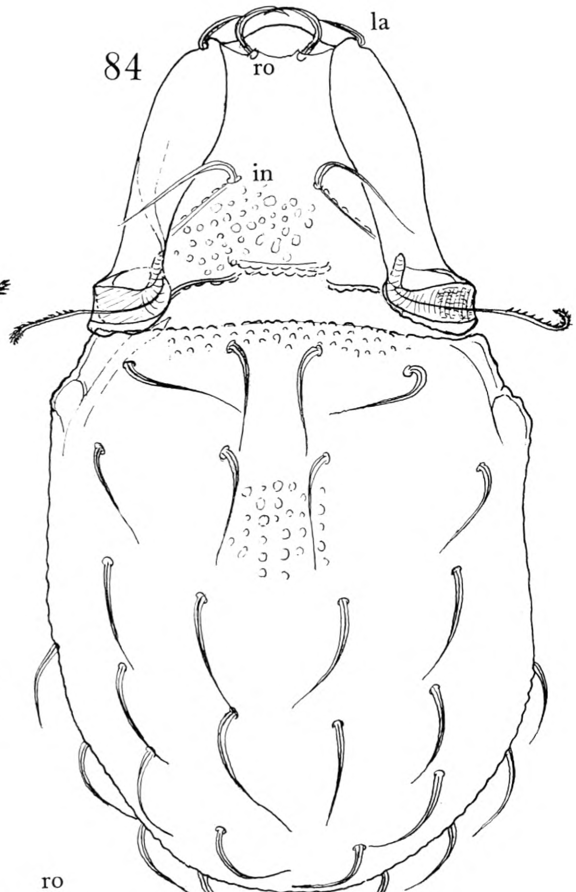

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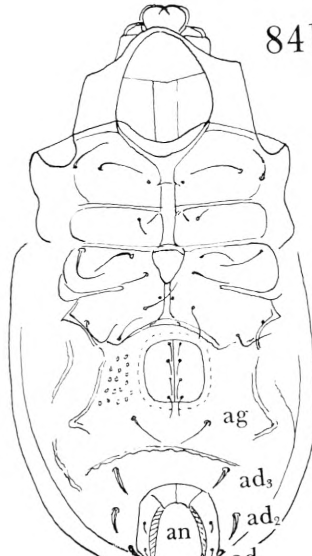

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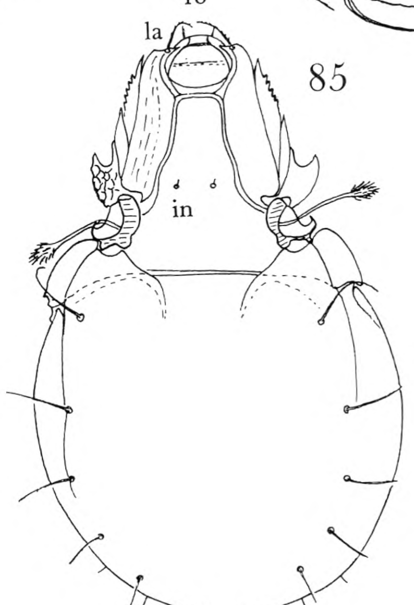

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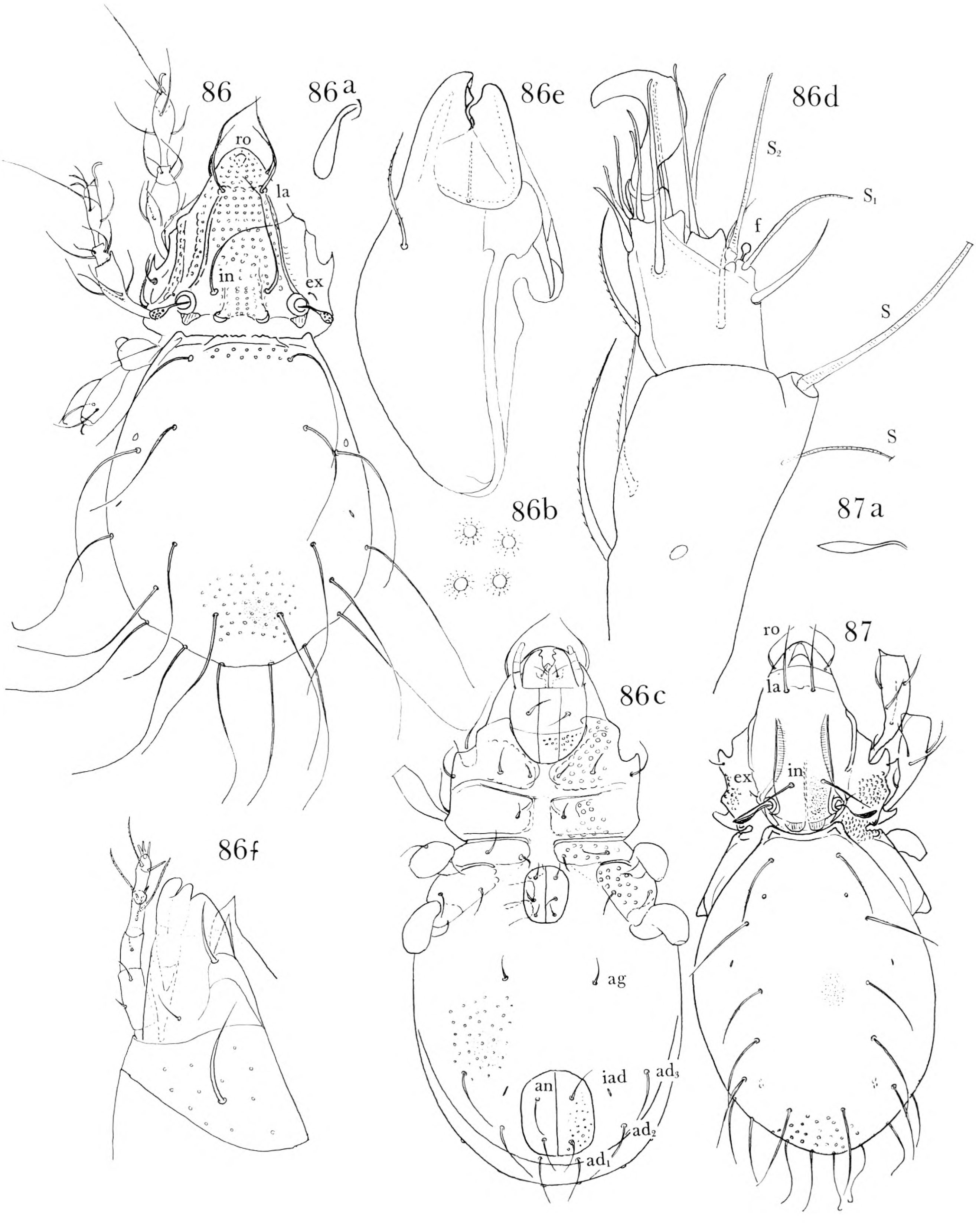
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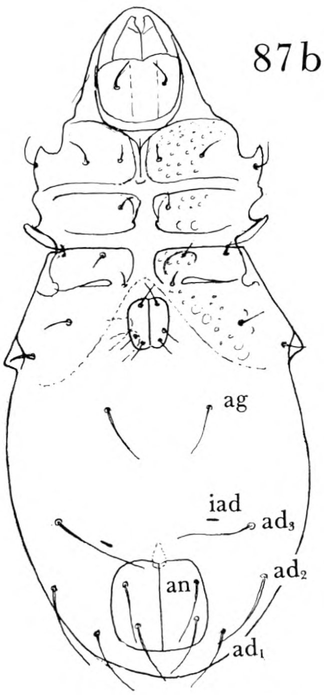
87 b



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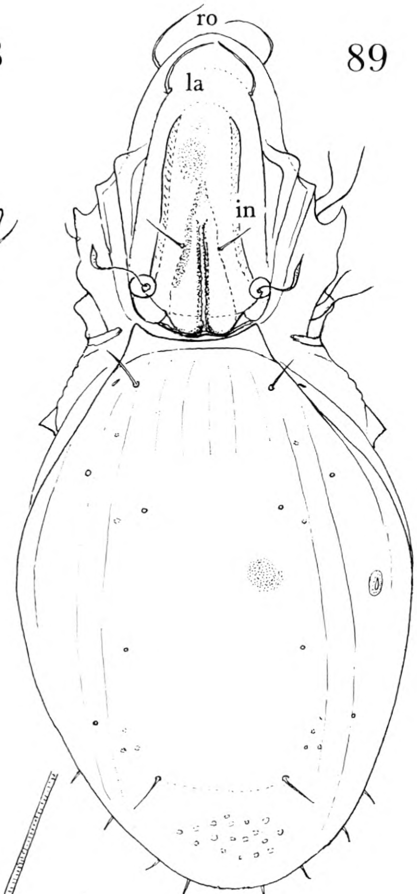

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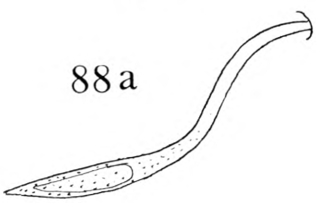

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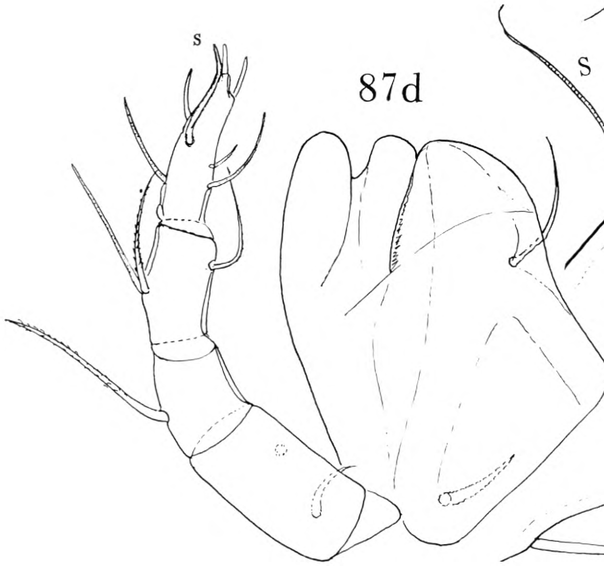

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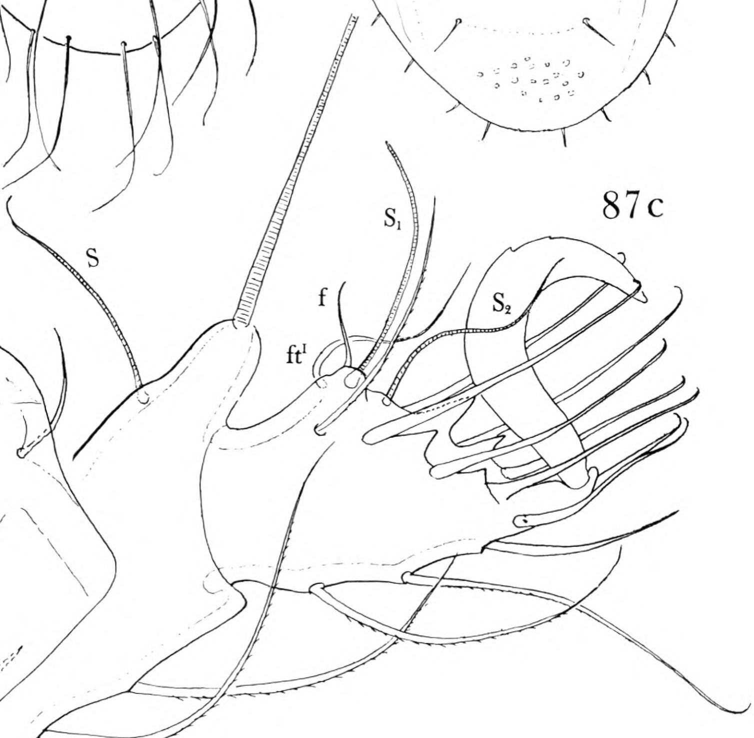

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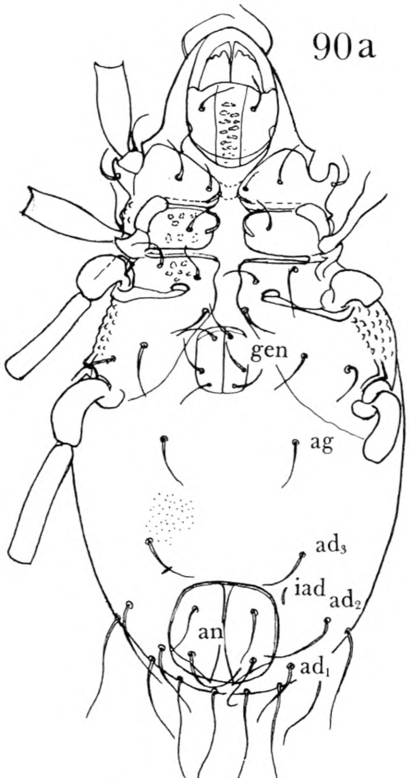

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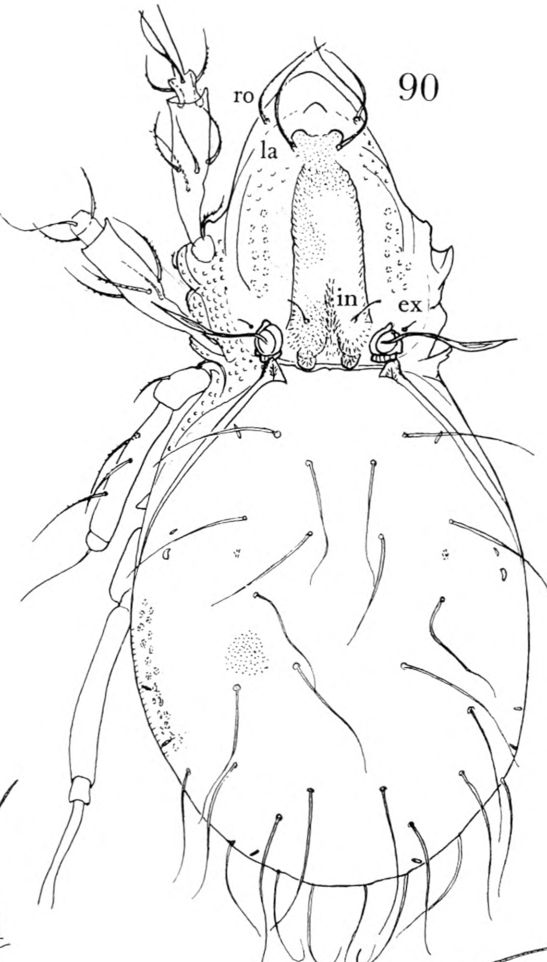

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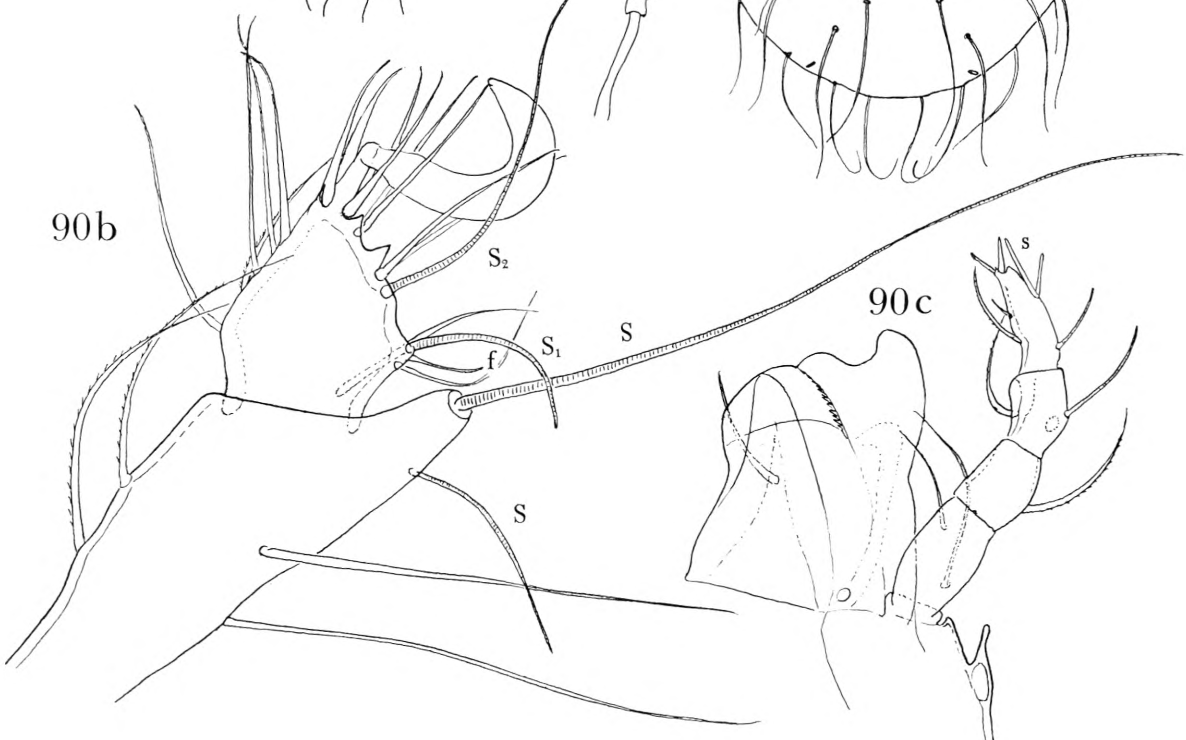

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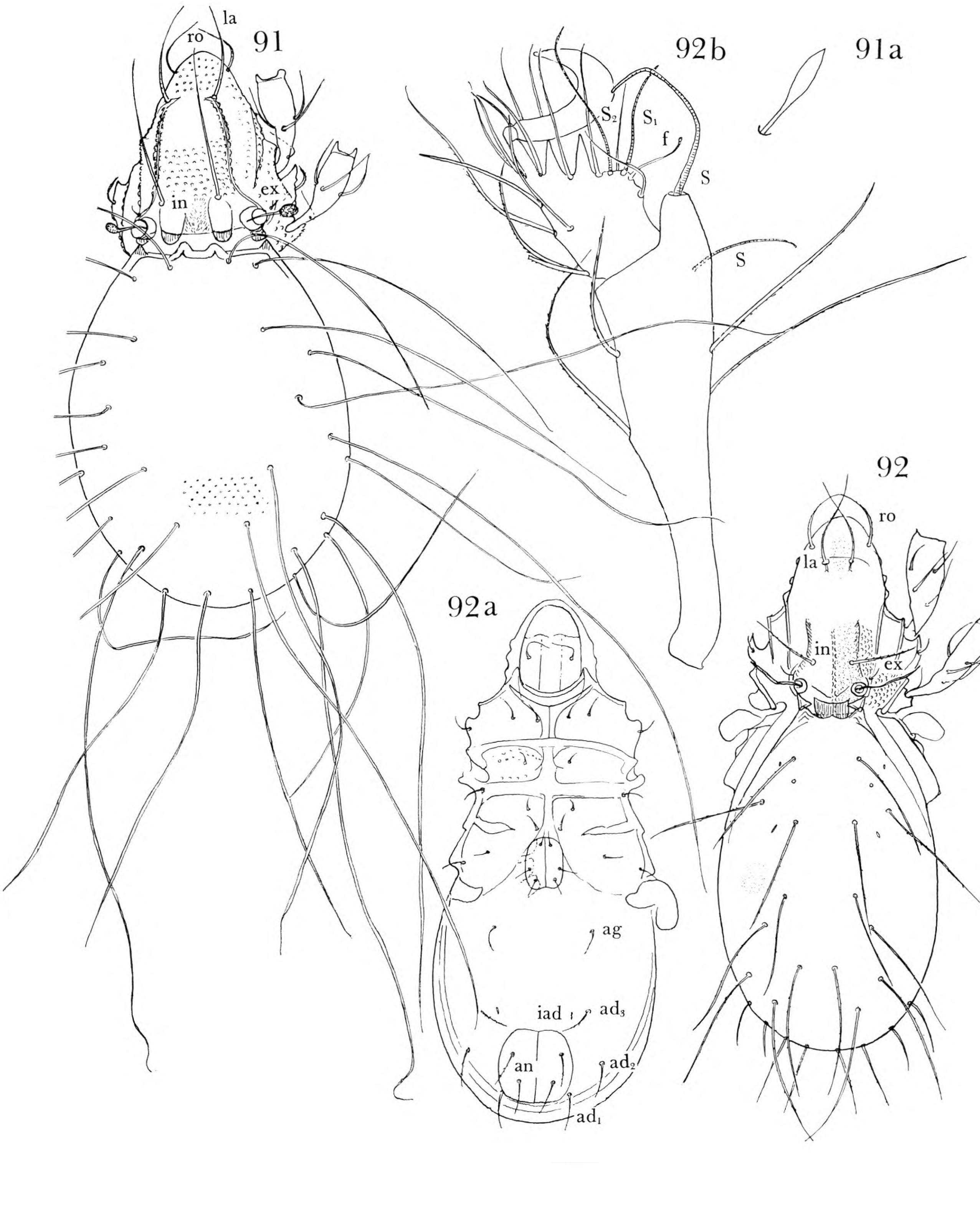
91
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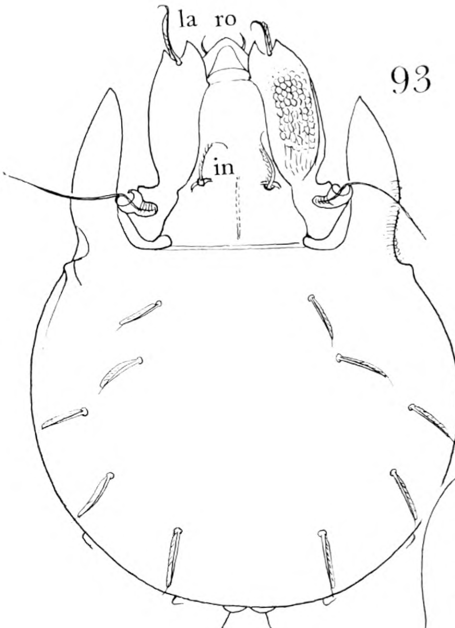
93



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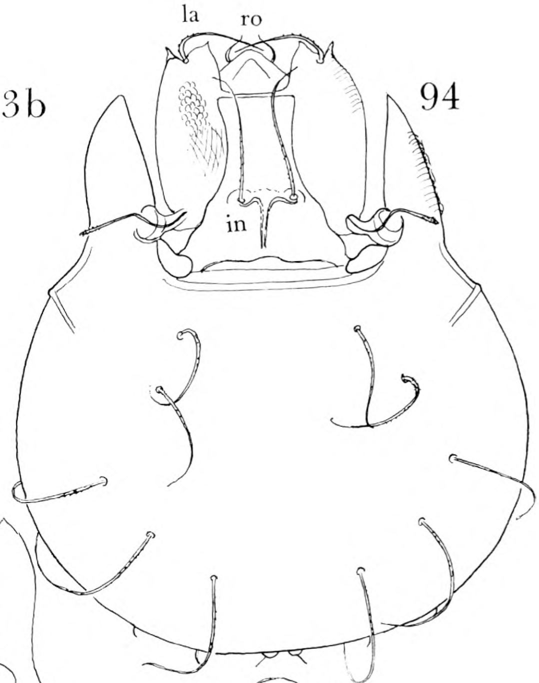

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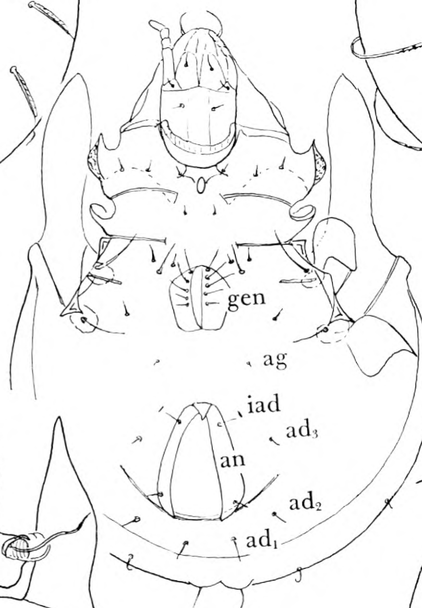

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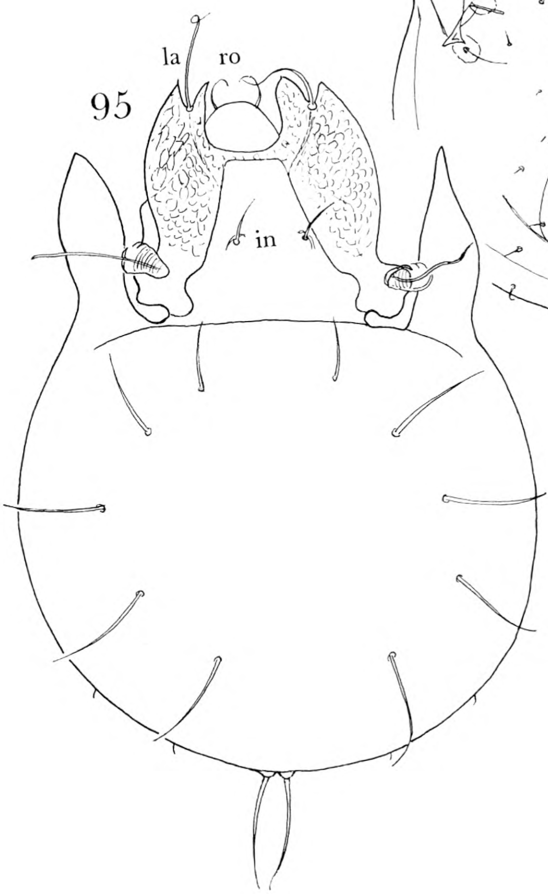

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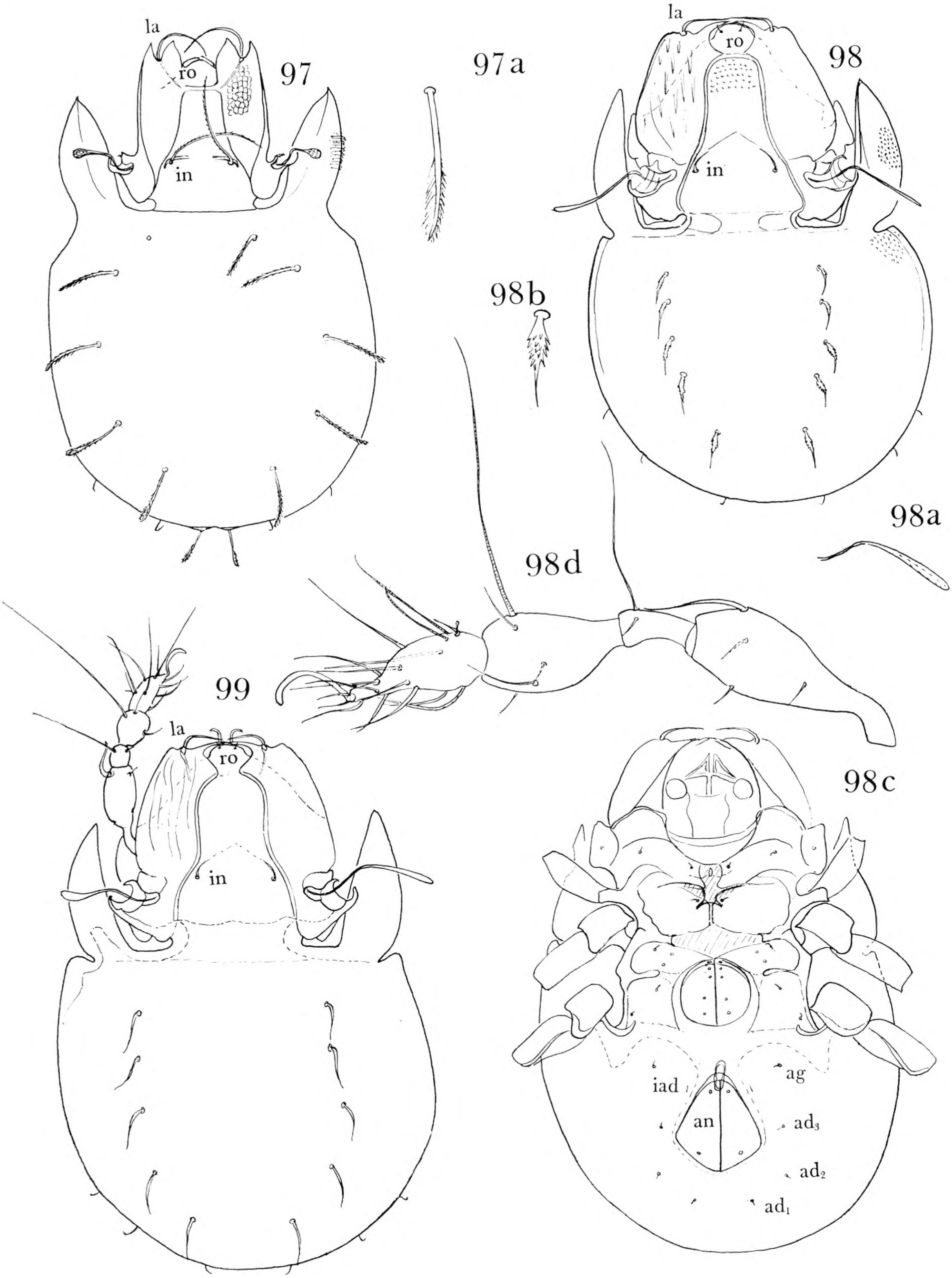
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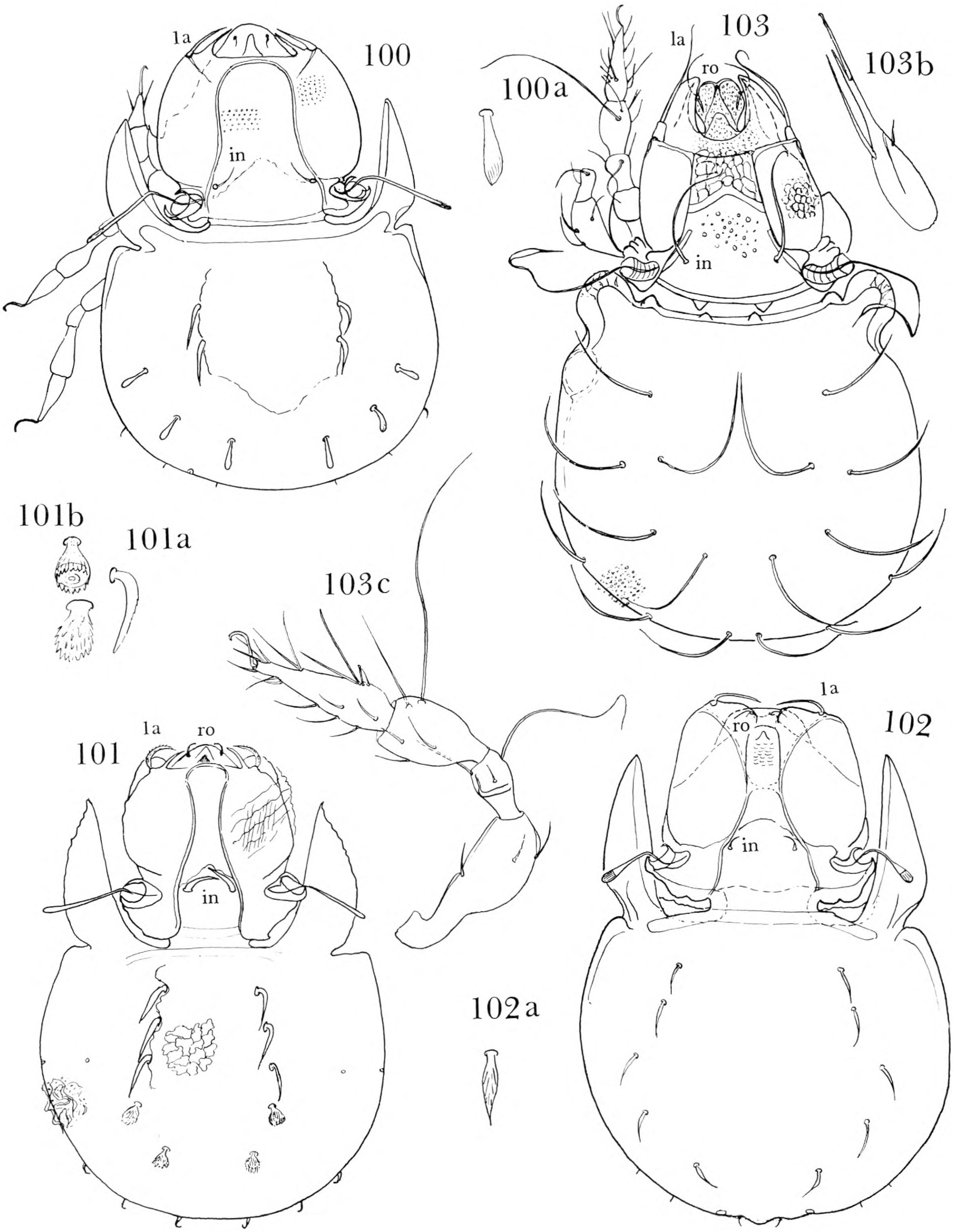
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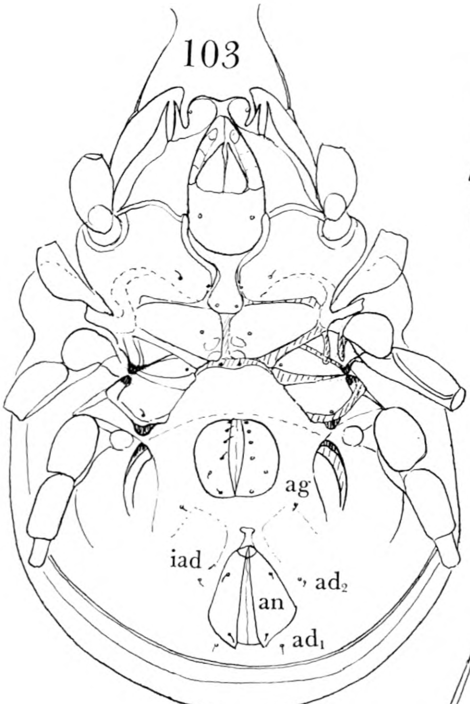
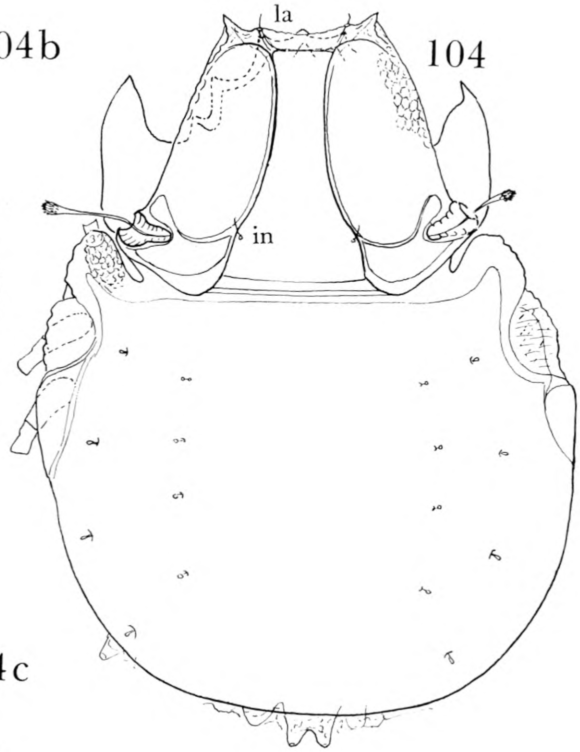
102a



103

104b



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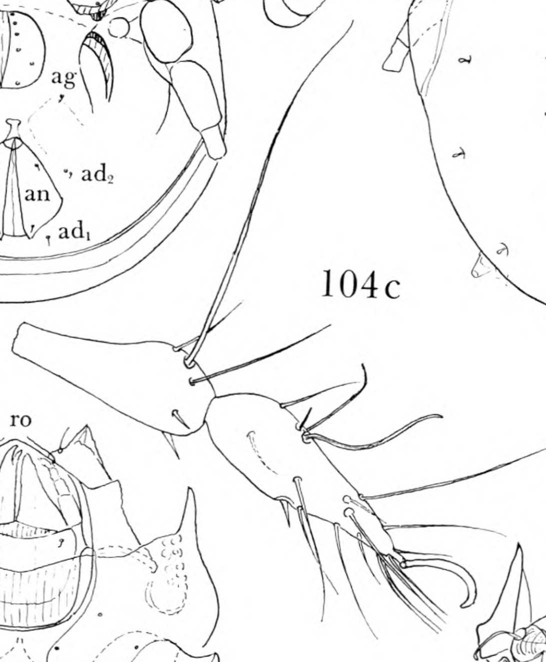

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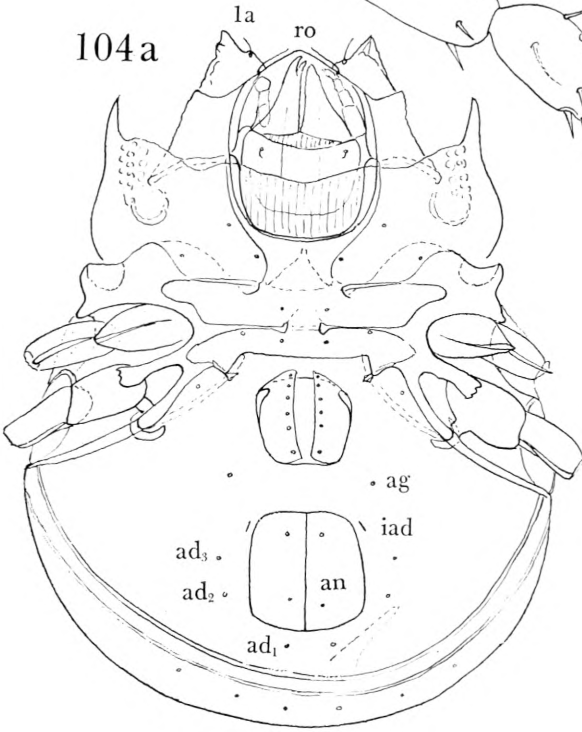

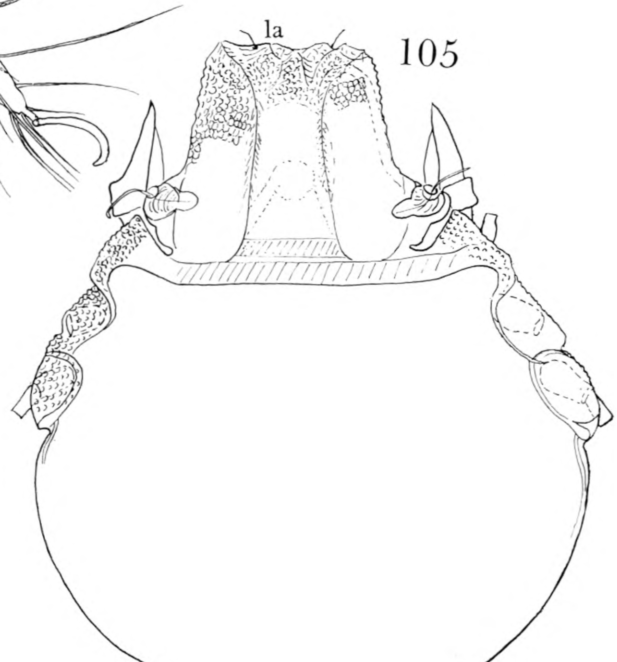

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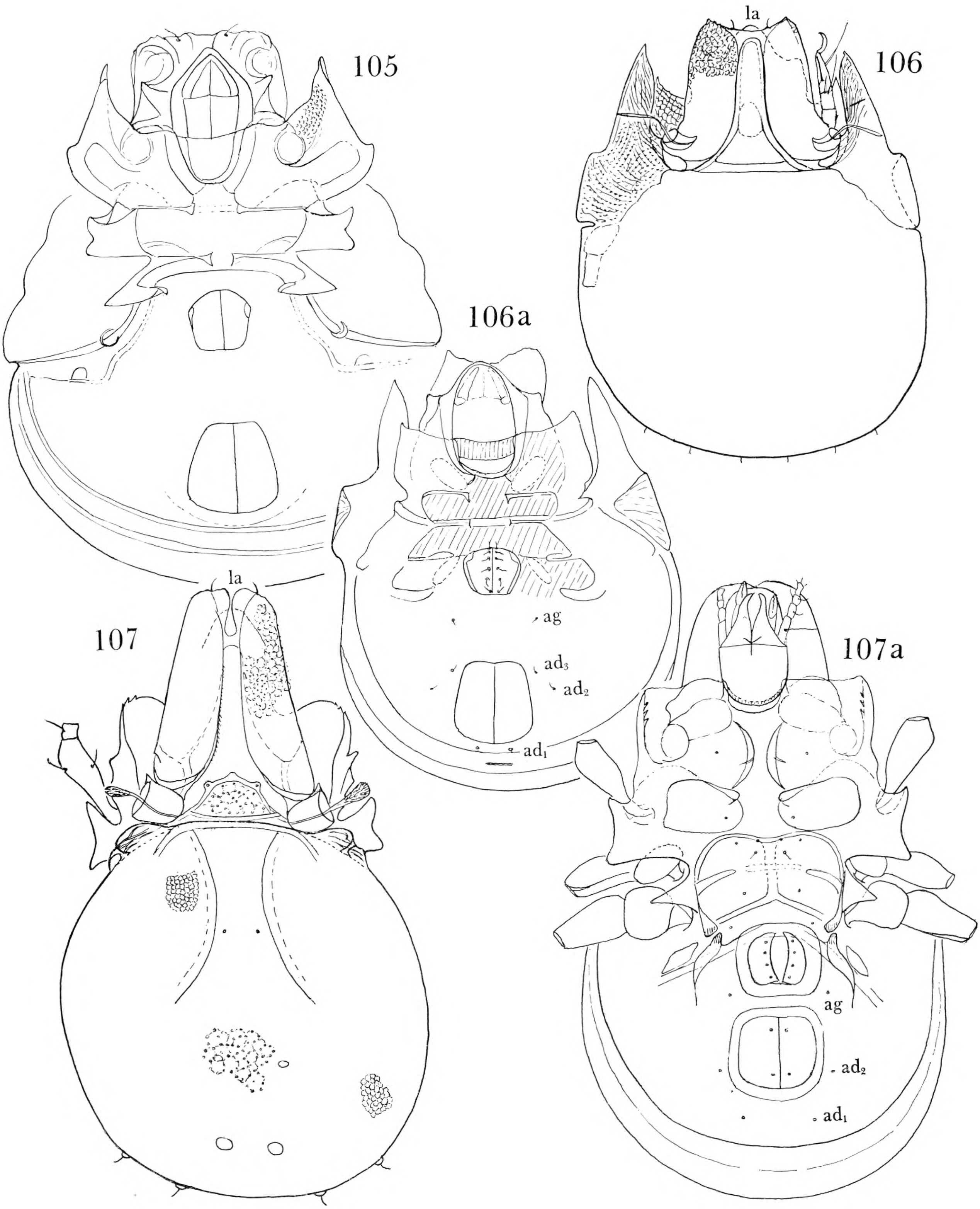

105
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106a
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107
107a
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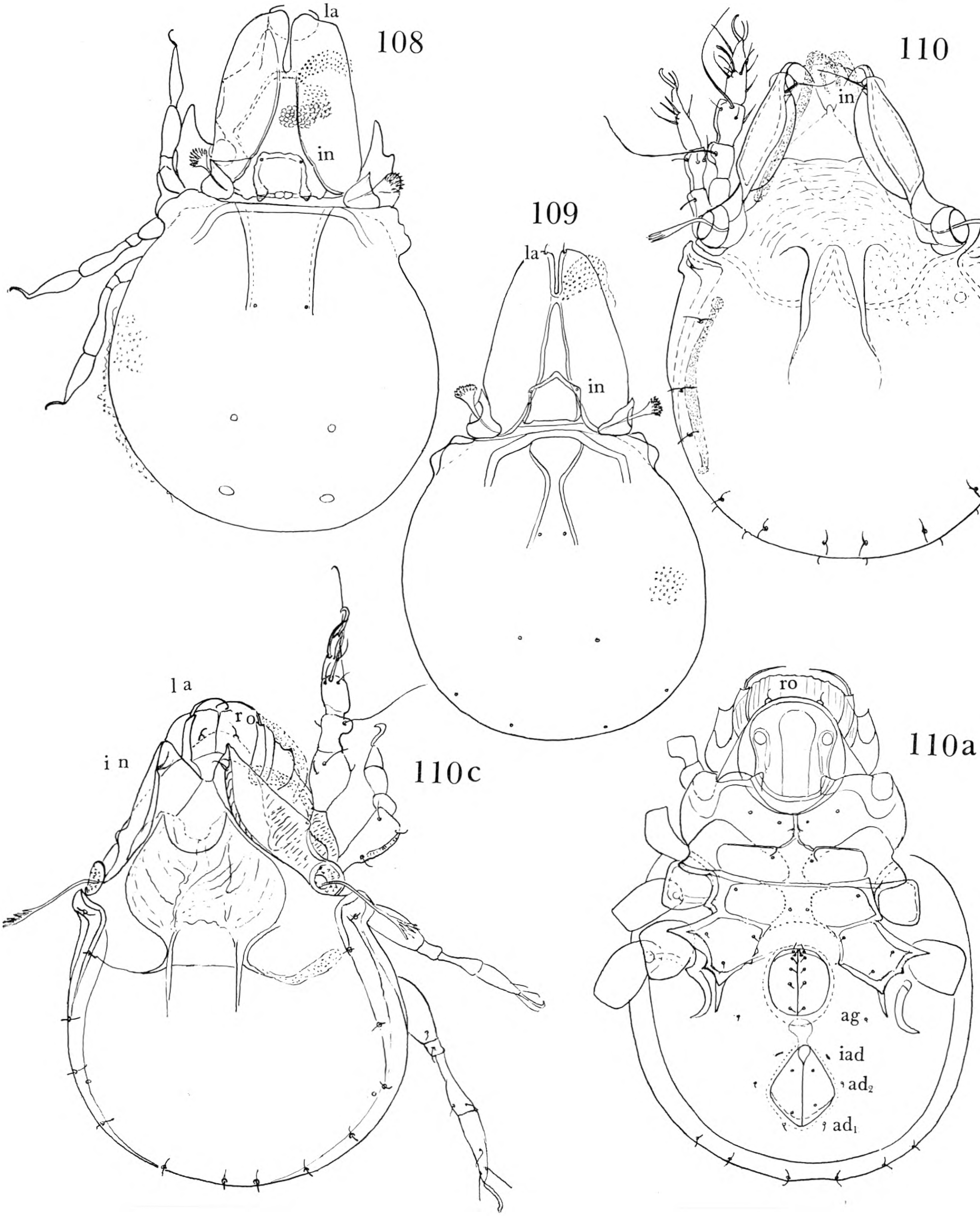
ad$_1$

Plate XXXVI



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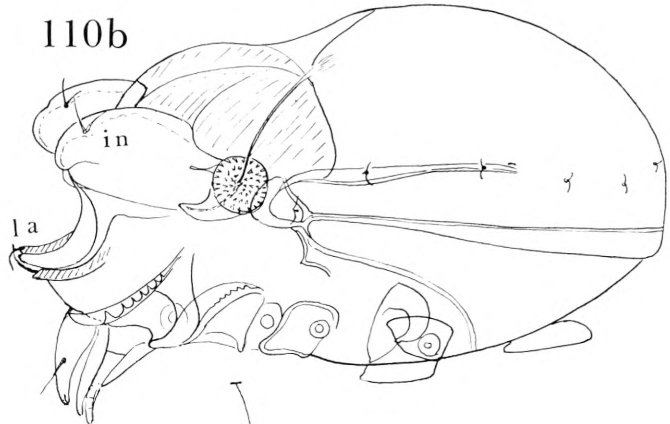

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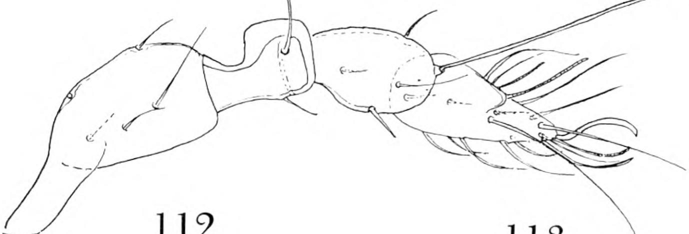

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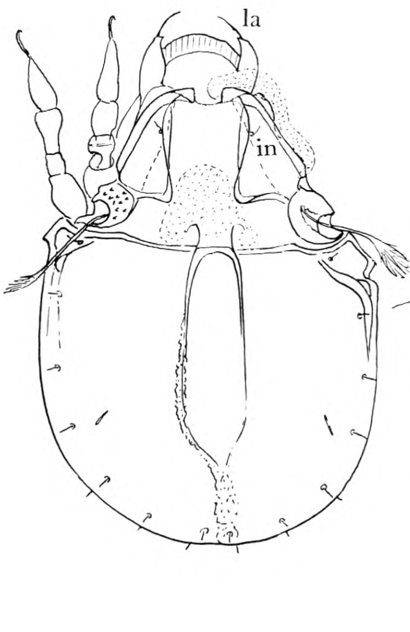
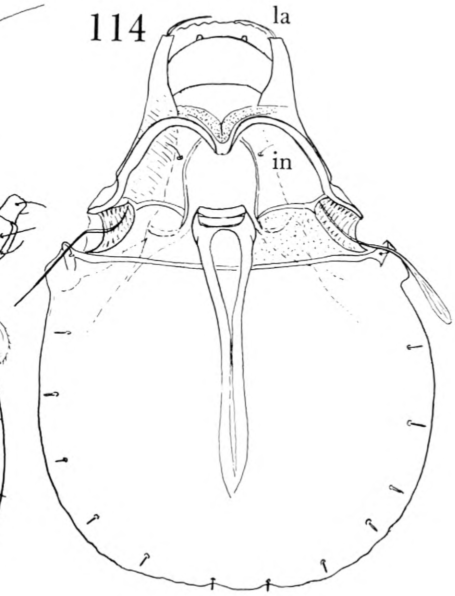
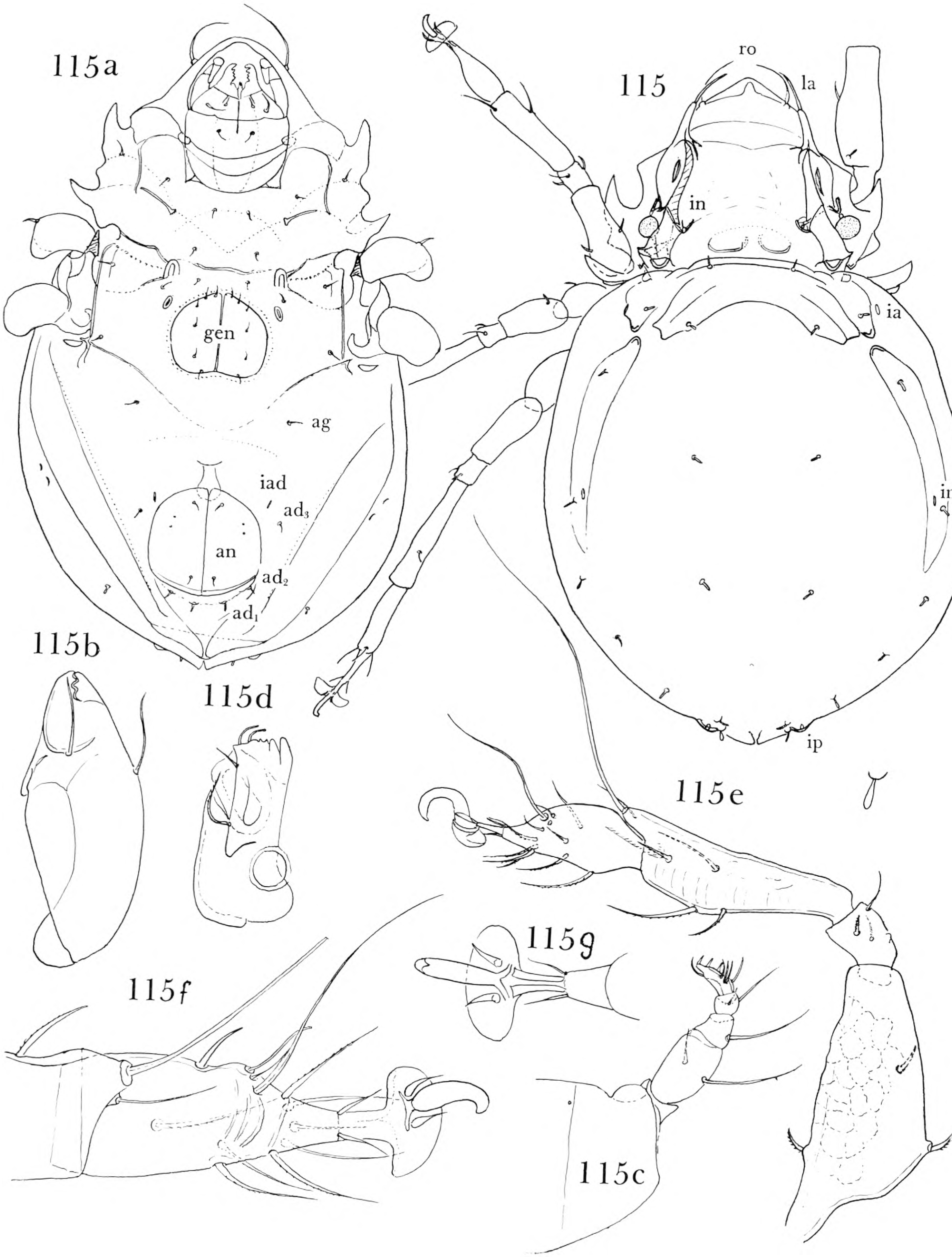


113

114





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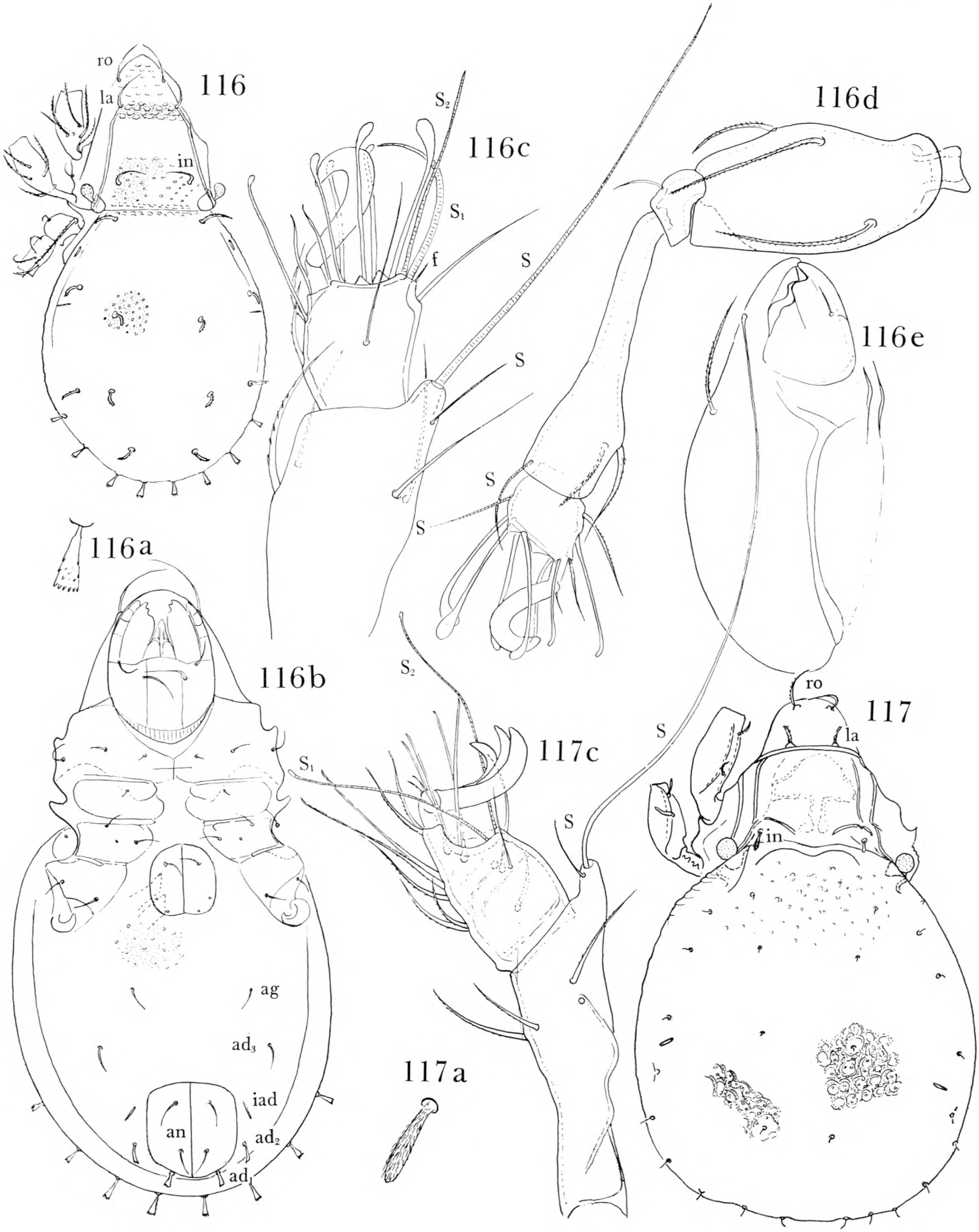
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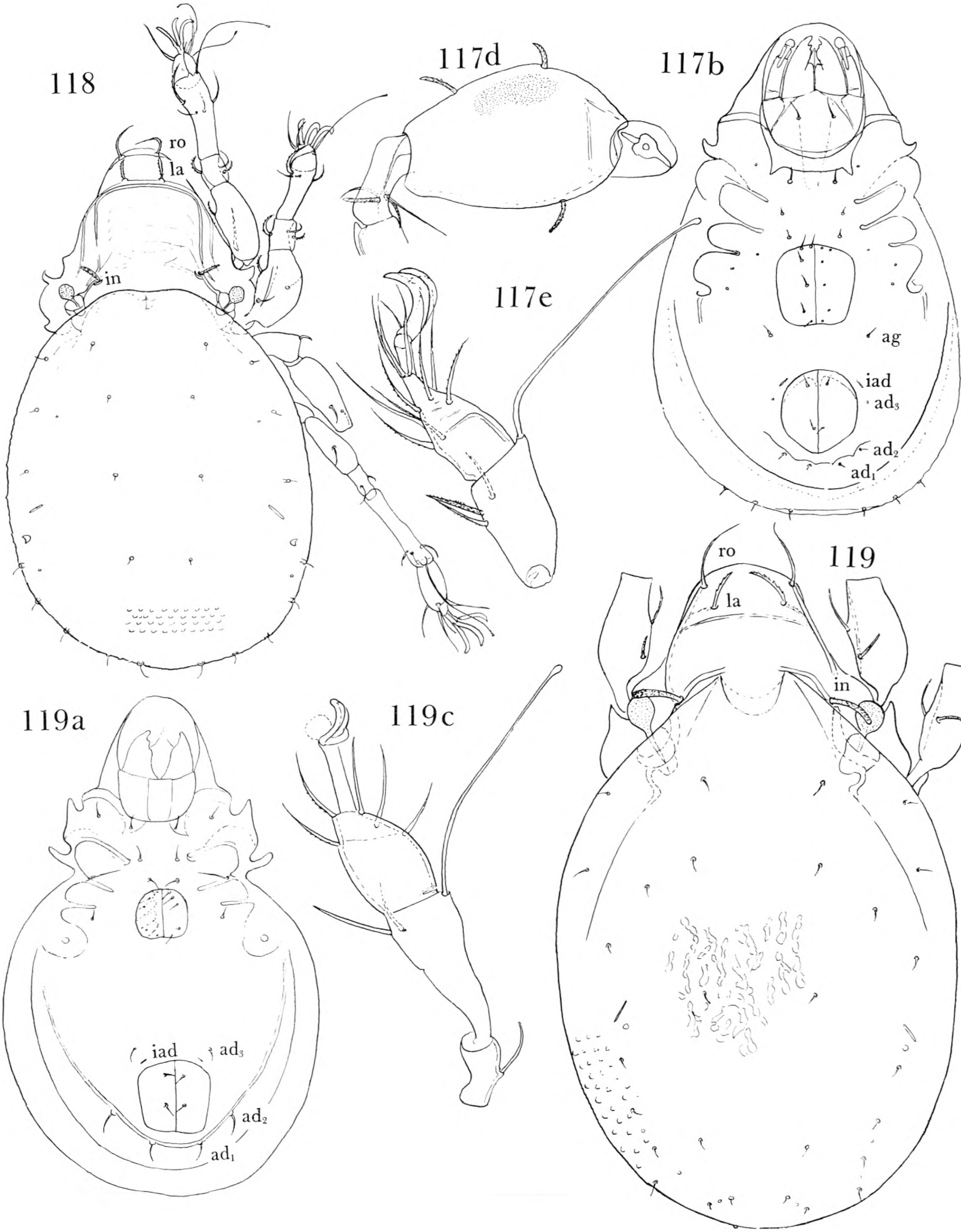
117a
117c



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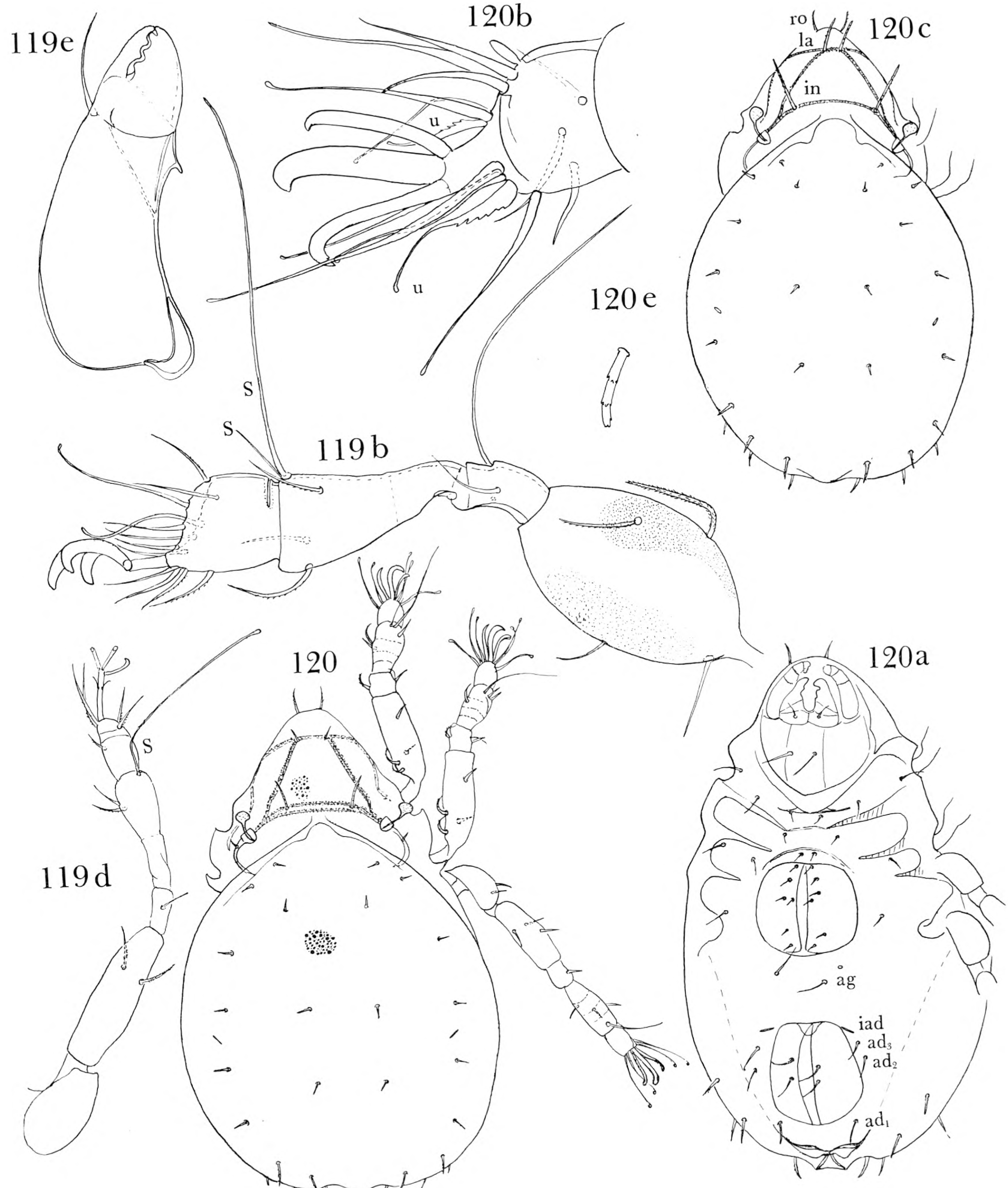
ad₁
119c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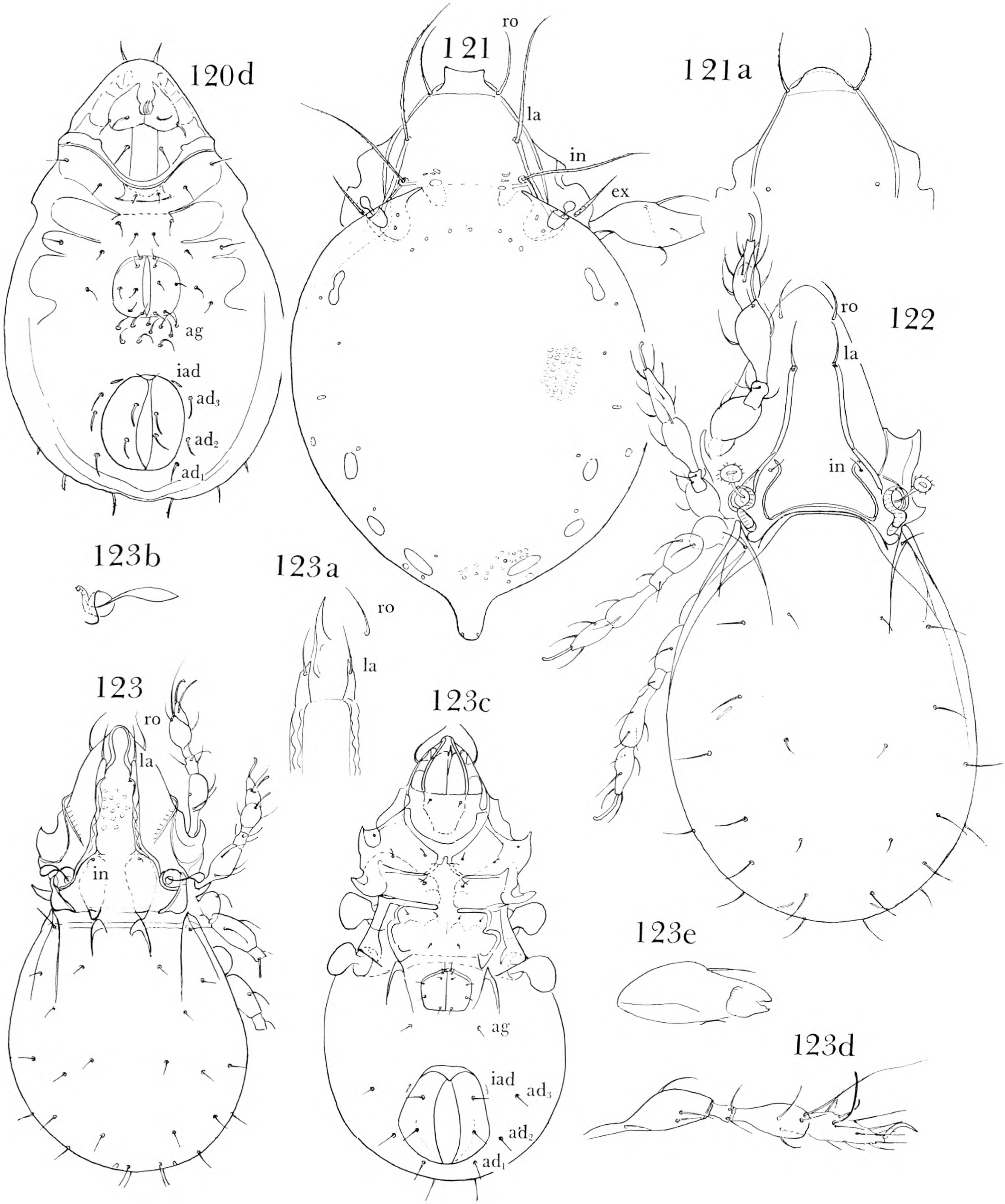
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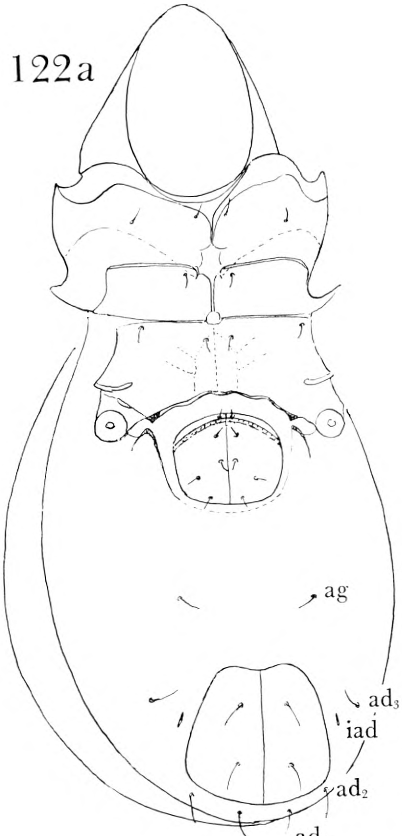
123d

122a



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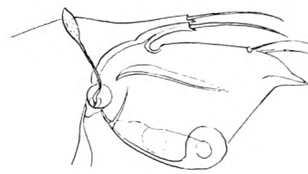
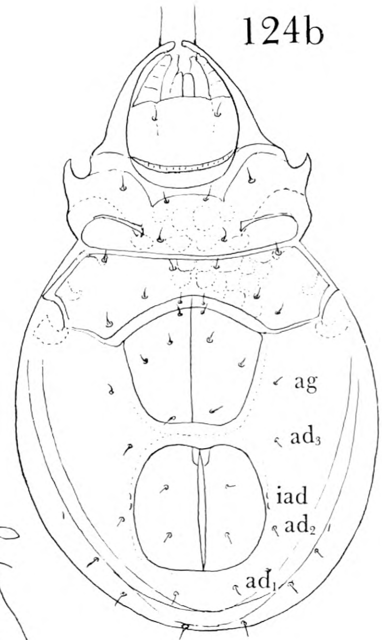


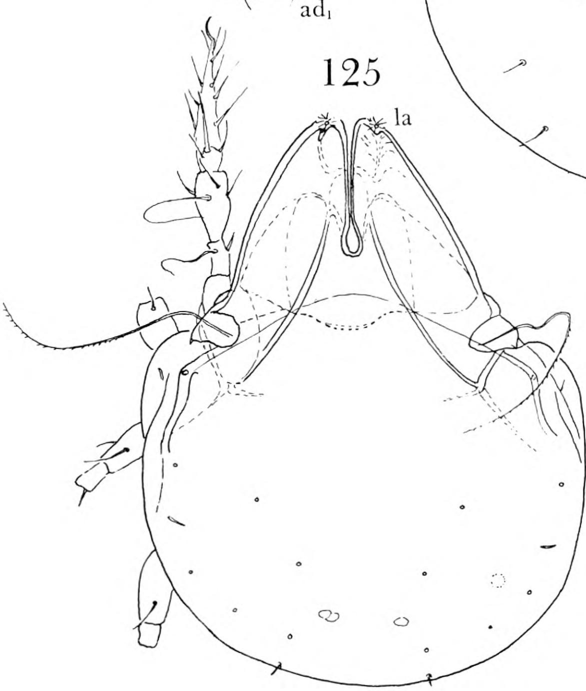
124b



124

125a

125



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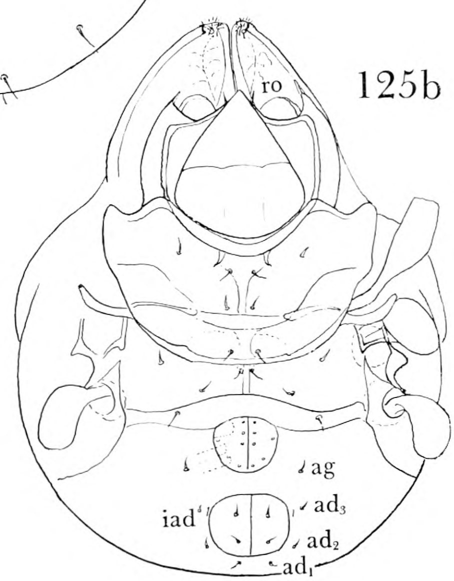

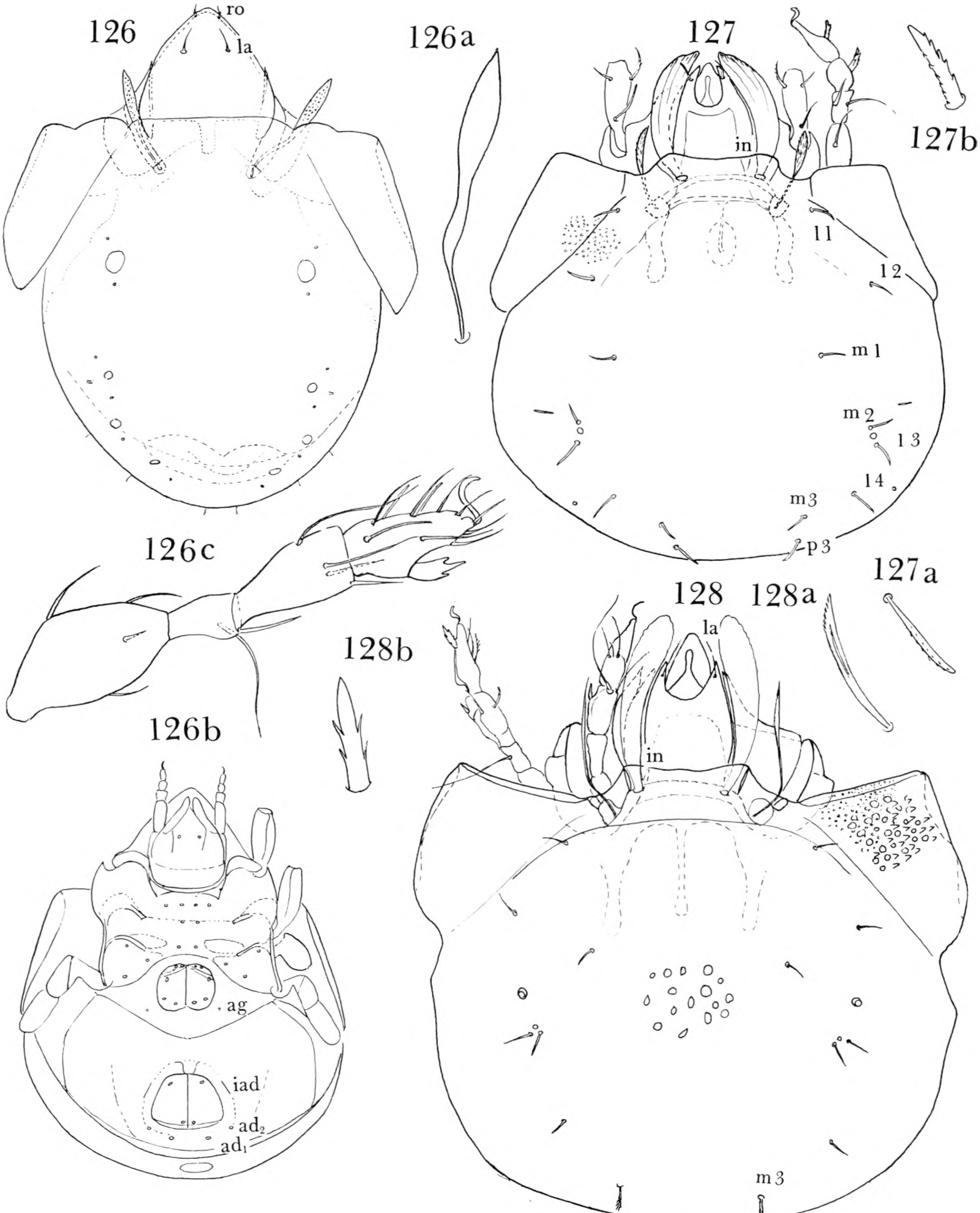
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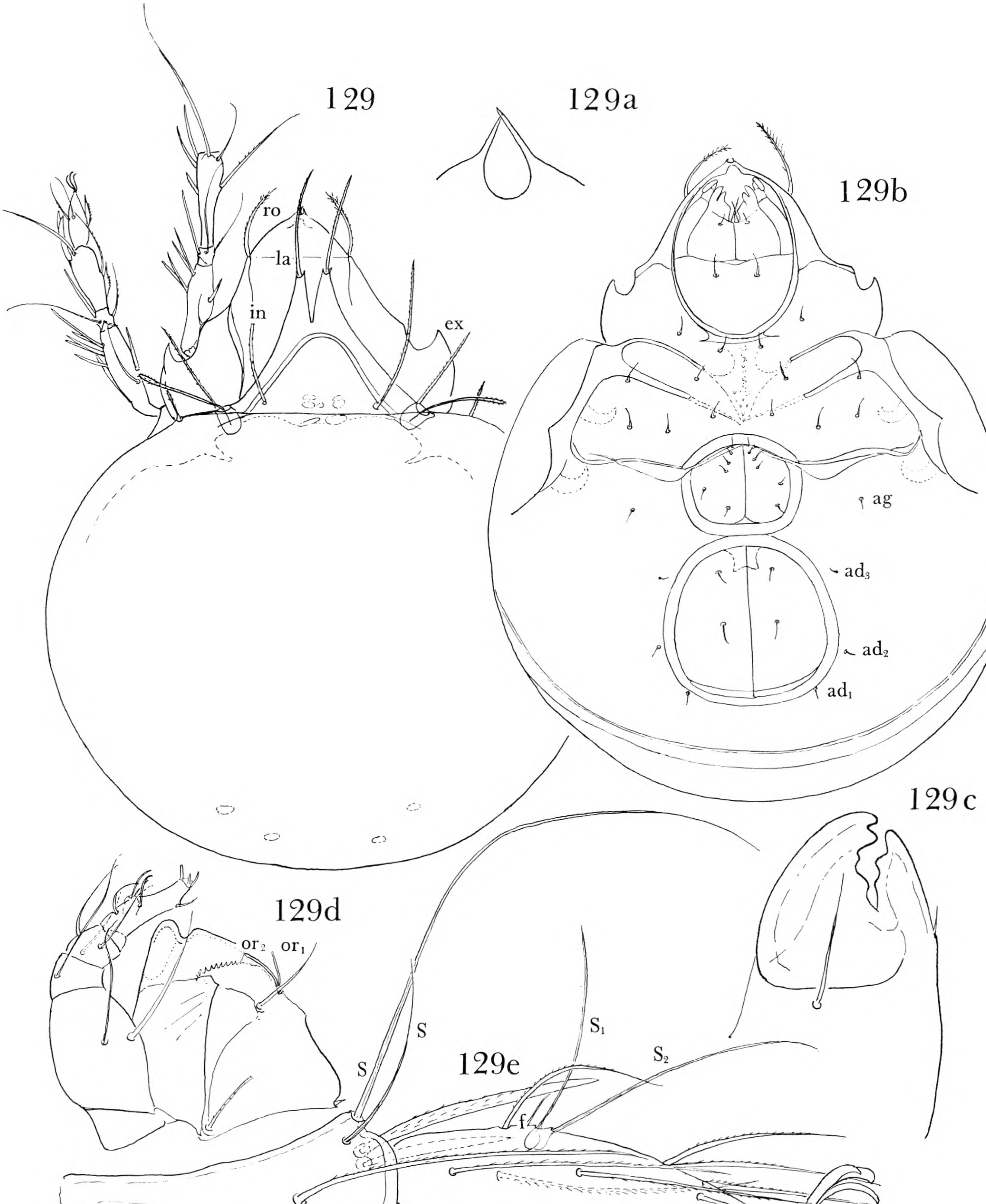
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Det Kongelige Danske Videnskabernes Selskab

Biologiske Skrifter

Biol. Skr. Dan. Vid. Selsk.

Bind **10** (kr. 105,00)

kr. ø.

1. Hammer, Marie: Investigations on the Oribatid Fauna of the Andes Mountains. I. The Argentine and Bolivia. 1958 30,00
2. Böcher, Tyge W., and Larsen, Kai: Experimental and Cytological Studies on Plant Species. IV. Further Studies in Short-Lived Herbs. 1958 5,00
3. Køie, M., and Rechinger, K. H.: Symbolae Afghanicae. Enumeration and Descriptions of the Plants Collected by L. Edelberg and M. Køie on "The 3rd Danish Expedition to Central Asia" and by G. Kerstan, W. Koelz, H. F. Neubauer, O. H. Volk, and others in Afghanistan. — Vol. IV. 1958 35,00
4. Degerbøl, Magnus, and Krog, Harald: The Reindeer (*Rangifer tarandus* L.) in Denmark. Zoological and Geological Investigations of Discoveries in Danish Pleistocene Deposits. 1959 35,00

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TEXTILINA nov. gen., *TEXTULARIA* DEFRANCE

AND

SPIROPLECTAMMINA CUSHMAN, (*FORAMINIFERA*)

BY

AKSEL NØRVANG

København 1966
Kommissionær: Ejnar Munksgaard

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Synopsis

The new genus *Textilina* is defined to accomodate species with perforated test wall and presence of an adventitious chamber. As a request for change of the type species for the genus *Textularia* might have undesirable consequences, the number of species in this genus is drastically reduced. A neotype is selected for the type species, *Textularia sagittula*, and as this species is characterized by an imperforate wall and a planospiral initial end the diagnosis of *Textularia* is accordingly emended. The genus *Spiroplectammina* has a purely arenitic wall in which respect it differs from both *Textilina* and *Textularia*, which have calcarenitic walls.

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During the course of work on samples from West Africa, collected by the Atlantide and Galathea Expeditions, it was found that the genus *Textularia* might be divided into two different genera. As it has been necessary to use a great deal of material from the Mediterranean and other areas, it was finally decided to prepare a special report on the subject. The result of the examination has shown that the species, conventionally referred to the genus *Textularia*, vary so widely that the author can only confirm Hofker's assumption that some of them may rather be related to *Dorothia* and *Karreriella* of the family Valvulinidae than to the type species *Textularia sagittula*. The difficulty in examining specimens however, was that the perforation of the wall is very difficult to observe, even in very thin sections, and the figures given by Hofker are not very convincing. Consequently, the main problem was to develop a technique which establishes with certainty the presence, or—what is perhaps more important—the absence of perforations in all cases. The procedure, fortunately, appeared to be fairly simple, and at the same time revealed details of the wall texture which are considered of value in discussing problems on the amount of secreted substance in the agglutinated, calcareous walls.

The nomenclatural problem is primarily caused by the fact that Defrance did not mention the presence of a spiral initial end in his diagnosis. Consequently, later authors referred a multitude of species with no planospire to the genus *Textularia*. When agglutinated, biserial forms with a large and easily recognisable, planospiral initial end were discovered, these species were referred to the genus *Spiroplecta* Ehrenberg, 1844 = *Spiroplectammina* Cushman, 1927. As nearly all the species, by common usage, referred to the genus *Textularia* have no planospire, some specialists have preferred to incorporate *T. sagittula* in *Spiroplectammina*, evidently being unaware of the fact that the genus *Textularia* is monotypic and that *T. sagittula* must therefore be the type species.

T. sagittula is a very distinctive species, and since the publication of excellent figures by Brady (1884) identification seems to have caused little trouble; the attempt made by Silvestri (1903) to distinguish between *T. sagittula* with no planospire and *Spiroplecta wrightii*, is of course, excepted. Silvestri's view has been thoroughly discussed by Lacroix (1929) and Höglund (1947), and the present author has himself never found perfect specimens, referable to *T. sagittula*, without a planospiral initial end.

Among the synonyms Brady lists "polymorpha sagittulae", described by Soldani (1779–1792), and the figures published by Soldani appear to be sufficiently accurate to exclude any other possibility than that of *T. sagittula*. It may consequently be inferred, and most authors seem tacitly to have done so, that the very name indicates that Defrance had Soldani's form in mind, and that it was his intention to present it with a Linnean name. Unfortunately, Defrance did not directly refer to Soldani's publication, and his subsequent description and figures may thus fit a variety of Mediterranean forms. Only examination of the holotype could definitely solve the problem. For this reason the author visited the University Museum in Caen, France, where the curator, Dr. Rioult could testify that the whole museum, including the Defrance Collection, was totally destroyed during the 1944 invasion. As d'Orbigny recorded the species in 1826, there was, however, a possibility that he had received the material from Defrance, and if the material had still been present in the d'Orbigny Collection in the Museum d'Histoire Naturelle in Paris, a lectotype could have been selected. Unfortunately, examination of the d'Orbigny Collection revealed that no such specimens exist. Thus, in the present situation it will be necessary to select a neotype, because without fixation of the species, *T. sagittula*, there will always be doubt as to which of the two groups shall in future carry the generic name, *Textularia*. If one accepts the view that Defrance actually did have Soldani's form in mind when he defined the genus *Textularia*, only two of the present known species can be incorporated in this genus, and a new genus must be defined for the majority of the species. On the other hand, the total loss of Defrance's material means that the opposite view can never be disproved, and were a neotype to be chosen from another of the Mediterranean forms, the common usage of the name *Textularia* could be continued. However, in this case the name *T. sagittula* would suppress another, equally well-established name, and a new name would have to be introduced for the well-known and easily recognisable form recorded earlier under this name. For this reason, it has been considered less confusing to assume that Defrance actually did have Soldani's form in mind, and in this case to stabilise the species and its name by choosing a neotype and finally, to define a new genus to accommodate the rest of the species.

Method

The thin sections have been prepared by grinding specimens embedded in araldite. In some cases the araldite has been colored by eosine, and the perforations can normally be observed without further treatment of the section. However, in practice, it is almost impossible to place the specimen with the degree of accuracy necessary for sectioning perpendicular to the wall, and in very thin sections only parts of the perforations are observed. In thicker sections the high index of refraction of the calcite hampers the observation of detail, and in these cases it has been necessary to remove the calcite. Acids destroy, or at least partly destroy the tectine, and the rest is destroyed by the effervescence. The dissolution of the calcite takes place by placing the thin sections in a bath of ammonium nitrate (100 g/l) and leaving them overnight. The next day—or the day after if the section is very thick—the calcite is completely and very gently removed. The residue of the wall, however, is extremely delicate, and normally the strain of undergoing baths of alcohol and xylene for final embedding in canada balsam more or less completely destroys the details. For this reason it is recommended, after removing the ammonium nitrate into a bath of distilled water, to add only a drop of glycerine and a cover-glass. For more permanent storage glycerine gelatine has been used with reasonable success.

Texture of the Test Wall

Among previous studies of this subject the present author is of the opinion that the views expressed by Wood (1948), give, by and large, a very clear picture of the general opinion. His introductory statement of the presence of four main types of wall structure of which "only the Porcellanea and the Fusulinidae can be claimed to be natural groups" seems to favour the view that there is an intergradation of the agglutinated and the hyaline types. The restricted scope of the present publication does not allow any definite conclusions, but a few observations seem to indicate that the problem needs further examination.

Wood very logically starts his conclusions by stating that a binding medium must be present, even if the cement may be difficult to observe in some of the agglutinating forms. He consequently assumes that the calcitic grains may form this binding medium and are, accordingly, secreted by the protoplasm. After studying a number of species, Wood arrives at the conclusion that there is complete intergradation from forms with a test of detrital grains and scant amounts of secreted calcite to types in which "agglutination appears to have been superseded by direct secretion of calcite granules". The examination of a number of thin sections seems completely to confirm Wood's conclusions, but after dissolution of the calcitic grains the picture is quite different. After such treatment not only the quartz grains remain but also a fine, spongy net-work of tectine which still presents perfect imprints of even the smallest grain of calcite. This indicates rather that the binding medium in the tests is tectine, and not the fine grained calcite presumed by Wood. This however does not disprove the fact that calcite grains may be secreted by the organism. It is true that some species have tests constructed by few, comparatively large detrital grains in a matrix of generally smaller calcitic granules. Nevertheless, in the species here described, the size distribution of the quartz grains appears to be almost similar to that of the calcitic grains. Thus, the major part of the coarser grains are calcitic and only few are siliceous, but after dissolution of the calcite it is possible to observe a large number of tiny quartz grains, evenly distributed throughout the whole test. One cannot exclude the possibility that all the mineral grains may be of detrital origin, and a gradual evolution from agglutinated forms to species with a secreted granular test can thus not be considered a proven fact.

It now appears obvious that there is a certain doubt regarding the existence of a "calcareous cement". Most authors seem to have used this descriptive term—as well as "siliceous cement"—fairly loosely, without recording any facts. (The present author has the suspicion that with several authors the term "siliceous cement" means only that the test is insoluble—or at least, only soluble after a long period—in dilute acids). For these reasons an attempt has been made to avoid these terms in the present study, and in their place to introduce the more neutral terms arenitic, calcarenitic and calcitic (or aragonitic) which by and large, cover the well-known descriptions arenaceous/ agglutinated, arenaceous "with much calcareous cement" and calcareous (aragonitic)/ secreted, respectively.

Regarding the perforations of the calcarenitic tests, Wood states that there "can be little doubt that these tubuli and multiple apertures are physiologically equivalent to the pores of the perforate types". The present author is inclined to agree that they are similar in function, but doubts whether they are homologues. In contrast to the perforations of the secreted, calcareous test, the tubuli of the calcarenitic tests are winding, and seem to bifurcate in the exterior parts.

Genus *Textilina* nov. gen.

Synonyms: *Textularia* Defrance, 1824 (part); *Plecanium* Reuss, 1861 (part); *Valvotextularia* Hofker, 1951 (part).
Type species: *Textilina stricta* (Cushman) = *Textularia stricta* Cushman, 1911.

Diagnosis:

Test free, polythalamous; chambers biserially arranged; initial part in most species with an adventitious chamber in the microspheric form, and in some species, also in the megalospheric form; wall calcarenitic, perforate; aperture interior-marginal; with no distinct lips.

Differential Diagnosis:

This genus differs from both *Spiroplectammina* and *Textularia* in having an adventitious chamber instead of an initial planospire, and in the distinct perforation of the chamber wall.

Remarks:

The perforations of the test were already observed by Möbius (1880) on material which he referred to *Textularia agglutinans*. Möbius gave some excellent illustrations of the texture of the wall which are surprisingly accurate, when the optical and other technical aids of his time are taken into account. However, apart from a few random remarks in the text-books this important discovery remained more or less in obscurity until it was confirmed by Lacroix (1931) in several other species. A few years later Hofker (1933) observed the very coarse perforations in the wall of *T. stricta*.

The adventitious chamber was discovered by Lacroix (1933) in *Bigenerina nodosaria*, but unfortunately, this author did not revise his previous work (1932) on several Mediterranean species which he had referred to the genus *Textularia*. This omission confused Höglund (1947), who observed an adventitious chamber in the microspheric form from Scandinavia which was previously referred to *T. agglutinans* by Göes (1894). As Lacroix, after examining the very similar form from the Mediterranean, had interpreted the initial end as a planospire, Höglund was unable to judge the importance of his discovery and merely defined the Scandinavian form as a new species, *T. bocki*.

Hofker (1951, 1956), who realized that the forms with adventitious chambers and perforated walls were different from *T. sagittula*, suggested that these might rather be related to certain species of the *Valvulinidae* with a similar wall texture. He consequently defined the genus *Valvotextularia* to cover these species, but unfortunately chose *Siphotextularia catenata* as the type species. For this reason—irrespective of whether *Textilina* and *Siphotextularia* are considered congeneric or not—the name *Valvotextularia* will, according to the Rules of Nomenclature, forever remain a junior synonym of *Siphotextularia*, unless it can be proved that *S. catenata* belongs to another genus than the type species *S. wairoana*.

Textilina stricta (Cushman)

Pl. 1, fig. 1; pl. 2, figs. 1 & 2.

Textularia stricta Cushman, 1911, p. 11, fig. 13.
Textularia vertebralis new species – Cushman, 1913, p. 663, pl. 78, fig. 1.
Textularia stricta Cushman-Cushman, 1921, p. 107, pl. 21, fig. 1.
Textularia vertebralis Cushman-Cushman, 1921, p. 110, pl. 22, fig. 3; pl. 24, fig. 1.
Textularia stricta Cushman-Hofker, 1933, p. 78, pl. 1, figs., 1, 2, Text-figs. 3, 4.
Valvotextularia stricta Cushman-Hofker, 1951, p. 33, fig. 11.

Remarks:

This species was originally described by Cushman from off Japan and the Philippines; Hofker found it in the Banda Sea and south of Borneo. We have in the Copenhagen collection excellent specimens from the Banda Sea (identified by Hofker), and from the Great Australian Bight (collected by the Galathea-Expedition).

As the exterior characters of this very large species are excellently described by Cushman, little can be added. However, as no mention is made of the adventitious chamber and the perforations it is probable that Cushman had not actually examined any sections. The adventitious chamber must have been observed by Chapman, however, who referred the species to the genus *Spiroplecta*. Hofker (1933) stated that the microspheric form has a planospiral initial end which he did not find in the megalospheric form. It is quite possible that the adventitious chamber may easily be observed in the thin-walled, microspheric, initial end, but in the thicker megalospheric form its presence can only be proved with certainty in thin sections. Even as late as 1951 Hofker does not seem to have discovered the adventitious chamber in *T. stricta*, although he very distinctly describes a similar chamber in *T. miletti*. The presence of perforations in the genus, discovered by Möbius (1880) and later confirmed by Lacroix (1931), was further confirmed by Hofker's discovery (1933) of the very coarse pores of this species. Hofker's description (1956) of the specimens in material from the Siboga Expedition does not add much to his previous one. He does, however, consider *T. stricta* and *T. vertebralis* conspecific, which the material from the Great Australian Bight seems to confirm.

Textilina agglutinans (d'Orbigny)

Pl. 1, figs. 2, 3 & 4; pl. 2, figs. 3, 4, 5 & 13.

Textularia agglutinans d'Orbigny, 1839, p. 144, pl. 1, figs. 17, 18, 32, 34.
Textularia candeina d'Orbigny, 1839, p. 143, pl. 1, figs. 25–27.
Textularia agglutinans d'Orbigny-Brady, 1884, p. 363, pl. 43, figs. 1–3.
Textularia agglutinans d'Orbigny-Cushman, 1922, p. 7, pl. 1, figs. 4, 5.
Textularia candeina d'Orbigny-Cushman, 1922, p. 8, pl. 1, figs. 1–3.
Textularia agglutinans d'Orbigny-Lacroix, 1931, p. 7, figs. 1–2.
Textularia agglutinans d'Orbigny-Lacroix, 1932, p. 16, figs. 13, 14.
Textularia candeina d'Orbigny-Lacroix, 1932, p. 17, figs. 15–17.
Textularia agglutinans d'Orbigny-Hofker, 1932, p. 91, fig. 16.
Valvotextularia candeina (d'Orbigny)-Hofker, 1956, p. 34, pl. 2, figs. 13–25.
Textularia agglutinans d'Orbigny-Hofker, 1960, p. 237, fig. 18.
Textularia gramen d'Orbigny-Hofker 1960, p. 237, fig. 16.

Remarks:

Both *T. agglutinans* and *T. candeina* were originally described from beach sand from Cuba. According to the type figures *T. candeina* has a rapidly widening shape, while *T. agglutinans* has a more lingulate shape. It seems evident that the type of *T. candeina* was a microspheric individual, and consequently, it is reasonable to assume that *T. agglutinans* is the corresponding megalospheric form. Some material from the Virgin Islands is included in the present collection, referred by Hofker to *Valvotextularia candeina*. The specimens are probably megalospheric but are, nevertheless, forms that more or less rapidly flare. However, this does not exclude the possibility that the type figure of *T. agglutinans* may represent an extreme form. Comparison with the similar Mediterranean form does, to some extent, make this assumption reasonable.

Some excellent material from the Mediterranean in the present collection admirably illustrates the forms which Hofker and Lacroix referred to *T. agglutinans* and *T. candeina*. Lacroix evidently had difficulty in keeping the forms apart, as he mentions that one of them may only be a variety of the other. The present author fully agrees with Lacroix, as intermediate specimens occur to such an extent that it seems most reasonable to assume that the whole material represents only one species with a rather wide range of variation.

While *T. stricta* has an adventitious chamber both in the megalospheric and the microspheric form, this is only present in the microspheric form of *T. agglutinans*. The chamber was discovered by Höglund in material from Kattegat and the Gullmar Fjord, and as Lacroix had suggested that the Mediterranean form had a planospiral initial end, Höglund concluded that the Scandinavian form was a different species. However, as the two forms have an identical initial end, they would appear to be conspecific.

Textilina conica (d'Orbigny)

Pl. 1, figs. 5, 6 & 7; pl. 2, fig. 8.

Textularia conica d'Orbigny, 1939, p. 143, pl. 1, figs. 19, 20.
Textularia conica d'Orbigny-Cushman, 1922, p. 22, pl. 5, figs. 5–7.
Textularia communis d'Orbigny-Hofker, 1960, p. 237, fig. 28B.

Remarks:

This form is easily distinguished from the former species by its conical shape and the truncated apertural end which causes the flattened apertural face to meet the sides of the test in a distinct angle. The form occurs commonly in the samples from the Bay of Naples, and it is evidently this species to which Hofker (1960) applies the name *T. communis*. However, this name is not only a nomen nudum but also a nomen oblitum. Actually, material from Banyuls and other places meets d'Orbigny's diagnosis of the West Indian form very well, and since, according to other authors, it seems to be a species of wide distribution the present author has little hesitation in referring the Mediterranean form to *T. conica*. In the present collection are specimens from Kattegat and the Gullmar Fjord, which undoubtedly belong to the form Höglund (1947) described as *T. truncata*. This form does not differ in any characters from the Mediterranean form from Banyuls and Naples. Thus, the Mediterranean form has no adventitious chamber in the microspheric form, the absence of which was already pointed out by Höglund in *T. truncata*.

The wall structure of this species is very similar to that of *T. candeina*, but while the wall of both species is distinctly perforated, the apertural end and the septa of *T. conica* are practically imperforate. As mentioned in the discussion of the preceding species, recognition of the presence or absence of an adventitious chamber and the degree of perforation of the wall and septa as characters of generic value, would—at least in this particular case—lead to the unhappy result, a genus for every species. In this respect, the author has refrained from trying to define any new genera pending further examination of these interesting characters in other species.

Genus *Textularia* Defrance, 1824

Synonym: *Plecanium* Reuss, 1861, (part).
Type species: *Textularia sagittula* Defrance, 1824, (monotypic).

Emended Diagnosis:

Test free, polythalamous; chambers of the initial end planospirally arranged both in the megalospheric and the microspheric generations, later chambers biserial, wall calcarenitic, imperforate; aperture interior-marginal, with no distinct lips.

Differential Diagnosis:

This genus differs from *Textilina* in having an initial planospire and no adventitious chamber, and in the lack of perforations. The wall of *Textularia* is calcarenitic, but it is at present unknown whether the difference between the calcarenitic and the purely arenitic wall is of generic importance. If later examinations should reveal an intergradation *Spiroplectammina* will probably be a junior synonym of *Textularia*.

Remarks:

The name of the type species seems to indicate that Defrance had in mind the form, previously described by Soldani (1791) from the Mediterranean, under the name "polymorpha sagittulae", and that Defrance wanted only to present a proper binomial name for this form. At least, d'Orbigny (1826) must have thought so, because he gave credit to Soldani for the species and Defrance only for the genus.

Soldani expressly mentions the beach of Rimini as being one of the localities, and furthermore states that the specimens are similar to those he previously pictured (1780) from the Pliocene of Italy. While the first illustration is lacking in detail and the fossil form consequently difficult to place, this is not the case with his beautiful figures of the Mediterranean form. The compressed test with the deepened and slightly curved sutures and the thickened median part leaves hardly any doubt that his material belonged to the species which ever since has been named *Textularia sagittula*. Until the year 1884 the records of this species are uncertain, but in the Challenger Report Brady published excellent illustrations of a form unquestionably identical to that of Soldani under the name *T. sagittula*. The present conception of this species is probably based entirely on Brady's figures. In the interval between Soldani and Brady very few records exist as the form may have been confused with other species, and unfortunately, this may even be the case with Defrance's record. In fact, the description and figures by Defrance are so deficient that they may fit a variety of forms. Under these circumstances it has been considered necessary to define a neotype, as mentioned in the introduction.

According to the new, emended definition the genus *Textularia* exclusively comprises species with a planospiral initial end and imperforate walls. This means a drastic reduction of the number of species within the genus. At the present time only two species are known, viz., besides the recent species *T. sagittula*, known at least from the Pliocene, the closely related *T. carinata* from the Oligocene and the Miocene.

Textularia sagittula Defrance

Pl. 1, figs. 9–23; pl. 2, fig. 12.

"*sagittulae*" Soldani, 1780, p. 120, pl. 14m, figs. 74 Sand F.
"*polymorpha sagittulae*" Soldani, 1779–1792, p. 120, pl. 133, figs. O, P, Q, R, S, T, and V.
Textularia sagittula Defrance, 1824, p. 177, pl. 13m, fig. 3.
Textularia sagittula Sold.-d'Orbigny, 1826, p. 263, No. 20.
Textularia sagittula Defrance-Brady, 1884, p. 301, pl. 42, figs. 17, 18.
Textularia sagittula Defrance-Cushman, 1922, p. 6.
Textularia sagittula Defrance-Lacroix, 1929, p. 1, text-figs. 1–12.
Spiroplectammina sagittula (Defrance)-Hofker, 1930, p. 365, pl. 12, figs. 1–3; text-figs. 2, 4, and 3.
Textularia sagittula Defrance-Lacroix, 1931, p. 13, fig. 8.
Textularia sagittula Defrance-Lacroix, 1932, p. 10.
Spiroplectammina sagittula (Defrance)-Hofker, 1932, p. 95.
Textularia sagittula (Defrance)-Lacroix, 1933, p. 1, figs. 1–9.
Textularia sagittula Defrance-Höglund, 1947, p. 167, pl. 12, figs. 3, 4, text-figs. 143–146.
Spiroplectammina sagittula (Defrance)-Hofker, 1960, p. 237, fig. 17.

Neotype:

A slightly twisted, megalospheric specimen. Mediterranean, Baie de Villefranche; 70 m. Coll: Le Calvez, St. 8 (see Y. Le Calvez 1958, pp. 163, 164).

Description of Neotype:

Length 0.92 mm, breadth 0.40 mm; thickness: 0.20 mm. Composed of four chambers, with the initial chamber forming the planospiral initial end, followed by 19 paired chambers; sutures indistinct in the initial end, slightly depressed in the mature part of the specimen; median thickening very distinct in the initial part, less so in the mature part; size of initial chamber approx. 40 μ.

Remarks:

T. sagittula is perhaps one of the best described foraminifera in the world. Moreover, the material from the Bay of Villefranche corresponds closely in general size, number of chambers and size of the initial chambers to the measurements given by Lacroix. Höglund has probably rendered the most exact description of the species, and his description—although based on material from Skagerak and the Gullmar Fjord—fits the Mediterranean material so well that the present author sees no reason to prepare another description which, point by point, would be a repetition. The specimens in the present collection from the Gullmar Fjord are only slightly smaller, a bit coarser grained, and the median thickening a little more pronounced than in the Mediterranean specimens. The specimens from Banyuls are in all respects similar to those from Villefranche, but in the Bay of Naples specimens the median thickening is more pronounced. Lacroix stated that both the microspheric and megalospheric specimens had a planospiral initial part, Hofker, however, maintaining that Lacroix had only observed the A_1 and A_2 generations, published a drawing of a microspheric specimen from the Bay of Naples with no planospire and an initial chamber with a diameter of only 14 μ. Lacroix drew attention to the fact that measurements of the initial chambers would necessarily have a very considerable margin of error, and suggested that Hofker had drawn an incomplete, microspheric specimen with slight erosion of the initial end. After studying Scandinavian specimens, Höglund could only confirm the views expressed by Lacroix, but supposed that the forms described by both Lacroix and Hofker were not conspecific. He then drew attention to Hofker's thin section showing "Mundlippen" i. e., an extra-marginal aperture which differs from the inferior-marginal aperture of *T. sagittula*. The examination of specimens from the Bay of Naples shows a definite interior-marginal aperture, but it must be admitted that the specimens are very difficult to place correctly for sectioning in balsam, and oblique sections show phenomena which bear some resemblance to Hofker's figure. As a result of these examinations the present author considers that the collected evidence overwhelmingly confirms the view expressed by Lacroix and Höglund. The very great number of specimens now known seems to indicate that the single specimen pictured by Hofker is either slightly eroded or abnormal. Likewise, it appears reasonable that the forms with no planospiral initial end, described by Silvestri, are specimens with broken initial parts, and that *Spiroplecta wrightii* Silvestri is a synonym of *T. sagittula*. There is material in the present collection both from Rimini and Porto Corsini in the Adriatic. The specimens, though not very well preserved, are obviously closely related to the Atlantic and Western Mediterranean form, but they differ from these in the more pronounced obliquity of the sutures (in which respect they are intermediate between *T. sagittula* and *T. carinata*). As a matter of interest, the Adriatic form is strikingly similar to the specimens from the Pliocene of Rome and Castel Arquato. It would consequently be of great interest if such specimens were some day caught in the living state.

Textularia carinata d'Orbigny

Pl. 1, fig. 8; pl. 2, fig. 10.

Textularia carinata d'Orbigny, 1826, p. 263, (nomen nudum).
Textularia carinata d'Orbigny-d'Orbigny, 1846, p. 247, pl. 14, figs. 32–34 (type figure).
Textularia carinata d'Orbigny-Brady, 1884, p. 360, pl. 42, figs. 15, 16.
Textularia carinata d'Orbigny-Egger, 1893, (1895), p. 270, pl. 6, figs. 39–41.

Remarks:

Excellent specimens from Nussdorf are found in the present collection, and these are presumed to belong to the form described by d'Orbigny (1846). They correspond very well to his description but not to his figure. However, present in the d'Orbigny Collection in Paris are specimens from the Adriatic labelled *T. carinata* which are very similar to the specimens from Nussdorf. There is, unfortunately, no material of the Indo-Pacific form in the present collection (separated under the name, *Textularia pseudocarinata* by Cushman (1921)). It has therefore, been impossible to discuss the difference between the fossil and the Indo-Pacific form. Nevertheless, it may be opportune to mention that the few diagnostic features given by Cushman in no way suffice to separate the two forms. Moreover, the type locality of *T. carinata* is the Adriatic, and if the fossil and the recent forms are not found to be conspecific it might be advisable to rename the fossil one. *T. carinata* is normally easy to distinguish from *T. sagittula* by the thin and sharp carina, usually provided with long, spinal projections. On specimens with a less developed or poorly preserved carina, the presence of a fairly sharply defined apertural face may provide a means of distinguishing these two species. Thin sections of the test of *T. carinata* reveal that the content of siliceous grains is considerably larger than in *T. sagittula* and that these grains are generally of greater size, but the diagnostic value of this feature is at present unknown.

Genus *Spiroplectammina* Cushman, 1927

Synonym: *Spiroplecta* Ehrenberg, 1844 (part).
Type species: *Spiroplectammina biformis* (Parker & Jones) = *Textularia aggluttinans* Var. *biformis* Parker & Jones, 1865.

Emended Diagnosis:

Test free, polythalamous, chambers of the initial end planospirally arranged both in the megalospheric and the microspheric generations, later chambers biserial; wall arenaceous, imperforate, aperture interior-marginal with no distinct lips.

Differential Diagnosis:

This genus differs from *Textilina* by the presence of an initial planospire. It differs from both *Textilina* and *Textularia* in the non-calcareous wall.

Remarks:

There is, unfortunately, no authentic material in the present collection of *Bolivinopsis capitata* Yakowlev, 1891, and it is, consequently, impossible to decide whether *Spiroplectammina* is a junior synonym of *Bolivinopsis*. In the event that the wall of *B. capitata* is calcarenitic, *Bolivinopsis* will be a junior synonym of *Textularia* Defrance, 1824; if not, *Bolivinopsis* will have priority over *Spiroplectammina* Cushman, 1927.

According to the new definition of the genus it is found that the species *Textularia elegans* Lacroix, 1932, should be classified with the genus *Spiroplectammina*. As the species shows a somewhat reduced initial end it may be anticipated that species with no planospiral initial end may be observed in the future. If, however, the wall should consist of siliceous grains only, the author feels that this character will be of subgeneric value only, as the form—or group of forms—will be linked to *S. biformis* by the intermediate form *S. elegans*.

Spiroplectammina biformis (Parker & Jones)

Pl. 1, fig. 24; pl. 2, fig. 9.

Textularia agglutinans d'Orb., Var. *biformis*, Parker & Jones, 1865, p. 370, pl. 15, figs. 23–24.
Textularia biformis Parker & Jones-Brady, 1878, p. 436, pl. 20, fig. 8.
Spiroplecta biformis Parker and Jones-Brady, 1884, p. 376, pl. 45, figs. 25–27.
Spiroplecta biformis Parker & Jones-Göes, 1894, p. 38, pl. 7, figs. 308–312.
Spiroplectammina biformis (Parker & Jones)-Lacroix, 1932, p. 5, fig. 1.
Spiroplectammina biformis (Parker and Jones)-Höglund, 1947, p. 163, pl. 12, fig. 1; text-figs. 140, 141.
Spiroplectammina biformis (Parker and Jones)-Cushman, 1948, p. 30, pl. 3, figs. 7, 8.

Remarks:

Excellent material of this species from Kattegat is found in the present collection and—like Höglund—the author sees no reason to doubt that the form from temperate waters is identical to the species originally described by Parker & Jones. The test wall consists of siliceous grains of very different sizes generally arranged in a single layer and firmly cemented by brownish tectine. Thus the species has a wall texture very similar to most other arenaceous species and, accordingly, the wall appears to be imperforate.

Spiroplectammina elegans (Lacroix)

Pl. 1, fig. 24; pl. 2, fig. 11.

Textularia elegans Lacroix, 1931, p. 15, fig. 11, (nomen nudum).
Textularia elegans Lacroix, 1932, p. 8, figs. 4–6, (type figure).
Textularia tenuissima Earland-Höglund, 1947, p. 176, pl. 13, fig. 1; text-figs. 154, 155, 161.

Remarks:

According to the emended diagnosis of the genera *Spiroplectammina* and *Textularia* this species is referred to *Spiroplectammina* because of the agglutinated wall which is built up exclusively of siliceous grains, and the presence of a planospiral, initial part, although this planospire seems to be reduced and imperfectly developed in most specimens. Höglund states that the species has been found not only in the Gullmar Fjord and Skagerak but in all stations in Kattegat, and consequently, there is no reason to doubt the present material not being identical to his. Unfortunately, the author has not yet been able to find any specimens in the present material from the Mediterranean, but the Scandinavian form fits the definition by Lacroix exactly, even in several small details, e. g., the somewhat irregular arrangement of the planospiral chambers, so distinctly illustrated by Lacroix.

The specific name was abandoned as a homonym of *Plecanium elegans* Hantken, 1868, but after transfer of the species to another genus it will be available again. As there are no specimens of the species *Textularia parvula* Cushman, 1922, in the Copenhagen collection, it is impossible to determine whether this species and *S. elegans* are conspecific.

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Zoologisk Museum, Copenhagen

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PLATES

Plate I

Fig. 1. *Textilina stricta*, Great Australian Bight, 37°11′ S 138°42′ E, 370 m, Galathea Expedition St. 558. 30 ×.
Fig. 2. *Textilina agglutinans*, Bay of Villefranche, 70 m; Y. Le. Calvez St. 8. 30 ×.
Fig. 3. *Textilina agglutinans*, Bay of Naples, Walther Bank, 180 m, Hilterman No. 25 (12934). 30 ×.
Fig. 4. *Textilina agglutinans*, Banyuls, 42°28′ N 3°11′ E, 50, Nørvang St. 5. 30 ×.
Fig. 5. *Textilina conica*, Bay of Villefranche, 70 m, Y. Le Calvez. St. 8. 30 ×.
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Fig. 10. *Textularia sagittula* (after Defrance).
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Fig. 17. *Textularia sagittula*, Bay of Naples, Biondo Palomba, 110 m, Hiltermann No. 23 (12932). 30 ×.
Fig. 18. *Textularia sagittula*, Gullmar Fjord, Sweden, 30 ×.
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Fig. 24. *Spiroplectammina biformis*, Kattegat, SE of Hirsholmene. 30 ×.
Fig. 25. *Spiroplectammina elegans*, Kattegat, SE of Hirsholmene. 30 ×.

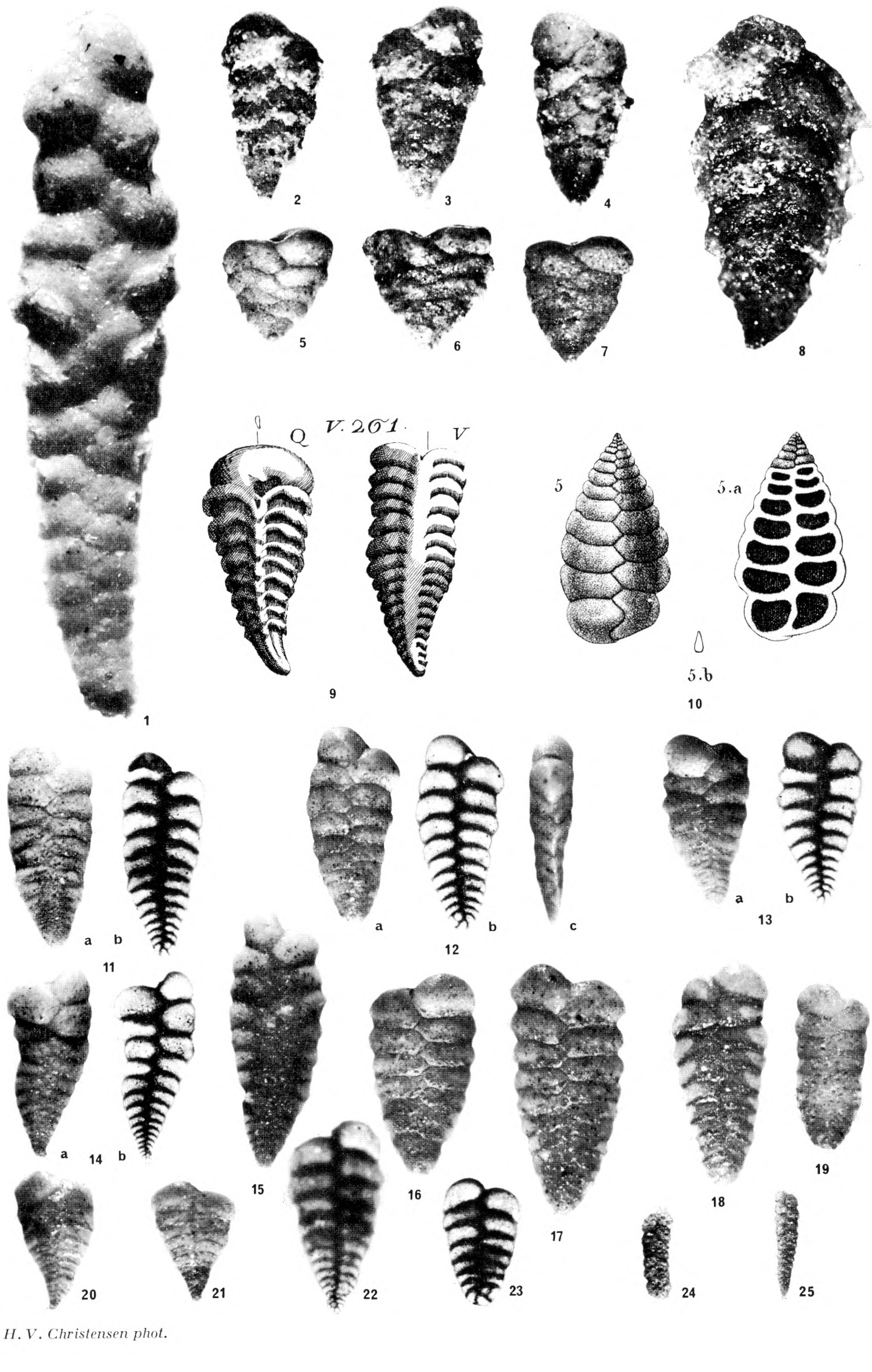

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Plate II

Fig. 1. *Textilina stricta*, Kei Islands, 5°40′ S 132°21′ E, 263 m, Th. Mortensen, St. 48; section of initial part of megalospheric specimen, ordinary and polarized light; p= initial chamber; a = adventitious chamber; 1 = first biserial chamber; 2 = second biserial chamber. 50 ×.

Fig. 2. *Textilina stricta*, Kei Islands, 5°38′ S 132°26′ E, 196 m, Th. Mortensen, St. 7; section of wall showing coarse perforation. 150 ×.

Fig. 3. *Textilina agglutinans*, Banyuls, 42°28′ N 3°11′ E, 50 m, Nørvang St. 5; decalcified section of wall showing perforation. 150 ×.

Fig. 4. *Textilina agglutinans*, Bay of Naples, Walther Bank, 180 m, Hiltermann No. 25 (12934); decalcified section showing perforation. 150 ×.

Fig. 5. *Textilina agglutinans*, Banyuls, 42°28′ N 3°11′ E, 50 m, Nørvang St. 5; Ordinary light and polarized light. Perforation hardly visible before decalcification (comp. figs. 3 & 4). 150 ×.

Fig. 6. *Textularia sagittula*, Bay of Villefranche, 70 m, Y. Le Calvez St. 8; Ordinary and polarized light. 200 ×.

Fig. 7. *Textularia carinata*, Badener Tegel, Sooss, Austria, Miocene; Ordinary and polarized light. 150 ×.

Fig. 8. *Textilina conica*, Banyuls, 42°28′ N 3°11′ E, 50 m, Nørvang St. 5; decalcified section showing perforation of chamber walls and imperforate septa. 150 ×.

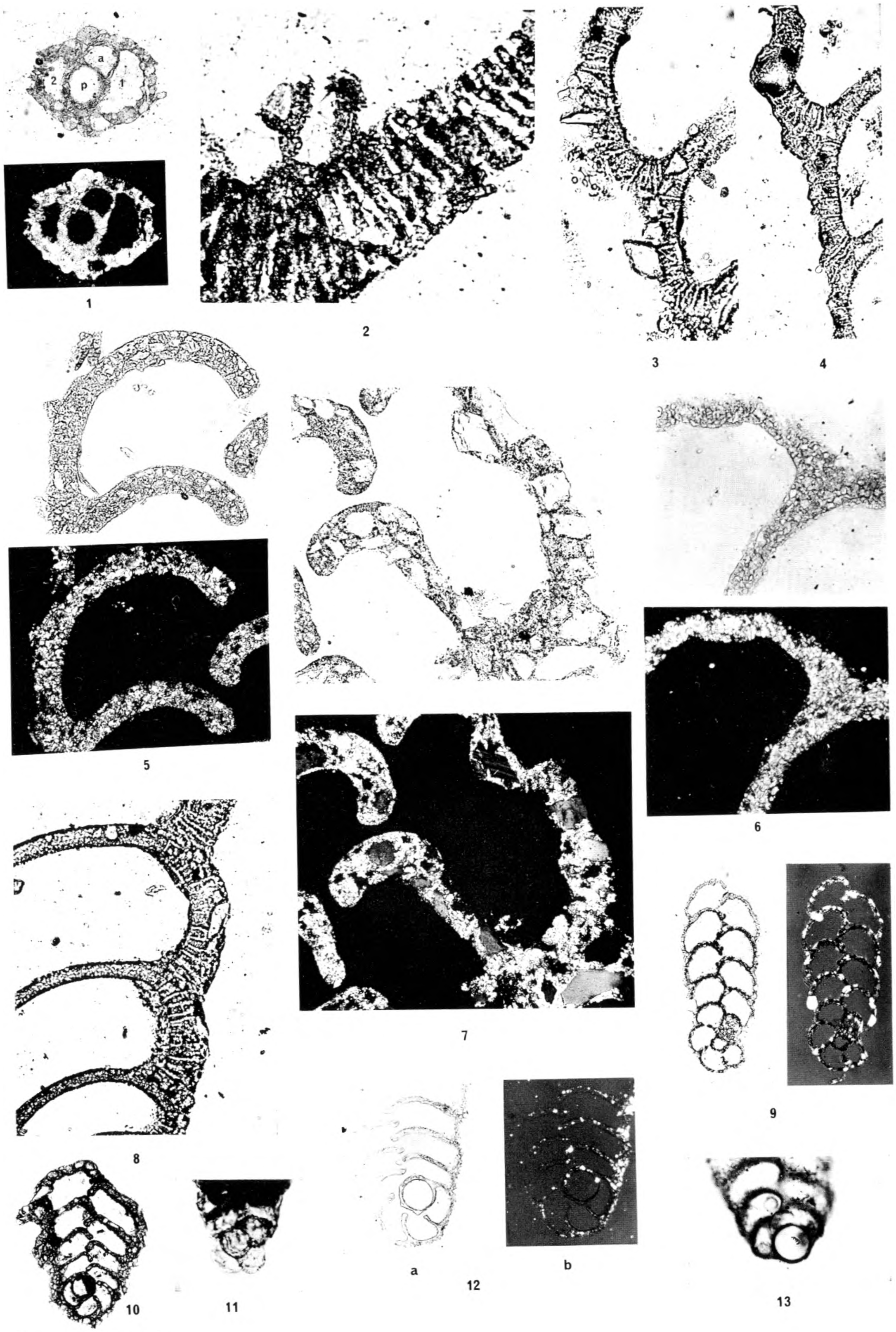
Fig. 9. *Spiroplectammina biformis*, Kattegat, SE of Hirsholmene; thin section; Ordinary and polarized light. 70 ×.

Fig. 10. *Textularia carinata*, Badener Tegel, Sooss, Austria, Miocene. Decalcified section, showing initial planospire of megalospheric specimen. 120 ×.

Fig. 11. *Spiroplectammina elegans*, Kattegat, SE of Hirsholmene; initial planospire; transmitted light. 300 ×.

Fig. 12. *Textularia sagittula*, Bay of Villefranche, 70 m, Y. Le Calvez St. 8; a) decalcified section, ordinary light, showing initial, megalospheric planospire and lack of perforation; b) same section, polarized light, note the insignificant amounts of siliceous grains and the great variation in size. 95 ×.

Fig. 13. *Textilina agglutinans*, Banyuls, 42°32′ N 3°20′ E, 100 m, Nørvang St. 10; decalcified section of microspheric specimen; the adventitious chamber is seen near the initial chamber slightly above the level of the first pair of chambers. 210 ×.



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Synopsis

The present paper is Part II of a study on the oribatids of New Zealand. It includes mention of 82 species within the superfamilies Cepheoidea-Carabodoidea, Liacaroidea, Oribatelloidea, Ceratozetoidea, and Oribatuloidea, mainly pteromorphous species. 13 species have previously been described, 2–3 have been described by RAMSAY, but not published. 13 new genera and 66 new species have been set up. All species with the exception of three previously described and easily recognizable ones have been pictured, a few with drawings of details, only. For each species an account is given of the character of the biotope and of finding places in New Zealand. A total survey of all the species found and of their occurrence in New Zealand, as well as the relation of the fauna to other regions investigated, especially South America, will be given in Part III.

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BIANCO LUNOS BOGTRYKKERI A/S

Preface and Introduction

The present paper constitutes Part II of my *Investigations on the Oribatid Fauna of New Zealand.* In Part I 130 species are described, mainly non-pteromorphous species. Part II deals with 82 species within the superfamilies Cepheoidea-Carabodoidea, Liacaroidea, Oribatelloidea, Ceratozetoidea, and Oribatuloidea, mainly pteromorphous species. In Part III I shall discuss the Galumnoidea, the genus *Oppia* sensu lato, and perhaps the Phthiracaroidea, if the treatment of the last-mentioned group is not left to a specialist on this group. Furthermore I shall deal with synoptic conclusions regarding the distribution of the species, partly in New Zealand, partly in relation to previous investigations, especially in South America.

In Part II I have abandoned the morphological terms used by earlier acarologists and have adopted the terms used by GRANDJEAN and later research-workers. I have done so in order to avoid a mixing-up of concepts and to provide more clarity for young scientists. As this applies to very few terms, it will hardly cause any difficulties to the reader's understanding. The previous concept Tectop. I is now termed tutorium. Tectop. II is now called Tectop. I in conformity with its function of protecting Leg I. Tectop. II protects Leg II. Apodema I is situated near the margin of the camerostome and is mostly little conspicuous. Apodema II is the previous Apodema I, and the sejugal apodema was previously mentioned as Apodema II. This concludes the confusion; the other early terms are unaltered.

In the present paper a few species of oribatids are mentioned which have been collected from bird's nests in New Zealand by Mr. C. MITCHELL, P. B. Bishop Museum, Honolulu. I want to offer my best thanks to Dr. J. L. GRESSITT, Bishop Museum, for assigning to me the task of working-up this in several respects extremely interesting material.

The present paper is the sixth of a number of publications on the distribution of the oribatids on the southern hemisphere. They have all been printed by the Royal Danish Academy of Sciences and Letters, to the Directors of which I owe an immense debt of gratitude. The Carlsberg Foundation has given financial support to me during the work, and the Royal Danish Academy of Sciences and Letters has defrayed the expenses of the linguistic revision of my manuscript, which has been made by Mr. NIELS HAISLUND, M. A. For all this assistance I offer my most cordial thanks.

Fredensborg, May 1966. MARIE HAMMER

List and Descriptions of the Species Found

Tikizetes n. gen.

Pycnotic, probably belonging to the superfamily Cepheoidea, but different from all the known genera. Propodosoma narrow as compared with the broad, rounded hysterosoma. True lamellae as vertical thin blades. Rostral, lamellar, and interlamellar hairs present. Pseudostigmata big, open anteriorly, situated far laterally. The pseudostigmatic organ flagelliform. Hysterosoma arched, long, and broad; its anterior border with two small forwards projecting edges. 6 pairs of long, feathered, submarginal, notogastral hairs, 3 tiny postero-marginal ones. Genital and anal fields separated, the latter being very large. 7 pairs of genital hairs. All legs monodactylous. Femora and Coxae III–IV with a pointed tooth.

Tikizetes spinipes n. sp.; fig. 1.

Colour clear brown. Length about 0.71 mm.

The propodosoma is conical anteriorly and broad with parallel sides posteriorly. The tip of the rostrum is conical, but ventrally a fine membranous plate covers the ventral side of the rostrum and makes it look broader. The rostral hairs are smooth and bent medially. The proximal part of the lamellae, which are narrow ridges, converge, then the lamellae run parallel, at the same times becoming thin blades, which stand up as vertical plates. The latter are posteriorly decorated with pits, anteriorly with radiating stripes. The anterior part of the vertical plates forms the cusps, which taper towards the tip, where the lamellar hair is situated. The latter is very thin towards the tip and smooth. There is no translamella, only a short medially running part of the medial thickening of the lamellae. The interlamellar hairs, which are situated on short apophyses off the point where the lamellae change directions, are very long, soft, bent, and provided with a broad fringe of thin, secondary bristles. The pseudostigmata, which are situated far laterally at some distance in front of the anterior border of the hysterosoma, are big bowls, which are open anteriorly. The pseudostigmatic organs are flagellants, almost equally thick throughout, and smooth.

The hysterosoma is only slightly longer than it is broad. Its anterior border is a low arch, which is heavily chitinized. The shoulder is rounded, but behind the pseudostigma there is a short forwards projecting edge or tooth, formed by the anterior border being displaced a little posteriorly. At some distance from the border there are

6 pairs of long, bent hairs, fringed like the interlamellar hairs. On the posterior border of the hysterosoma three pairs of tiny hairs can be seen. The sculpture consists of low, indistinct, more or less longitudinal, posteriorly transverse wrinkles. Fig. 1 a shows the ventral side. Apodema II is a thin, transverse, straight line, the sejugal apodema, which also is very thin, is directed towards the genital field. Between Apodemata II and the sejugal apodemata there is a darker zone with a lying 8-shaped belt between the sejugal apodemata. The genital field is not half as big as the anal field. There are 7 pairs of genital hairs, viz. four anterior ones in a line along the medial border, three in a curved longitudinal line almost in the middle of the plates. There is one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs, all of them being smooth. Ad 1 and ad 2 are situated behind the anal field, ad 3 off the posterior half of the plates. The fissure iad is located at some distance from the lateral margin of the anal field, in front of ad 3. All legs are monodactylous. Leg I, is shown in fig. 1 b. Femora I–II have distally a dorsal, brush-shaped hair, medially a smaller one. The solenidia of Genu, Tibia, and Tarsus I are very long. Fig. 1 c shows Leg IV. Coxae and Femora III–IV have each a sharp tooth, on the femora not situated distally as is usually the case, but almost in the middle of the ventral side. Tarsus III has proximally a smooth ventral spine. The number of solenidia of the legs is:

	I	II	III	IV
Tarsus	2	2	0	0
Tibia	2	1	1	1
Genu	1	1	1	1
Femur	0	0	0	0

The mandible is slender with many strong teeth, fig. 1 d. A distinct spine projects anteriorly, but as I am unable to see its insertion I cannot tell whether it belongs to the mandible. A thin layer of secretion covers the surface of the propodosoma.

Fox Glacier: One specimen in moist to wet liverworts or low mosses on a thick trunk in native forest; four individuals in mouldering leaves in native forest on Lake Matheson.

Pseudoceratoppia n. gen.

Pseudoceratoppia belongs to the superfamily Liacaroidea, and has superficially a great similarity to *Ceratoppia*. The lamellae are long, converging with a slender cuspis. Tutorium a broad plate with a long free tip. The pseudostigmatic organ is thread-shaped to slightly clavate. Propodosoma and hysterosoma separated by a straight line. No pteromorphae. Hysterosoma of very characteristic shape, broad, globular with the latero-anterior border slightly depressed in the middle. Only a few notogastral hairs of very variable length and shape can be seen. The ventral side with a transverse ridge immediately in front of the genital field and two curved ridges running from the anterior border of the genital field to Acetabulum IV. Genital and anal field separated by a long distance. The anal fields is by far the biggest. 6 pairs of genital hairs, 1 pair of aggenital hairs, 2 pairs of anal hairs, and 3 hairs of adanal hairs. Legs rather short, tridactylous. Genu I with an unusually long medial hair. Mandibles of the normal, chelicere type. Big dark species.

Pseudoceratoppia sexsetosa n. sp.; fig. 2.
Colour brown. Length about 0.86 mm.

The propodosoma is broad, triangular. The tip of the rostrum is pointed as in *Ceratoppia*, but there are no lateral teeth. The rostral hairs, which are inserted on the dorsal surface, are slightly barbed, directed straight forwards, and they are twice to three times longer than their mutual distance. The lamellae, which are situated far from the lateral sides, are narrow, slightly converging, the cusps, however, parallel. The cusps, which are no broader than the distal part of the lamellae, are about half as long as their mutual distance. There is no translamella. The lamellar hairs, which are directed straight forwards, are rather thin and faintly barbed. They reach by one third of their length beyond the tip of the rostrum. The interlamellar hairs are situated at a short distance from the lamellae and from the anterior border of the hysterosoma. They are thin, slightly barbed, and reach the tip of the rostrum. The pseudostigmata, which are small cups, are situated immediately in front of the anterior margin of the hysterosoma. The pseudostigmatic organ is a barbed thread, half as long as the interlamellar hairs and no thicker. The tutorium is a broad blade with a long free tip, see fig. 2a. It is longitudinally striped. The hysterosoma is as long as it is broad. The anterior border is straight, and the latero-anterior border has a slight depression in the middle, a rounded shoulder, and a characteristic edge behind the depression. Only six notogastral hairs can be seen, all of them long, thin, and barbed. Four are situated near the latero-posterior border, two at a short distance from the posterior end. The long radiating hairs add to the similarity to *Ceratoppia*. The ventral side is shown in fig. 2 b. A characteristic feature is a dark transverse ridge located immediately in front of the genital field. In front of this ridge the integument is a lighter colour than behind it. The epimeric hairs are long, barbed, and directed forwards. From the anterior border of the genital field a curved ridge runs on either side backwards to Acetabulum IV. The genital field is much smaller than the anal field (the anal field is shortened in fig. 2b due to pressure, and the anterior anal hair is displaced posteriorly). The six pairs of genital hairs, the aggenital hairs, the anal hairs, and the adanal hairs are all barbed and moderately long. Ad 3 is preanal, ad 1 and ad 2 are postanal. Iad cannot be seen. A circumpedal ridge and discidium can be seen both in a lateral and in a ventral view. The legs have three almost equally strong claws. Genu I with a very long medial hair (figs. 5a and 6). The number of solenidia of Legs I–IV is, beginning with the tarsus, 2:2:1:0;2:1:1:0;0:1:1:0;0:1:0:0.

Ramsay has described a species: *Ceratoppia sexpilosus* (see Hammer, 1966, p. 5), which may represent *Pseudoceratoppia sexsetosa*, but as it has not been published and I have no paratype of this species, its identity is so far uncertain.

Rotorua: One specimen in *Sequoia* forest at The Forest Research Institute, Whakarewarewa; several individuals in dead leaves in Kaingaroa State Forest (STYLES coll.).

Fox Glacier: One specimen in luxurious moss on a dead trunk.

Pseudoceratoppia microsetosa n. sp.; fig. 3.
Colour mahogany red. Length about 0.95 mm.

As the following species in most characters are similar to the preceding one, only the most important differences will be mentioned. The tip of the rostrum is small. The cusps reach the base of the rostral hairs. They are proportionately shorter than in *P. sexsetosa*. The interlamellar hairs are thick, barbed, and only a little longer than their mutual distance. The pseudostigmatic organ is a short, slender club. The hysterosoma is a little broader than it is long and it has the same characteristic depression in its latero-anterior border. The six notogastral hairs are very short and thin.

Rotorua: Four specimens on green foliage in State Forest, Whakarewarewa (STYLES partly coll.).

Pseudoceratoppia asetosa n. sp.; fig. 4.
Colour mahogany red. Length about 0.85 mm.

The tip of the rostrum is rounded. Interlamellar hairs absent in all the specimens found. The pseudostigmatic organ is short, lanceolate, set with minute bristles. The hysterosoma is considerably broader than it is long. No notogastral hairs can be seen. Fig. 4a shows the ventral side, which is very similar to that of *P. sexsetosa*. The adanal hairs cannot be seen, only their pores.

Lake Rotoiti: Two individuals in thick moss and bone-dry lichens in open *Manuka* shrub and *Nothofagus* forest a few hundred feet above lake level.

Queenstown: One specimen in dripping wet moss on a vertical slope about 2000 feet above sea level.

Milford: Three specimens in a dense carpet of low mosses (? liverworts) on a rotten trunk in shadow on the beach.

Pseudoceratoppia clavasetosa n. sp.; fig. 5.
Colour mahogany red. Length about 1.20 mm.

The tip of the rostrum is rounded. The cusps are short, no longer than broad, tapering distally. The interlamellar hairs, which are shorter than their mutual distance, are thick and scaly. The pseudostigmatic organs are broadly clavate, set with minute scales. The hysterosoma is proportionately narrow, i.e. it is as broad as it is long. The six notogastral hairs are slender clubs set with minute scales. The ventral side is similar to that of the preceding species. Ad 1 and ad 2 are moderately long, situated postanally as in *P. sexsetosa*. Ad 3 is preanal. Fig. 5 a shows the anterior part of Leg I. Genu I has a long medial hair. Tarsus I has ventrally a stiff, distal spine. The three claws are almost equally strong.

Nelson District: Golden Downs State Forest three specimens on green foliage (STYLES coll.).

Pseudoceratoppia diversa n. sp.; fig. 6.
Colour mahogany red. Length about 0.92 mm.

The tip of the rostrum is rounded. The lamellae are situated more laterally and they are broader than in the preceding species. The cusps, which taper towards the tip, have a lateral tooth. They almost reach the tip of the rostrum. There is a transverse ridge in front of the lamellae, but it does not represent the translamellae. The rostral hairs, the lamellar hairs, and the interlamellar hairs are proportionally thin. The interlamellar hairs are shorter than their mutual distance. The pseudostigmatic organs are very thin, smooth flagellants, about twice as long as the interlamellar hairs. The hysterosoma is a little divergent from that of the preceding species by having a short edge on the latero-anterior border. The depression in the latero-anterior margin behind the edge is not so deep. The hysterosoma is longer than it is broad. On the dorsal surface of the hysterosoma of a bleached specimen some small pores can be seen. On the posterior border there are six extremely small hairs. The ventral side reminds of that of the preceding species. Ad 1 and ad 2 are postanal, long and thin, ad 3 is preanal and also long. All legs have three almost equally strong claws. Genu I and Tibia I have each an extremely long medial hair.

Keri-Keri: Three individuals in thin moss on a lawn. One specimen in moss and liverworts on a stone-post.

(*Leiosoma longipilis* Moniez 1864, fig. 1, may belong to *Pseudoceratoppia*.

It is 0.70 mm long, and it has a triangular propodosoma, a broad, rounded hysterosoma with five long hairs on the posterior border. The figure and the description are, however, too deficient to determine its identity).

Tectocepheus velatus (Mich.) var. *sarekensis* Trägårdh; fig. 7.

Specimens of the genus *Tectocepheus* have been found in one third of all the samples and in many localities, i.e. Keri-Keri, Puketi, Waitakere, Rotorua, Waitomo, New Plymouth, Pauatahanui, Pu Pu springs, Upper Takaka, Dunedin, and at Milford. It is commonest in open land biotopes, i.e. found in huge numbers in dry moss on a sunny lawn. This genus has been in dispute for years and nobody seems to be able to distinguish the different species in spite of many efforts made by several scientists. HAARLØV (1952) arrives at the result that "All hitherto described species and varieties of the genus *Tectocepheus* (except *T. alatus*) belong to *Tectocepheus velatus*", whereas KNÜLLE (1953) keeps the species already described and adds a number of new species. During my work on the South American oribatids I tried myself to distinguish the many different forms or varieties found there by dissecting in the way of Knülle, but finding all possible transitions between the extremes I finally gave it up after having made numerous sketches. I shall therefore here only figure some forms of different sizes and of different shapes of the cusps and of the pteromorphae without rendering an account i.a. of the notogastral hairs and other characters, which apparently are of no specific importance. Fig. 7 shows a specimen of what is usually called *T. sarekensis* Trägårdh with its very broad and rounded cusps. Length about 0.34 mm. The lyrifissure iad is directed laterally (Knülle 1953, p. 284, fig. 4). This is the one most commonly found.

Tectocepheus velatus (Mich.) var. *minor* Berl.; fig. 8.

Fig. 8. shows a smaller specimen, 0.29 mm in length, with narrow, pointed cusps. Apparently it corresponds to *T. minor*. Iad is directed laterally.

Keri-Keri: Two specimens in moss on a lawn; 7 at Bay of Islands (Stagaard coll.). New Plymouth: One individual in moss on a lawn.

Tectocepheus velatus (Mich.) var. *novus* n. var.; fig. 9.

Fig. 9 shows a very small whitish species or variety, which I have not seen before. Length about 0.25 mm. The cusps are tapering and have a short medial tooth. The pseudostigmatic organs are unusually long as compared with the small body. The pteromorphae are more strongly pointed laterally than in *T. minor*. The grains of the cerotegument are greyish and almost equally large. I ad is parallel to the anterior part of the lateral side of the anal field. A few specimens were collected by Stagaard at Bay of Islands. One specimen in liverworts and low ferns in native forest, New Plymouth.

Lamellobates palustris Ham.; fig. 10.

Colour light brown. Length about 0.31 mm.

Although the cusps are a little narrower than in the species from the Argentine (Hammer 1958, fig. 124), the specimens from New Zealand agree in all other details with the specimen from South America.

Rotorua: Seven specimens in thick moist moss under *Manuka* shrub in the thermal area.

Parahypozetes n. gen.

Parahypozetes, which belongs to the superfamily Ceratozetoidea, is in many respects similar to *Hypozetes* (Balogh 1959, p. 15, figs. 17–18). It differs, however, in the shape of the lamellae and in the appearance of the ventral side. Lamellae and the cusps are well developed, broad, covering most of the propodosoma. A narrow translamella usually present. Lamellar hairs rather rough, inserted on the ventral side of the cusps. Interlamellar hairs very long, usually reaching the tip of the rostrum. Pseudostigmatic organ rodshaped. The tutorium with a long free tip. The latero-anterior border of the pteromorphae usually reaching as far anteriorly as the anterior border of the hysterosoma. Ten pairs of notogastral hairs. Three pairs of sacculi. Sejugal apodemata located behind the anterior border of the genital field, reaching the latter by narrow ridges. Six pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. The hairs inserted beside the hair pore. The lyrifissure iad situated near the anterior border of the anal field. Tibiae I–II and Genus I–II each with a long smooth spine. Tarsi I–II often with a branched, ventral spine. The number of claws is variable. The dorsal edge of the lateral claws serrate. Mandibles of the normal, chelicere type. Maxillar palp with five joints.

Parahypozetes grandis n. sp.; fig. 11.
Colour dark mahogany red. Length about 0.88 mm.

The rostrum is conical. The rostral hairs are inserted rather far posteriorly on the lateral sides. They are slightly barbed, and they almost meet in a broad curve in front of the rostrum. Immediately behind the tip of the rostrum there is a pale spot with a strong tooth from its posterior border. The spot has lateral thickenings. The lamellae are very broad and cover most of the propodosoma, leaving the tip of the rostrum free in front of the cusps. The latter are a little broader than the lamellae and are separated by only a short distance, which is longest immediately in front of the short, curved, and very narrow translamella. The cuspis has a broad, rounded, medial tip and a small, pointed, lateral tip. The border is straight between the tips. The size of the tips or teeth and the distance between them are, however, variable. The lamellae are wrinkled in all directions often with small dots between the wrinkles. The lamellar hair is situated near the medial tip on the ventral side of the cuspis. A narrow furrow runs from its insertion to the posterior border of the cuspis. The lamellar hairs are rather thick, smooth, and as long as the rostral hairs. They reach beyond the tip of the latter. The interlamellar hairs, which are slightly rough, are very long and reach the tip of the rostrum. They are inserted below the anterior border of the hysterosoma close to the lamellae. The pseudostigmata, which are deep cups with a long anterior tip, are halfway hidden below the anterior border of the hysterosoma. The pseudostigmatic organs are rod-shaped, long and slender, slightly flattened at the tip and apparently without secondary bristles. They are directed forwards. The tutorium is a broad plate with a free tip, which almost reaches the anterior border of the cuspis.

The hysterosoma is slightly arched anteriorly, reaching beyond the base of the interlamellar hairs. The latero-anterior border of the pteromorphae reaches as far or further. The ptermorphae are very long. There are 10 pairs of notogastral hairs. They are rather long and smooth, ta being the longest, p 1–p 3 the shortest. Ti is situated at a level a little behind te. The integument is extremely finely and densely punctate. The pteromorpha has radiating stripes, and has along its outer border small dark dots between the stripes, probably due to secretion. Behind the anterior border of the hysterosoma a longish pale spot can be seen. The ventral side is shown in fig. 11 a. The sejugal apodemata are situated far posteriorly. By a narrow ridge they reach the genital field off the third genital hair. The distance between the posterior border of the camerostome and the genital field is short with only two pairs of epimeris hairs, viz. 1a and 2a (in *Hypozetes* three pairs). There are six pairs of genital hairs, which are geniculate, viz. three pairs on the anterior border and three in a longitudinal row at some distance from the lateral border. Fig. 11 b shows a genital hair inserted beside the hair pore, which is surrounded by a rather large round plate. The anal field is much larger than the genital field. There are two pairs of anal hairs and three pairs of adanal hairs. Ad 1 and ad 2 are situated behind the anal field, ad 3 off the middle of the lateral border. Iad is located off an 1, i.e. far anteriorly. All the hairs are geniculate and smooth. Fig. 11 c shows Genu. Tibia and Tarsus I, fig. 11 d Leg II. Genus I–II and Tibia I–II have a long, smooth spine. Tarsus II has ventrally a very strong, branched spine. The distal hairs of the tarsi end in a small knob. There are three claws, the middle one being the strongest. The dorsal edge of the lateral claws is serrate. The number of solenidia of Legs I–IV is, beginning with the tarsus, 2:2:1:0;2:1:1:0; 0:1:1:0;0:1:0:0; respectively.

Keri-Keri: A few individuals at Keri-Keri falls; many in a cleft with water (Stagaard coll.).

Puketi: Numerous in thin moss and lichens on trees and on dead branches; a single one in luxurious moss on a *Rimu* tree.

Rotorua: A few individuals in the thermal area (Stagaard coll.); numerous in dry moss on the ground and in dead leaves in the thermal area, also on lawns at The Forest Research Institute, Whakarewarewa.

Waitomo: Two specimens in dead leaves.

New Plymouth: Several in dead leaves; in moss on a tree in native forest.

Lake Rotoiti: Several individuals in thick, moist moss on a log in *Nothofagus* forest.

Fox Glacier: A few in dead leaves in native forest on Lake Matheson.

Milford: A few individuals in several samples taken in moist moss on a log and in dead leaves in *Nothofagus* forest.

Parahypozetes bidentatus n. sp.; fig. 12.
Colour brown. Length about 0.57 mm.

As the following species in most characters are similar to *P. grandis* I shall restrict myself to mentioning only some characters in which the species in question deviates from the type species, *P. grandis.*

In *P. bidentatus* the cusps are separated by a rather long, straight and narrow ridge on which there are two dark tubercles. Behind this ridge a faint, curved line, i.e. the translamella, can be seen. The cuspis has a broad, pointed lateral tooth, no medial tooth. The anterior border of the cuspis behind the lamellar hair forms a faint lobe. The lamellar hairs are thick, uneven. They are inserted near the anterior border of the cuspis on the ventral side. This species has only one claw.

Puketi, Waitakere, Rotorua, New Plymouth, Pauatahanui, and Lake Matheson near Fox Glacier. Found in huge numbers at Rotorua in low moist mosses and in dead leaves on the ground in the thermal area, very often together with *P. grandis.*

Parahypozetes quadridentatus n. sp.; fig. 13.
Colour brown. Length about 0.65 mm.

The cusps are longer than broad and have parallel medial sides for most of their length, the space between them widening slightly at the translamella, viz. the ridge between the lamellae. The cusps have each two teeth, viz. a long medial one directed straight forwards as a continuation of the medial border of the cuspis, and a shorter lateral one, which is directed forwards and outwards. In some specimens there are two small lateral teeth. The cuspis amounts to two fifth of the length of the whole lamellar structure. The distance between the cusps is about one third of the width of the cuspis. The lamellar hairs are thick and rather short. They are inserted at some distance from the anterior border of the cuspis on the ventral side of the latter. The interlamellar hairs, which reach beyond the cusps, are uneven. The pseudostigmatic organs are very slender, and no thicker than the interlamellar hairs. The legs have only one claw.

Lake Rotoiti: A few individuals in slightly moist, dead leaves in *Nothofagus* forest.

Fox Glacier: Several specimens in different samples taken in dense mosses, small ferns, and dead leaves in native forest; also in drier vegetation of grass and low plants outside the forest.

Parahypozetes furcatus n. sp.; fig. 14.
Colour mahogany red. Length about 0.69 mm.

The specific name originates from the shape of the cuspis, which is furcate, having two equally long pointed teeth. The cusps are almost as long as the lamellae. They are convex medially, where they touch in the middle, leaving a narrow space open in front of the translamella. The latter is an arch, open anteriorly. The pseudostigmatic organs are as thick as the lamellar hairs and twice as thick as the interlamellar hairs. All legs have three claws, the middle one of which is the strongest, and much stronger than the lateral ones.

Waitakere: Several specimens in moist grass, moss, and dead leaves in native forest.

Waitomo: One specimen in thick moss in native forest; many individuals in dead leaves in a cleft at the roadside, shadowed.

New Plymouth: A single specimen in dead leaves in native forest.

Parahypozetes lobatus n. sp.; fig. 15.
Colour light brown. This light colour may be due to the only specimen found being young. Length about 0.43 mm.

The medial part of the cusps forms a lobe, which halfway covers the dark tubercles on the transverse ridge. The lobes do not touch, but leave a broad space open, in which the rostrum can be seen. The tip of the rostrum seems to be faintly serrate. The cusps have a small pointed, lateral tooth as a district continuation of the lateral border. The translamella forms a broken arch, which is semicircular. The lamellar hairs are inserted closest to the medial border of the cuspis. The latter reaches the tip of the rostrum. The pseudostigmatic organs are very long and much thicker than the interlamellar hairs. Legs I–II have two claws, viz. a normal strong one and a rudimental inner claw; the latter is present only on Legs I–II. Legs III–IV have only one claw.

Fox Glacier: One specimen in thick moss in native forest on Lake Matheson.

Parahypozetes giganteus n. sp.; fig. 16.
Colour mahogany red. Length about 1.16 mm.

The cusps are separated by a distance, which is almost as long as the width of the cusps. The latter have almost in the middle of their anterior border a small tooth. The lamellar hairs are inserted on the medial border of the cusps. They are uneven and comparatively thin. The interlamellar hairs are very thin and reach beyond the tip of the cusps. The pseudostigmatic organs are unusually short for the genus, and thin, too. The legs have three almost equally strong claws.

Waipahihi Stream northeast of Invercargill: One specimen in dead leaves in National Park (STYLES coll.).

Parahypozetes macrodentatus n. sp.; fig. 17.
Colour brown. Length about 0.65 mm.

Characteristic of this species is the long medial tooth, which is rather pointed. The latero-anterior part of the cuspis forms a broad, somewhat shorter tooth. The lamellar hairs are inserted at the bottom of the right angle between the teeth. Between the cusps there is rather a narrow space. The translamella is indistinct. The interlamellar hairs are thin (one is broken in fig. 17). The pseudostigmatic organ is thin and short, too. All legs have three claws, the middle one of which is twice as strong as the lateral claws.

Kaingaroa State Forest southeast of Rotorua: Two specimens in dead leaves (STYLES coll.).

Parahypozetes maximus n. sp.: fig. 18.
Colour black. Length about 1.24 mm.

As this species is completely black, apart from a light spot behind the anterior border of the hysterosoma and the anterior part of the pteromorphae, and as I did not succeed in bleaching it sufficiently I have been able to show only the most important characters, i.e. its size and the shape of the cusps. The cusps end in two slender, diverging teeth as in *P. furcatus*. The lamellar hairs, which are inserted between the teeth, bend towards each other in a curve. They are equally thick throughout and rather short. The cusps are separated by some distance, whereas they touch in the much smaller species; *P. furcatus*. I have not been able to see a translamella, only a faint line. The pseudostigmatic organ is short as in *P. giganteus*. Inside, the pseudostigma is strengthened by a chitinous spiral.

Arthur's Pass: One specimen in *Nestor notabilis*' nest (C. Mitchell, B.P. Bishop Museum, Honolulu, coll.).

Edwardzetes novazealandicus n. sp.; fig. 19.
Colour brown. Length about 0.73 mm.

As most of the species within the genus *Edwardzetes* are very similar, it is not necessary to repeat here all its characters (cp. *E. andicola* Ham. (1958, p. 89, fig. 110) with fig. 19), but only to mention some characteristic features. *E. novazealandicus* differs from *E. andicola* by its somewhat shorter notogastral hairs, but first of all it is possible to distinguish them by the differences in Legs I–II. Fig. 19a shows Femur and Genu I; fig. 19b shows Leg II. Genus I–II have both a distal ventral tooth, which is longest in Genu I. Genu II has a thin distal spine. Femur II has a tongue-shaped distal, ventral keel, which is absent in Femur I. In *E. andicola*, fig. 19c, Genu II has no distal tooth, but a spine, which is a little stronger than in *E. novazealandicus*. The ventral keel on Femur II is low. Genu I has neither a spine nor a distal tooth. These two species can easily be distinguished from *E. dentifer* Ham. (1962 a, p. 69, footnote), as *E. dentifer* has very short and thin notogastral hairs. Genu II, fig. 19d, has a strong tooth and a short thick spine. The ventral keel on Femur II is tooth-shaped. These three species have a strong medial claw and two thin lateral claws.

Keri-Keri, Rotorua, Waitomo, New Plymouth, Pauatahanui, Lake Rotoiti, Hokitika, Fox Glacier, and Milford. It has been found in thick, moist moss near a stream, in moist moss and liverworts on the bank of Lake Tarawera, in thick moss on a branch, in moist-wet moss on a trunk, etc., in the greatest number in thick moss under trees on a riverbank at Hokitika.

Parafurcobates n. gen.

Parafurcobates agrees in most characters with *Furcobates* Sell. 1959. It differs, however, in the appearance of the ventral side, and in smaller details.

Parafurcobates cuspidatus n. sp.; fig. 20.
Colour light brown. Length about 0.63 mm.

The propodosoma is comparatively broad, its posterior part having rounded sides, its anterior part slightly concave sides. The rostrum is broad, truncate, due to a ventral, hyaline lip. The dorsal part of the rostrum is pointed, slightly projecting with a small distal tooth and a V-shaped opening behind the projecting part. A long tooth from the posterior border of the opening fits into the anterior part of the opening. The rostral hairs, which are situated laterally on the edged rostrum, close to its anterior border, are stiff, pointed, and densely unilaterally barbed. The lamellae are broad. Their proximal part converge, whereas the cusps are parallel. The latter are half as long as the lamellae. The lamellae, which are broadest off the translamella, consist proximally of a vertical, finely longitudinally striped, thin blade, distally of an apparently more solid ridge, which forms the cuspis and which tapers both proximally towards the pseudostigma and distally in the cuspis. The cusps have a tiny lateral tooth. Their mutual distance is about two thirds of their length. The translamella is half as broad as the lamellae off the translamella. The lamellar hairs, which are more than twice as long as the cusps, are rather thick and distinctly barbed. The interlamellar hairs are slightly thinner than the lamellar hairs and of the same length as the lamellar hairs; they are erect and seem shorter. In *Furcobates hastata* (Kramer) the interlamellar hairs are much longer. The pseudostigmata are big, open bowls, which have a broad, lateral lobe. The pseudostigmatic organ is short, clavate. The stalk is rather short and thin. The tutorium ends in a short free tip, fig. 20 a, which does not reach the tip of the cusps (in *Furcobates hastata* it has a long free tip).

The anterior margin of the hysterosoma, which is broadly arched, projects beyond the pseudostigmata and beyond the projecting tip of the pteromorphae. Laterally to the pseudostigma there is a small lobe on the anterior border of the pteromorpha, further laterally a deep incurvation. There are 9 (probably 10) pairs of notogastral hairs; most of them cannot be seen as they are tiny. I am unable to discern the hair pore for p. 3. There are four pairs of area porosae, all very distinct, and perhaps two small areae porosae postanalis of the existence of which I am not quite sure. Fig. 20 b shows the ventral side. The sejugal apodemata do not form a transverse ridge as in *Furcobates,* in which it can be seen a short distance in front of the genital field. Immediately in front of the genital field, following its anterior border there is a dark curved ridge, which laterally ends near Acetabulum IV. There are? six genital hairs (one cannot be seen with certainty). Ad 3 is situated off the posterior half of the lateral side at some distance behind iad. Ad 1 and ad 2 are located behind the anal field. A long, curved indistinct fold can be seen laterally to the anal field. All legs are tridactylous with a strong middle claw and two thin lateral claws. Femur 1 has a low distal keel ventrally, Femur II a short broad, rounded keel. Genus I–II have a strong distal tooth, which is absent in *Furcobates*. Fig. 20 c shows Genu and Tibia I. Tibia I has a small distal tooth. Tibiae I–II have a coarse, distal spine. The palp, fig. 20 d, is similar to that of *Furcobates* except that Sellnick 1959, p. 81, fig. 8 depicts only two hairs on the tibia, in *Parafurcobates* there are three.

Lake Rotoiti: Two individuals in decayed leaves; two in moist to wet *Leucobryum* in a spring locality; one in moss on the ground, all in *Nothofagus* forest.

Fox Glacier: One specimen in dead leaves in native forest on Lake Matheson.

Milford. One individual in moist moss on the ground in *Nothofagus* forest.

Macrogena Wallwork*). (Type: *M. monodactyla*).

Small poronotic oribatids belonging to the superfamily Ceratozetoidea. Lamellar and interlamellar hairs very thick and rough. Pseudostigmatic organs clavate. Rostrum

*) Still unpublished january 1967.

tripartite, the lateral parts bending ventrally, reaching the lateral border of the camerostome. Broad lamellae and translamella. Cusps present. The tutorium with long free tip. Pteromorphae connected by a narrow bridge, not movable. 10 pairs of notogastral hairs. Areae porosae present. No sternal plate. Five pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. Discidium and circumpedal ridge present. All tarsi monodactylous. Solenidia of Genus I–II and of Tibiae I–II very long.

Macrogena rudentiger n. sp.; fig. 21.
Colour yellow, propodosoma light brown. Length about 0.24 mm.

On the tip of the rostrum two small tips can be seen, which, when laid bare, reveal that the rostrum has two deep incurvations and the tips represent the lateral border of these incurvations, fig. 21a. The rostral hairs, which are inserted on the lateral sides, are bushy, unilaterally barbed. The lamellae are broad. The cusps are as broad as the lamellae and so short that they hardly project beyond the broad translamella. Between the cusps the translamella is slightly concave. The space between the lamellae is a regular rounded arch. The lamellar hairs are inserted in the middle of the cusps. On either side of the hair there is a hardly marked tooth. The lamellar hair is thick, rough, almost smooth at the tip. They are slightly longer than their mutual distance (see also fig. 21a). The interlamellar hairs, which are situated immediately in front of the anterior margin of the hysterosoma and rather close together, are surrounded by a dark ring at their base. Proximally they diverge, then they converge, the tips almost meeting a good distance in front of the tip of the rostrum. They are much thicker than the lamellar hairs. The pseudostigmatic organs are situated in broad cusps, the larger part of which projects beyond the anterior margin of the hysterosoma. They are clavate, broadest at the tip and set with minute bristles. They are directed medially. The tutorium has a free tip with a few small distal teeth, fig. 21 a. This tip reaches beyond the cusps.

The anterior border of the hysterosoma is almost straight in the middle, projecting laterally to the pseudostigma, then drawing slightly back. The pteromorphae are connected by a very narrow bridge. Behind the anterior border of the hysterosoma a large light spot can be seen. There are 10 pairs of short, smooth notogastral hairs, situated as shown in fig. 21. The areae porosae are very small and indistinct, only three pairs can be seen. The ventral side, fig. 21b. Apodemata II, Sejugal Apodemata and Apodemata III are present as short faint ridges. There is no sternal plate. There are five pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. Ad 1 and ad 2 are postanal, ad 3 latero-anal. All legs are monodactylous. Fig. 21c shows Leg I (not all the hairs are figured). Genus I–II have a distal spine, which is shortest in Genu II. Femur II has a long ventral distal tooth. Tarsus I has ventrally a long rough spine. The solenidia of all tibiae and of Genus I–II are very long. The solenidion of Genu I is undulating proximally. Mandibles of the normal, chelicere type.

Puketi: Numerous in thick, moist-wet mosses on the ground in dense native forest. A single individual in luxurious moss on the trunk of a *Rimu* tree.

Waitakere: 10 individuals in moist moss, liverworts, and dead leaves in native forest.

Macrogena crassa n. sp.; fig. 22.
Colour yellow to light brown. Length about 0.28 mm.

As *Macrogena crassa* is identical with *M. rudentiger* in almost all characters only the few differences will be mentioned. The lamellar and the interlamellar hairs are coarser (hence the specific name) and the interlamellar hairs are parallel and much shorter. The latter reach only a little beyond the tip of the cusps. The cusps are more pronounced, as the incurvation in the anterior border of the translamella is deeper. They are rounded at the tip. The length of the cusps varies greatly, and in some specimens the incurvation between them is semicircular, the cusps and the translamella then are narrower than shown in fig. 22. In these specimens the lamellae are also narrower and the space between them not an even arch, but more square; the interlamellar hairs are slightly thinner and not so rough, altogether a more delicate form of a somewhat darker colour. These specimens have all been collected round Fox Glacier and at Milford.

Waitakere: Two specimens in moist liverworts and mosses on a trunk in native forest.

Pu Pu Springs: Several individuals in almost dry mosses under *Manuka* shrub near the spring.

Lake Rotoiti: Numerous in moist moss on a rotten log; in moss on the ground; fewer in moist-wet moss in a spring locality, all in *Nothofagus* forest.

Queenstown: A few in dripping wet moss on a vertical slope.

Fox Glacier: Several specimens in luxurious moss at the foot of a gigantic tree, all covered by mosses; and in liverworts and mosses on a trunk in native forest.

Milford: A few individuals in moss from dead branches of a tree-fern; a few in moss and liverworts on rotten branches in *Nothofagus* forest.

Pedunculozetes andinus Ham. (1962 a, p. 68, fig. 62).
Length about 0.47 mm.

As *P. andinus* is easily recognizable I have not figured it. It is one of the commonest species in New Zealand.

Keri-Keri, Waitakere, Rotorua, Waitomo, New Plymouth, Pauatahanui, Pu Pu Springs, Hokitika, Fox Glacier, Queenstown, and Milford. It has been found in the greatest number in moss on a slope near a small stream in deep shadow, and in moss on a rotten trunk at Keri-Keri. Moreover, numerous in moss and liverworts on the ground in native forest; in moss and grass on a lawn, both at Waitakere.

Pedunculozetes minutus n. sp.; fig. 23.
Colour yellowish to light brown. Length about 0.40 mm.

P. minutus can be distinguished from *P. andinus* only by its lighter colour, its smaller size, and especially by its extremely long pseudostigmatic organs. The latter reach the tip of the lamellae. The head of the pseudostigmatic organ is lanceolate in profile, in a lateral view a broad ribbed plate, fig. 23a, as is also the case in *P. andinus*. The notogastral hairs are a little longer and more curved. The sejugal apodema and Apodema III meet at some distance from the anterior margin of the genital field. This is not figured correctly in Hammer 1962 a, fig. 62b.

Pu Pu Springs; 30 specimens in almost dry mosses under *Manuka* shrub.

Tutorozetes n. gen.

The relationship of *Tutorozetes* must be within the superfamily Ceratozetoidea. It has true lamellae and translamella. The tutorium huge, covering the lateral side. Pseudostigmatic organs ball-shaped. Pteromorphae connected by a chitinous bridge, not moveable. 10 pairs of notogastral hairs. Areae porosae present. All apodemata short, not reaching the middle or sternal line. Discidium and circumpedal ridge present. Six pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. All legs monodactylous.

Tutorozetes termophilus n. sp.; fig. 24.
Colour light brown. Length about 0.26 to 0.30 mm.

The propodosoma, which is triangular, is covered on its lateral sides by two broad plates, viz. Tutorium and Tectop. I. The rostrum is broad and rounded. The rostral hairs, which are situated near the anterior border, are very short and thin. The lamellae are located in the middle of the propodosoma. They are equally broad throughout, almost parallel, and they only halfway reach the tip of the rostrum. The cusps are short, dull, and narrower than the lamellae. The lamellar hairs are thin, smooth, and about half as long as their mutual distance. The interlamellar hairs, which are inserted below the anterior border of the hysterosoma, are likewise thin and short. The pseudostigma is almost covered by the anterior border of the hysterosoma, only an anterior tip projects.

The pseudostigmatic organ has a round head set with minute bristles. The stem is short and thin. Between the pseudostigmatic a trim of secretion can be seen, usually lying along the anterior border of the hysterosoma, but now and then separated from the latter. The tutorium is a large, broad plate, which anteriorly reaches beyond the cuspis. In a lateral view, fig. 24a, it can be seen that it covers most of the lateral side. In a ventral view, fig. 24b, it reaches the border of the camerostome. Tectop. I is deep and well developed.

The anterior border of the hysterosoma, which is longer than broad, is arched. The same is the case with the anterior border of the pteromorphae. The three arches thus formed are equally broad and reach equally far anteriorly. The pteromorphae are connected by a chitinous bridge, which is a slightly darker colour than the integument behind it. The pteromorphae are broad, their distal part bent ventrally. They are not movable. There are 10 pairs of short, thin notogastral hairs, situated as shown in fig. 24. The areae porosae are very indistinct and only three pairs can be seen with certainty, viz. Aa, A 1, and A 2. In the integument there are numerous cracks.

The ventral side is shown in fig. 24b. Apodemata II are very short, separated from each other by a distance twice their length. The sejugal apodemata, which are a little longer and parallel to Apodemata II, are separated from the anterior border of the genital field by a distance of their own length. Apodemata III are half as long as Apodemata II. There is no chitinous sternal plate. The discidium is distinctly developed. The circumpedal ridge reaches Tectop. II, from which a thin line proceeds for a short distance obliquely forwards and medially. The genital field is almost quadrangular. There are six pairs of genital hairs. The anal field is narrowest anteriorly. There are two pairs of short anal hairs. Three pairs of adanal hairs. Ad 1 and ad 2 are located near the latero-posterior corner of the field, ad 3 near the lateral side. The lyrifissure iad is situated immediately in front of ad 3. Surrounding the anal field from the lateral and the posterior sides a broad furrow can be seen and farther laterally a shorter similar one. The legs: Femora I–II have a ventral keel, narrow in Femur I. In Femur II it is short and broad and reminds of a distal tooth. Genu I has a long distal tooth, Genu II a shorter one. Tibia I has a short distal dorsal tooth. All legs are monodactylous.

Rotorua: Many individuals in moss in a dry and sunbaked locality with *Manuka* shrub in the thermal area.

Magellozetes clathratus n. sp.; fig. 25.

Colour yellow. Length about 0.36 mm.

Characteristic of *Magellozetes*, apart from the rostral projections, is a lateral tooth on the cusps. The tooth is distinctly separated from the medial part of the cusps, on which the lamellar hair is situated. This is not pointed out clearly enough in the description of *M. processus* Ham. (1962 a, p. 65), but, a distinct tooth is figured in fig. 59. *M. clathratus* has on the tip of the rostrum three projections separated by deep incisions. The two lateral ones are rounded laterally, inclining medially, and almost touching the middle projection, which is T-shaped. The projections, which form a fine lattice (hence the specific name) are rather thin distally, but strongly chitinized proximally. Immediately behind the middle projection there is a V-shaped opening in the dorsal surface of the rostrum. The rostral hairs are distinctly barbed. The lamellae are very broad as compared with those of *M. processus*, broadest off the translamella. The latter is only slightly narrower than the lamellae. Its posterior border overlaps the medial border of the lamellae and seems to push them aside, which is indicated by a faint wrinkle at either end of the translamella. The cusps are broad.

They are separated by an incurvation, which is almost as broad as the space between the lamellae. The medial part of the cuspis inclines laterally towards a long tooth or tip, which reaches just beyond the base of the lamellar hair. Between the lateral tooth and the medial part there is a longitudinal furrow reaching beyond the posterior border of the translamella. The outer part of the lamellae is longitudinally striped, the inner part is faintly transversally wrinkled. The lamellar hairs, which are finely barbed, are twice as long as their mutual distance. The interlamellar hairs are very thick, barbed, and reach the tip of the rostrum. The pseudostigma is a broad, open bowl, most of which is projecting in front of the anterior border of the hysterosoma. The pseudostigmatic organ has a broad club on a short stalk.

The anterior border of the hysterosoma is arched in the middle, drawing back behind the pseudostigmata. The pteromorphae are undulating with a distal projecting tip. The notogastral hairs, which are situated as shown in fig. 25, are much longer than in *M. processus*. The areas porosae are indistinct, especially A 1. As the ventral side does not differ from that of *M. processus* it has not been figured. All legs have three claws, the middle one of which is the strongest.

Milford. A few specimens in dead leaves in *Nothofagus* forest, near Bowen Fall; many individuals in luxurious moist moss on sandy soil in the same locality.

Ceratozetes gracilis (Mich.); fig. 26.
Colour brown with a reddish brown zone across the hysterosoma. Length about 0.62 mm.

Keri-Keri: Numerous in moss on the ground near a small stream in a deep cleft with tall trees; in mosses on a rotten trunk; in dead leaves; a few specimens in dead needles of a fir; many in moss and liverworts at a roadside in shadow, etc.

Waitakere: A few specimens in moss and grass under bushes in a garden.

Rotorua: One individual in moist liverworts and moss on a slope on Lake Tarawera.

New Plymouth: Six specimens in moss and grass on a lawn in a park.

Ceratozetes mediocris Berl.; fig. 27.
Colour yellow with a reddish brown zone across the hysterosoma. Length about 0.37 mm.

C. mediocris is closely related to *C. monticola* Ham. (1961, fig. 110). The latter is, however, smaller (0.33 mm), yellow, or light brown without a reddish zone across the hysterosoma. The anterior border of the hysterosoma is highly arched and the rostral hairs, the lamellar hairs, and the interlamellar hairs are much shorter and thinner, too. *C. monticola* may be a variety of *C. mediocris* Berl.

Keri-Keri: Numerous in moist moss on a lawn, under bushes; many in moist grass and *Hieracium* at a road-side.

Ceratozetes bicornis n. sp.; fig. 28.
Colour brown with a reddish brown zone across the hysterosoma. Length about 0.38 mm.

On either side of the tip of the rostrum there is a small tip. The lamellae have very long cusps, which project as horns (hence the specific name). The cusps, which are half as long as the lamellae, incline a little. Their tip is rounded without a tooth. They are almost as broad as the lamellae. The cuspis and the lamella together are slightly S-shaped and do not form a straight line as in *C. furcatus* (Pearce & Warburton) (= *C. argentinensis* Ham. (1958, fig. 105). The lamellar hairs are thick and uneven, though tapering towards the tip. They are almost one and a half times longer than the cusps. The interlamellar hairs, which are situated close to the lamellae, are also uneven, and so long that they reach the tip of the rostrum. There is no translamella, but the medial thickening of the lamellae indicates its place. Immediately in front of this place there is a transverse ridge. The pseudostigmatic organs are slender clubs. The propodosoma is covered by a veil of secretion.

The anterior border of the hysterosoma is highly arched, reaching beyond the insertion of the interlamellar hairs. The latero-anterior tip of the pteromorpha, which also projects, reaches a level off the anterior part of the pseudostigma, thus forming a long regular curve between the anterior border of the hysterosoma and the tip of the pteromorpha. The hysterosoma is as broad as it is long, broadest across the hairs, te. The notogastral hairs are very fine and often bent near the tip. The areae porosae are very indistinct.

The ventral side does not show any particular characters, and it agrees with fig. 257 for *C. gracilis* (Mich.) in Willmann 1931. There are six long genital hairs, all directed forwards, viz. two on the anterior border and four in a straight line not far from the medial border. One pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. Ad 3 is situated off the middle of the lateral side of the anal field. Iad is located close to the anal field a short distance in front of ad 3. Ad 1 and ad 2 are situated behind the anal field, the distance ad 1 – ad 1 being two to three times longer than ad 1–ad 2. Genus I–II have a lateral spine. All legs with only one strong claw.

This species reminds very much of *C. furcatus* (Pearce & Warburton) by its long cusps, by the broad arched hysterosoma, and by its hook-shaped notogastral hairs. It is, however, smaller in size (*C. furcatus* 0.50 mm in the Argentine), the cusps shorter, not so straight, and the notogastral hairs not so dark.

Rotorua: Many individuals in wet moss on a stone in a small pond with gold fish, shadowed, at the Forest Research Institute, Whakarewarewa.

Queenstown: Many in a spring locality at Lake Moke, in wet thick moss, *Mimulus*, low *Juncus*, and grass.

Ceratozetes hamobatoides n. sp.; fig. 29.
Colour light brown, darkest in a zone across the hysterosoma. Length about 0.38 mm.

The whole appearance of this species reminds so much of *Hamobates* (Hammer, 1962 a) that I am in doubt whether to incorperate it within *Hamobates* or *Ceratozetes*, but as all legs have only one claw and *Hamobates* is characterized by having three claws on Legs III–IV (the lateral claws being hook-shaped) I shall so far establish it within *Ceratozetes*.

The propodosoma is conical, very broad posteriorly. On the tip of the rostrum two short tips can be seen. The rostral hairs, which are inserted rather far posteriorly, are very long, thin, and unilaterally finely barbed. The lamellae are long, inclining, and broadest off the base of the cusps. The latter, which are almost parallel, are approximately half as long as the lamellae. They taper towards the tip. The distance between them is shorter than their length. There is no translamella. A few indistinct transverse ridges can be seen between the cusps. The lamellar hairs are stiff, slightly rough, and about as long as the cusps. They reach beyond the tip of the rostrum. At their base a tiny ventral tip can be seen. The interlamellar hairs are situated behind the tip of the highly arched anterior border of the hysterosoma. They are almost equally thick throughout, slightly rough, and about twice as long as the lamellar hairs. They reach the tip of the cusps. The pseudostigmata have an anterior sharp tip. The pseudostigmatic organs are long, slender, grey clubs provided with small scales. The tutorium has a very long free tip, which almost reaches the tip of the cusps. Between the lamellae and the cusps something like a hyaline funnel can be seen. It projects beyond the tip of the rostrum, but only in the type specimen, probably a sheet of secretion.

The hysterosoma is broader than it is long. Its anterior border projects between the lamellae and almost to the base of the cusps leaving only a short space open between it and the cusps. The tip of the pteromorphae projects as far anteriorly as the anterior border of the pseudostigmata, the whole anterior border thus becoming strongly undulate. There are ten pairs of notogastral hairs, all extremely small. The hair pores are clear. Areae porosae cannot be seen as is often the case within *Ceratozetes*, whereas they are very distinct within the two described species of *Hamobates* from Chile (Hammer 1962 a, figs. 60–61). The ventral side has the same appearance as in *C. bicornis*. There are six long genital hairs, one aggenital hair, two anal hairs situated close to either end of the plate, and three adanal hairs, viz. ad 3 off the middle of the lateral side, ad 1 and ad 2 in a curve behind the anal field. The distance ad 1–ad 1 is twice as long as ad 1–ad 2. Genua I–II have each a short lateral spine. All legs have only one strong claw.

Fox Glacier: Several individuals in wet, lowly *Scirpus* on the bank of Lake Matheson; one specimen in wet liverworts and moss in a ditch along the road.

Onychobates n. gen.

Onychobates belongs to the superfamily Ceratozetoidea. It is so peculiar in many ways that it is not easy to place it in any of the existing families. Propodosoma and hysterosoma are separated. True pteromorphae present, not moveable. Lamellae and cusps present. No true translamella, but a chitinous scale in its place. Tutorium present. Pseudostigmatic organs broad, disk-shaped. Tectop. I–II well developed.

Hysterosoma poronotic. Only one pair of areae porosae present. Ten pairs of notogastral hairs. Ventral side with discidium and circumpedal ridge. 6 pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs, the latter situated in a row along the lateral side of the anal field. Tarsi I–III with one claw, Tarsus IV besides with a long thin outer claw. The claws apparently adapted for clinging to feathers.

Onychobates nidicola n. sp.: fig. 30.
Colour yellowish. Length about 0.375 mm.

The propodosoma is more or less triangular with a broad tripartite rostrum. The middle part of the rostrum is rounded, whereas the lateral parts are pointed, fig. 30 a. The rostral hairs are inserted laterally in front of a broad plate, the anterior end of which in a dorsal view can be seen in front of the base of the rostral hair as a tooth. The lamellae, which are located in the middle of the propodosoma, are for most of their length parallel, and also the cusps are parallel. The lamellae seem to make a turn a short distance behind the cuspis, the inner side of the lamella thus continuing into the outer side of the cuspis. The cusps are approximately two thirds as long as their mutual distance. They have no distal tooth. There is no translamella, but immediately in front of its place there is a short ridge with a bipartite scale on its anterior border. The lamellar hairs, which are as long as the lamellae without cusps, are barbed. The interlamellar hairs, which are situated in the corner between the lamellae and the anterior border of the hysterosoma, sit on the end of a short oblique ridge coming from the pseudostigma. They are almost two and a half times longer than their mutual distance and barbed. No exopseudostigmatic hair has been observed. Fig. 30 a shows the propodosoma in a lateral view. The tutorium ends in a free tip, which reaches as far anteriorly as the cuspis. The pseudostigma, which can be seen immediately behind the anterior border of the hysterosoma, has a long anterior tip. The pseudostigmatic organ is a rounded, angular disk set with minute bristles on a thin stem.

The hysterosoma is as broad as it is long. Its anterior border is almost straight, its posterior half is semicircular. The pteromorphae are broad, their latero-anterior border sligthly projecting (in fig. 30 they are pressed a little out of shape). They are not mobile. Laterally to the pseudostigma there is a short curved ridge. Near its posterior end the hair, ta, is situated and a short distance behind ta ti can be seen. Further laterally the lyrifissure ia is situated. There are ten pairs of notogastral hairs. The only hairs discernible are those seen in profile along the posterior border. Only one pair of areae porosae is present, apparently represented by A 1. It is longish and large.

The ventral side is shown in fig. 30 b. Apodemata II are connected by faintly chitinized spurs from the ventral plate. The sejugal apodemata are also connected by a faintly chitinized transverse band. Apodemata III are very short. A discidium is present. The circumpedal ridge reaches Apodemata II. Epimere I is striated. The genital field is as broad as the anal field, but shorter. There are six pairs of genital hairs, all of which are situated at a short distance from the lateral border and directed medially. They are strong and barbed, as is the case with all the hairs of the ventral side. The aggenital hairs are long. The adanal hairs have an unusual position, all being arranged in a row along the lateral side of the anal field. They are directed medially, which is also the case with the anal hairs. Iad is located near the latero-anterior border of the anal field. All legs have very long, thin, and barbed hairs. There are no spines and no teeth anywhere. Tarsi I–III have a long, slightly curved sickle-shaped claw, which sit on the end of a long thin stalk against which the claw can be bent, so that the two parts together serve as a kind of a nipper. This has probably something to do with the mite's habitat being birds' nests, and with the mite's possible more or less parasitic way of living. Tarsus IV, fig. 30c, besides the normal claw has a long, thin outer claw. Fig. 30 d shows Tibia and Tarsus I.

Arthur's Pass: Four specimens in *Gerygone igata* nest (C. Mitchell, B.P. Bishop Museum, Honolulu coll.).

Anellozetes longicaulis n. sp.; fig. 31.
Colour light brown, deepest brown on the propodosoma and across the hysterosoma. Length about 0.37 mm.

Anellozetes is characterized by having a ring round the rostrum (see Hammer 1962 b, fig. 14). In a lateral view it can be seen that the "ring" is not closed and that the plate, which lies round the lateral side of the rostrum, ends on the dorsal surface in a tip, from which proceed two faint lines, one in direction towards the translamella, the other running transversally across the rostrum, thus forming in front of the lamellae two tips connected by a transverse line. The different species of *Anellozetes* are very difficult to distinguish except by very careful study. They are very much alike, only the differences will therefore be mentioned. Their distribution within New Zealand is for the same reason difficult to tell, as I cannot examine every specimen found.

A. longicaulis differs from *A. muscicola* only in a few characters. It is a trifle smaller (*A. muscicola* 0.40 mm). The distance between the lamellae is longer, and the pseudostigmatic organ has a much smaller head, and especially a long and thin stalk, which is several times longer than the head (hence the specific name). The stalk is straight, bent outwards and backwards, then upwards and forwards. In *A. muscicola* the head is not much longer than the stalk. No notogastral hairs can be seen, not even all the hair pores. The pteromorphae are not so distinctly striped as those of *A. muscicola*. There are two light "fields" on the pteromorphae, viz. one behind the anterior margin, the other in the posterior part of the pteromorpha, separated by a greyish-yellow middle field from where the stripes radiate. All legs have three claws, viz. a strong middle one and two thin, lateral ones.

Rotorua: One specimen in wet moss on a stone in a pond with gold fish.

Lake Rotoiti: Two specimens in moist moss on a dead trunk in *Nothofagus* forest.

Hokitika: One individual in liverworts and moss on a river bank, under trees.

Fox Glacier: Three individuals in moist moss and grass; one in grass, *Cares, Ranunculus,* and moss, all taken at the roadside.

Anellozetes intermedius n. sp.; fig. 32.

Colour light brown-brown. Length about 0.37 mm.

A. intermedius can be recognised by its thin and short interlamellar hairs. In a dorsal view they often appear shorter due to their erect position. Sometimes they are only half as long as their mutual distance. The light fields in the pteromorphae stand out more distinctly than in the preceding species, probably due to a slightly darker colour of the surroundings. Fig. 32a shows the pseudostigmatic organ. Fig. 32b shows the ventral side. All legs are tridactylous with a strong middle claw and two very thin lateral ones.

Keri-Keri: One specimen on a river in a cleft (Stagaard coll.); several in wet moss on a stone in a river; several also in moss and lichens on a tree, about one metre from a stream.

Moerewa south of Keri-Keri: many individuals on the walk of a freezing house and on a water pipe (Stagaard coll.).

Rotorua: Five individuals in wet moss on a stone in a pond with gold fish, Whakarewarewa.

Waitomo: A few in moss on a trunk.

Lake Rotoiti: One specimen in moss on the ground in *Nothofagus forest.*

Christchurch: Four specimens in moist moss and low plants on a slope with oozing water.

Fox Glacier: Two specimens in thick liverworts and dead leaves on the ground in native forest.

Anellozetes luteus n. sp.; fig. 33.

Colour yellow. Length about 0.32 mm.

A. luteus is the smallest one of the three species found in New Zealand. Its smaller size and its lighter colour are in reality the two best characters to distinguish it from the two preceding species. The lamellar hairs are short and do not reach the tip of the rostrum. In *A. intermedius* the lamellar hairs just reach the tip of the rostrum and in *A. longicaulis* they project with half their length beyond the tip of the rostrum. Interlamellar hairs are absent, or so small that I am unable to see them. The pseudostigmatic organ is perhaps a little shorter than that of *A. intermedius.* The anterior light field of the pteromorpha does not stand out so distinctly as in *A. intermedius* due to the yellow colour. All legs are tridactylous with a strong middle claw and two very thin lateral claws. The hysterosoma is a little more slender than in the two preceding species.

Keri-Keri: Found together with *A. intermedius* by a river (Stagaard coll.), and in moss and lichens on a tree.

Waitakere: Two specimens in liverworts and moss on a trunk in native forest.

Rotorua: Two specimens together with *A. longicaulis* and *A. intermedius* in moss on a stone in a pond, Whakarewarewa.

Waitomo: Several individuals in liverworts, moss, and dead leaves in a tree-fern forest in a deep cleft, and together with *A. intermedius* in moss on a trunk.

Fox Glacier: One specimen in moss and dead leaves in native forest; a few in moss on a dead trunk.

Campbellobates has been established by WALLWORK (Pacific Insects Monograph 7, 1964b. Type species: *Campbellobates acanthus* Wallwork).

Campbellobates latohumeralis n. sp.; fig. 34.

Colour light brown. Length about 0.28 mm.

Across the pteromorphae this species is unusually broad. In the middle of the hysterosoma it is narrow, then again broad, so that the hysterosoma more or less gets the shape of an hour-glass. The propodosoma is extremely narrow with parallel lateral sides. The rostrum is rounded and has two short incisions, which divide the rostrum into three parts, viz. a broad rounded middle part and on either side of that a pointed lateral part. The rostral hairs, which are smooth and inserted on the lateral sides, are situated on the end of a narrow ridge, the tutorium, fig. 34a. Along the tutorium there is a trim of secretion, which widens distally and forms a transverse belt of secretion situated between the rostral and the lamellar hairs. The lamellae are very narrow costulae, almost parallel and situated near the lateral side of the propodosoma. The lamellar hairs are thin, smooth, and about as long as the rostral hairs. The interlamellar hairs, which are situated in the corner between the lamella and the anterior border of the hysterosoma, are twice as long, and smooth. The exopseudostigmatic hair cannot be seen, although there is a small pore. The pseudostigmata are completely hidden far behind the anterior margin of the hysterosoma. The pseudostigmatic organs are clavate, broadest distally, and reach almost half the length of the head beyond the anterior margin of the hysterosoma. The exposed part of the head is partly hidden below a triangular plate, which projects under the anterior border of the hysterosoma and reaches a short distance beyond the base of the interlamellar hair. Also in a lateral view this triangular plate, which is attached to the pseudostigma, can be seen, fig. 34a.

The anterior border of the hysterosoma is one long slightly convex line without showing a transition to the pteromorphae. The latter are very broad and not moveable. There are ten pairs of notogastral hairs, which are inserted beside their pore. They are black, light proximally, and moderately long and thick. Sacculi are present, but very indistinct, and I am unable to see more than Sa and S 1. The lyrifissurae im and ip are long and distinct.

The ventral side, fig. 34 b. Apodemata II, the sejugal apodemata and Apodemata III meet the middle line, where there is a narrow sternal ridge, which goes right up to the camerostome. Apodema II and the sejugal apodema are parallel, directed medially and backwards, whereas Apodema III runs transversally. It is separated from the opposite one by a small plate on the sternal ridge. There is a broad chitinous bridge immediately in front of the genital field with a line running to Acetabulum IV. A faint frame can be seen round the lateral and the posterior border of the genital field. There are three pairs of genital hairs, and a very small pore on the anterior margin. Aggenital hairs are absent. The anal field is a regular oval and it has only one pair of hairs, which are situated in the anterior fourth of the plates. There is no preanal plate. Iad is situated off the anal hair. Ad 3 is located behind iad. Ad 1 and ad 2 are situated behind the anal field, the distance ad 1–ad 1 being only slightly longer than ad 1–ad 2. A faint veil covers the latero-posterior part of the ventral plate. The legs, which are hidden below the broad pteromorphae, are in many ways peculiar. They are rather short. All tarsi are monodactylous. Fig. 34 c shows Leg I (not all hairs are figured). Genu 1 has a thin spine, Tibia I three spines. Tarsus I has dorsally a narrow proximal slit. At the base of the claw there are two short thick brush-shaped hairs, which are slightly bipartite distally; they are black. Fig. 34 d shows Leg III with three strong spines on the tibia, a dorsal slit in the tarsus and two distal brush-shaped hairs. Also Legs II and IV have spines on the tibia. Mandibles are of the normal, chelicere type.

Fox Glacier: Three specimens in moist-wet liverworts on a big trunk in native forest.

Milford: Three individuals in wet liverworts and moss on a rotten branch in *Nothofagus* forest; three in mosses on the ground; five individuals in mosses on a stone.

Campbellobates occultus n. sp.; fig. 35.
Colour yellowish in the anterior half, brownish posteriorly. Length about 0.29 mm.

Although this species in many ways seems to differ from the preceding one they have so many important characters in common that they without any doubt must belong to the same genus. The propodosoma is not so narrow and the hysterosoma not so broad as in *C. latohumeralis*. The lamellae are long and parallel, but to me it looks as if they and the whole propodosoma as far as the lamellar hairs are covered by a large shield issuing together with the triangular plate from the surroundings of the pseudostigmata. A similar curved line in front of the lamellar hairs can be seen also in the preceding species. The rostrum is rounded and the rostral hairs are smooth. The lamellar hairs are also smooth and curly. The interlamellar hairs are dark, though clear proximally, bent, and as long as the rostral hairs, viz. a little shorter than their mutual distance. The triangular plate has a short anterior slit, parallel to the lamella. The pseudostigma and the pseudostigmatic organ are completely hidden by the pteromorpha and the triangular plate (hidden=occultus). The pseudostigmatic organs are slender clubs.

The anterior border of the hysterosoma is slightly convex without showing where the pteromorphae begin. The latter are very long and comparatively narrow, and the hysterosoma is no broader across the pteromorphae than behind them. There are 10 pairs of notogastral hairs, most of them are, however, broken. They are inserted beside the hair pore. The few hairs left are long, smooth, and very thin at the tip. They are clear at the base, otherwise dark. Of sacculi only Sa can be seen. The lyrifissurae im and ip are distinct.

The ventral side, fig. 35 a, differs a little from that of *C. latohumeralis*, as Apodemata III from the two sides do not reach the sternal plate. Only three pairs of genital hairs can be seen, no aggenital hairs. There is one pair of anal hairs and three pairs of adanal hairs, which are situated as in the preceding species. No preanal plate. The legs are monodactylous. All tarsi with two thick brush-shaped bipartite hairs. The Genus and Tibiae have similar strong spines as found in the preceding species.

Fox Glacier: One specimen in luxurious moss on a dead trunk in native forest.

Campbellobates aureus n. sp.; fig. 36.
Colour golden. Length about 0.335 mm.

Although only a skin without hairs and legs of this beautiful mite is present, there are so many characters which are common to the two preceding species, that I establish it within the same genus.

The propodosoma is very narrow as in *C. latohumeralis* and the hysterosoma is very broad, especially across the pteromorphae. The lamellae are long and parallel and seem to be covered by a hyaline plate, the anterior border of which I am unable to see. The triangular plate has the same shape as in *C. occultus* with a medial branch round the base of the interlamellar hair. These two branches form together an indistinct arch in front of the anterior margin of the hysterosoma. The pseudostigmata are not situated so far posteriorly as in the preceding species and the pseudostigmatic organs project with half their length beyond the anterior border of the hysterosoma. The pseudostigmatic organs are short, broad clubs. Below them the thick, spine-shaped exopseudostigmatic hair can be seen. All the notogastral hairs are missing, the hair pores are distinct. The integument of the hysterosoma is beautifully decorated with small yellow dots on the golden ground.

Fig. 36a shows the ventral side, which agrees that with of *C. latohumeralis*. Behind and laterally to the genital field there are a few asymmetric pores, smaller than the hair pores, and I think that none of them represents the aggenital hair pore. From Acetabulum IV strong chitinous folds run obliquely backwards. There are three pairs of genital hairs and a minute anterior pore, one pair of anal hairs, and three pairs of adanal hairs. Ad 3 is situated farther laterally than in the two preceding species. The ventral plate is decorated with small yellow dots. All legs are missing.

Milford: One skin in mosses below ferns in shadow near the beach.

Punctoribates punctum (C. L. Koch); fig. 37.
Length about 0.36 mm.

Keri-Keri: Many individuals in moss on a lawn, and in moss and grass at the road-side.

Waitakere: Several specimens in moss and grass under bushes in a garden.

Nelson: A few in moss and grass on a lawn.

Punctoribates manzanoensis Ham.; fig. 38.
Length about 0.46 mm.

Keri-Keri: Two specimens in wet moss on a stone in a stream; several specimens in moist to wet moss at the edge of a swamp.

Magnobates n. gen.

Magnobates must be placed within the superfamily Ceratozetoidea, whereas its familiar relationship is uncertain.

Propodosoma and hysterosoma separated. Propodosoma with lamellae, large tutorium. No translamella and no cusps. The pseudostigmatic organs flagella. The cusp halfway hidden below the anterior border of the hysterosoma. The ptermorphae are movable. 10 pairs of notogastral hairs, four pairs of sacculi. The ventral side has a sternal plate; it is strongly chitinized. Four pairs of genital hairs, one pair of aggenital, two pairs of anal, and three pairs of adanal hairs. All tarsi are tridactylous, lateral claws with inner subsidiary tooth.

Magnobates flagellifer n. sp.; fig. 39.
Colour reddish brown. Length about 1.0 mm.

The propodosoma is narrow with slightly inclining lateral sides. The latter are covered by the large tutorium, which reaches the base of the rostral hair, and ends in a blunt tooth. The rostrum is rounded and it has on its dorsal surface a slit with a triangular lobe projecting from the posterior border of the slit. The rostral hairs, which are inserted laterally, are faintly barbed, and are as long as their mutual distance. The lamellae, which are situated far laterally, taper towards the lamellar hairs. They are dark. Their anterior end is not well defined and the lamellae apparently merge in a curve in front of the lamellar hairs without forming a true translamella. The lamellar hairs are very thin, smooth, and approximately as long as their mutual distance. The interlamellar hairs, which are situated near the lamellae at a long mutual distance, are both broken on the only specimen found. They are thin and smooth. The anterior part of the pseudostigmata can be seen in front of the pteromorphae. The pseudostigmatic organs are long, thin, and smooth flagella.

The anterior border of the hysterosoma is arched, the posterior end is rounded. The latero-anterior part of the pteromorphae projects, but not so far anteriorly as the anterior margin does. The pteromorphae are mobile. There are 10 pairs of notogastral hairs, which are situated as shown in fig. 39. The hairs are thin and smooth.

There are four pairs of sacculi. Across the dorsum a row of small light cracks can be seen. Farther posteriorly there are some dark spots.

The ventral side is shown in fig. 39a. It is heavily chitinized, all apodemata being surrounded by trims of dark chitinizations. The epimeres have densely set light spots. Apodemata II and III are short, whereas the sejugal apodemata are long and almost reach the anterior border of the genital field. The latter has four pairs of hairs, i.e. two in the latero-anterior corner and two in the latero-posterior one. The anal field is very long. There are two pairs of anal hairs and three pairs of adanal hairs. Ad 3 is preanal, ad 1 and ad 2 are situated in a big curve behind and laterally to the anal field. The distance ad 1–ad 1 is about twice as long as ad 1–ad 2. A deep furrow almost surrounds the anal field from the posterior end. Farther laterally there are low folds. The circumpedal ridge reaches Tectop. II. It is very difficult to see details of the lateral side of the ventral side, but a discidium is apparently present. All legs are tridactylous, the middle claw being the strongest. The two lateral claws have immediately behind the tip a long inner subsidiary tooth, fig. 39 b. Femur II has distally a short, but very broad ventral keel. Tibia II has distally in front of the solenidion a sharp tooth, fig. 39 b. The solenidion of Tibia II is very short. All the hairs of the legs are long and feathered.

Keri-Keri: One specimen in thin moss on a lawn.

Baloghobates n. gen.

Baloghobates belongs to the superfamily Ceratozetoidea. It has superficially a great similarity to *Edwardzetes*, but deviates in having movable pteromorphae. Propodosoma and hysterosoma are separated by a distinct line. Lamellae with short cusps present. Translamella incomplete, or narrow. Tutorium present. Dorsal surface of the rostrum with an opening. A minute tip on the lateral side of the rostrum. Pseudostigmatic organs clavate. Hysterosoma broad with movable pteromorphae. Four pairs of areae porosae. 9–10 pairs of notogastral hairs. Discidium and circumpedal ridge present. All apodemata short. 6 pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. All tarsi tridactylous. This genus is named after the famous acarologist, Dr. J. Balogh, Budapest.

Baloghobates nudus n. sp.; fig. 40.

Colour light brown. Length about 0.83 mm.

A short distance behind the tip of the rostrum, which is round, there is on either side a tiny tip. Between the tips there is on the dorsal surface a light spot, from the posterior border of which two short dark tips project. They represent the ends of narrow ridges, which are located along the lateral side of the rostrum, fig. 40 and fig. 41 a. The rostral hairs, which are situated on the lateral sides on a level with the lamellar hairs, are curved and densely unilaterally feathered. The lamellae, which are situated rather far laterally, incline a little, tapering towards the short cusps. The translamella is represented by a short ridge on either side, in its middle by an indistinct line. The lamellar hairs are thin, barbed, and about twice as long as their mutual distance. The interlamellar hairs have a longer mutual distance than the lamellar hairs and are as long as the latter. The tutorium has a broad free tip, which reaches beyond the base of the rostral hairs. Ventrally to its free tip it is serrate. The pseudostigmata are hidden by the anterior border of the hysterosoma, and only their anterior tip projects. The pseudostigmatic organs have a rounded, clavate head, which is broadest distally, on a thin short stem.

The anterior border of the hysterosoma is slightly arched. The pteromorphae project distally as far anteriorly as the hysterosoma. Behind the anterior border of the hysterosoma there is a tripartite yellow spot surrounded by brown lines. The pteromorphae are movable. In the middle of the pteromorpha there is a dark middle field from which dark lines radiate. In front of this middle field there is a light field, and a smaller light field near the posterior border of the pteromorpha. The lyrifissure ia can be seen at the base of the middle field. There are four pairs of dark areae porosae. There are probably 10 pairs of notogastral hairs, although p 1 cannot be seen. The pores can be seen only, as the hairs are missing or indiscernible.

The ventral side is shown in fig. 40a. Apodemata II and the sejugal apodemata are short and parallel, Apodemata III much shorter. The discidium is broad. A circumpedal ridge runs to Acetabulum I. I cannot tell with certainty the exact appearance of the lateral region. Tectop. I and II are well developed. Tectop. I has a hyaline trim anteriorly. The genital field is comparatively broad. There are 6 pairs of long, barbed genital hairs. Ad 3 is situated at some distance from the middle of the lateral side of the anal field, ad 1 and ad 2 behind the anal field. Ad 1 and ad 2 are bent forwards. Iad is situated between ad 3 and the anal field. The femora have no ventral keel, although a faint tongue-shaped projection can be seen distally on Femur I, fig. 40b. Genus I–II have a distal tooth, fig. 40b–c. Fig. 40c shows Leg II. All tarsi are tridactylous, the claws being almost equally thick, the middle one only slightly stronger than the lateral ones. No subsidiary tooth. All hairs of all legs are strong and feathered. Femora II–III have a medial curly hair, fig. 40 c. The largest part of the medial side of Femora I–II is punctate.

Rotorua: A large number on the green foliage of the low bush vegetation in the Redwood forest at Whakarewarewa.

Tapanui n. of Invercargill: A few individuals on green foliage in the State Forest (Styles coll.). Found in great numbers from samples taken from green foliage in *Pinus radiata* forest, i.e. at Kaingaroa Forest Southeast of Rotorua, at Anzac Park, Palmerston North, and "Treelands", Himitangi in the southern part of the South island, all coll. by Styles.

Baloghobates parvoglobosus n. sp.; fig. 41.
Colour light brown. Length about 1.16 mm.

B. parvoglobosus reminds so much of *B. nudus*, that only a few characters which are characteristic of this species will be mentioned. It is considerably bigger than

B. nudus. The pseudostigmatic organs have minute round clubs on a comparatively long, thin stem. In profile they appear to be longish; see fig. 41a, which shows the propodosoma in a lateral view with the opening behind the tip of the rostrum and the different tips (see under *B. nudus*). Also the exopseudostigmatic hair can be seen. It is rather long. The areae porosae are all big and longish. 10 pairs of notogastral hair pores can be seen. The ventral side is like that of *B. nudus*. All tarsi have three almost equally strong claws.

Arthur's Pass: One specimen in *Nestor notabilis* nest (C. Mitchell, B.P. Bishop Museum, Honolulu coll.).

Zealandobates grandis Ramsay; fig. 42.

Colour mahogany red. Length about 0.78 mm.

Zealandobates has been established by Ramsay, but not published (see Hammer 1966, p. 5).

The rostrum is broadly rounded. The rostral hairs, which are situated far backwards almost at the same level as the lamellar hairs, are thin and finely barbed. The lamellae are broad, their lateral sides converging, ending in the little pronounced cusps. Their medial border is straight proximally. Towards the cusps they bend laterally and meet the lateral border at the lamellar hair. The cusps have a minute medial tooth. The translamella, which is broken in the middle, consists of only an undulating line. The lamellar hairs are as long as their mutual distance and pectinate; they are almost equally thick throughout. The interlamellar hairs, which are situated at a slightly shorter mutual distance than the lamellar hairs, are a little longer than their mutual distance, pectinate and almost equally thick throughout. The pseudostigma projects for most of its length beyond the anterior margin of the hysterosoma. It has a big open collar round the cup. The pseudostigmatic organ is a minute club set with small bristles on a proportionately long stalk. The tutorium is a broad plate with a rounded tip, which projects beyond the cusps. The dorsal surface of the rostrum is finely striped, whereas the space between the lamellae has a meander pattern.

The hysterosoma is as broad as it is long. The anterior border is a low broad arch. The pteromorphae, which are movable, project a good distance beyond the anterior margin of the hysterosoma. They are decorated with a veil of hexagonal secretion cells, which give the whole dorsal surface a delicate pattern. There are 13 pairs of stiff, more or less spine-shaped hairs, which are a little rough or uneven, fig. 42a. They are situated on low apophyses. The anterior hair c 2, is slightly longer than the others. Areae porosae cannot be seen, although there is a faint spot laterally to lp.

Fig. 42b shows the ventral side. All the apodemata are very short and none of them reach the middle line. The sejugal apodema is the longest. The discidium is broad. The circumpedal ridge reaches Acetabulum I. Tectop. I is deeply bowl-shaped with an anterior trim, which covers the base of Leg I ventrally. The genital field is separated from the anal field by a distance twice its length. There are 6 pairs of genital hairs, viz. two on the posterior half of the plates, four on the anterior half, two of them near the anterior border, the two others in the middle line. The anal field is much longer than the genital field. There are two pairs of anal hairs, one at either end. Three pairs of adanal hairs, viz. ad 3 off the middle of the lateral side, ad 1 and ad 2 in a curve behind the anal field. Iad is situated near the latero-anterior corner of the anal field in front of ad 3. The sculpture of the ventral plate consists of low, broken dark lines, which are parallel to the border of the hysterosoma, and of indistinct polygonal cells. All tarsi are tridactylous. The middle claw is only a little stronger than the lateral claws. Fig. 42c shows Genu, Tibia, and Tarsus I. Both the genu and the tibia have a distal, lateral, rough spine. The genu has moreover a distal tooth. Genu II has a smaller spine and a distal tooth. The distance between the solenidia of Tarsus I is very long.

Keri-Keri: Two specimens in moist grass and moss on the ground near a small stream in a deep cleft with tall trees.

"Treelands", Himitangi, west of Palmerston North: Numerous on green foliage (Styles coll.).

Balmoral, north of Christchurch: Many individuals on branches (Styles coll.).

Setobates medius n. sp.; fig. 43.

Colour light brown to brown. Length about 0.61 mm.

As the species within the genus *Setobates* are very much alike and as it is mostly the different size which apparently counts, I have called this medium-sized species *S. medius*, to distinguish it from *S. magnus* Balogh, which is about 1.04 to 1.05 mm long (Balogh 1962, p. 122, figs. 67–69).

The rostrum is short, rounded (in *S. magnus* pointed). The lamellae are situated at some distance from the lateral sides of the propodosoma. They are rather narrow and consist of a thin lamella and a somewhat broader sublamella. A prolamella runs to the rostral hair. The rostral hairs are curved, pectinate, and project with half their length beyond the tip of the rostrum. The lamellar hairs, which are very thin and slightly pectinate, are longer than the lamellae. The interlamellar hairs are also very thin towards the tip and slightly pectinate. They reach beyond the tip of the rostrum. The pseudostigma has on its lateral border a distinct broad tooth. The pseudostigmatic organ is a slender club set with minute bristles in a few longitudinal rows, fig. 43 a. It is geniculate in the middle and directed outwards and backwards.

The anterior margin of the hysterosoma is slightly convex, whereas the anterior border of the pteromorphae is almost straight. The hysterosoma is only a little longer than broad. The outer half of the pteromorphae is yellow, and very finely striped, the inner half is greyish-brown. There are 13 pairs of notogastral hairs, which are arranged as shown in fig. 43. The hairs are very thin and curly. Medially to c 2 there is apparently another hair pore. I am, however, unable to see a hair. There are four pairs of sacculi. In front of and between the hairs, h 1, there are many light spots. The ventral side, which is shown in fig. 43b, agrees with that of *S. magnus* Balogh. The most characteristic feature is that ad 3 are situated immediately in front of the anal field. Also the appearance of the dorsal side of Tarsus I, fig. 43c, agrees with Balogh's fig. 69, showing the same part of the tarsus. All tarsi are tridactylous with a strong middle claw and thin lateral claws. No sculpture can be seen.

Keri-Keri: Several individuals near a river (Stagaard coll.).

Setobates minor n. sp.; fig. 44.

Colour light brown to brown. Length about 0.42 mm.

S. minor can be distinguished from *S. medius* by its smaller size and by a distinct line across the pteromorphae separating the finely striped, greyish-yellowish outer border from the median greyish part. The lamellar and the interlamellar hairs are not so thin as in *S. medius.* They are finely barbed. The pseudostigmata have, as in *S. medius,* a sharp, lateral tooth. The notogastral hairs, which are arranged as shown in fig. 44, are hardly discernible, apparently longest along the posterior border of the hysterosoma or easiest to see there. The distance between the two dorsal rows of hairs is shorter than in *S. medius.* H 2–h 1–h 1–h 2 are situated almost in a transverse line and rather close together. The distance h 1–h 1 is about twice as long as h 1–h 2. Ps 2 is situated almost at the same level as h 1 and h 2.

The ventral sides agrees with that of *S. medius.* Ad 3 is situated immediately in front of the anal field. All tarsi are tridactylous. The dorsal side of Tarsus I has the same appearance as in *S. medius.* There is no sculpture on the integument.

Keri-Keri: Several specimens at Keri-Keri falls (Stagaard coll.).

New Plymouth: Many individuals in moss, grass, and white clover on a lawn shaded by tall trees in a former native forest.

Pauatahanui: Several specimens in bitten-off grass and white clover on the bank of a small stream.

Nelson: One specimen in moss and grass on a lawn.

Setobates discors n. sp.; fig. 45.

Colour light brown. Length about 0.54 mm.

It is with some doubt that I incorporate this species within the genus *Setobates,* although it agrees in almost everything with *Setobates.* It deviates, however, in a very important character, having a tiny hair near the anterior border of the pteromorphae. As I have found only one specimen with this hair, it may be an anomaly. In the same sample there is, moreover, another specimen, which I am unable to distinguish from the one with the hair on the pteromorphae except for lack of this hair.

The rostrum is slightly pointed, ending in a tiny tip. The rostral hairs are thin, bent, and slightly barbed. The lamellar and the interlamellar hairs are thin and finely barbed. They are both about as long as the lamellae. The lamella and the sublamella have not been studied. The pseudostigma has a lateral, rounded tooth. The pseudostigmatic organ is lanceolate, very slender with a few longitudinal rows of minute bristles. The head is about half as long as the stalk.

The hysterosoma is approximately as broad as it is long. The anterior border is slightly convex, the anterior border of the pteromorphae is almost straight. The pteromorphae are very broad and have an incurvation in the middle of their lateral border. A faint line separates the outer finely striped part from the medial part. There are 13 pairs of notogastral hairs. The hairs are very thin and slightly curly. Besides the 13 pairs of notogastral hairs there is a tiny hair near the anterior border of the pteromorphae. It is situated at the end of a long furrow, which runs obliquely backwards. On the right side the hair is missing, the furrow and the hair pore are present. There are four pairs of sacculi. The distance between the hairs, ps 1, is very long as compared with that of the preceding species.

The ventral side agrees in every detail with that of the two preceding species (see fig. 43b), thus ad 3 is situated immediately in front of the anal field. Also the appearance of the dorsal side of Tarsus I is similar to that shown in fig. 43 c. All tarsi are tridactylous with a strong middle claw and faintly developed lateral claws. Femur II has a distal tooth on the ventral keel.

Keri-Keri: Only one specimen in a thin layer of moss and lichens on a tree near a small stream in a cleft, shadowed.

Grandjeanobates novazealandicus n. sp.; fig. 46.
Colour brown. Length about 0.42 mm.

Grandjeanobates has been established by RAMSAY, but no yet published (see HAMMER 1966, p. 5). The type species is *G. australis* from New Zealand. *Grandjeanobates* belongs to the superfamily Oribatuloidea and is near *Scheloribates*.

The propodosoma is very narrow as compared with the hysterosoma. The latter has very long pteromorphae. The rostrum is conical and the lateral sides of the propodosoma are almost parallel. The rostral hairs, which are situated on the lateral sides of the propodosoma, are thin and smooth. They reach by half their length beyond the tip of the rostrum. The lamellae, which are parallel and situated near the lateral sides, consist of a narrow lamella and a broad sublamella. Proximally the lamella is double, fig. 46a. In a dorsal view one gets an impression that the lamella is folded laterally and ventrally covering the sublamella. In that way the small fold in front of the pseudostigma can be explained as representing the proximal part of the lamella. The lamellar hairs are very thin, smooth, and a little longer than their mutual distance. The interlamellar hairs are extremely thin, smooth, and slightly longer than their mutual distance. The pseudostigma is hidden immediately behind the anterior border of the hysterosoma. It is covered dorsally by a broad lobe, fig. 46b, which is usually hidden below the pteromorpha. The pseudostigmatic organ is a short club, which just reaches beyond the anterior border of pteromorpha.

The hysterosoma, which is longish with parallel lateral sides, is characterized by having very long and narrow pteromorphae. The anterior border is slightly convex and the anterior border of the pteromorphae almost projects as far anteriorly as the hysterosoma. The pteromorphae, which have a faint incurvation in the middle of their lateral border, are light brown. Their distal part is finely striped. There are 10 pairs of notogastral hairs, which are thin, curly, and moderately long. They are situated as shown in fig. 46. There are four pairs of sacculi.

Fig. 46c shows the ventral side, which has much in common with that of *Scheloribates*. Apodemata II are faintly developed. They are separated by a small plate, which is often divided by a longitudinal furrow. The sejugal apodema and Apodema III almost meet in front of the genital field. There is a very narrow sternal ridge. The epimeres have pale spots. The circumpedal ridge is indistinct. The genital field is very small as compared with the anal field. There are four pairs of genital hairs. The aggenital hairs are situated almost behind the genital field, i.e. rather medially. There are two pairs of anal hairs and three pairs of adanal hairs. Ad 3 is situated immediately in front of the anal field, ad 1 rather laterally behind the lateral side of the anal field, ad 2 at some distance from the lateral side. Iad is located near the latero-anterior corner of the anal field. The anal field almost touches the posterior border of the ventral plate. All tarsi are tridactylous and have a strong claw and two very thin lateral claws. Femur II has a ventral keel with a distal tooth.

G. novazealandicus reminds much of *G. australis* Ramsay. The latter has stronger lateral claws, which apparently have an inner tooth behind the tip of the claw. I cannot see a similar subsidiary tooth in the very thin lateral claws of *G. novazealandicus.*

Waitakere: One specimen in moist moss and dead leaves; a few in liverworts, moss, and small ferns on a dead trunk, all in native forest.

Rotorua: One specimen in liverworts and moss on a slope at Lake Tarawera.

New Plymouth: Sex individuals in moss on a trunk in native forest.

Although it is rather purposeless to describe species of the genus *Scheloribates*, which in most cases cannot be recognised from figures, only by comparison of specimens, it must be done, otherwise one gets an impression that *Scheloribates* has not been found in the material investigated. Stress must be laid on the shape and the size of the body, the exact position of sacculi and of notogastral hairs, the number of claws, etc. In many species a study of the appearance of the ventral side seems to be the best way to distinguish the species in question. Instead of repeating information concerning length, i.e. of the lamellar hairs and the interlamellar hairs, which does not vary much within the many species, I shall in the following let the figures speak for themselves.

Scheloribates crassus n. sp.; fig. 47.
Colour clear brown, except for the border of the pteromorphae, which is yellowish to clear. Length varying from 0.58 mm to 0.98 mm (0.58; 0.60; 0.61; 0.70; 0.78; 0.79; 0.93; 0.98).

The propodosoma is conical anteriorly, whereas the posterior part has parallel sides and is very broad. The lateral sides in front of Leg I are slightly concave. The rostral hairs, which are inserted on the lateral sides of the rostrum on the end of the prolamella, are one and a half times longer than their mutual distance. They project with half their length beyond the tip of the rostrum. They are uneven. The lamellae are located at some distance from the lateral sides of the propodosoma. They appear rather broad. In a lateral view, fig. 47a, it can be seen that they consist of a narrow lamella and a broader sublamella, which meet and merge a short distance behind the lamellar hair. From the base of this hair a narrow prolamella runs to the rostral hair. The lamellar hairs are extremely thick and coarse (= crassus) and about twice as long as their mutual distance. Between the base of the lamellar hairs there is a distinct curved ridge. The interlamellar hairs, which are about twice as long as their mutual distance, are rather thick, but thin as compared with the lamellar hairs. They are uneven. The pseudostigmatic organs are slender clubs, the head set with short bristles. The stalk is rather long, and when stretched out, it almost reaches the lateral border of the pteromorpha.

The hysterosoma is very broad as compared with the propodosoma. Its anterior margin is slightly convex. The anterior margin of the pteromorphae is almost straight. The pteromorphae have a clear to yellowish outer part, the medial border of which is indicated by a broken line. There are 10 pairs of hair pores on the dorsal surface, but tiny hairs can be seen only on the posterior border. There are five pairs of sacculi, S 1 being divided into an anterior and a posterior sacculus. They are all large and distinct, arranged as shown in fig. 47. All tarsi are tridactylous with a strong middle claw and two thin lateral claws. Genus and Femora I–II have medially a thick, bushy hair. Femur II has a ventral keel, which distally ends in a bipartite tooth, fig. 47 a.

The ventral sides is shown in fig. 47b. There are four pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs, all very small. Ad 3 is preanal, and situated at rather a long distance in front of the anal field. Ad 1 and ad 2 are situated more or less off the posterior part of the lateral side of the anal field. The distance ad 1–ad 1 is twice as long as ad 1–ad 2. Most of the hairs of the ventral side are hardly discernible, and not all have been seen.

Found almost everywhere, thus at Keri-Keri, Puketi, Waitakere, New Plymouth, Pauatahanui, Nelson, Upper Takaka, Lake Rotoiti, Dunedin, Fox Glacier, and Milford. It prefers wet and moist localities, i.e. thick wet moss on a stone in a stream, moss and dead leaves on the ground, moss and small ferns on a log, *Scirpus* vegetation near a spring locality, moss on the edge of a swamp, etc.

Scheloribates anzacensis n. sp.; fig. 48.
Colour clear to light brown. Length about 0.86 mm.

The rostrum is pointed. The rostral hairs are thin, barbed, and reach by half their length beyond the tip of the rostrum. The lamellae are brown. The lamellar hairs are thin, slightly barbed, and twice as long as their mutual distance. The interlamellar hairs are also thin, slightly barbed, and considerably longer than the lamellar hairs. The pseudostigmatic organs are very small as compared with the broad pteromorphae. The head is a tiny club set with minute bristles, the stalk is two to three times longer than the head. Laterally the head reaches only the middle of the anterior border of the pteromorpha. The anterior border of the hysterosoma is a little convex, the anterior border of the pteromorphae is concave, and the tips of the pteromorphae project as far anteriorly as the anterior border of the hysterosoma. The posterior half of the hysterosoma is semicircular. The pteromorphae have yellowish to white distal borders; proximally they are ochre-brown. There are 10 pairs of notogastral hair pores, the hairs are absent. The four pairs of sacculi are big and distinct.

Fig. 48 a shows the ventral side. Apodemata II are very short, the sejugal apodemata and Apodemata III of ordinary length for a *Scheloribates*, almost meeting in front of the latero-anterior border of the genital field. The anterior genital hairs are exceptionally long. Ad 3 is situated on the dark frame surrounding the anal field, in front of the latter. Ad 1 and ad 2 are situated behind the anal field, the distance ad 1–ad 1 being much longer than ad 1–ad 2. Tectop. I is broad, yellowish like the distal border of the ptermorphae. All tarsi are tridactylous with a strong middle claw and two faintly developed lateral claws.

Anzac Park, Palmerston North: 31 specimens on the ground (Styles coll.).

Scheloribates pacificus n. sp.; fig. 49.
Colour light brown to brown. Length about 0.53 mm.

The rostrum is conical. The rostral hairs, which are thin, especially towards the tip, barbed, and undulating, reach by half their length beyond the tip of the rostrum. The lamellar hairs, which likewise are very thin towards the tip, but smooth, reach by one third of their length beyond the rostral tip. The interlamellar hairs, which are very thin and smooth, reach beyond the tip of the rostrum. The pseudostigmatic organs are clavate, the head broadest distally. The stalk is short and the pseudostigmatic organs do not reach laterally beyond Tectop. I.

The hysterosoma is broad as compared with the propodosoma. Its anterior border is almost straight. The lateral sides are parallel and the posterior half of the hysterosoma is semicircular. The anterior borders of the pteromorphae withdraw a little and the latero-anterior corner is rounded. The distal or outer borders of the pteromorphae are whitish, the proximal part is light-brown. The outer border is decorated with undulating, short lines, forming low or shallow pits between them. There is no radiating striation. The notogastral hairs are moderately long, slightly curly, and thin towards the tip. The hair pores are much bigger than the hair base and clear. There are four pairs of sacculi.

Fig. 49a shows the ventral side. Apodemata II are longer than those of the preceding species. Ad 3 is situated in front of the anal field close to its anterior border, ad 1 at the latero-posterior corner and ad 2 much farther laterally. All tarsi are tridactylous with a strong middle claw and two thin lateral ones.

Hokitika: Two specimens in luxurious moss and liverworts under trees on the river bank; one specimen in dry moss, grass, and *Medicago* at the roadside.

Scheloribates keriensis n. sp.; fig. 50.

Colour light brown. Length about 0.46 mm.

The rostrum is conical, rounded at the tip. The rostral hairs are barbed and reach by half their length beyond the tip of the rostrum. The lamellar hairs are broken. The interlamellar hairs are rather thick, barbed, and perhaps a little longer than their mutual distance. The pseudostigmatic organs reach beyond the lateral sides of the pteromorphae. They are slender, the head tapering, being drawn out into a long thread, which is set with minute bristles like the head itself (on the left side the tip is broken).

The anterior border of the hysterosoma is slightly convex, the anterior border of the pteromorphae is almost straight. There is a slight depression on the lateral side of the pteromorphae. These have a distal greyish border without any sculpture; the proximal part is light brown. The right pteromorpha in fig. 50 is anomalous, having a distinct hair pore near its anterior margin. The hair is absent. The 10 pairs of notogastral hairs are not discernible, except those on the posterior border. There are four pairs of sacculi.

Fig. 50 a shows the ventral side. Apodemata II are short. The sejugal apodemata and Apodemata III from each side are fused medially, forming a V-shaped figure, which is open laterally. Ad 3 is preanal and is situated within the dark frame surrounding the anal field. Ad 1 and ad 2 are situated behind the anal field with a long distance between the hairs ad 1. All tarsi are monodactylous.

Keri-Keri: One specimen in a thick, wet carpet of small ferns and mosses near a small stream in a deep cleft grown with tall trees.

Scheloribates zealandicus n. sp.; fig. 51.

Colour light brown. Length about 0.37 mm.

The rostrum is broadly rounded. The rostral hairs, which are barbed, project by half their length beyond the tip of the rostrum. The lamellar hairs, which reach by one third of their length beyond the tip of the rostrum, are approximately as long as the lamellae. The interlamellar hairs are shorter, but also barbed. The pseudostigmatic organs have a lanceolate head, which is as long as the stalk and set with minute bristles in longitudinal rows. The head reaches beyond the lateral side of the pteromorpha.

The hysterosoma is longish and has a slightly convex anterior margin. There is rather a deep incurvation between the anterior margin and the latero-anterior tip of the pteromorphae. The latter project almost as far anteriorly as the anterior border of the hysterosoma. The outer or distal borders of the pteromorphae are greyish and finely striated, the proximal part is light brown. The notogastral hairs are extremely small, and most of them have not been seen. There are four pairs of sacculi. The hair ms is situated very close to S 1, r 3 close to S 2, and r 1 immediately in front of S 3. Fig. 51 a shows the ventral side. Apodemata II are short, the sejugal apodemata are longer than Apodemata III. The sternal plate is rather broad. Along the oblique line laterally to Acetabulum IV there are several small light spots. On the ventral plate there is a long oblique line on either side in front of the anal field but more laterally. The adanal hairs are situated as usually, i.e. ad 3 in front of the anal field, ad 1 and ad 2 behind the field with a long distance between the hairs ad 1. All tarsi are tridactylous with a strong middle claw and two faintly developed lateral ones.

Keri-Keri: Several individuals at Bay of Islands (Stagaard coll.).

Lake Rotoiti: One specimen in moist to wet *Sphagnum* at a spring locality in *Nothofagus* forest, many individuals in wet moss and liverworts on a vertical slope above a small stream in *Nothofagus* forest.

Scheloribates conjuges n. sp.; fig. 52.

Colour light brown. Length about 0.41 mm.

The rostrum is conical. The rostral hairs, the lamellar hairs, and the interlamellar hairs are distinctly barbed. The head of the pseudostigmatic organ is slightly thicker than the stem. It is set with minute bristles, which lie down, for which reason the head appears smooth. It ends in a thin tip.

The anterior border of the hysterosoma is slightly arched. As the latero-anterior tip of the pteromorphae project, a rather deep incurvation is formed on either side laterally to the pseudostigma. The hysterosoma is short and rounded. In the middle of the lateral side of the pteromorphae there is a faint incurvation. The distal border of the pteromorphae is greyish, the proximal part is dirt greyish to brown. The notogastral hairs are so short that only a few seen in profile on the posterior border can be seen. There are four pairs of sacculi. Sa is rather big, the others are small and rather indistinct. Most of them are coupled with a hair (hence the specific name). The notogastral hairs are situated asymmetrically on the two sides in fig. 52.

The ventral side is shown in fig. 52a, which does not show any characteristic features, but it is to be hoped that the size and the shape of the reticulation of the epimeres can help in recognizing this species. All tarsi are monodactylous. Tectop. I is slightly obliqued striated.

Keri-Keri: Four specimens in thick moist moss on the ground near a small stream in a deep cleft with tall trees.

Scheloribates aequalis n. sp.; fig. 53.
Colour yellow. Length about 0.40 mm.

S. aequalis reminds so much of the preceding species, that only a few characters will be mentioned. It is a lighter colour. The pseudostigmatic organs are not quite so pointed. The anterior border of the hysterosome proceeds on either side as a line across the pseudostigma and farther laterally, making a bend and disappearing into a deeper level. Sa is long and narrow, S 1–S 3 are small and rounded. The position of the sacculi coupled with a notogastral hair is practically the same as in *S. conjuges*. I can see no difference between the appearance of the ventral side and that of the preceding species. All tarsi have, however, three claws, the middle one of which is the strongest.

Rotorua: Three individuals in dry moss under *Manuka* shrub in the thermal area.

Rostrozetes foveolatus Selln.; fig. 54.
Colour light brown. Length about 0.35 mm.

The specimens investigated agree with the description by Sellnick 1925, p. 84, figs. 6–7, and with that by Beck 1965.

Rotorua: Many individuals in moist moss and small ferns under *Manuka* shrub, and in thick, green, moist mosses also under *Manuka* shrub, both biotopes in the thermal area.

Peloribates fragilis n. sp.; fig. 55.
Colour light brown. Length about 0.51 mm.

The rostrum is broad, conical. The rostral hairs, the lamellar hairs, and the interlamellar hairs are all pectinate, The former just reach beyond the tip of the rostrum, the lamellar hairs reach it by one third of their length and the interlamellar hairs reach not quite so far as the lamellar hairs. The pseudostigmatic organ has, as seen in a dorsal view, an almost circular head on a moderately long stalk. When laid bare, fig. 55a, the head is pear-shaped, broadest distally and set with a few scales in two transverse rows. The stalk is several times longer than the head.

The notogastral hairs are very long and often broken as they are fragile (hence the specific name). They are smooth for most of their length, and proximally very finely barbed. They are undulating and extremely thin towards the tip. They are of different length, l a and h 1 being the longest. These are approximately twice as long as the interlamellar hairs and almost as long as across the hysterosoma.

Rotorua: Three specimens on green foliage below tall redwood trees at Forest Research Institute, Whakarewarewa.

New Plymouth: Four individuals in moss on a dead trunk in native forest.

Arthur's Pass: Five specimens in *Gerygone igata's* nest (C. Mitchell, B. P. Bishop Museum, Honolulu coll.).

Fox Glacier: One specimen in thick moist moss and liverworts on a trunk in native forest.

Peloribates magnisetosus Ramsay; fig. 56.
Colour light brown. Length about 0.42 mm.

P. magnisetosus has been established by Ramsay, but not yet published (see Hammer 1966, p. 5).

The rostrum is conical and very broad (it is probably a little flattened and too broad in fig. 56). The rostral hairs, the lamellar hairs, and the interlamellar hairs are barbed. The rostral hairs are shorter than their mutual distance, the lamellar hairs as long as their mutual distance, and the interlamellar hairs almost as long as their mutual distance. The pseudostigmatic organ has a slender lanceolate head, which is pointed at the tip and set with minute bristles. The stalk is very long, about four times longer than the head.

The hysterosoma is as broad as it is long and almost circular when the pteromorphae are bent ventrally. The notogastral hairs, 14 pairs, are equally thick throughout and faintly barbed. They are not equally long, although the variation in length is not big. The hair, 1a, is shorter and also thinner than the one in front of it, c 2. The hairs, ps 1 are as long as their mutual distance, and most of the notogastral hairs are as long as ps 1. Indistinct sacculi are present.

Keri-Keri: One specimen in a thick, green carpet of wet mosses and small ferns near a brook in a deep cleft, in deep shadow.

Incabates angustus n. sp.; fig. 57.
Colour light brown. Length about 0.35 mm.

Incabates angustus is twice as long as broad across the pteromorphae and much narrower than *I. nudus* Hammer (1961, p. 108, fig. 104).

The rostrum is conical, rounded at the tip. The rostral hairs are thin, slightly barbed and reach by half their length beyond the tip of the rostrum. The lamellar hairs, which are very thin and perhaps extremely finely barbed, are about one and a half times longer than their mutual distance. The lamellae are very long and almost parallel. Their proximal part is erect. The interlamellar hairs, which are situated at some distance from the anterior border of the hysterosoma, are surrounded by a ring. They are also very thin and as long as the lamellar hairs. The pseudostigma has a posterior tip, which projects beyond the anterior border of the hysterosoma. The pseudostigmatic organ has a disk-shaped head on a thin stalk. It is bent backwards and then forwards.

The anterior border of the hysterosoma is arched, reaching beyond the anterior border of the pseudostigmata. The anterior borders of the pteromorphae withdraw a little, forming together with the anterior border of the hysterosoma a broad, almost even arch. The pteromorphae, which are not movable, are narrow and have a distinct longitudinal, curved line from the pseudostigma to about off the hair te. There are 10 pairs of notogastral hairs, but apart from the hair p 1, only the pores can be seen. The hair is thin, hyaline, and therefore hardly discernible. There are four pairs of sacculi. Sa is situated between te and ti, though a little farther anteriorly. S 1 is located at a short distance behind im and near ms. S 2 is situated at a short distance in front of r 2, and S 3 behind r 1. The glands, which usually can be seen along the lateral and the posterior borders of the hysterosoma, are in *Incabates* situated much farther medially.

Fig. 57a shows the ventral side. Apodema II is short and reaches a spur from the faintly developed sternal plate. The sejugal apodema is considerably longer. It reaches a broad plate in front of the genital field. Apodema III is very short. The genital field is narrow and has four pairs of genital hairs. The genital and the anal fields are separate by a long distance, and the anal field is situated close to the posterior end of the ventral plate. Ad 3 is preanal and is situated at a good distance in front of the anterior border of the anal field. Ad 1 is located off the latero-posterior corner of the field and ad 2 off the middle of the lateral side of the anal field. The fissure iad is situated off the anterior anal hair. A discidium is present. The circumpedal ridge reaches Tectop. II. All tarsi are tridactylous with a strong middle claw and faintly developed lateral claws.

Waitakere: One specimen in liverworts and small ferns on a dead trunk in native forest.

New Plymouth: Two individuals in moss on a trunk in native forest.

Subphauloppia n. gen.

The rostrum forms a broad, more or less hyaline lip, on the dorsal surface of which the rostral hairs are situated. The anterior border of the hysterosoma highly arched, reaching halfway between the lamellar and the interlamellar hairs. Lamellae absent. Pseudostigmatic organs situated far behind the anterior border of the hysterosoma. No pteromorphae, no protruding shoulders. 10 pairs of notogastral hairs. Areae porosae present. *Subphauloppia* reminds much of *Phauloppia*, but it deviates by its lack of lamellae and by having only 10 pairs of notogastral hairs (*Phauloppia* 13 pairs).

Subphauloppia dentonyx n. sp.; fig. 58.

Colour dirty to light brown. Length about 0.33–0.37 mm.

The rostrum is very broad, almost semicircular and more or less hyaline. The small indentation in its tip, fig. 58a, cannot be seen in a dorsal view and may be due to slight damage. The rostral hairs, which are situated on the dorsal surface of the rostrum at some distance from the lateral sides and a good distance behind the anterior border, are smooth and almost as long as their mutual distance. They project by only half their length beyond the tip of the rostrum. Lamellae are absent. The lamellar hairs, which are situated almost in the middle of the propodosoma, have a shorter mutual distance than the rostral hairs. They are thicker than the latter, barbed, and a little longer than their mutual distance. The interlamellar hairs are likewise barbed, and as long as their mutual distance. They are situated halfway between the pseudostigma and the anterior point of the hysterosoma. Off the base of the lamellar hair an area porosa lamellaris can be seen, fig. 58 a. The posterior part of the propodosoma is very broad and has almost parallel lateral sides. The dorsal surface of the propodosoma has indistinct and irregularly curved folds or wrinkles.

The anterior border of the hysterosoma is highly arched, the lateral sides forming a right angle, which projects halfway between the lamellar and the interlamellar hairs. The pseudostigmata, which are concealed under the lateral borders, are situated far behind the anterior point of the hysterosoma. The pseudostigmatic organs are short and clavate, broadest distally. The head reaches beyond the lateral border of the hysterosoma. There are 10 pairs of notogastral hairs. They are very thin, and it is extremely difficult to see them. They are in fig. 58 situated asymmetrically on the two sides, also the areae porosae are asymmetrical. In one specimen there are two A 1 on the left side, one A 1 on the right side. In another specimen the opposite is the case. The integument has dense, golden punctures, which can be seen only when the integument is laid bare.

Fig. 58b shows the ventral side. All the apodemata are short and do not by far reach the opposite one in the middle plane. The genital field is rounded and there are four pairs of genital hairs. The aggenital hairs are situated at a good distance behind the genital field. The anal field touches the posterior border of the ventral plate. The fissure iad is located obliquely in front of the anal field, close to the anterior margin. Ad 3 is situated in front of iad, ad 2 off the middle of the lateral side, and ad 1 behind the anal field. All tarsi have three equally strong claws. All the tarsi are very short. Fig. 58 a shows Tibia and Tarsus I (not all the distal hairs of the tarsus are figured). All the claws have a strong, inner subsidiary tooth a short distance behind the tip.

Keri-Keri: One specimen in decaying leaves on a slope down to a small stream, in shadow.

Pauatahanui: One specimen in wet moss and liverworts in a small depression grown with *Scirpus* near a small stream in open forest.

Milford. One individual in wet liverworts on a dead branch in *Nothofagus* forest.

Paraphauloppia n. gen.

Like the preceding genus *Paraphauloppia* has a broad rostrum, but the rostral hairs are situated on the lateral sides. Narrow costulae present. Dorso-sejugal line indistinct and not so strongly arched as in *Subphauloppia*. 10 pairs of notogastral hairs. Areae porosae present. Ventral side with a transverse belt connecting the sejugal apodemata. A faintly developed sternal plate. Circumpedal ridge very distinct. Anal field close to the posterior border of the ventral plate. All tarsi tridactylous.

Paraphauloppia novazealandica n. sp.; fig. 59.

Colour yellowish to light brown. Length about 0.34 mm.

The rostrum is very broad and rounded. The rostral hairs, which are barbed, are situated near the lateral sides. The lamellae are represented by narrow costulae.

They are broken proximally by a short, bent ridge issuing from the pseudostigma and running to the base of the interlamellar hairs. A short distance behind the lamellar hair there is a tiny indentation in the costula. The lamellar hairs are barbed and as long as their mutual distance. They have the same mutual distance as that of the rostral hairs. The interlamellar hairs, which are shorter than the lamellar hairs and barbed, have a longer mutual distance than the lamellar hairs. The pseudostigma is almost entirely exposed, only its posterior part is hidden below the lateral border of the hysterosoma. The pseudostigmatic organ is a round disk on a thin stalk. A tiny exopseudostigmatic hair is present. The area porosa lamellaris can be seen laterally to the lamellar hair.

The hysterosoma is oval, the anterior and the posterior end being a little narrower than the middle. The anterior margin is indistinct. In the latero-anterior border there is a slight incurvation off the pseudostigma. There are 10 pairs of notogastral hairs, which are thin and smooth. There are (?) four pairs of areae porosae. Aa is large, A 2 almost as big, A 1 considerably smaller, and A 3 indistinct, not present with certainty.

Fig. 59a shows the ventral side. Apodemata II are narrow. The sejugal apodema, which is broader, meets the opposite one in a broad, transverse belt. I cannot tell the number of genital hairs; there are probably four, although I have seen only three hair pores. The aggenital hairs are situated rather close to the genital field. Ad 3 is situated at some distance in front of the anal field, ad 2 off the middle of the lateral side, and ad 1 behind the anal field. Iad is located in front of the anal field. All tarsi are tridactylous with a strong middle claw and two faintly developed lateral claws.

Lake Rotoiti: 11 specimens in thick moss and bone-dry lichens and *Lycopodium* in open *Manuka* and *Nothofagus* forest a few hundred feet above lake level.

Crassoribatula n. gen.

Crassoribatula in many ways reminds of *Oribatula*. The lamellae are short, narrow, and inclining. No cusps and no translamella. Anterior border of hysterosoma concave. 10 pairs of notogastral hairs. 4 pairs of areae porosae. No ventro-sejugal ridge. 6 pairs of genital hairs. All tarsi tridactylous, homodactylous. Integument with densely set dark tubercles covered by a secretious veil, which also covers the lateral parts of ventral plate.

Crassoribatula maculosa n. sp.; fig. 60.

Colour brown. Length about 0.64 mm.

The propodosoma is triangular, rather broad; its lateral sides are concave. The rostrum is broad, rounded. On its dorsal surface there is a small light spot. The rostral hairs, which are inserted laterally, reach by half their length beyond the tip of the rostrum, meeting in a big curve. They are densely unilaterally feathered. The lamellae, which are narrow and so short that they reach only one third of the distance to the tip of the rostrum, incline, forming most of an even arch. They proceed for a short distance beyond the base of the lamellar hair. The lamellar hairs are at least twice as long as their mutual distance and densely barbed. The interlamellar hairs are like the lamellar hairs long and barbed. Round their base there is a thick ring, which is situated on a ridge issuing from the pseudostigma, and which proceeds beyond the interlamellar hair as faint lines. The exopseudostigmatic hair is long and barbed. Fig. 60 a shows the propodosoma in a lateral view. The pseudostigma is hidden below the anterior border of the hysterosoma, only its anterior tip projects. The pesudostigmatic organ consists of a round head, which is fully exposed, and rather a short stalk. It is bent backwards and then forwards.

The hysterosoma is a regular oval without protruding shoulders. The anterior border is, however, unusual, being concave. On the posterior border there are two low incurvations medially to p 1. The pteromorphae are very narrow and rounded. The 10 pairs of notogastral hairs are arranged as shown in fig. 60. They are light proximally, but dark for most of their length. They are thick, curved, very thin towards the tip, and moderately long. The hair ti has an unusual position, being placed far laterally and behind Aa. Also ms, r 3, and r 2 are situated far laterally. Aa is long and narrow, sometimes divided into two. A 3 is bigger than A 1 and A 2. The integument is decorated with dark tubercles, which in the dorsal middle form an indistinct irregular pattern.

Fig. 60 b shows the ventral side. There is no sternal plate. Apodemata II and the sejugal apodemata are well developed. The latter do not meet in the sternal middle forming a ventro-sejugal ridge as in *Oribatula*. The genital field is not much smaller than the anal field. There are 6 pairs of long, thin genital hairs. The aggenital hairs are situated in their usual position. The anal field is located at some distance from the posterior border of the ventral plate. There are two pairs of long anal hairs. Ad 3 is preanal and situated rather far laterally. Ad 1 and ad 2 are situated in a broad curve behind the anal field, the distance ad 1–ad 1 being twice as long as ad 1–ad 2. Iad is located off the middle of the lateral side of the anal field. A secretitious veil from the dorsal surface covers the lateral sides of the ventral plate. All legs are strong. Femora I–II have no ventral keel, Genus I–II have no distal tooth, no spines. All hairs of the legs are thick, barbed, and dark. Fig. 60 c shows Tibia and Tarsus I. All tarsi are tridactylous and homodactylous. Mandibles of the normal chelicere type.

Rotorua: One specimen in dead leaves and moss under *Manuka* shrub in the thermal area; one individual on green foliage of the undervegetation in redwood forest, Whakarewarewa.

"Treelands", Himitangi, Palmerton North: One specimen on green foliage (Styles coll.).

Lake Rotoiti: One specimen in moss on a decaying trunk in *Nothofagus* forest.

Zygoribatula connexa (Berl.) (= *Z. striatissima* Hammer (1962 a, fig. 49).
Z. connexa, which is easily recognizable by having a fine striation over the whole dorsal surface of the hysterosoma, has not been figured in this investigation.

Pauatahanui: Two specimens in wet liverworts and mosses under bushes on a river bank; one specimen in liverworts on a vertical slope.

Zygoribatula novazealandica n. sp.; fig. 61.
Colour light brown, darkest across the hysterosoma. Length about 0.52 mm.

In *Z. novazealandica* the rostrum is pointed, ending in a tip as is the case also in *Z. lata* Ham. (1961, fig. 74). The new species is distinct from *Z. lata* by the shape of the lamella, in which there seems to be a deep furrow between the medial and the lateral part of the lamella, by having a short tooth on either side of the base of the lamellar hair, and especially by having a distinct rounded shoulder and small areae porosae.

The lamella is longer and narrower than in *Z. lata* and not so strongly twined. The translamella is also narrower, half of its width being occupied by the posterior thickening. The lamellar and the interlamellar hairs are equally long when laid bare; the rostral hairs are slightly shorter.

The hysterosoma is very broad, and it has a distinct rounded shoulder with a short rough seta, behind which a much thinner hair can be seen. The areae porosae are small, apart from Aa, which is longish, the others are round. There are apparently five pairs, A 2 having a more indistinct pore at some distance in front of it. There are 14 pairs of notogastral hairs, which are smooth and rather short.

Keri-Keri: Several individuals on a slope with plantation (Stagaard coll.).

Ingella n. gen.

Ingella belongs to the superfamily Oribatuloidea, more precisely to those genera without a distinct dorso-sejugal border. viz. *Maculobates*, *Totobates* etc. It has broad costulae without cusps. Rostral, lamellar, and interlalamellar hairs long. Pteromorphae not movable. Areae porosae present. 10 pairs of visible notogastral hairs. No dorsal sculpture. Two pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs, ad 3 being preanal. All tarsi monodactylous. Solenidia of all tibiae and of Genus I–II ending in a knob (bulla). This genus is named after my daughter Inga.

Ingella bullager n. sp.; fig. 62.
Colour yellowish to light brown. Length about 0.42 mm.

The propodosoma is conical with rounded lateral sides. The rostrum is short, broad, and rounded. The rostral hairs, which are situated on the lateral sides, project by about two thirds of their length beyond the tip of the rostrum. They are unilaterally barbed and very thin towards the tip, which is bent. In front of their base a small tip can be seen. The lamellae, which are equally broad throughout, incline a little. The lamellar hairs are about one and a half times longer than their mutual distance, unilaterally barbed, and very thin towards the tip, which also is bent. The interlamellar hairs, which are situated at the end of a short, curved ridge, a prolongation of the pteromorpha, are directed upwards and laterally in a big curve. They are longer than their mutual distance, unilaterally barbed, the tip is thin and bent. The pseudostigmata are completely hidden by the anterior border of the pteromorphae. The pseudostigmatic organ is clavate, the head is almost round, broadest distally, and set with minute bristles. They just reach beyond the anterior border of the pteromorphae. Between the lamellae the integument is faintly wrinkled, forming between the wrinkles shallow light hollows. Fig. 62 a shows the propodosoma in lateral view. From this it can be seen that the pteromorpha reaches the interlamellar hair, from which the interlamellar ridge runs to the lamellar hair. The prolamella reaches beyond the rostral hair as a small tip, which in dorsal view can be seen in front of the base of the rostral hair.

The hysterosoma, which is broadest across its middle, is truncate posteriorly, with two very low incurvations. Its anterior border is indicated only by a different shade in the colour of the integument. The pteromorphae have rounded, protruding shoulders. Their anterior border withdraw, their lateral border is slightly concave behind the shoulder. The pteromorphae are prolonged into a short ridge, which runs to the interlamellar hair. From this ridge several stripes radiate over the anterior part of the pteromorpha. There are 10 pairs of notogastral hairs, which are arranged as shown in fig. 62. They are thin, smooth, and curved. The hair pores are longish. There are four pairs of areae porosae, which are all distinct, Aa being the biggest. In the posterior part of the hysterosoma many light spots can be seen.

Fig. 62b shows the ventral side. The sternal plate, which is faintly chitinized, is narrow between Epimeres I, a broad plate is seen between Epimeres II and the fused Epimeres III–IV. Apodemata II are short and broad, the sejugal apodemata are considerably longer and also narrower. The genital field is small as compared with the large anal field. The latter almost touches the posterior border of the ventral plate. All the hairs of the ventral side are long, thin, and smooth. There are two pairs of genital hairs, one at either end. The aggenital hairs are situated in the usual position. There are three pairs of adanal hairs. Ad 3 is preanal and is situated at a short distance from the latero-anterior corner of the anal field; ad 2 is located off the middle of the lateral side, and ad 1 near the latero-posterior corner of the anal field. Iad is situated off the anterior anal hair. All tarsi are monodactylous. Fig. 62 c shows Leg I. The two solenidia of the tarsus are approximately equally long and end in a knob (in fig. 62a the anterior one is either abnormal or in some way bent below the claw, appearing too short). All the femora are broad and furnished with strong, barbed hairs. The solenidion of Genus I–II likewise end in a knob. I cannot see how many of the distal hairs of Tarsus I end in a knob and whether both the solenidia of Tibia I have a distal knob. Mandibles of the normal type.

Rotorua: One specimen on green foliage of the undervegetation in redwood forest, Whakarewarewa, the Forest Research Institute; two individuals on green foliage in Rotoehu State Forest (Styles coll.).

Waitomo: One specimen in thick moss on a dead trunk, in shadow.

Anzac Park, Palmerston North: Two individuals on the ground (Styles coll.).

Pauatahanui: One individual in thick moss, and low plants on a vertical slope at the roadside; one in wet moss and liverworts in a depression grown with *Scirpus* in native forest.

Hokitika: One individual in thick moss and liverworts on a river bank in shadow.

Protoribates capucinus Berl.
(see WILLMANN 1931, p. 160, fig. 240; HAMMER 1961, p. 108, fig. 103).

Keri-Keri: Numerous in moist to wet luxurious moss on the ground in dense, entangled shrub vegetation.

Liebstadia similis (Mich.).; fig. 63.
Colour light brown. Length about 0.47–0.52 mm.

Although the pteromorphae in fig. 63 are slightly more pronounced and a little more dentate, too, than in the specimens of *L. similis* in my collection from Europe and America, this is probably only a slight variation, as a smaller specimen, fig. 63 a, does not deviate from the typical form. A third specimen, fig. 63 b, from the same sample as the one figured in fig. 63 differs by having a not so strongly pointed rostrum, by its more rounded shape (0.47 mm long), and by the deeper incurvation behind the pteromorphae, which are smooth, not serrate.

On the dorsal surface of the hysterosoma two small pores situated almost between the areae porosae, A 2, can be seen. They are apparently secretory. Similar pores are present also in some specimens of *L. similis* examined by me from Denmark and Alaska.

Pauatahanui: One specimen in grass and white clover on the bank of a small stream.

Hokitika: Two specimens in moss, grass, and *Medicago* at the roadside.

Maculobates-Totobates.

In the oribatid material from New Zealand there is a great number of very similar species belonging to *Maculobates* and *Totobates*, which have appeared to be very difficult to distinguish. Although there is a great difference between the big, broad, and brown *Maculobates longiporosus* Hammer (1962, p. 61, fig. 54) and the small slender, and greyish *Totobates elegans* Hammer (1958, p. 81, fig. 100), it becomes extremely difficult to distinguish between these two genera when both of them are represented by small species and there is any imaginable transition between the two extremes. The main difference is that the pteromorphae of *Totobates* have a distinct curved line, which may indicate hinged pteromorphae. These are often bent steeply ventrally. This line is indistinct in the case of *Maculobates* and the pteromorphae are not bent ventrally and not hinged. This makes *Macubolates* broader. In both genera there is no distinct border between the propodosoma and the hysterosoma. There are three pairs of areae porosae, and there are 10 pairs of notogastral hairs. Lamellae and prolamellae always present, accessory ridge usually present in *Totobates*, lacking or very faintly developed in *Maculobates*. No translamella, no cusps. The ventral sides are almost alike in both genera. There are three pairs of genital hairs and three pairs of adanal hairs; ad 3 is always preanal. One claw.

As the different species within the two genera can be distinguished mainly by their size, their colour, their shape, the position of the notogastral hairs, the position of the hairs close to the sternal line, and a few more details, only a few characters will be mentioned for each species. The figures will show the differences, but a careful study of the position of the hairs is necessary.

Maculobates luteomarginatus n. sp.; fig. 64.
Colour brown with a broad, light brown to yellow, flattened margin surrounding the hysterosoma. The distal part of the pteromorphae is yellowish. Length about 0.65 mm.

The rostrum protrudes like a nose, which can be seen also in a lateral view, fig. 64a. The rostral, the lamellar, and the interlamellar hairs are all rather long and very faintly barbed. The pseudostigmatic organ is clavate. The head, which is as long as the stem, is lanceolate. Only the head is exposed. On the anterior border of the pseudostigmata there is a long tip, which can be seen in front of the anterior border of the pteromorpha. Fig. 64 a shows the lamella, the interlamellar ridge, and the prolamella. The hysterosoma is as broad as it is long. The anterior border of the pteromorphae is withdrawn. The notogastral hairs are moderately long, curved, and smooth. The distances r 1–r 1, r 1–r 2, p 1–p 1, and p 1–p 2 are equally long and in reality rather short as compared with those of the following species. Aa is longish, A 2 and A 3 smaller and round.

Fig. 64 b shows the ventral side. The sternal ridge is lacking anteriorly and very narrow between Epimeres II. In front of the genital field there is a broad plate connecting the sejugal apodemata and continuing obliquely backwards to Acetabulum IV. The genital hairs are long and thin. Discidium, custodium, and circumpedal ridge present.

F o x G l a c i e r: One specimen in thick liverworts and dead leaves on the ground in native forest; many individuals in decaying leaves in native forest.

Maculobates magnus n. sp.; fig. 65.
Colour light brown. The distal part of the pteromorphae yellowish. Length about 0.58 mm.

The tip of the rostrum is very pointed, ending in a small chitinous tip. The head of the pseudostigmatic organ is very narrow, only a few times broader than the thin stalk. Fig. 65a shows the pseudostigma with its long anterior tip. Fig. 65b shows the lamella, the interlamellar ridge, and the prolamella. Parallel to the lamella an indistinct short ridge can be seen, which may represent a rest of the accessory ridge, which usually is present in *Totobates* (Wallwork 1964) (see below sub *Totobates*).

The hysterosoma is as broad as it is long. The anterior border of the pteromorphae do not withdraw as in *M. luteomarginatus*, but run transversally. The notogastral hairs are proportionately shorter than in the preceding species. The distance r 1–r 1 is almost twice as long as p 1–p 1. R 2 is not in line with r 1, but situated farther posteriorly. All areae porosae are equally big. Fig. 65 c shows the ventral side.

Fox Glacier: Four specimens in decaying leaves in native forest on Lake Matheson.

Maculobates vulgaris n. sp.; fig. 66.
Colour yellow-brown. The distal part of the pteromorphae is not much lighter than the proximal part. Length about 0.44 mm.

The lamellar and the interlamellar hairs are very thin and faintly barbed. Both of them are as long as their mutual distance. The head of the pseudostigmatic organ is broad, oval, and set with minute bristles. The anterior border of the pteromorphae is withdrawn. The hysterosoma is a little longer than it is broad. The oblique line across the pteromorphae is probably due to a slight pressure caused by the cover glass. The notogastral hairs are thin and slightly curly. The distance r 1–r 1 is longer than p 1–p 1 and twice as long as r 1–r 2. All areae porosae are the same size. Fig. 66 a shows the propodosoma in a lateral view. The interlamellar ridge is double for some distance, but I cannot tell whether this is a rule.

Fig. 66 b shows the ventral side. The sternal plate is completely lacking anteriorly between Epimeres I. Between Epimeres II it is a broad plate, which connects Apodemata II and the sejugal apodemata.

Rotorua: Several specimens in moss on a lawn at the Forest Research Institute, Whakarewarewa.

Pauatahanui: Many individuals in moist decaying leaves; several in wet liverworts and in thin mosses on dead branches in native forest.

Maculobates luteus n. sp.; fig. 67.
Colour light yellow all over the body. Length about 0.43 mm.

The tip of the rostrum is truncate. The rostral hairs, the lamellar hairs, and the interlamellar hairs are very long, extremely thin, and slightly barbed, at least proximally. The pseudostigmatic organ has a broad, rounded head set with short bristles.

The hysterosoma is as broad as it is long, and the anterior border of the pteromorphae, which run transversally for some distance, make the hysterosoma seem almost quadrangular. The notogastral hairs are thin and smooth. The distance r 1–r 1 is long and approximately the same as p 1–p 1. It is twice as long as r 1–r 2. Aa and A 2 are the same size, A 3 is smaller. The distance A 3–A 3 is very long. The lamella, the lamellar ridge, and the prolamella are normal. There is no accessory ridge.

Fig. 67 a shows the ventral side. The hairs of the ventral side are very long and thin.

Waitomo: Several specimens in thick moss and liverworts on a trunk in native forest.

Maculobates longus n. sp.; fig. 68.
Colour light brown. Length about 0.33 mm.

The tip of the rostrum is truncate. The rostral hairs, the lamellar hairs, and the interlamellar hairs are longer than their respective mutual distance. The head of the pseudostigmatic organ is broad, clavate, and set with minute bristles. There is no accessory ridge.

The hysterosoma is one and a half times longer than broad and has parallel lateral sides. The anterior borders of the pteromorphae run transversally, forming broad shoulders. The distal part of the pteromorphae, bordered medially by an indistinct line, is short, triangular, and slightly greyish. The notogastral hairs are short, thin, and slightly curly. Characteristic of this species is the rather short distance r 1–r 1, which is approximately the same as r 1–p 1 and p 1–p 1. A 3 is situated halfway between r 1 and p 1. Aa is bigger than A 2 and A 3, the two latter of which are the same size. The ventral side does not show any characteristic feature.

Hokitika: One specimen in thick moss and liverworts under trees on the river bank.

Milford: One specimen in thick moss on dead branches in tree-fern forest; one in thick moss, white clover, and grass at the roadside.

Maculobates longipilosus n. sp.; fig. 69.
Colour light brown, the distal part of the pteromorphae yellow-greyish. Length about 0.38 mm.

The tip of the rostrum is truncate. The lamellar hairs are long, curly, and extremely thin towards the tip. They are distinctly barbed proximally. Also the interlamellar hairs are very long and thin. The pseudostigmatic organ has a rounded head, only the distal part of which is exposed. Fig. 69 a shows the lateral side of the propodosoma with the lamella, the interlamellar ridge, and the prolamella. There is no accessory ridge. The hysterosoma is longer than broad. The anterior borders of the pteromorphae are sloping, distally almost transverse. The notogastral hairs are very long, curly, and thin. R 1 is only half as long as the others. The distance r 1–r 1 is a little longer than p 1–p 1. The latter is almost twice as long as p 1–p 2. Aa and A 2 are the same size, A 3 is smaller.

Fig. 69b shows the ventral side. The sternal plate is hardly developed. The hairs of the ventral side are very long. An 1 is situated close to the anterior border of the anal plate.

Keri-Keri: One specimen by a river in a steep cleft (Stagaard coll.).

Rotorua: One specimen in a thick layer of a little moist moss or ?liverworts under *Manuka* shrub in the thermal area.

Maculobates minor n. sp.; fig. 70.

Colour yellow. Length about 0.29–0.32 mm.

This species bears a great similarity to *M. longus*; it is, however, broader and shorter. The distance between the lamellae is longer. The pseudostigmatic organs have broad, round clubs. Fig. 70a shows the propodosoma in lateral view. It is built like other *Maculobates* species and has no accessory ridge. The anterior borders of the pteromorphae run transversally and form broad shoulders. The distal part of the pteromorphae is greyish. It is, however, easily recognisable by having r 1, A 3, and ip close together in a line. In some specimens ip cuts into the posterior margin, leaving a deep incision. The distance r 1–p 1 is short. Fig. 70 b shows the ventral side. As it is very faintly chitinized, hairs could not be seen,—if they are present at all, nor all the hair pores.

Puketi: One specimen in moss on a *Rimu* tree.

Waitomo: One specimen in ?liverworts under a tree-fern in deep shadow.

Pauatahanui: One specimen in moss and liverworts in a depression with *Scirpus* in native forest.

Pu Pu Springs: One individual in almost dry moss under *Manuka* shrub.

Fox Glacier: One specimen in thick moss and liverworts on a trunk in native forest.

Milford: One specimen in moist to wet moss on a rotten branch in *Nothofagus* forest; one in wet moss on the ground in the same locality.

? *Maculobates acutissimus* n. sp.; fig. 71.

Colour light brown to brown. Length about 0.67 mm.

For the present I place this species within the genus *Maculobates*, although it deviates in some respect from the species belonging to *Maculobates* mentioned above. This will be evident from the description.

The rostrum is very pointed (hence the specific name). The rostral hairs are short and do not reach much beyond the tip of the rostrum. The lamella can be seen best in lateral view, fig. 71a. Below the lamella there is an asseccory ridge, which usually is not present in *Maculobates*. It does not reach the prolamella. The interlamellar ridge is represented by a short anterior ridge, which does not reach the interlamellar hair. The lamellar hair is very short and thin. The interlamellar hair is perhaps slightly stronger. The pseudostigmatic organ is a short club, which is broadest distally, sitting on a thin stalk. Only the distal half of the head is exposed. Tectop. I is well developed, ending in a tip, which can be seen best in ventral view. There is apparently no line between the propodosoma and the hysterosoma, and the anterior border of the pteromorphae does not reach the interlamellar hairs, as is otherwise the case in *Maculobates* species.

The hysterosoma is broad due to the very broad pteromorphae. These are not movable. From their latero-anterior edge a faint keel seems to run to their posterior border, laterally to which the border of the pteromorpha is bent ventrally. The pteromorphae are light brown all over and there is no line separating a distal lighter part from a proximal darker part as in other species within the genus *Maculobates*. Behind the latero-anterior edge of the pteromorphae there is a deep incurvation in their lateral side. There are 10 pairs of notogastral hairs, which are thin, curly, and smooth. There are three pairs of big, distinct areae porosae.

Fig. 71 b shows the ventral side, which does not deviate much from that of other *Maculobates* species. The lyrifissure iad is situated near the lateral side of the anal field. It is rather long and bent. The eggs, of which one specimen contained eight, are unusually long and narrow. All the femora have a broad keel. The tarsi are bilaterally flattened with two rows of dorsal, chitinous keels between which the claw can be reflected. All tarsi are monodactylous. The solenidia of Tarsus II are situated very close together far from the proximal part of the tarsus; no hairs proximally to them. Tarsus II has a dorsal slit proximally. Solenidion 2 of Tarsus I is located on the tip of a rather long, pointed projection.

Arthur's Pass: Two specimens in nest of *Nestor notabilis* (C. Mitchel, B.P. Bishop Museum, Honolulu coll.).

Totobates ovalis n. sp.; fig. 72.

Colour light brown. Length about 0.35–0.38 mm.

The rostrum ends in a small pointed chitinous tip. The rostral hairs, the lamellar hairs, and the interlamellar hairs are very thin and ?smooth. The pseudostigmatic organ has a small pear-shaped head, which is broadest across the middle. Fig. 72a shows part of the propodosoma in lateral view. There is a narrow but distinct accessory ridge (ar), which almost reaches the prolamella (prl). Within the distinct line across the pteromorphae the hysterosoma is a regular oval. The distal part of the pteromorphae is a slightly lighter colour than the notogaster. There are 10 pairs of notogastral hairs, which are thin, smooth, and curly. R 1 seems to be shorter and thinner than the others. The distance r 1–r 1 is approximately twice as long as p 1–p 1. The latter is as long as r 1–r 2. Aa is a little bigger than A 2 and A 3.

Fig. 72b shows the ventral side. The sternal plate is very narrow between Epimeres I, broader between Epimeres II. There is a broad, dark ring round the genital field.

Found at Keri-Keri, Waitakere, Rotorua, Waitomo, New Plymouth, Pauatahanui, Upper Takaka, Fox Glacier, Lake Matheson, and Milford, always in small numbers. Its habitat is moss and liverworts on the ground, on trunks, dead leaves, usually in native forest.

Totobates latus n. sp.; fig. 73.

Colour yellowish to light brown. Length about 0.34 mm.

The rostrum is pointed. The rostral hairs, the lamellar hairs, and the interlamellar hairs are very thin, smooth, and the same length, about as long as the mutual distance of the rostral hairs. The head of the pseudostigmatic organ is pear-shaped and fully exposed. The lamellae are bent a little about one third from their distal end. There is a long accessory ridge as in *T. ovalis* (see fig. 72 a), which almost reaches the prolamella. The anterior borders of the pteromorphae withdraw for their whole length, forming no projecting shoulders, although the latero-anterior margin of the pteromorphae bending ventrally forms a small sharp edge. The pteromorphae are bent ventrally along the distinct curved line across them.

The hysterosoma is comparatively broad and its shape, with the long, sloping shoulders, is the most characteristic feature of this species. The distance r 1–r 1 is a little longer than p 1–p 1 and as long as r 1–p 1. Aa and A 2 are slightly bigger than A 3.

Waitakere: 8 specimens in liverworts and moss on a log in native forest.

Lake Rotoiti: A few individuals in moist to wet *Sphagnum* in a spring locality in *Nothofagus* forest.

Fox Glacier: Many in decaying leaves and small ferns on the ground in native forest; one in thick moss by Lake Matheson.

Milford: A few specimens in liverworts on a dead branch in *Nothofagus* forest.

Totobates antarcticus Wallwork (= *Liebstadia uniova* Ramsay; see Hammer 1966, p. 5); fig. 74.
Colour yellowish to light brown. Length about 0.33 mm.

The rostrum is truncate. The rostral hairs, the lamellar hairs, and the interlamellar hairs are thin, smooth, and short. The asseccory ridge is distinct, fig. 74 a. The head of the pseudostigmatic organ is rounded and shorter than in the preceding species. The species is recognizable by the shape of the hysterosoma, where only the small edge of the latero-anterior borders of the pteromorphae break the regular longish oval. The areae porosae are small. The distance r 1–r 1 is a little longer than p 1–p 1 and equal to r 1–r 2. Fig. 74 b shows the ventral side.

This species has been very well described by Wallwork, 1964a, under the name of *T. elegans* (Hammer) ssp. *antarcticus* n. ssp. from Campbell Island. Dr. Wallwork kindly sent me specimens from Campbell Island for comparison with *T. elegans*, and it appeared that *Totobates elegans* ssp. antarcticus has nothing to do with *T. elegans*, but is a good species, the name of which must be *T. antarcticus* Wallwork.

Found at Keri-Keri, Waitakere, New Plymouth, Pauatahanui, Lake Rotoiti, Fox Glacier, and Milford: in mosses and lichens on a tree, in liverworts, in decaying leaves, etc., usually in *Nothofagus* forest. It is often found in great numbers, i.e. in moss on a dead trunk at Fox Glacier, National Park.

Totobates minimus n. sp.; fig. 75.
Lighter of colour than all the preceding species. Length about 0.29 mm.

The tip of the rostrum is truncate. The rostral hairs, the lamellar hairs, and the interlamellar hairs are short and thin, the rostral hairs being the longest. The accessory ridge, fig. 75 a, is shorter than that of *T. antarcticus*. This species most of all resembles

T. antarcticus, but can be distinguished by being broader across the shoulders and by its much shorter hysterosoma. Its great width can be seen especially by a study of the ventral side as compared with that of *T. antarcticus*. The hairs 1 a from the two sides are situated with a long mutual distance as compared with those of *T. antarcticus*. *T. minimus* may be a variety of *T. antarcticus*.

Found at Fox Glacier in thick moss at the foot of a giant tree; in decaying leaves; in moss on trunks, etc., all in native forest; by Lake Matheson in thick moss.

Totobates macroonyx n. sp.; fig. 76.
Colour yellowish to light brown. Length about 0.38 mm.

The tip of the rostrum is truncate. The rostral hairs, the lamellar hairs, and the interlamellar hairs are very thin, long, and all of them longer than their respective mutual distance. An accessory ridge is not present, but there is an indistinct line, which may represent the accessory ridge, fig. 76a. The pseudostigmatic organ has a comparatively small and narrow head.

The hysterosoma is as broad as it is long. The anterior borders of the pteromorphae withdraw for their whole length. The distal part of the pteromorphae is yellowish-grey and has finely radiating stripes. The notogastral hairs are slightly curly. The distance r 1–r 1 is longer than p 1–p 1, and almost twice as long as r 1–r 2.

Fig. 76 b shows the ventral side. The four hairs, 2 a and 3 a from the two sides are situated in a transverse line in front of the genital field. The most characteristic feature of this species is the very long and slender claw of all tarsi. The claw of Tarsus II is almost as long as the tarsus, fig. 76c.

Lake Rotoiti: Numerous in dripping wet moss in oozing water (a spring?) in *Nothofagus* forest.

Totobates communis n. sp.; fig. 77.
Colour yellowish to light brown. Length about 0.35 mm.

The tip of the rostrum is truncate. The rostral hairs, the lamellar hairs, and the interlamellar hairs are thin and moderately long, i.e. considerably longer than those of *T. latus*. The pseudostigmatic organ has a short head, which is equally broad throughout. A distinct accessory ridge is not present, but it may be represented by an indistinct line which can be seen ventrally to the lamella, widening towards the prolamella, fig. 77a.

The hysterosoma is almost as broad as it is long. The anterior borders of the pteromorphae run transversally for most of their length. The notogastral hairs are thin and smooth. The distance r 1–r 1 is equal to p 1–p 1 and longer than r 1–r 2. Characteristic of the ventral side, fig. 77b, is the position of 2 a and 3 a from the two sides, being situated almost in a longitudunal line in the middle of the sternal plate. The hairs 1 a are situated rather close together.

Waitakere: One specimen in moss and liverworts in native forest.

Waitomo: One individual in decaying leaves under trees at the roadside.

Lake Rotoiti: Several individuals in thick moss with bone-dry lichens and *Lycopodium* in open *Manuka* shrub and *Nothofagus* forest a few hundred feet above lake level.

Angullozetes n. gen.

Angullozetes is closely related to *Maculobates* and *Totobates* and apparently belongs to the family Haplozetidae under the superfamily Oribatuloidea. The following characters may serve to define the genus. No distinct border between the propodosoma and the hysterosoma. Poronotic. True ventrally curving pteromorphae, which do not seem to be movable. Lamellae and sublamellae present. No prolamella and no interlamellar ridge. No translamella and no cusps. No tutorium. 10 pairs of notogastral hairs. Sternal plate broad. Discidium, custodium, and circumpedal ridge present. Three pairs of genital hairs, one pair of aggenital hairs, two pairs of anal hairs, and three pairs of adanal hairs. Ad 3 preanal. All tarsi monodactylous.

Angullozetes rostratus n. sp.; fig. 78.

Colour light brown. Length about 0.36 mm.

Both the propodosoma and the hysterosoma are angular (hence the generic name). The propodosoma is comparatively narrow with rounded lateral sides. The rostrum is protruding and well defined, as can be seen best when it is laid bare. Fig. 78 a shows a dorsal view of the right side of the propodosoma as seen from inside. On the dorsal side of the rostrum there is a slit, a short distance behind which the minute rostral hairs can be seen. A broad dark band runs from the rostrum to Acetabulum I. This band can be seen also in lateral view, fig. 78b. The lamellae, which are situated far laterally, are curved and taper towards the tip. The lamellar hair is situated near the lamellar tip. It is as minute as the rostral and the interlamellar hair. Below the lamella there is a strong accessory ridge, which distally runs parallel to the distal part of the lamella. In fig. 78a it has another direction, which may be due to a damaging fracture along the broken line and the preparation being slightly flattened out. There is no interlamellar ridge between the interlamellar hair and the lamellar hair, and no prolamella from the lamellar hair to the rostral hair. The pseudostigmatic organ is set in a deep cup far below the anterior border of the pteromorpha. It has a spherical head on a very long, thin stem and only the head is exposed.

The hysterosoma is angular and its anterior half is broader than the posterior half. The pteromorphae are broad, but only a narrow distal part is bent ventrally. Their anterior borders withdraw, forming a long sloping line continuing into the lateral side of the pteromorphae. There are 10 pairs of notogastral hairs, which are so minute, that only those seen in profile can be discerned. The hair pores are distinct. There are three pairs of areae porosae situated as in *Totobates* and *Maculobates*; all are approximately the same size.

Fig. 78c shows the ventral side, which in most details agrees with that of *Totobates* and *Maculobates*. A short discidium is present. The circumpedal ridge joins the anterior part of the discidium and forms a custodial ridge. The sternal plate is broad, but faintly chitinized. There are three pairs of genital hairs, viz. one on the anterior margin, and two in the posterior half of the plates. Ad 3 is situated in front of the anal field, as is the case also in *Totobates* and *Maculobates*. The positions of ad 1, ad 2, and iad are the same as in the two preceding genera. Behind the anal field and halfway surrounding its posterior end there is a fold or wrinkle. All tarsi are monodactylous. There are no secondary teeth. A broad ventral keel is developed on all femora. The tarsi of all legs are bilaterally flattened and the claw, when bent backwards, rests between two rows of hairs. Tibia II has a short distal tooth. Tarsi I–II have a proximal dorsal slit.

Fox Glacier: A few specimens in thick mosses and decaying leaves in native forest; numerous in dead leaves on the ground.

Milford: Several specimens in dead leaves in *Nothofagus* forest; one in wet moss on a rotten branch.

Andacarus ligamentifer n. sp.; fig. 79.

Colour white-yellowish. Length about 0.39 mm.

The rostrum is narrow, rounded, and is situated at a much lower level than the posterior part of the propodosoma. The rostral hairs, which are greyish and not feathered as the lamellar hairs, are rather thin. The lamellar hairs are thick, feathered, black, and at least twice as long as their mutual distance. The interlamellar hairs, which in fig. 79 are more or less erect, in other specimens reach beyond the base of c 1. The quadrangle between the interlamellar hairs is drawn out into short tips in all four corners. On its posterior border an indistinct pattern like that within the quadrangle can be seen. The posterior exopseudostigmatic hair is longer than the lamellar hair, but not so long as the hair cp. The anterior exopseudostigmatic hair is a short, stiff seta. The pseudostigmatic organ is very long and tape-shaped.

The integument of the hysterosoma has no sculpture. It is whitish, and the sclerites are often so faintly chitinized that they cannot be seen. C 2 and c 3 are very short, much shorter than f 1. In fig. 79 c 1 is erect, but when stretched backwards it reaches beyond the base of d 1. The latter is thinner than d 2. In some specimens it is as thick as d 2 and reaches beyond the base of e 1. E 1 is undulating. The ventral side has not been studied. The female contains from two to four eggs.

Found at Waitakere, Rotorua, Waitomo, Lake Rotoiti, Fox Glacier, Lake Matheson, and at Milford. It has usually been found singly or in small numbers, i.e. three specimens in rather dry mosses under *Manuka* shrub at Waitakere; 9 individuals in low plants under *Manuka* shrub in the thermal area, Rotorua; by Lake Rotoiti one specimen in thick moss and bone-dry lichens and *Lycopodium* in open *Manuka-Nothofagus* forest; at Fox Glacier and Milford in mosses and liverworts on dead branches and in dead leaves.

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Explanation of the Figures on Plates I–XL

Fig. 1. *Tikizetes spinifer* n. gen. n. sp.
– 1 a. — — ventral side.
– 1 b. — — Leg I.
– 1 c. — — Leg IV.
– 1 d. — — mandible.
– 2. *Pseudoceratoppia sexsetosa* n. gen. n. sp.
– 2 a. — — propodosoma in lateral view. (Shows erroneously *P. microsetosa*).
– 2 b. — ventral side.
– 3. — *microsetosa* n. sp.
– 4. — *asetosa* n. sp.
– 4 a. — — ventral side.
– 5. — *clavasetosa* n. sp.
– 5 a. — — Genu, Tibia and Tarsus I.
– 6. — *diversa* n. sp.
– 7. *Tectocepheus velatus* (*Mich*). *v. sarekensis* Trägårdh.
– 8. — — — *v. minor* Berl.
– 9. — — — *v. novus* n. var.
– 10. *Lamellobates palustris* Ham.
– 11. *Parahypozetes grandis* n. gen. n. sp.
– 11 a. — — ventral side.
– 11 b. — — genital hair.
– 11 c. — — Leg I.
– 11 d. — — Leg II.
– 12. — *bidentatus* n. sp.
– 12 a. — — tip of pseudostigmatic organ full face.
– 13. — *quadridentatus* n. sp.
– 14. — *furcatus* n. sp.
– 15. — *lobatus* n. sp.
– 16. — *giganteus* n. sp.
– 17. — *macrodentatus*.
– 18. — *maximus* n. sp.
– 19. *Edwardzetes novazealandicus* n. sp.
– 19 a. — — Femur and Genu I.
– 19 b. — — Leg II.
– 19 c. — *andicola* Ham. Femur and Genu II.
– 19 d. — *dentifer* Ham. Femur and Genu II.
– 20. *Parafurcobates cuspidatus* n. gen. n. sp.
– 20 a. — — propodosoma in lateral view.
– 20 b. — — ventral side.
– 20 c. — — Genu and Tibia I.
– 20 d. — — palp.

Fig. 21. *Macrogena rudentiger* n. sp.
– 21 a. — — propodosoma in an oblique lateral view.
– 21 b. — — ventral side.
– 21 c. — — Leg I.
– 22. — crassa n. sp.
– 23. *Peduncolozetes minutus* n. sp.
– 23 a. — — tip of pseudostigmatic organ.
– 24. *Tutorozetes termophilus* n. gen. n. sp.
– 24 a. — — propodosoma in a lateral view.
– 24 b. — — ventral side.
– 25. *Magellozetes clathratus* n. sp.
– 26. *Ceratozetes gracilis* (Mich.).
– 27. — *mediocris* Berl.
– 28. — *bicornis* n. sp.
– 29. *Ceratozetes hamobatoides* n. sp.
– 30. *Onychobates nidicola* n. gen. n. sp.
– 30 a. — — propodosoma in lateral view.
– 30 b. — — ventral side.
– 30 c. — — Tibia and Tarsus IV.
– 30 d. — — Tibia and Tarsus I.
– 31. *Anellozetes longicaulis* n. sp.
– 31 a. — — propodosoma in oblique lateral view.
– 32. — *intermedius* n. sp.
– 32 a. — — pseudostigmatic organ.
– 32 b. — — ventral side
– 33. — *luteus* n. sp.
– 34. *Campbellobates latohumeralis* n. sp.
– 34 a. — — propodosoma in lateral view.
– 34 b. — — ventral side
– 34 c. — — Leg I.
– 34 d. — — Leg III.
– 35. — *occultus* n. sp.
– 35 a. — — ventral side.
– 36. — *aureus* n. sp.
– 36 a. — — ventral side.
– 37. *Punctoribates punctum* (C. L. Koch).
– 38. — *manzanoensis* Ham.
– 39. *Magnobates flagellifer* n. gen. n. sp.
– 39 a. — — ventral side.
– 39 b. — — Tibia and Tarsus II.
– 40. *Baloghobates nudus* n. gen. n. sp.
– 40 a. — — ventral side.
– 40 b. — — Femur and Genu I.
– 40 c. — — Leg II.
– 41. — *parvoglobosus* n. sp.
– 41 a. — — propodosoma in lateral view.
– 42. *Zealandobates grandis* Ramsay.
– 42 a. — — hair of hysterosoma.
– 42 b. — — ventral side.
– 42 c. — — Leg I.

Fig. 43. *Setobates medius* n. sp.
– 43a. — — pseudostigmatic organ.
– 43b. — — ventral side.
– 43c. — — dorsal edge of Tarsus I.
– 44. — *minor* n. sp.
– 45. — *discors* n. sp.
– 46. *Granjeanobates novazealandicus* n. sp.
– 46a. — — propodosoma in lateral view.
– 46b. — — pseudostigmatic organ with surroundings.
– 46c. — — ventral side.
– 47. *Scheloribates crassus* n. sp.
– 47a. — — propodosoma in lateral veiw.
– 47b. — — ventral side.
– 48. — *anzacensis* n. sp.
– 48a. — — ventral side.
– 49. — *pacificus* n. sp.
– 49a. — — ventral side.
– 50. — *keriensis* n. sp.
– 50a. — — ventral side.
– 51. — *zealandicus* n. sp.
– 51a. — — ventral side.
– 52. — *conjuges* n. sp.
– 52a. — — ventral side.
– 53. — *aequalis* n. sp.
– 54. *Rostrozetes foveolatus* Sell.
– 55. *Peloribates fragilis* n. sp.
– 55a. — — pseudostigmatic organ.
– 56. — *magnisetosus* Ramsay.
– 57. *Incabates angustus* n. sp.
– 57a. — — ventral side.
– 58. *Subphauloppia dentonyx* n. gen. n. sp.
– 58a. — — propodosoma in lateral view.
– 58b. — — ventral side.
– 58c. — — Tibia and Tarsus I (not all the distal hairs of the tarsus are figured).
– 59. *Paraphauloppia novazealandica* n. gen. n. sp.
– 59a. — — ventral side.
– 60. *Crassoribatula maculosa* n. gen. n. sp.
– 60a. — — propodosoma in lateral view.
– 60b. — — ventral side.
– 60c. — — Tibia and Tarsus I.
– 61. *Zygoribatula novazealandica* n. sp.
– 61a. — — pseudostigmatic organ.
– 62. *Ingella bullager* n. gen. n. sp.
– 62a. — — propodosoma in lateral view.
– 62b. — — ventral side.
– 62c. — — Leg I.
– 63. *Liebstadia similis* (Mich.).
– 63a. — — variation of the shoulder.
– 63b. — — variation of the shoulder.

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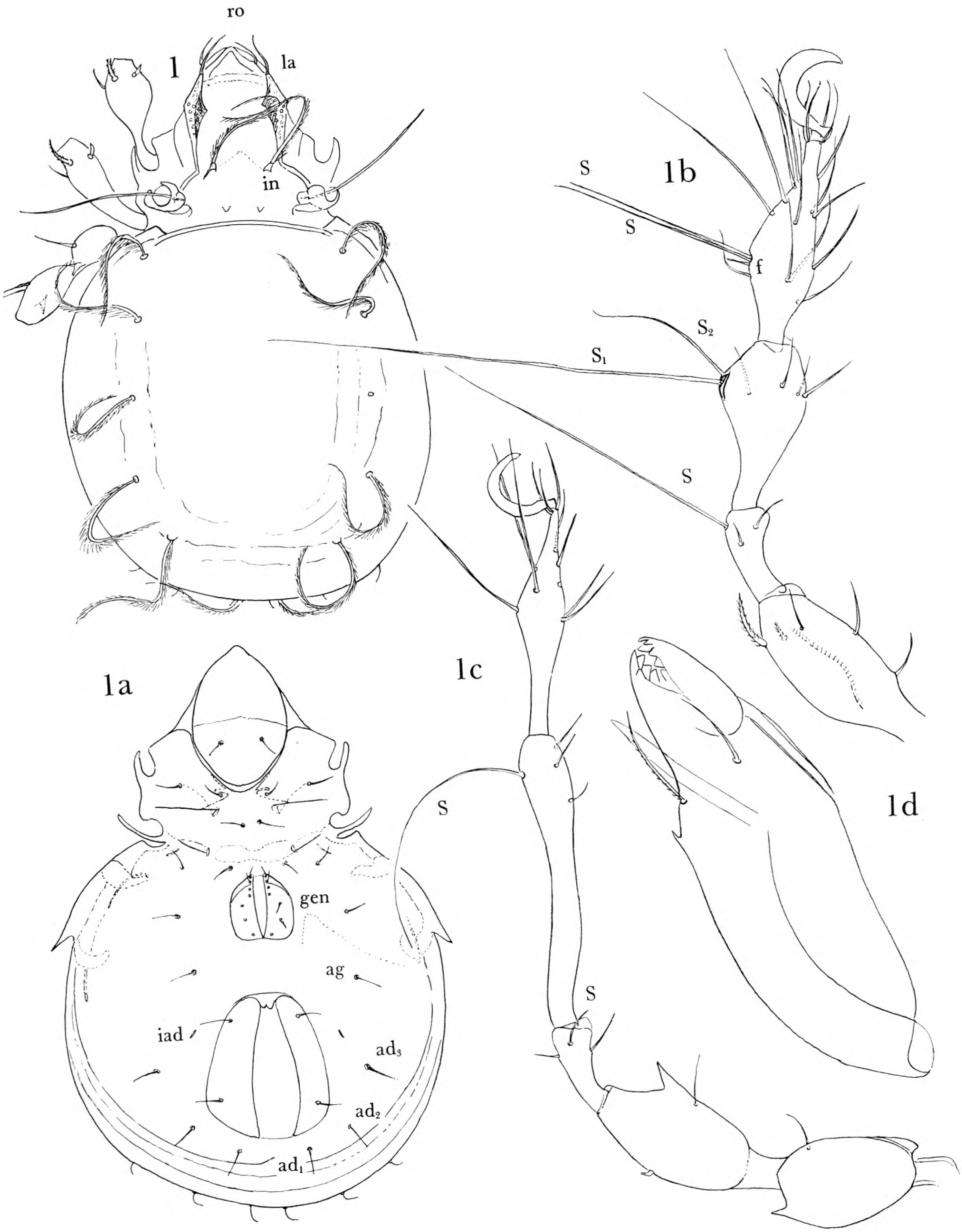
Færdig fra trykkeriet den 18. februar 1967.



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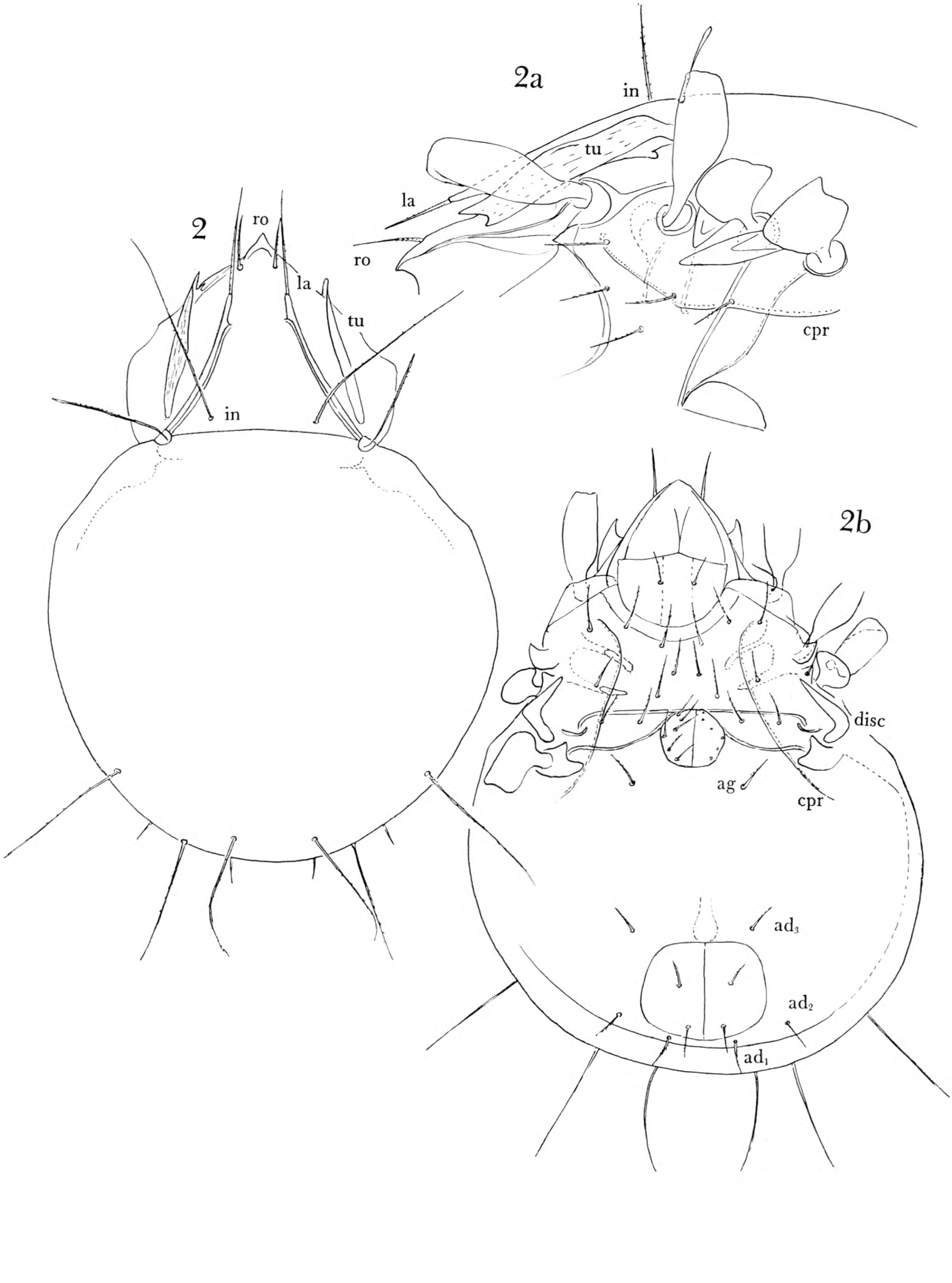
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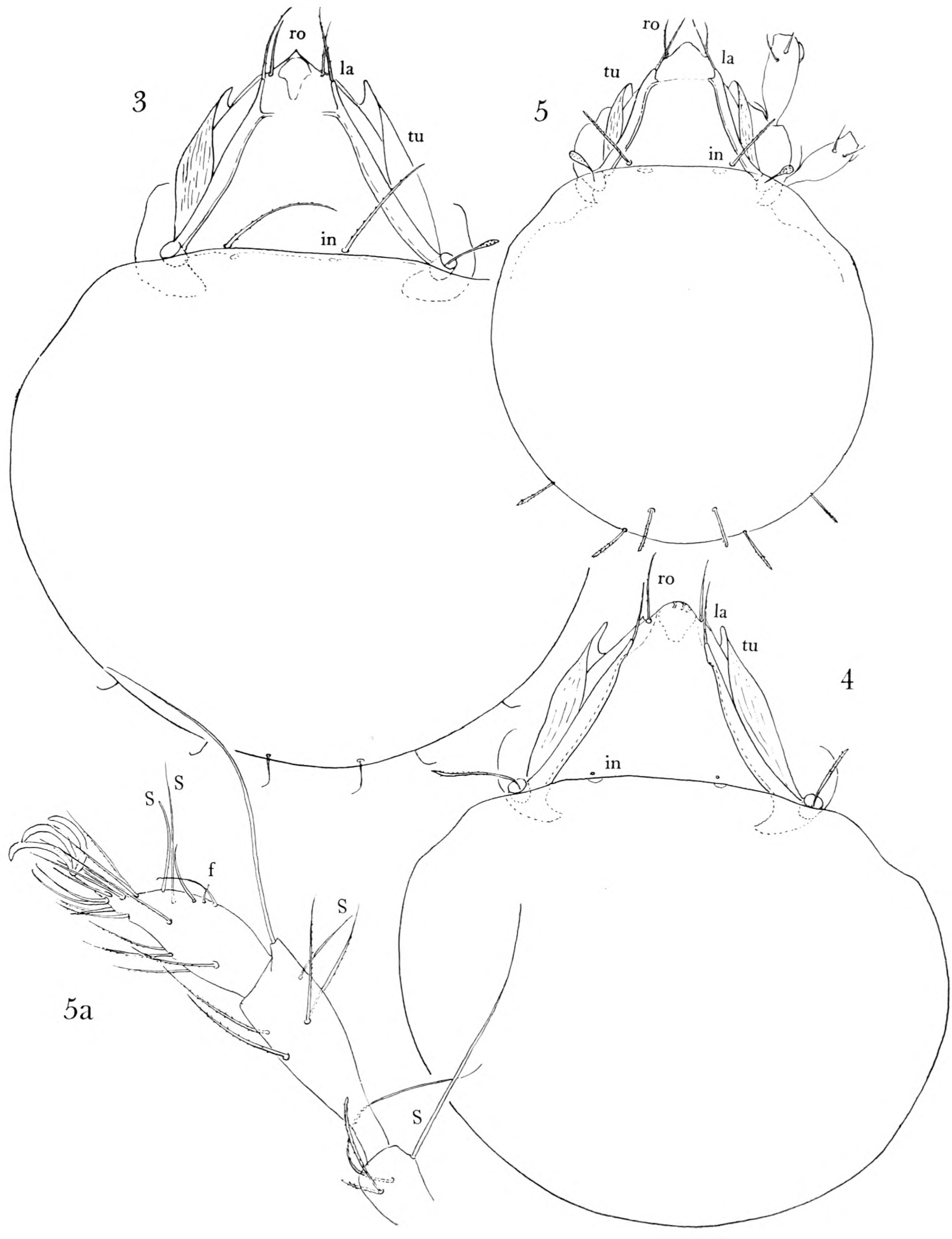
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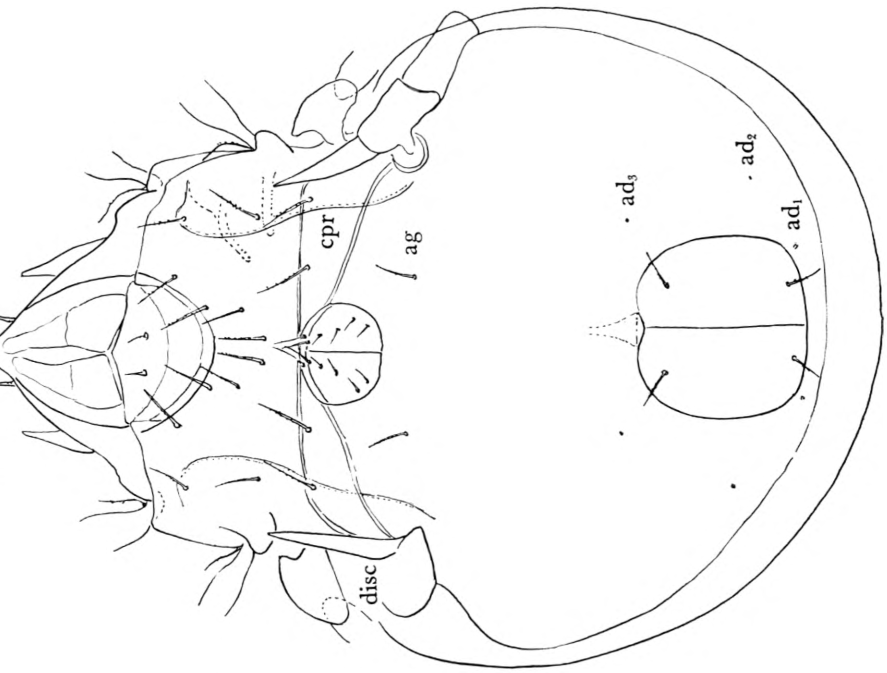

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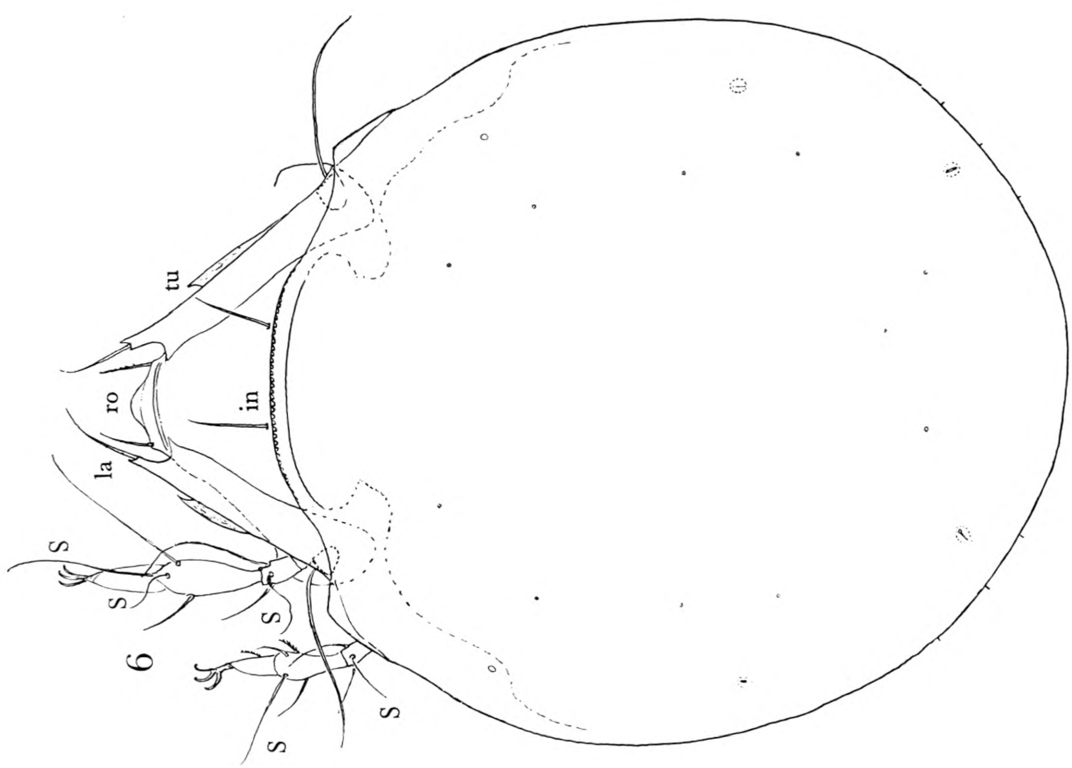

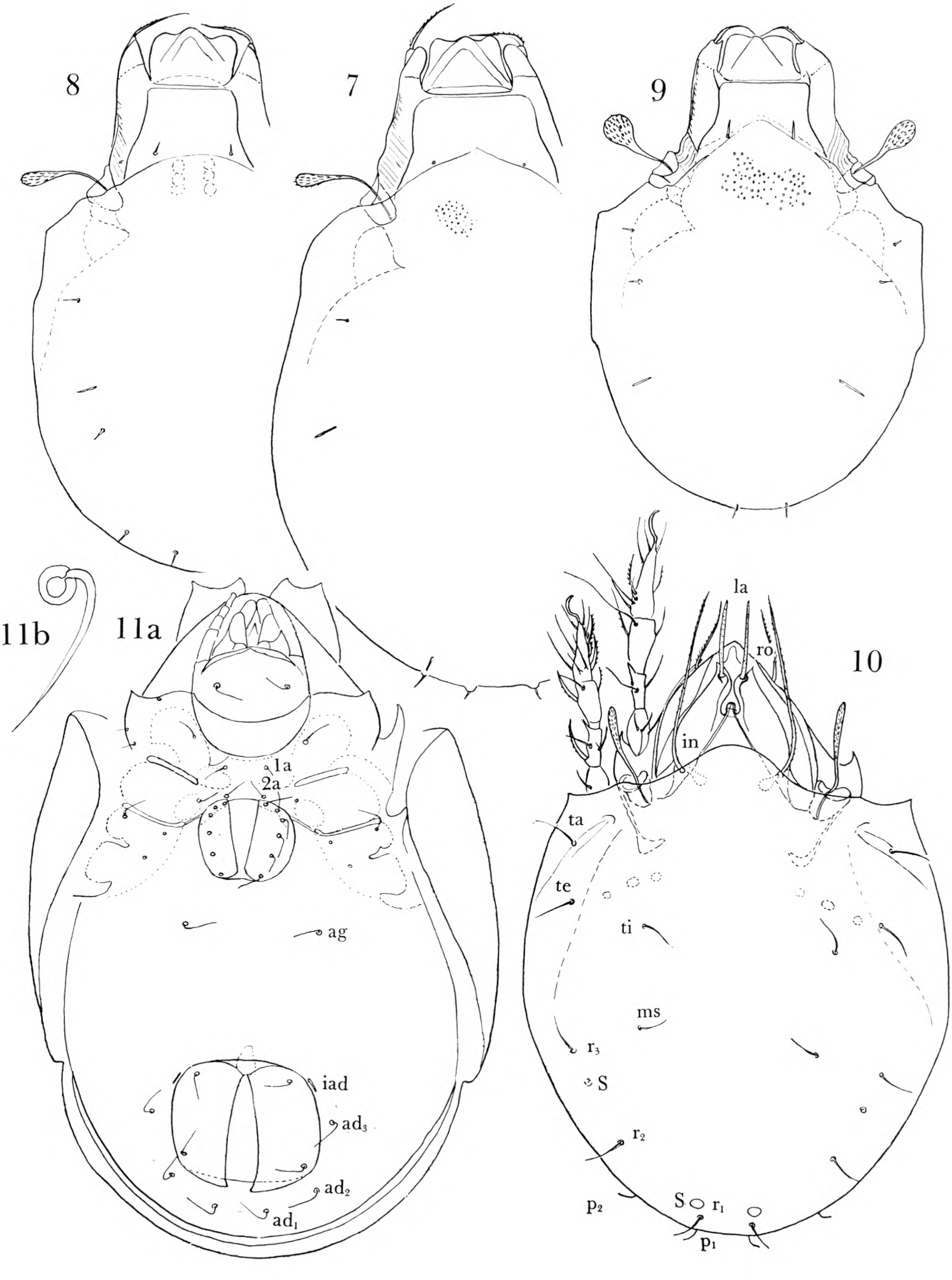

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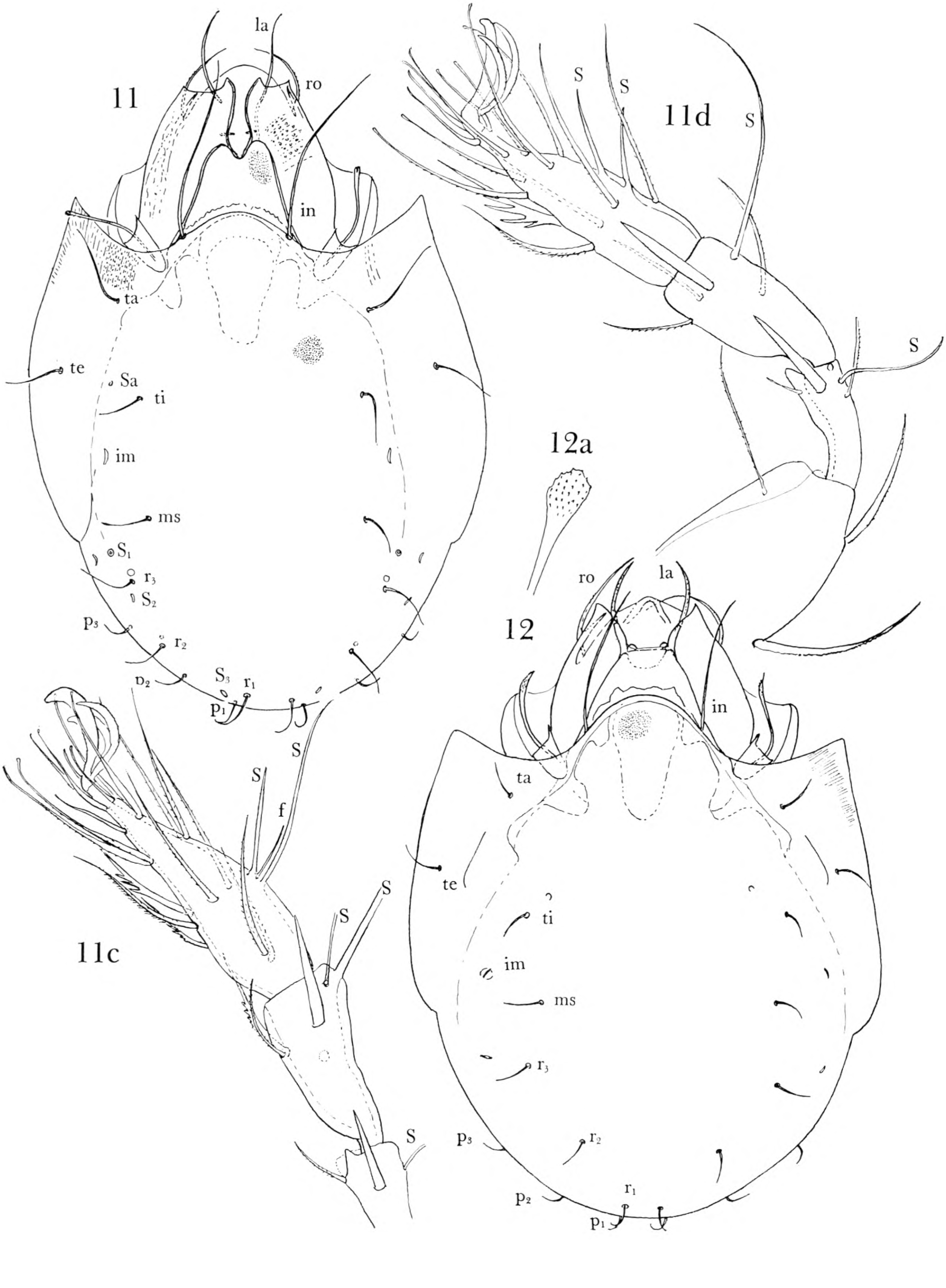
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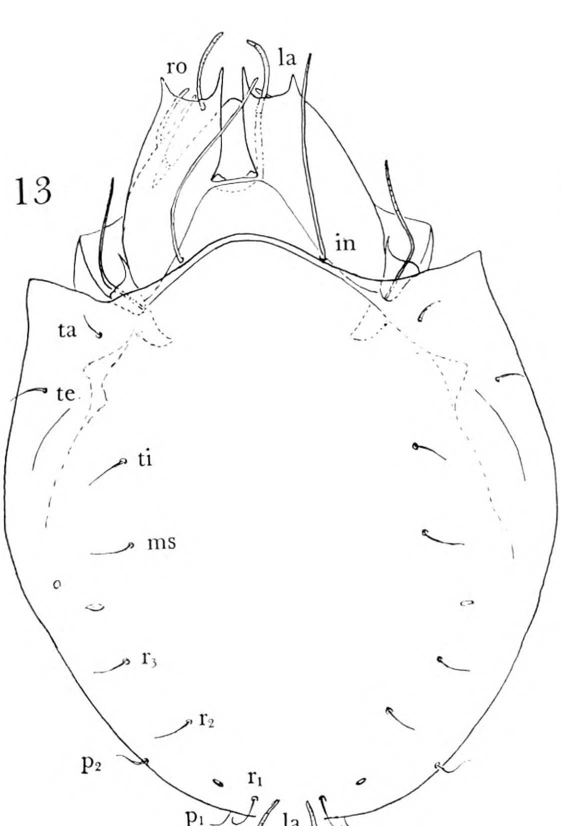
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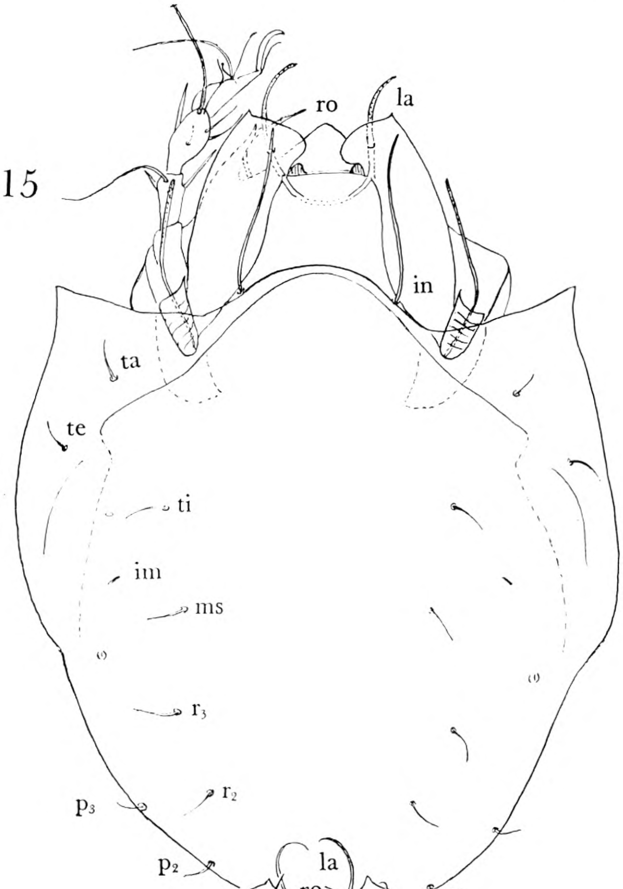
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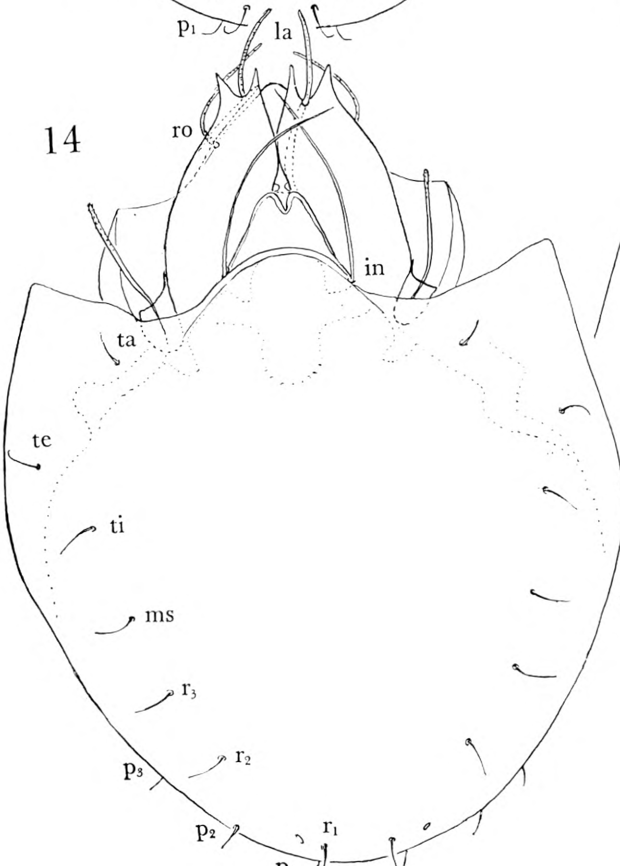
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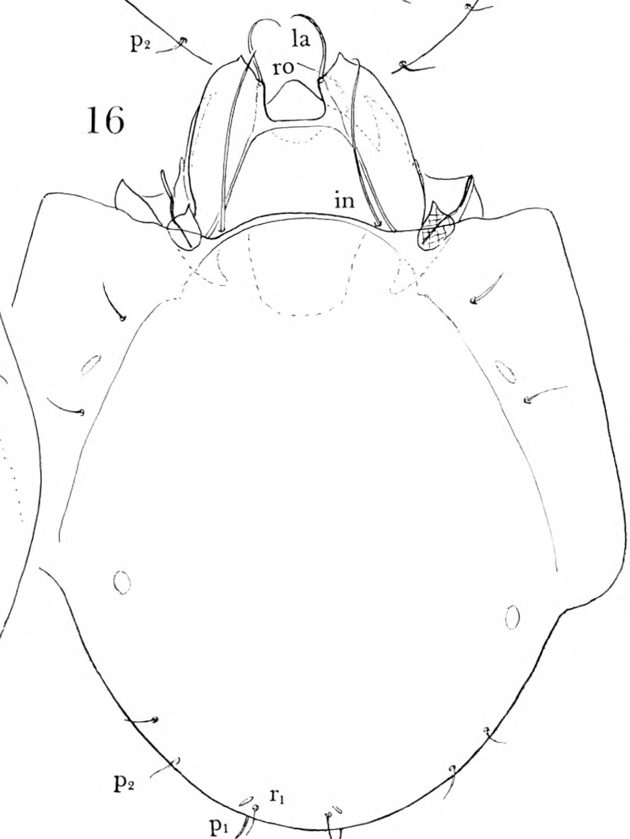
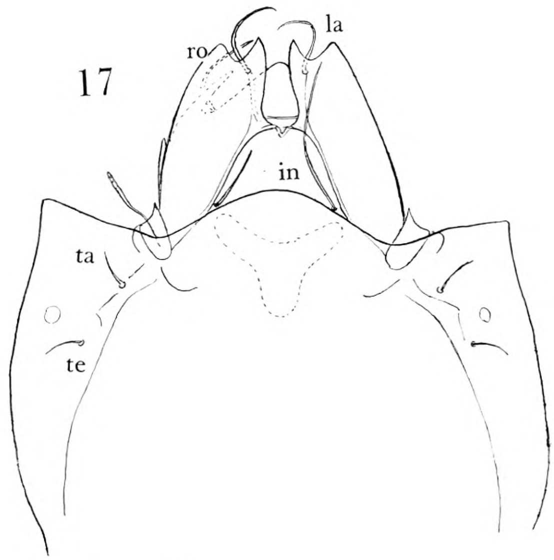

la
ro
in
p_2
r_1
p_1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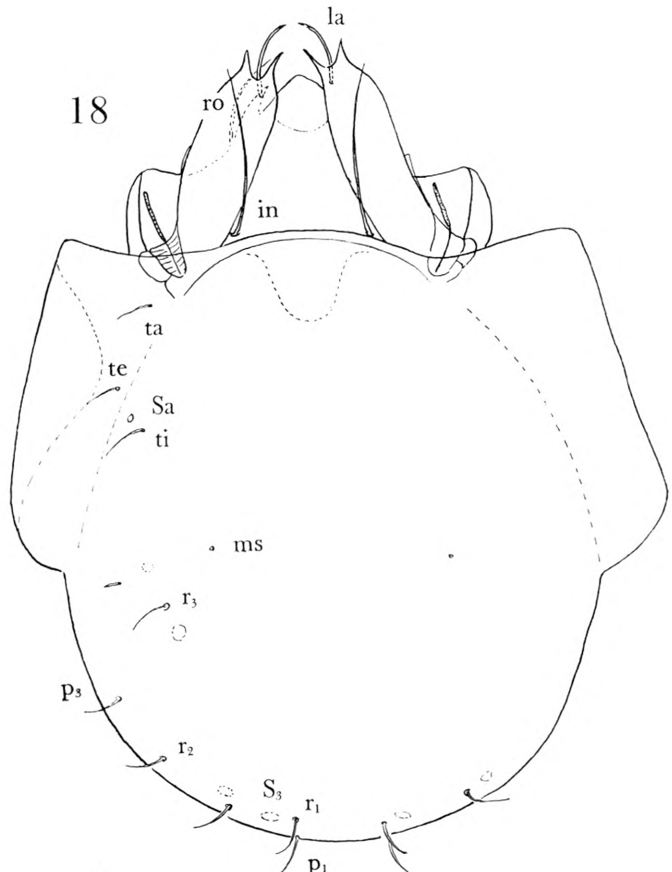
la
in
ta
te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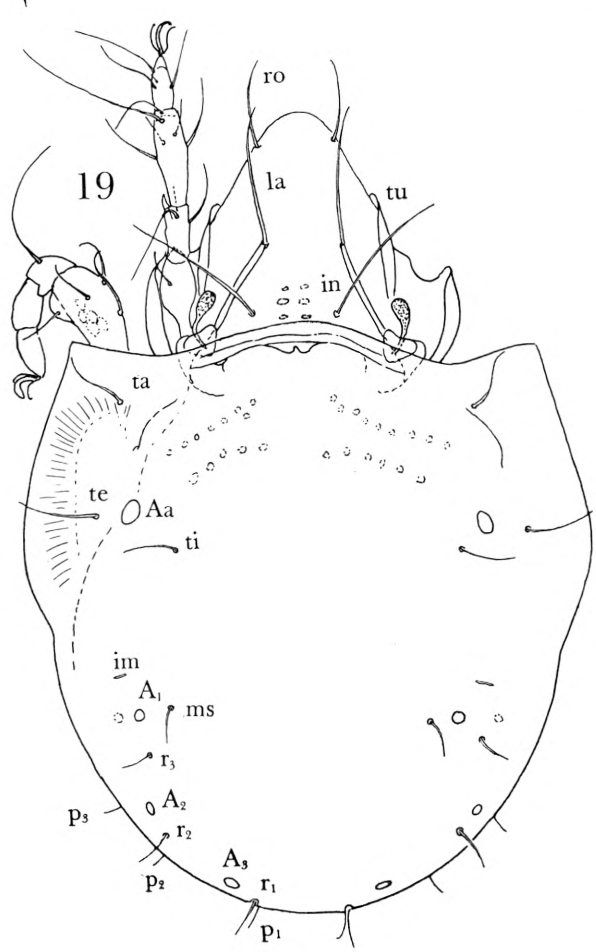
ta
te
Sa
ti
ms
r_3
p_3
r_2
S_3
r_1
p_1


19
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ta
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ms
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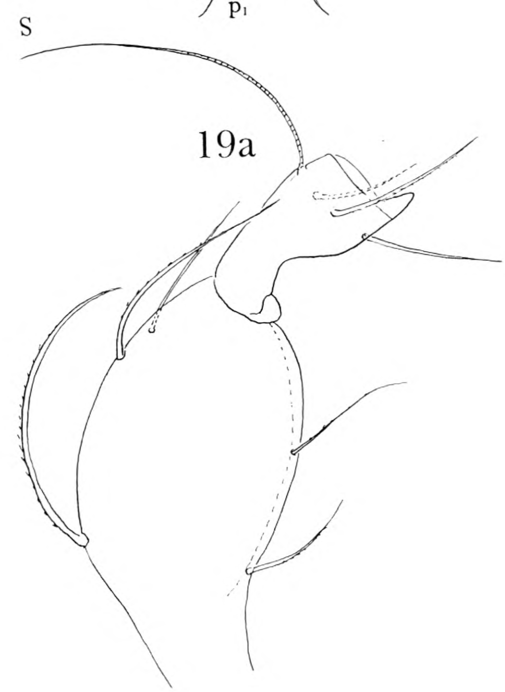
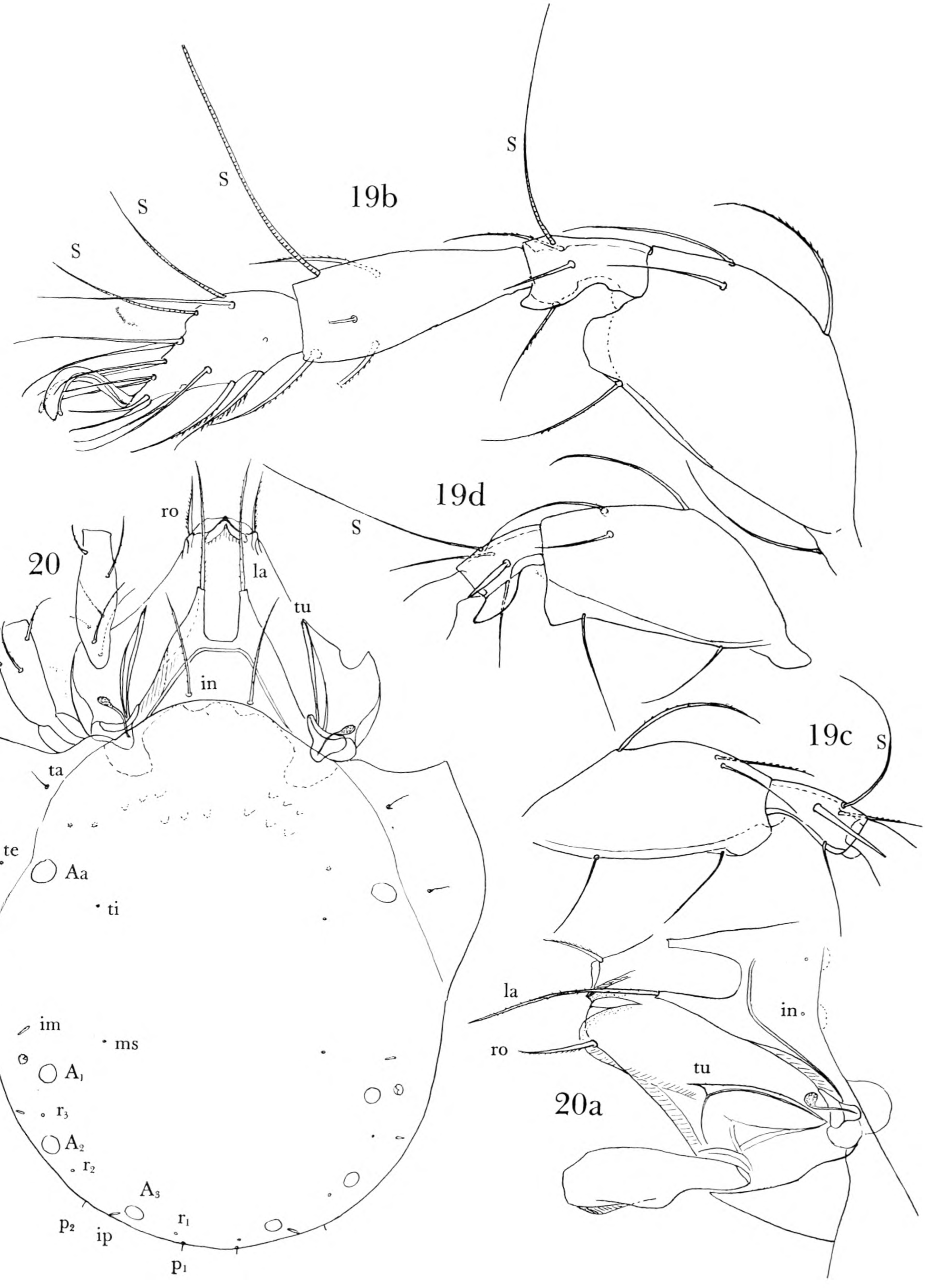
p_3
A_2
r_2
p_2
A_3
r_1
p_1


S
19a


19b
S
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19d
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19c
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ip
p1
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la
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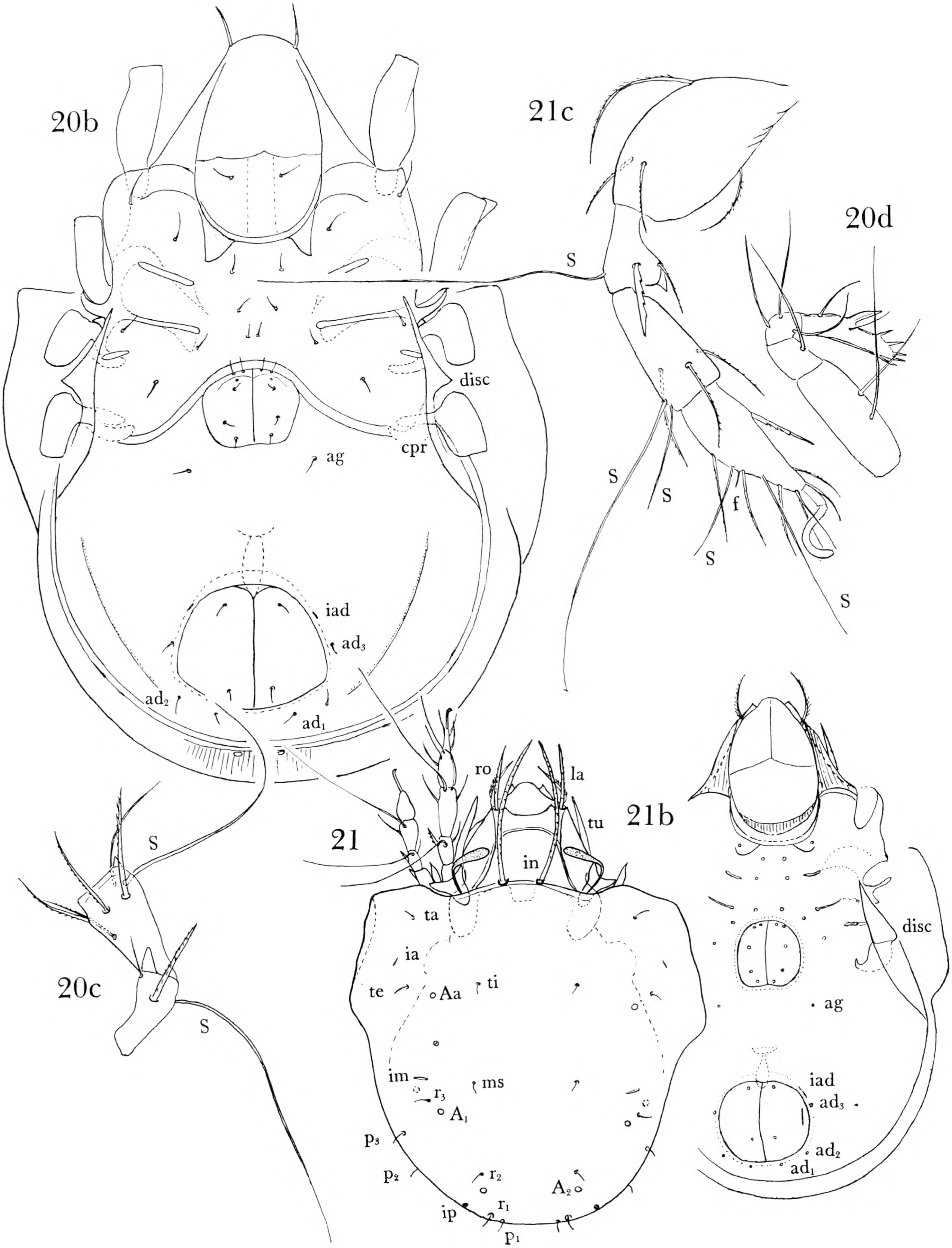
in
tu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21c
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iad
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21b
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Aa
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disc
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20c
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A_2
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p_1
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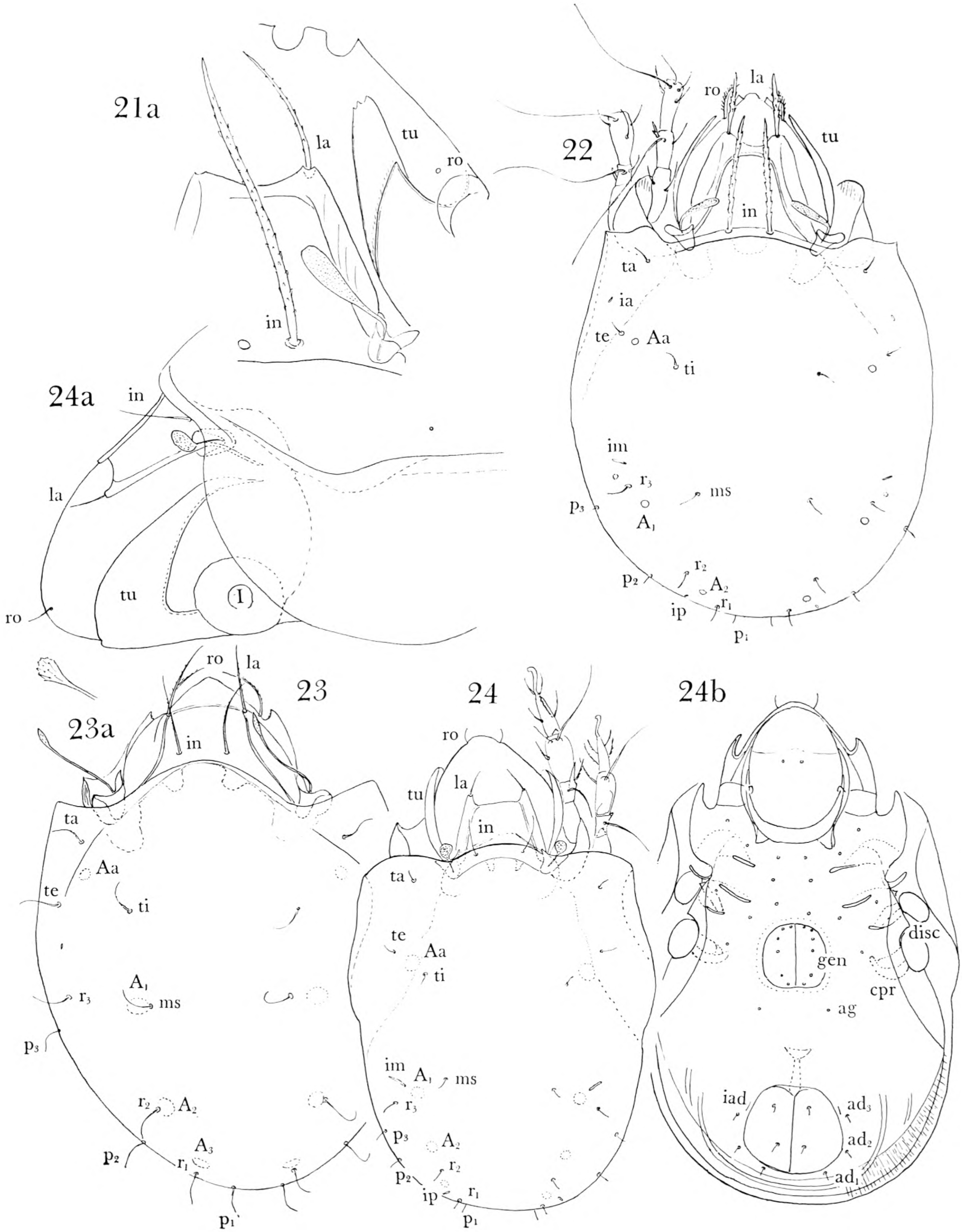
ad_3
ad_2
ad_1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24a
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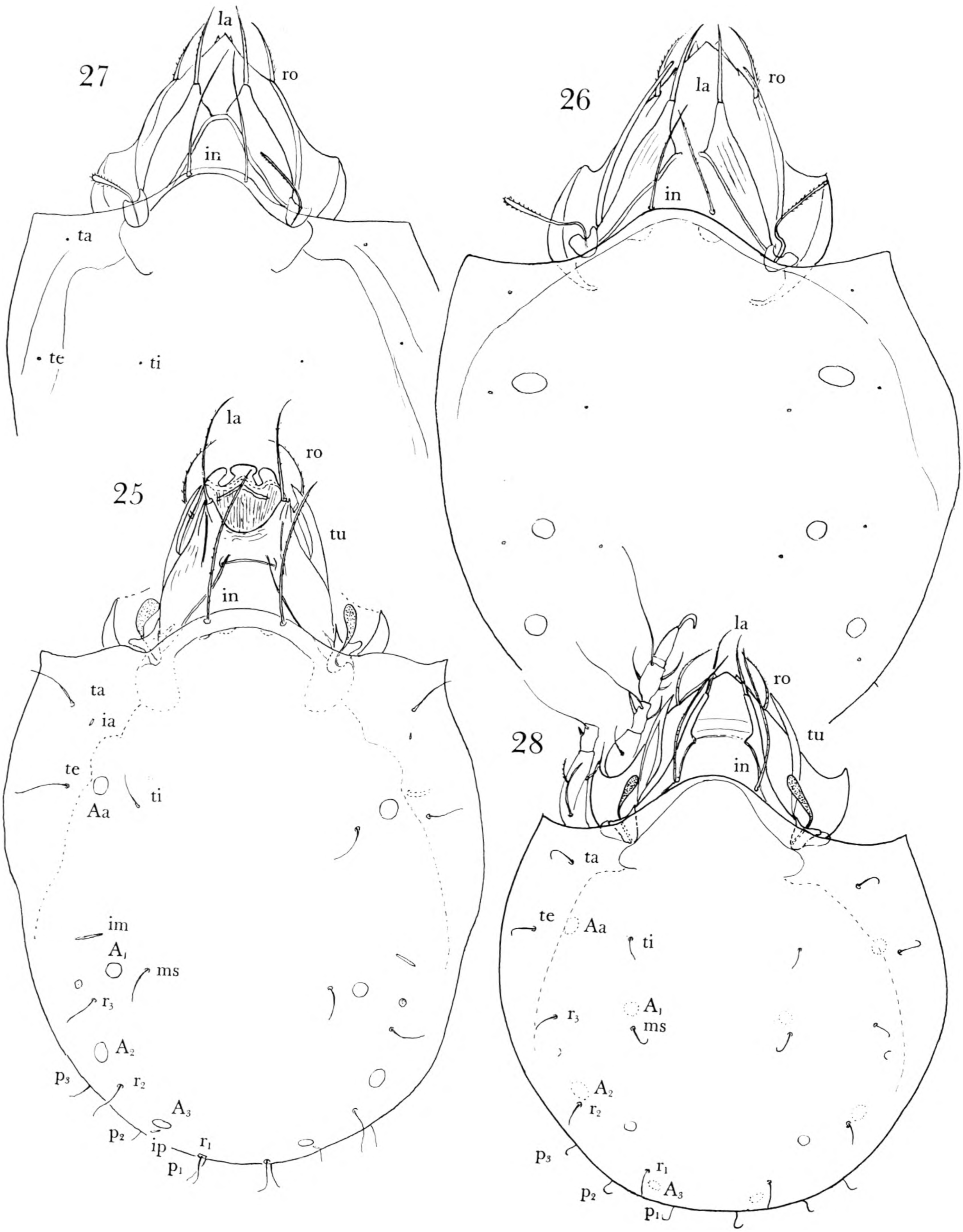
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28
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A_3
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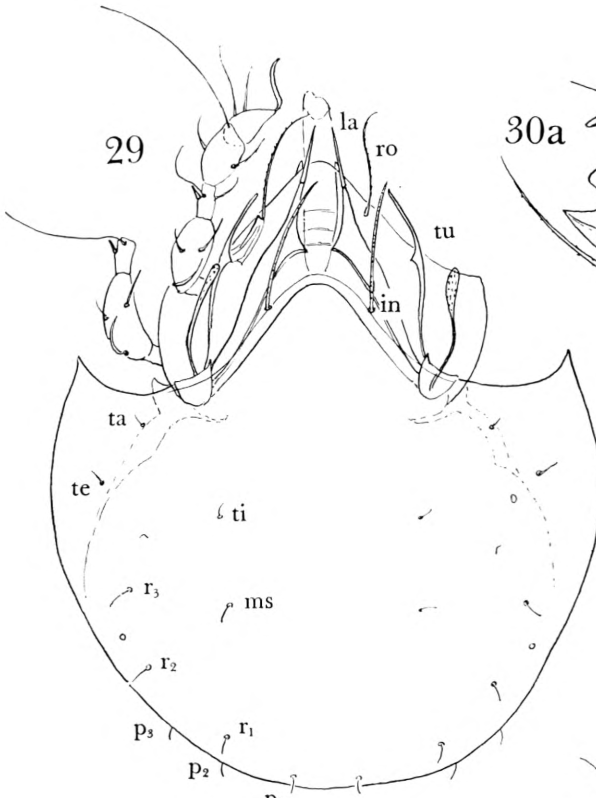
p_1

29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r₂
p₃
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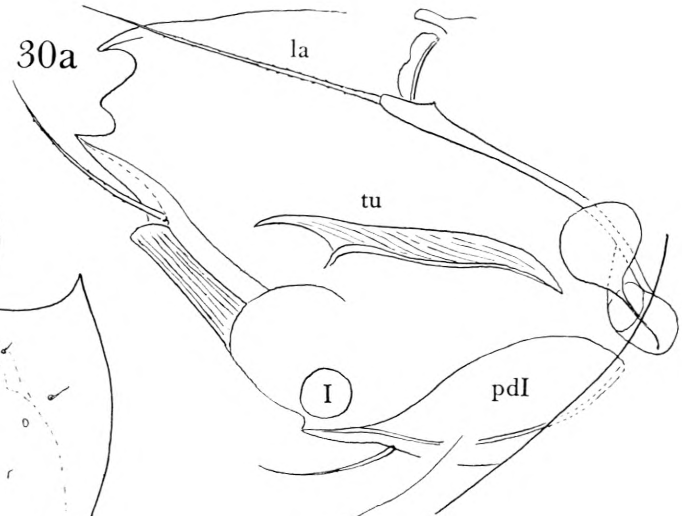
p₁

30a


la
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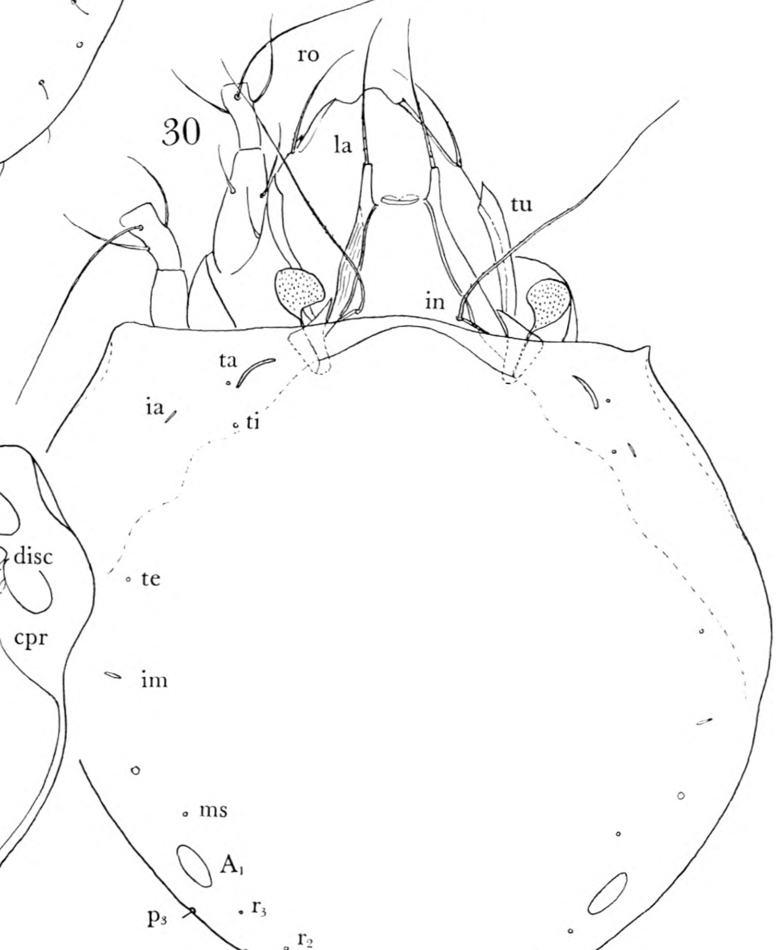
pdI

30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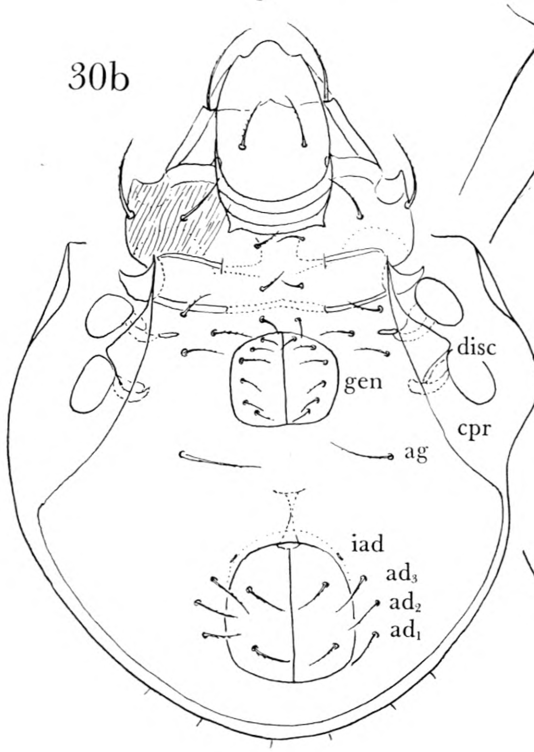
30b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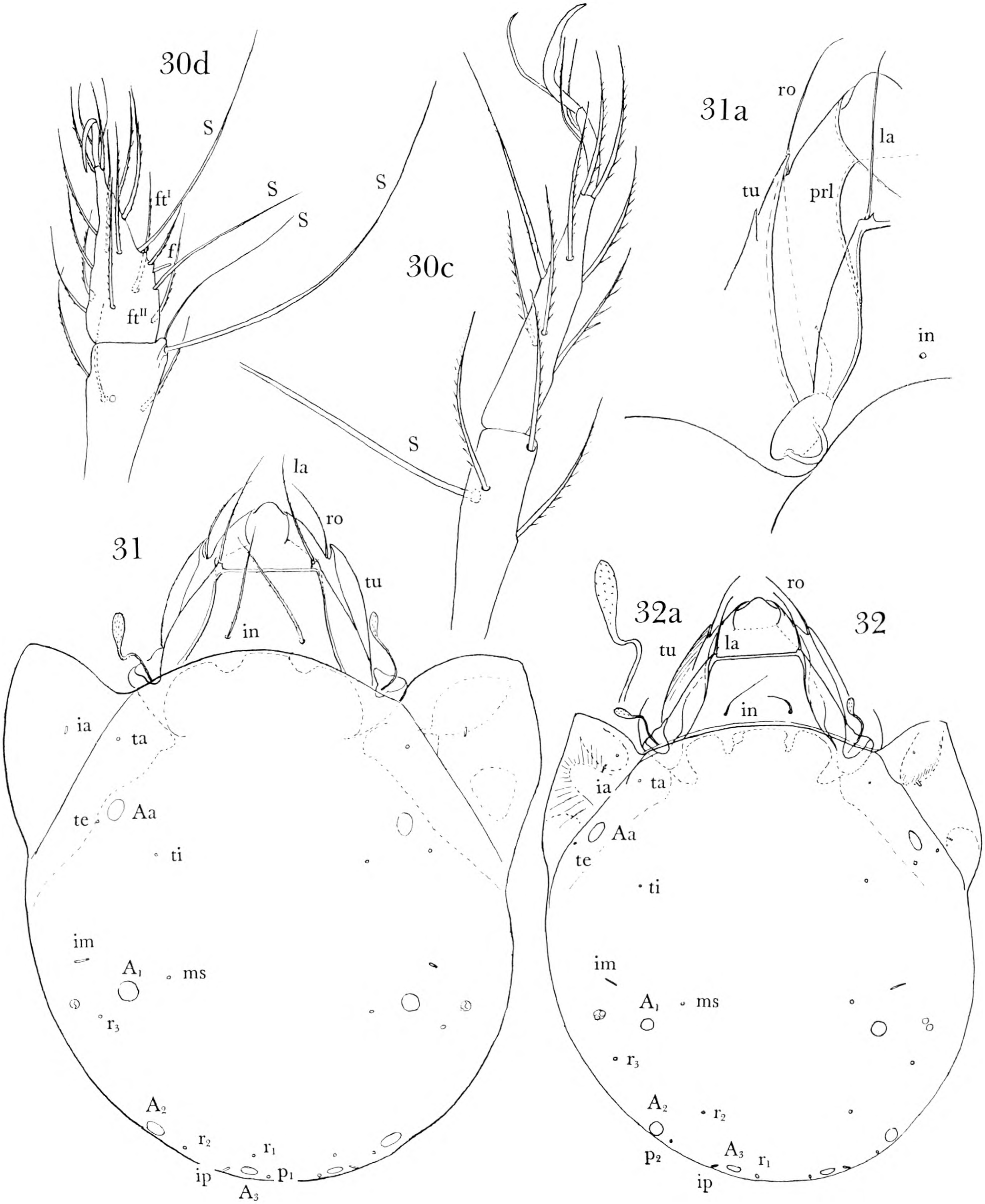
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31a
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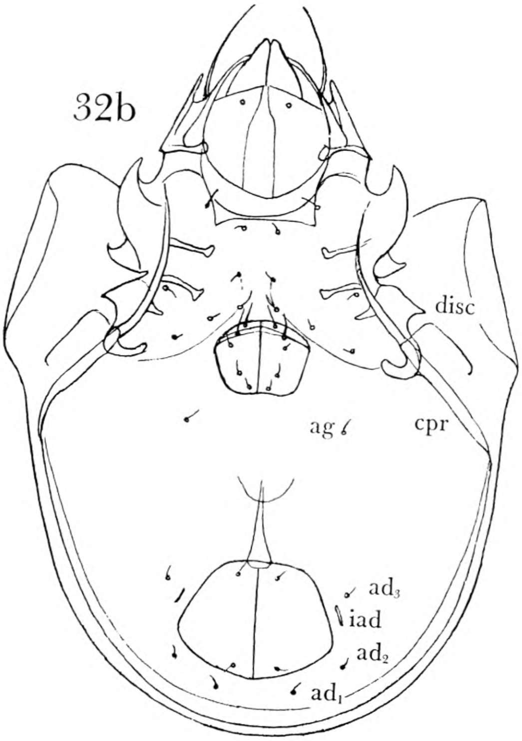
ip

32b



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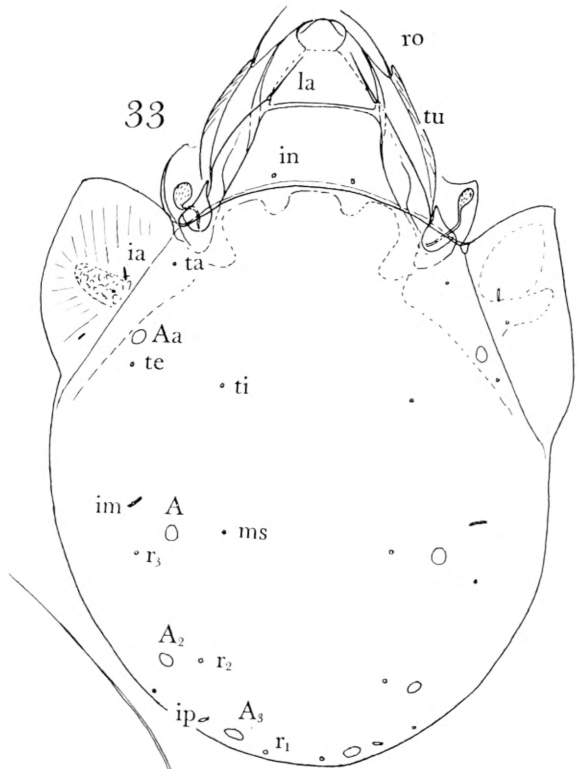
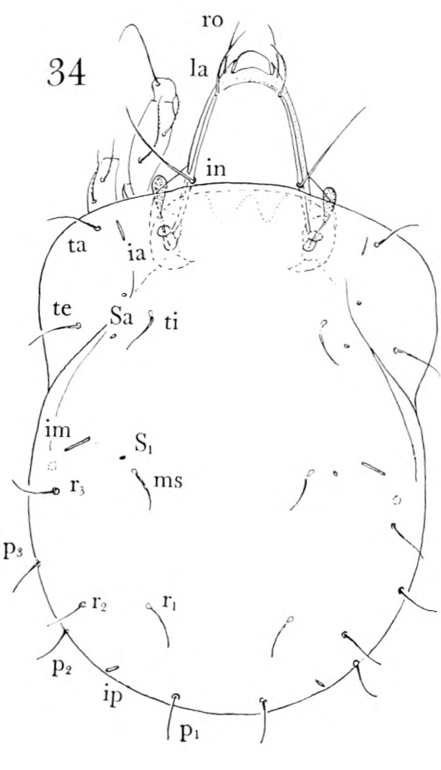
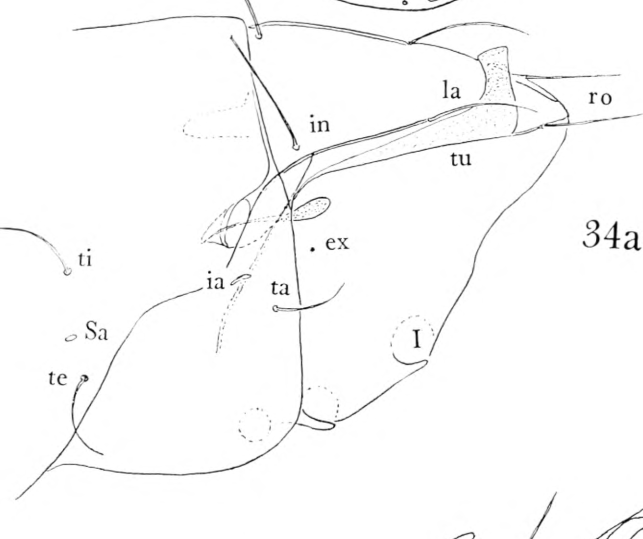


34



34a



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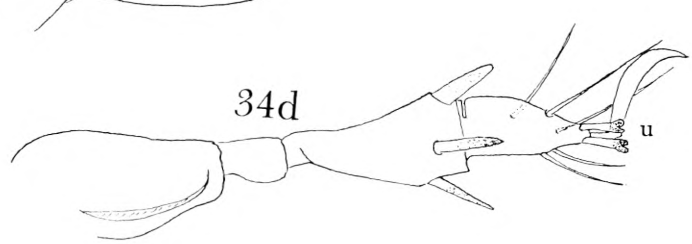

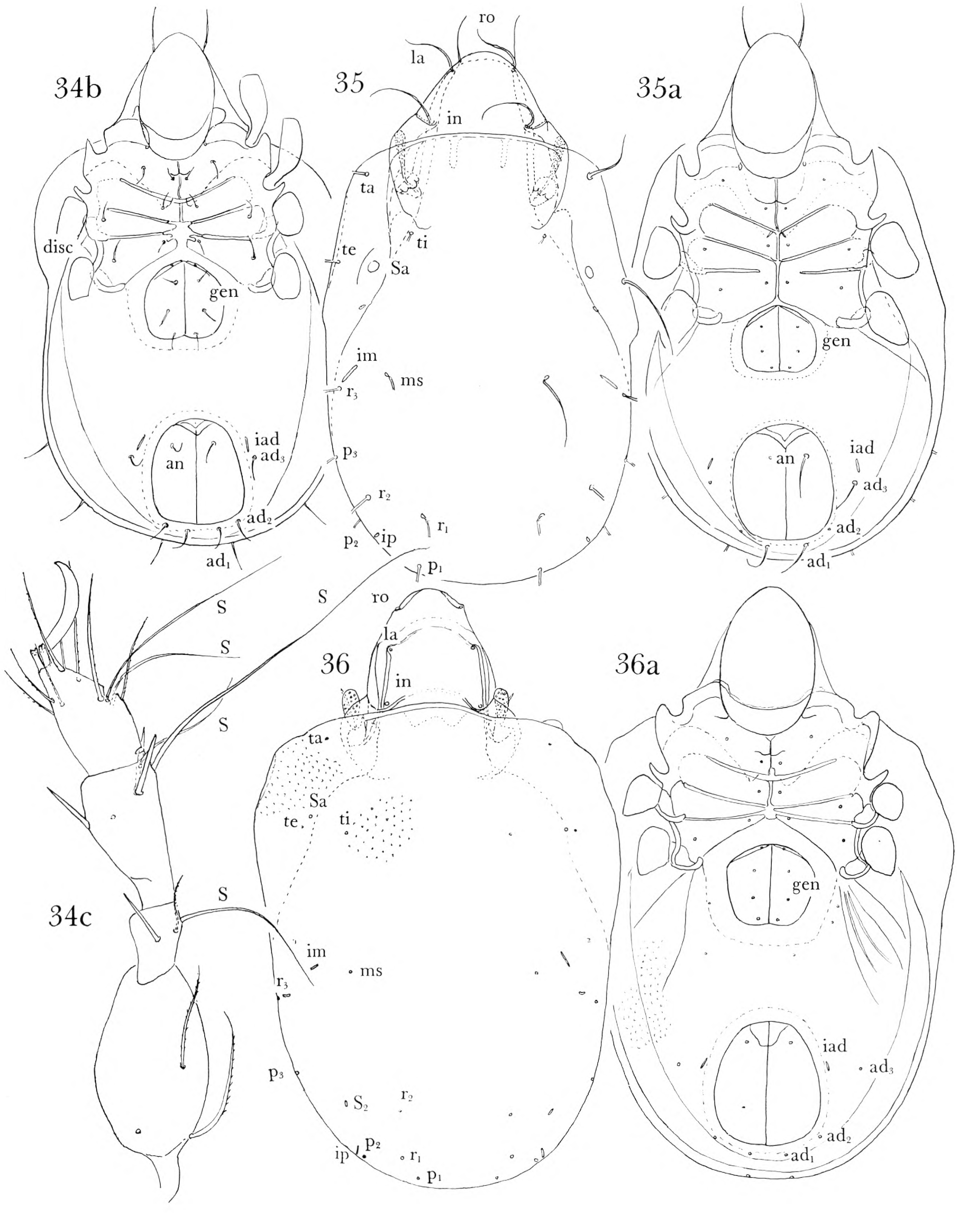
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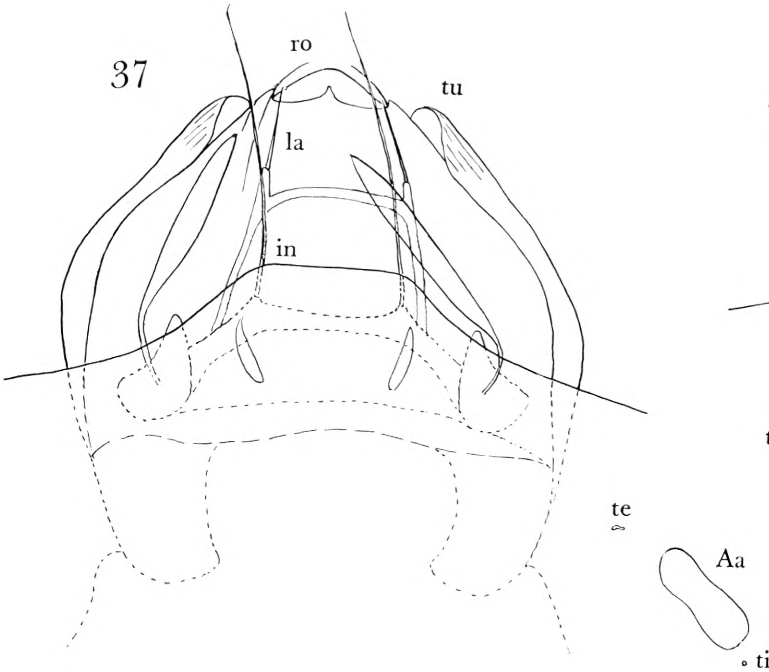
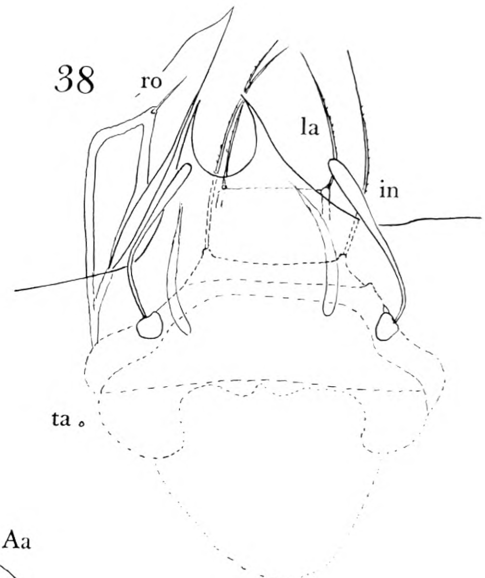
37



38



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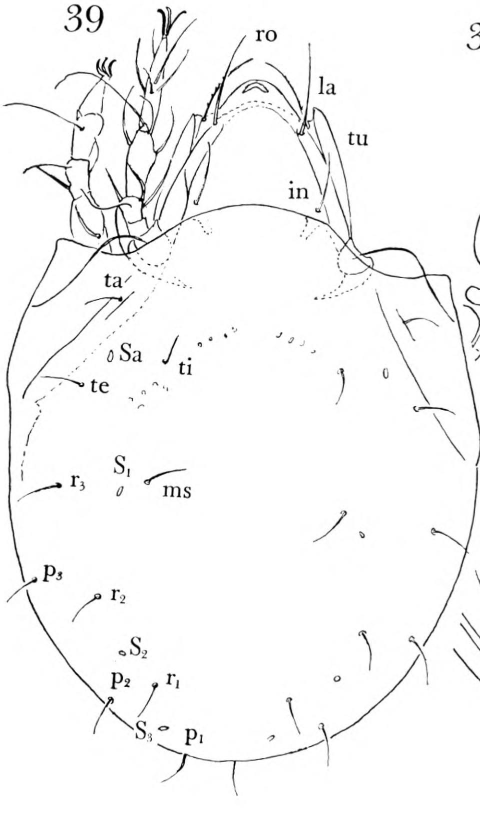
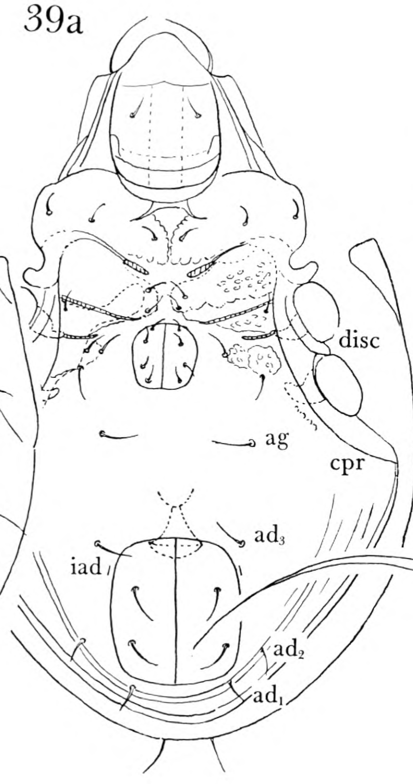
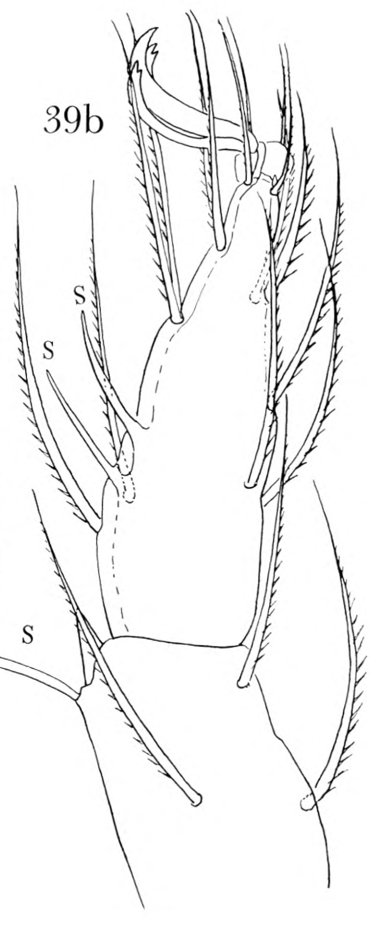
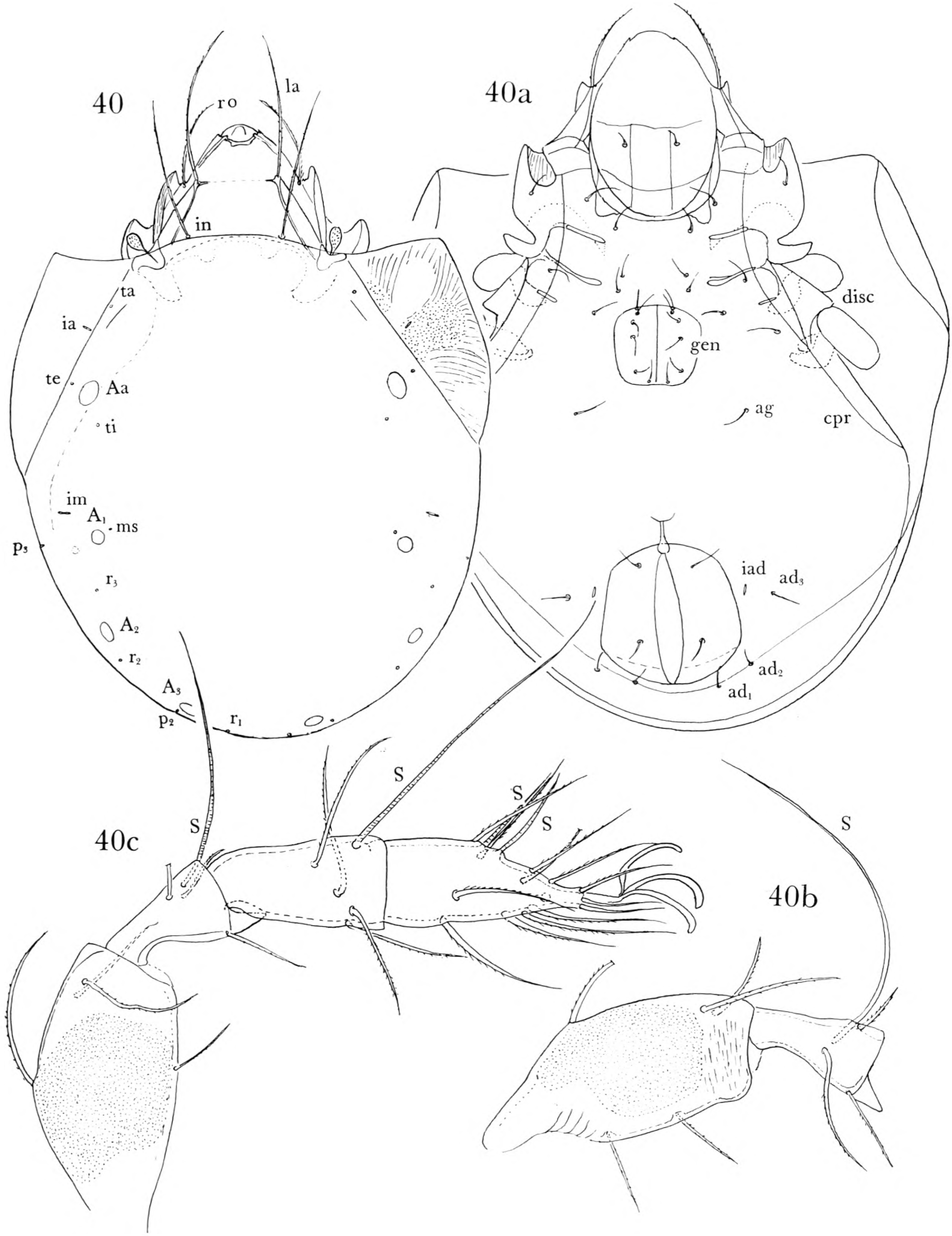


39a



39b




40
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40b
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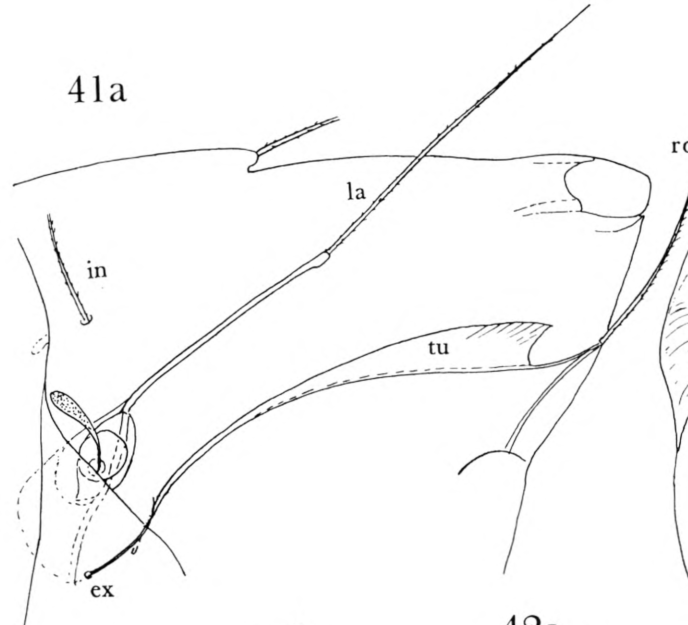
41a



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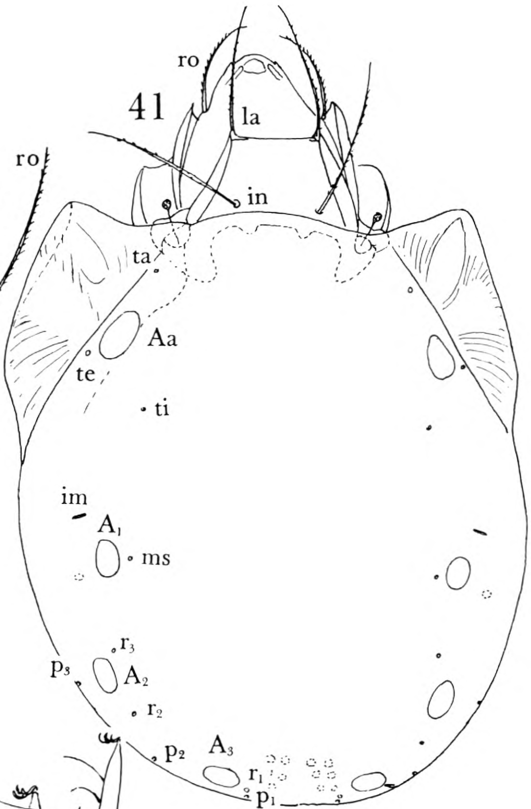
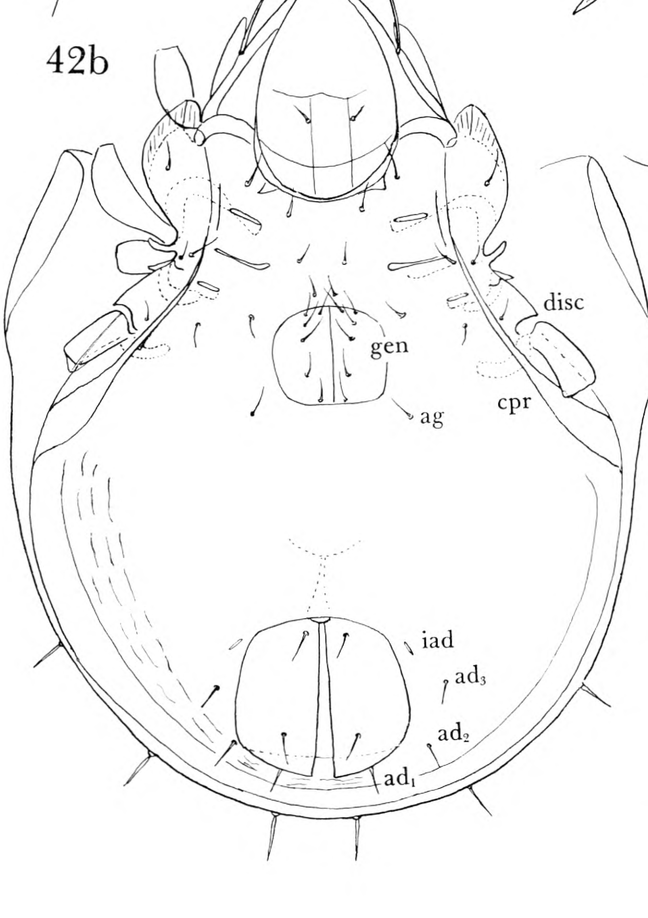
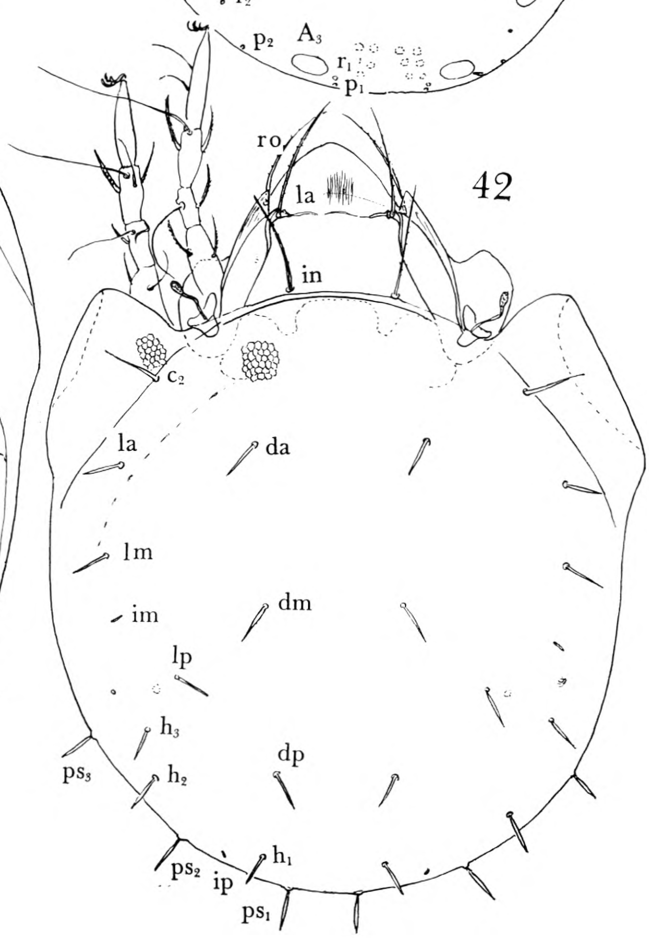


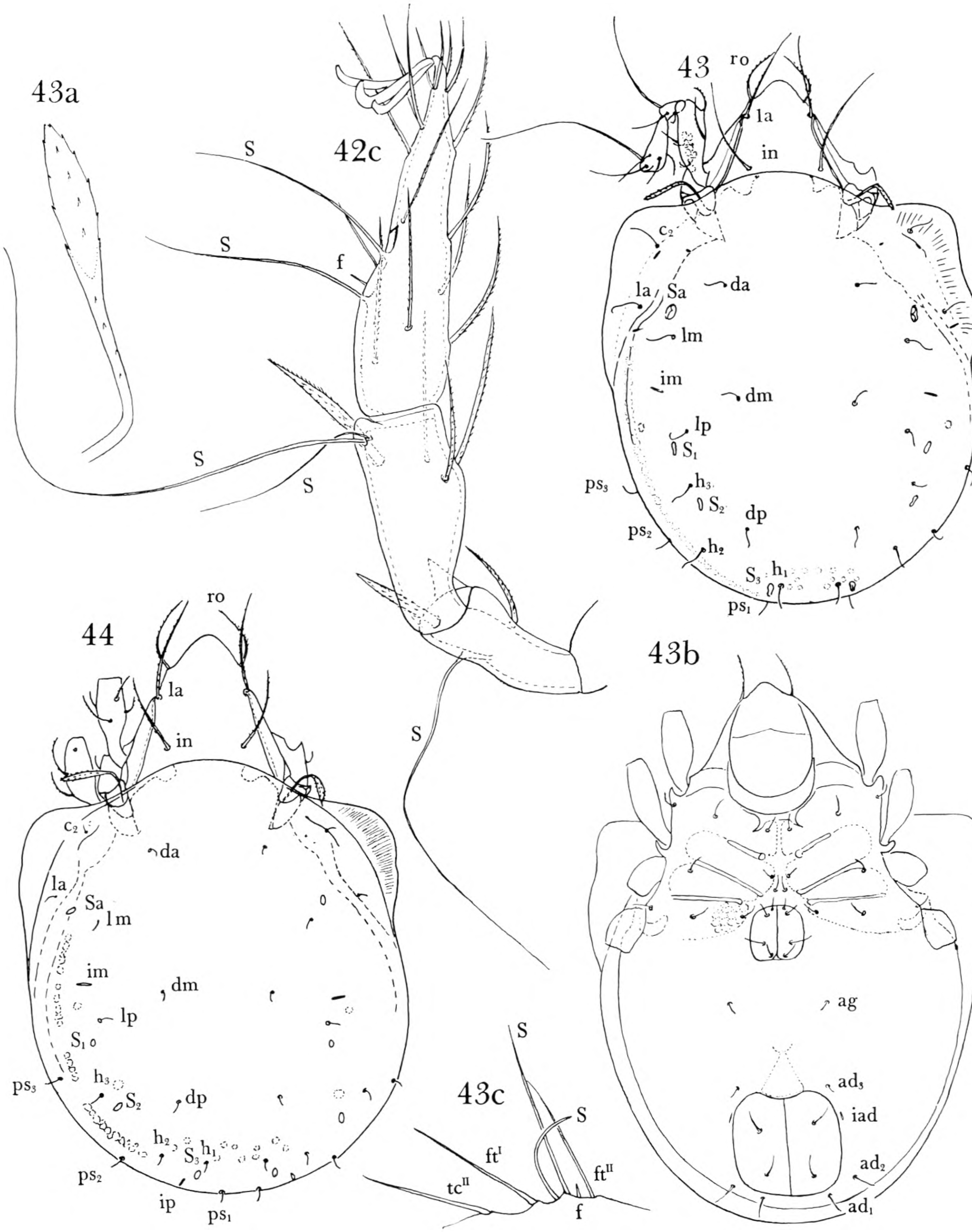
42a

42b



42

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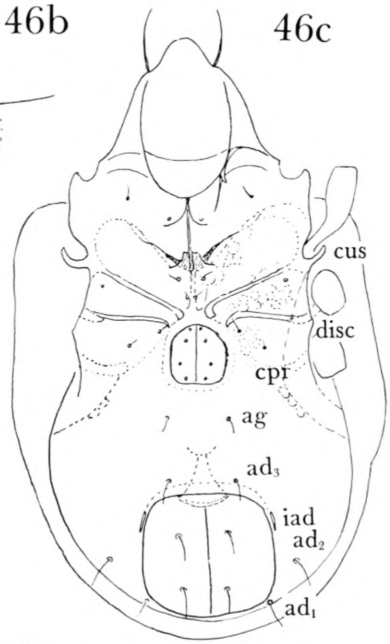
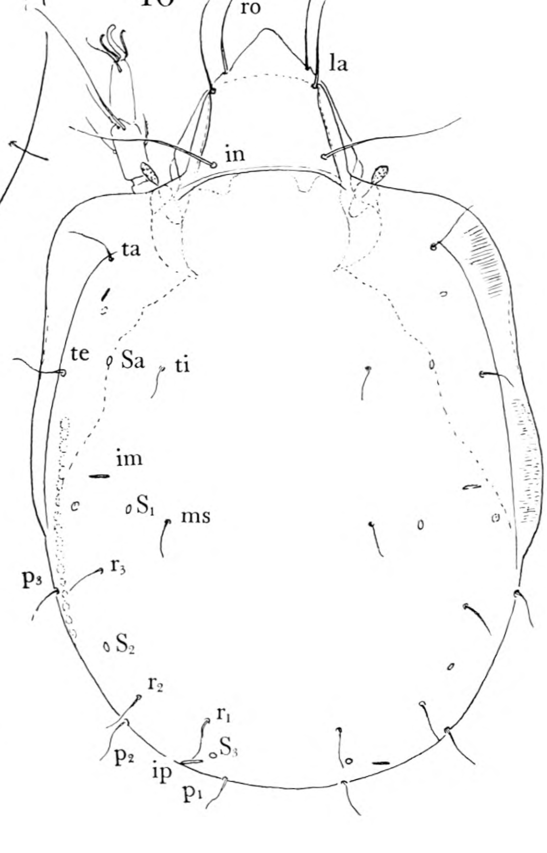
45

46b

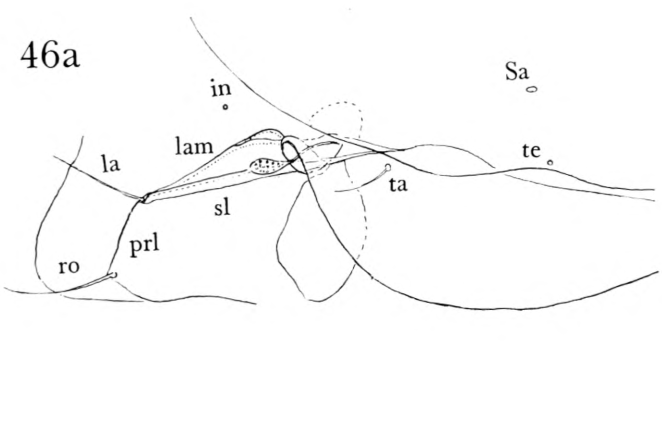
46c



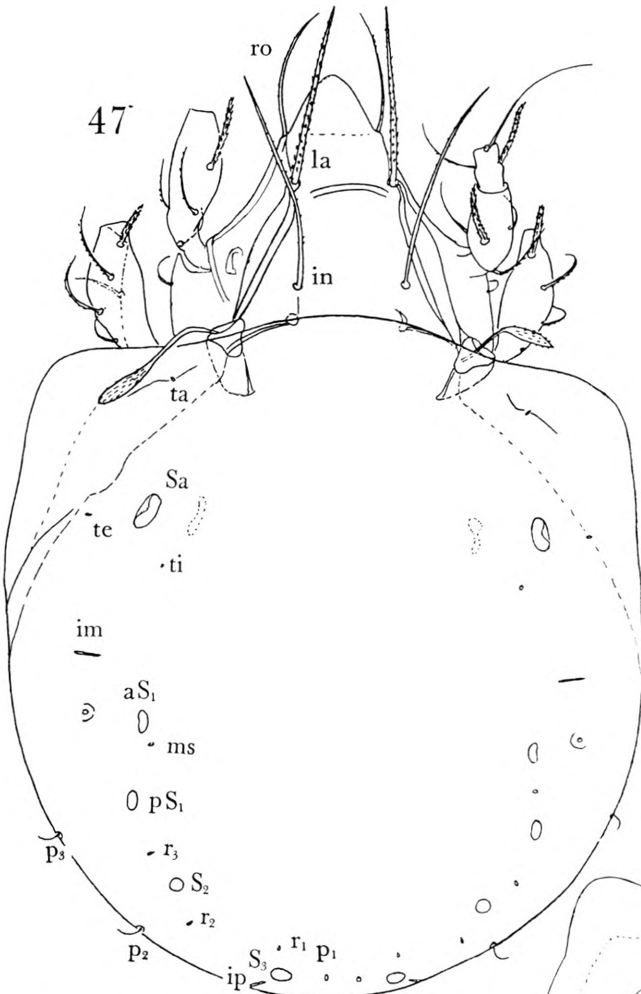
46



46a



47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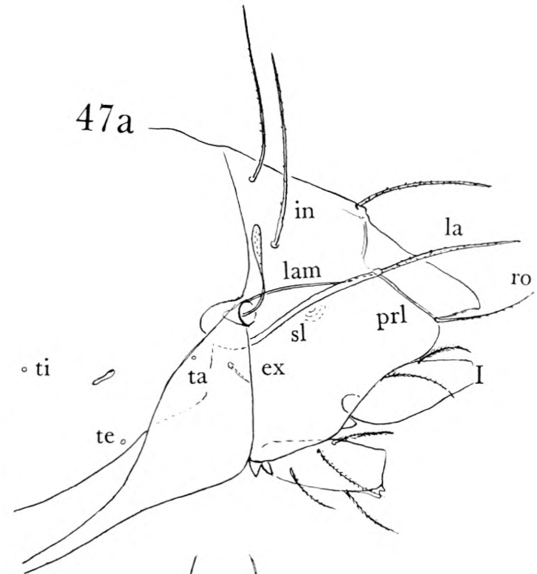
47a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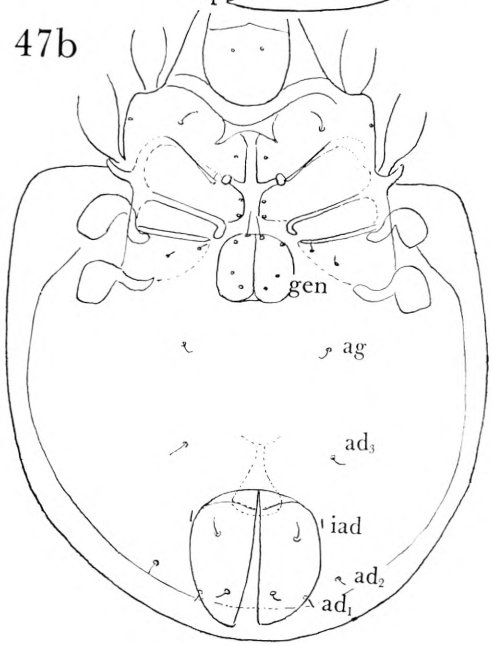
47b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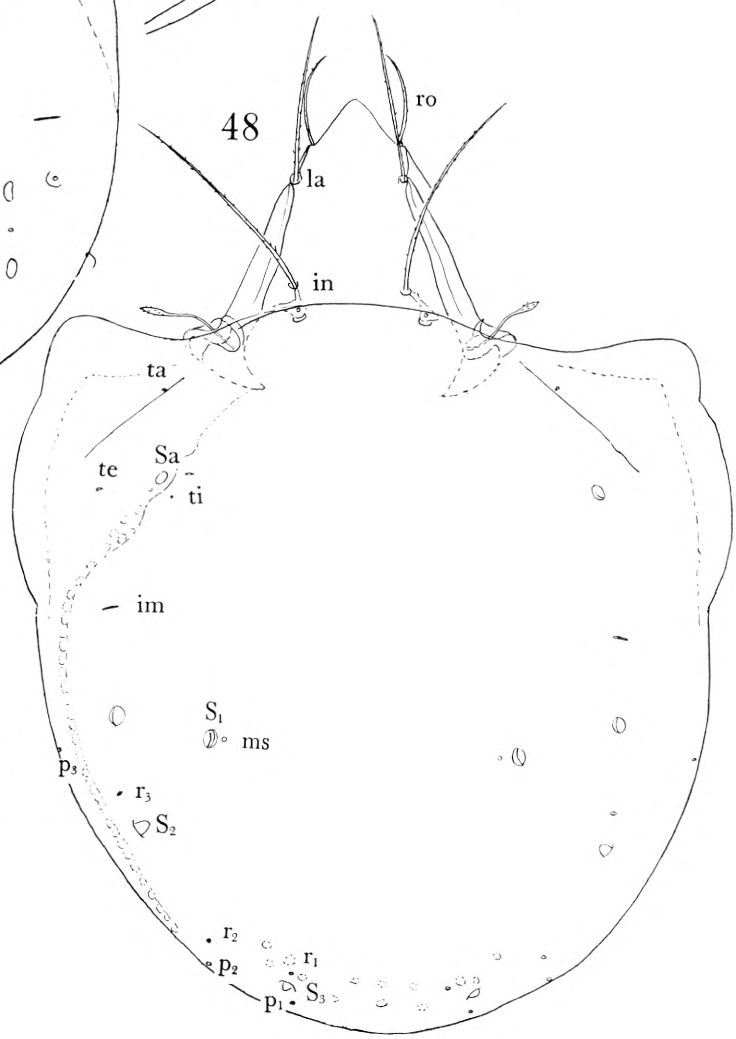
48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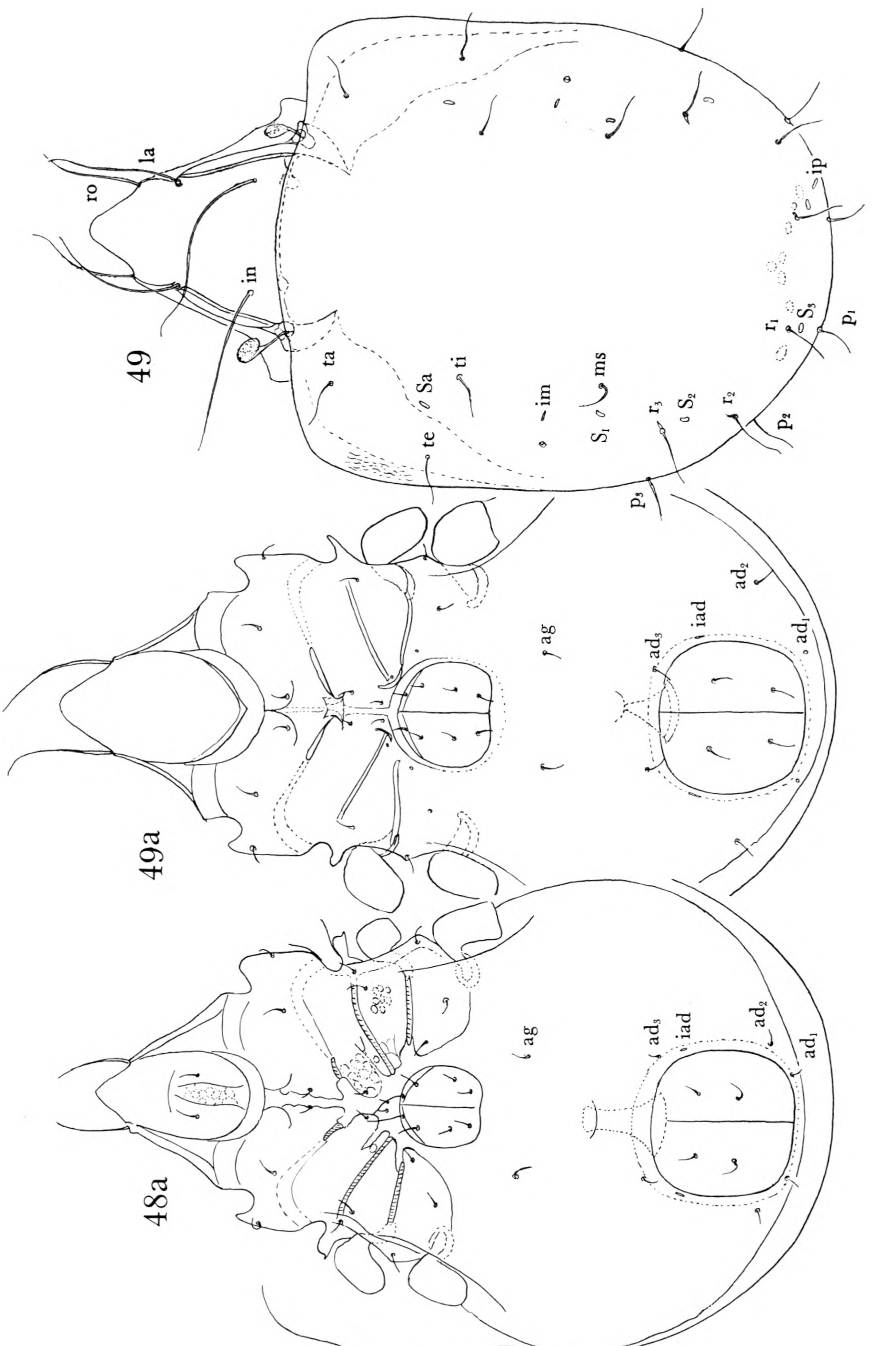
49
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48a
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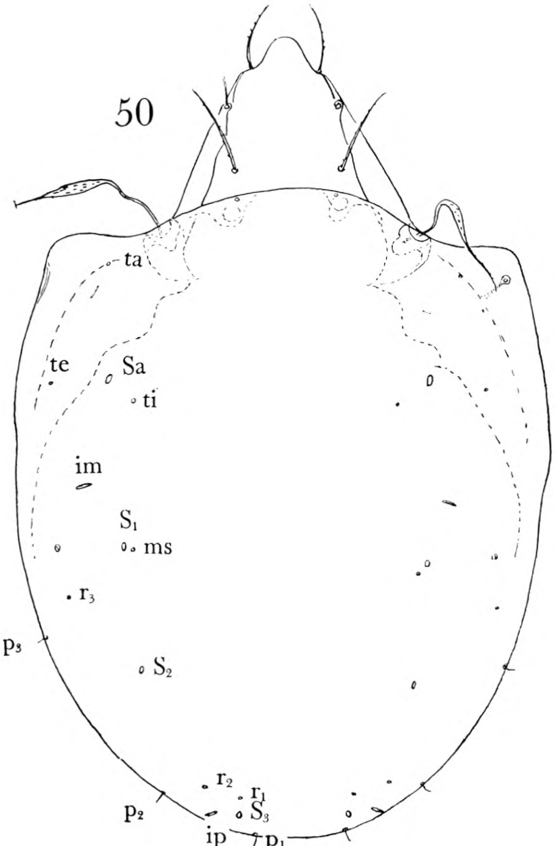
50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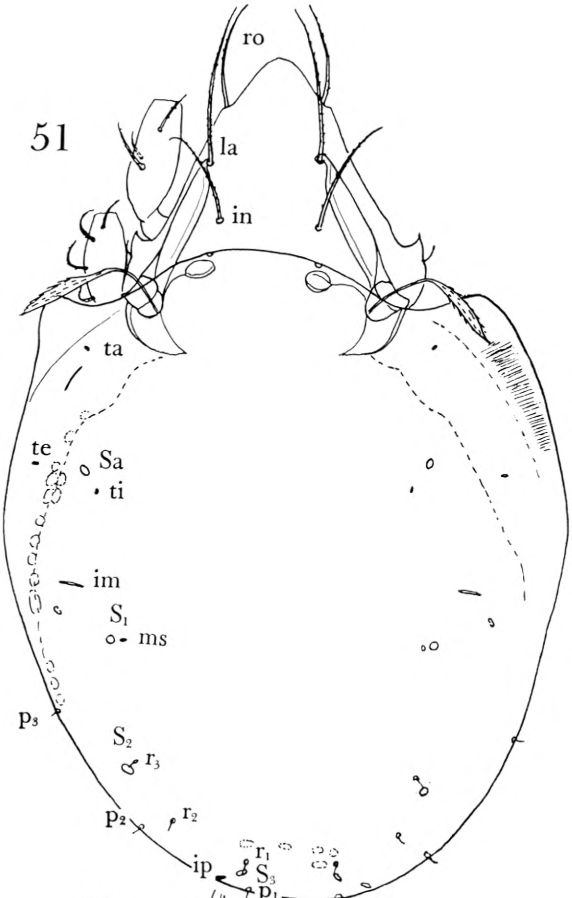
51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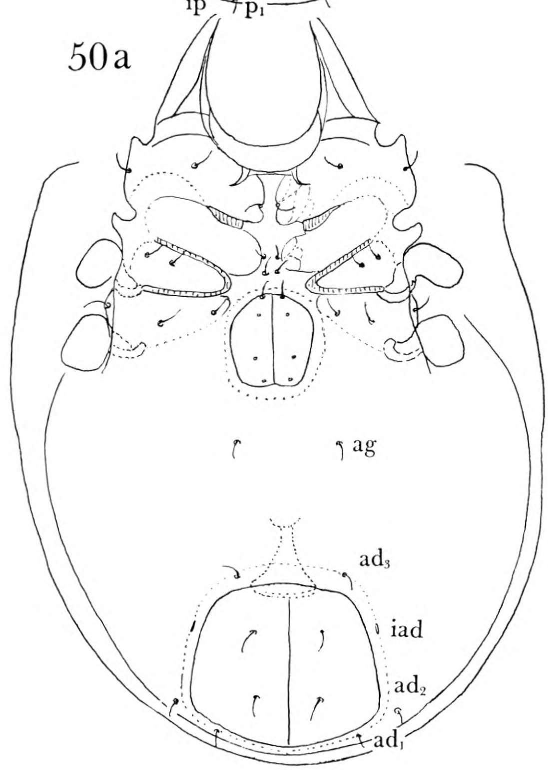
50a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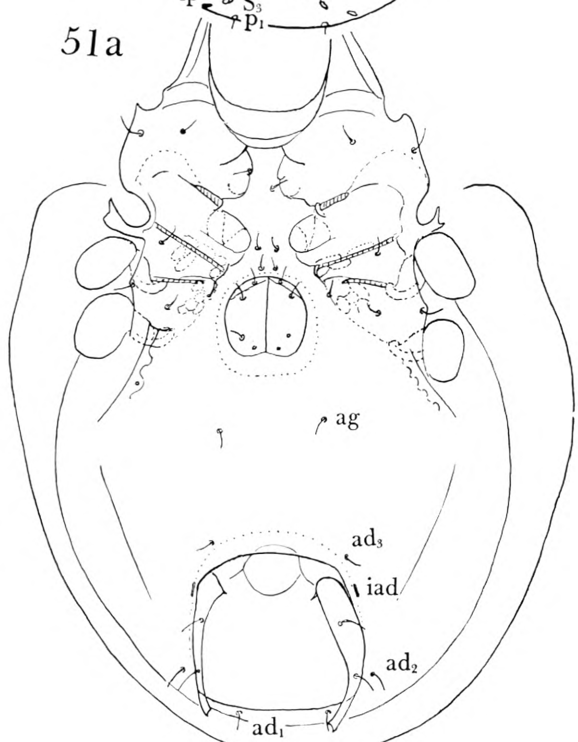
51a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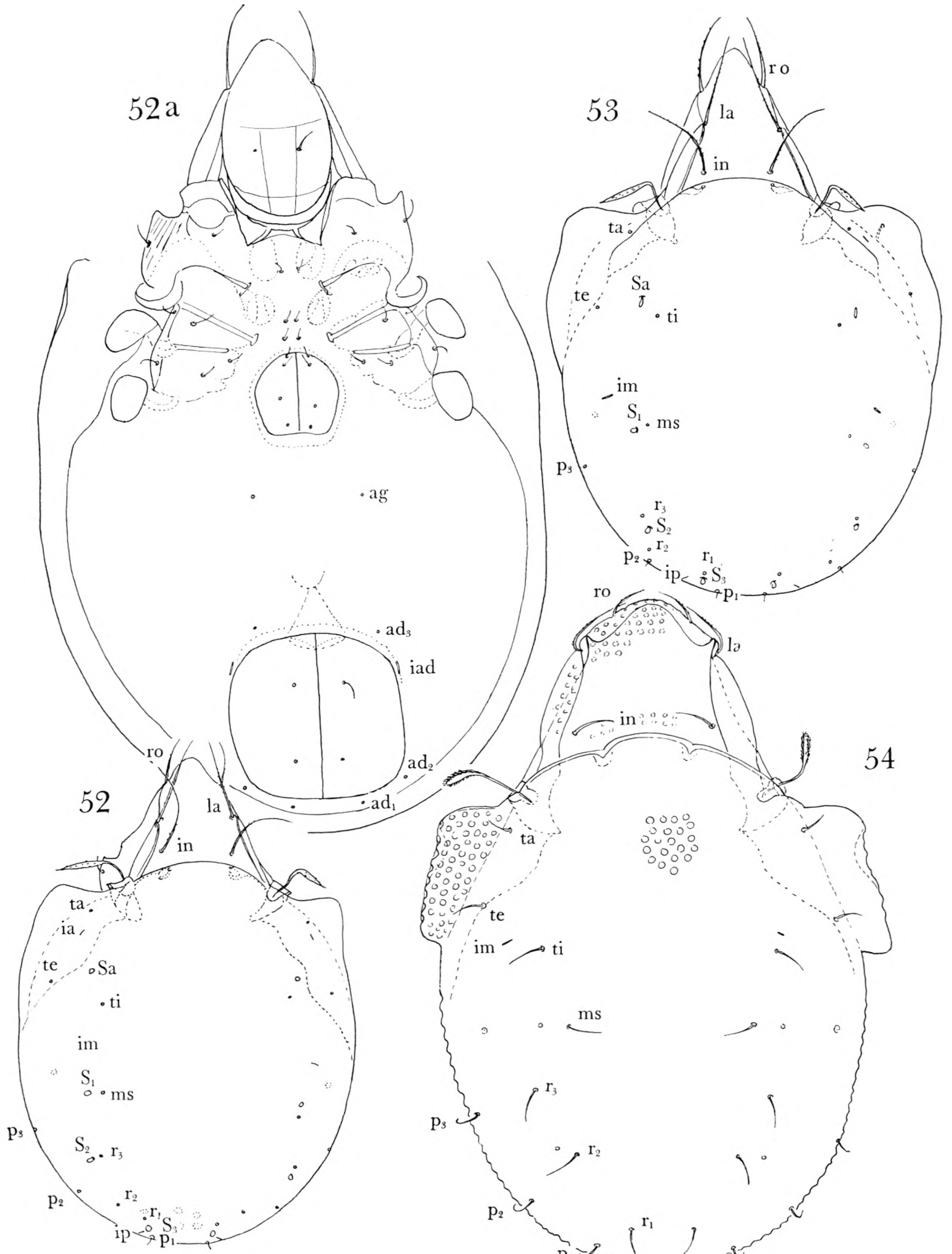
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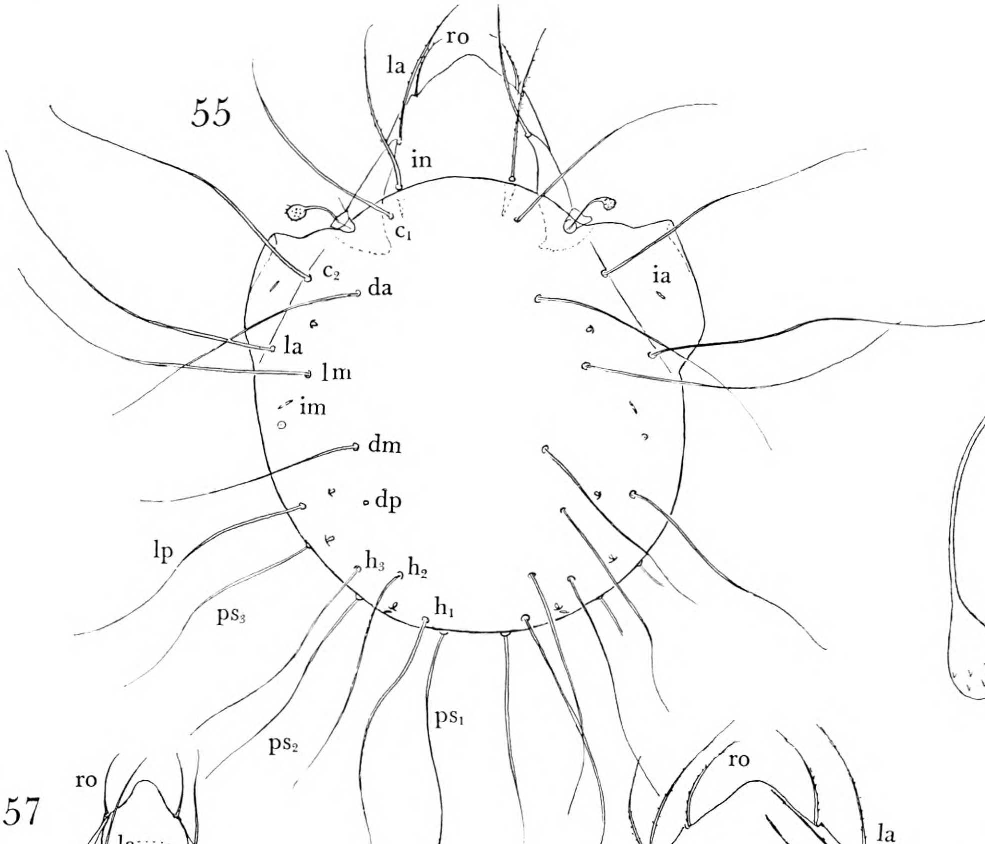
55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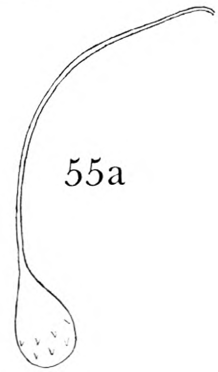
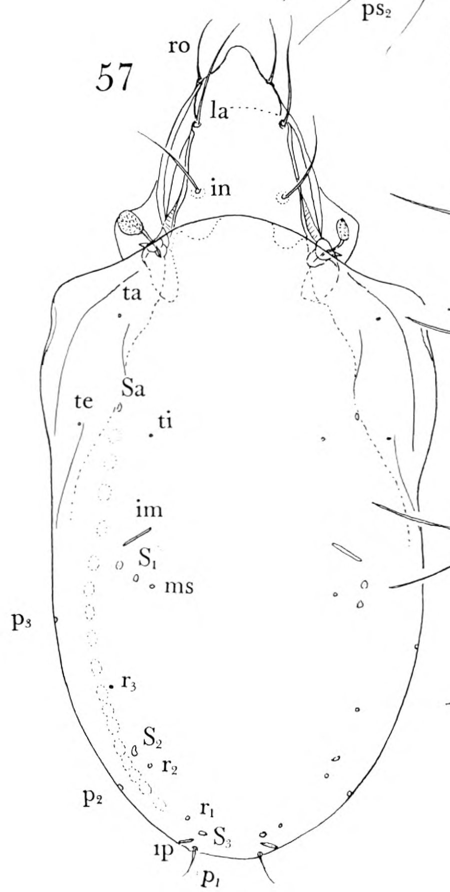


55a

57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S_3
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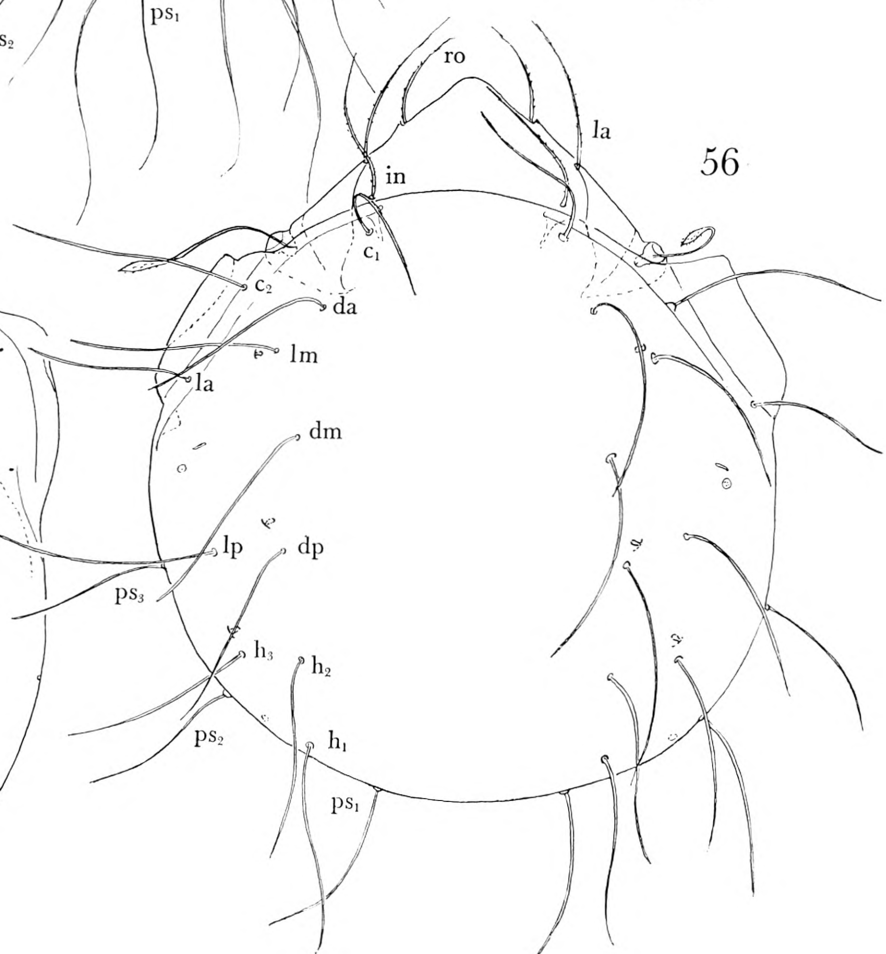
p_1

56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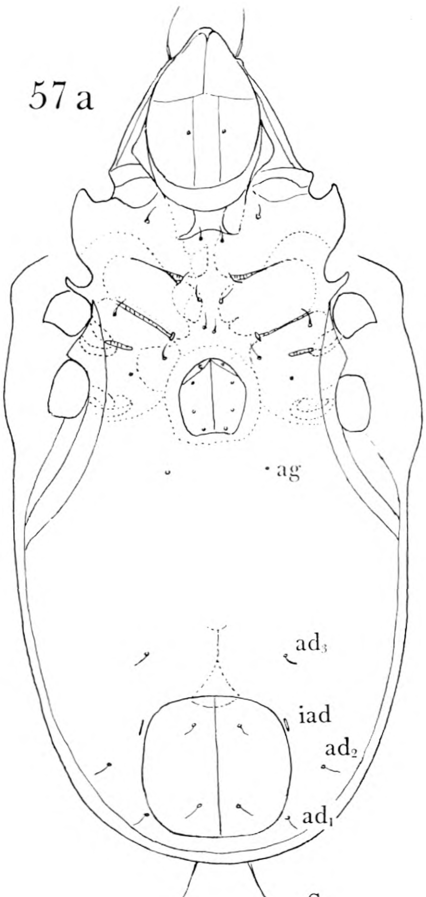
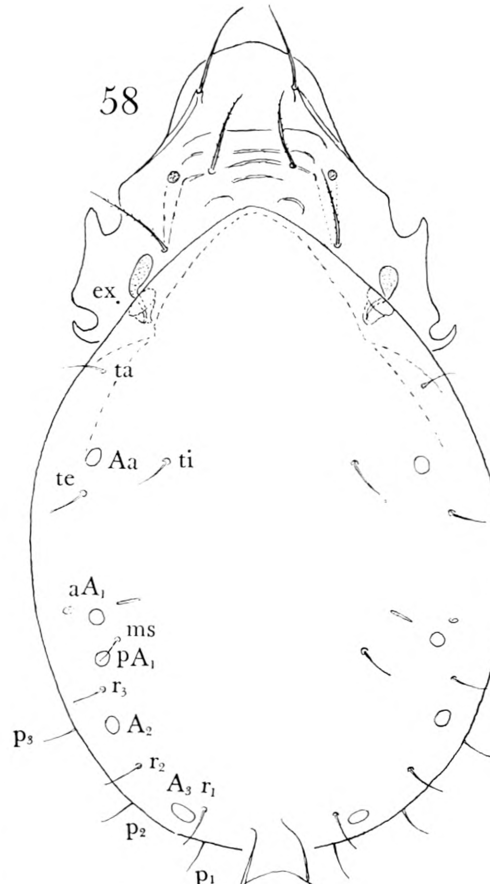
57 a



58



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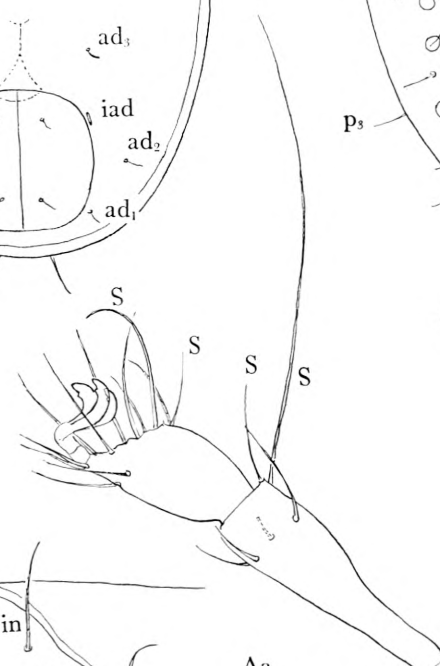

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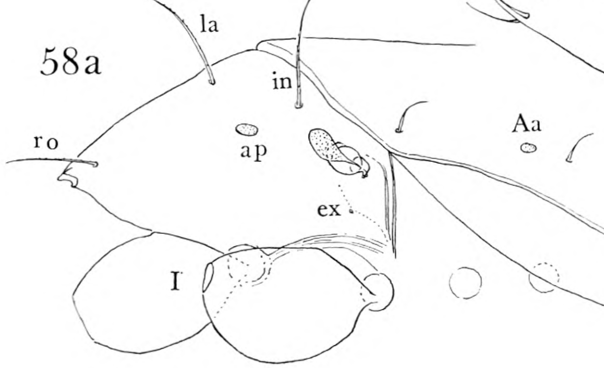

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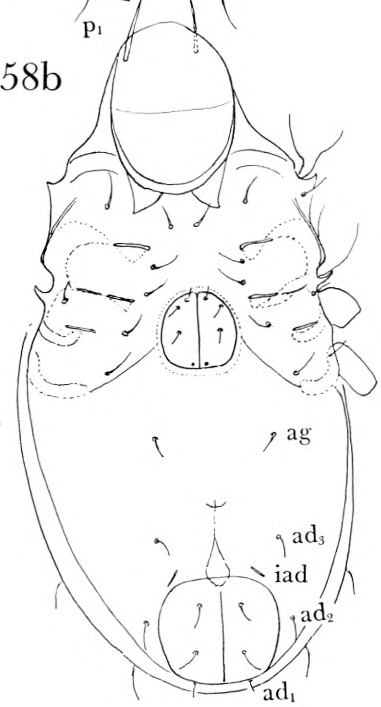

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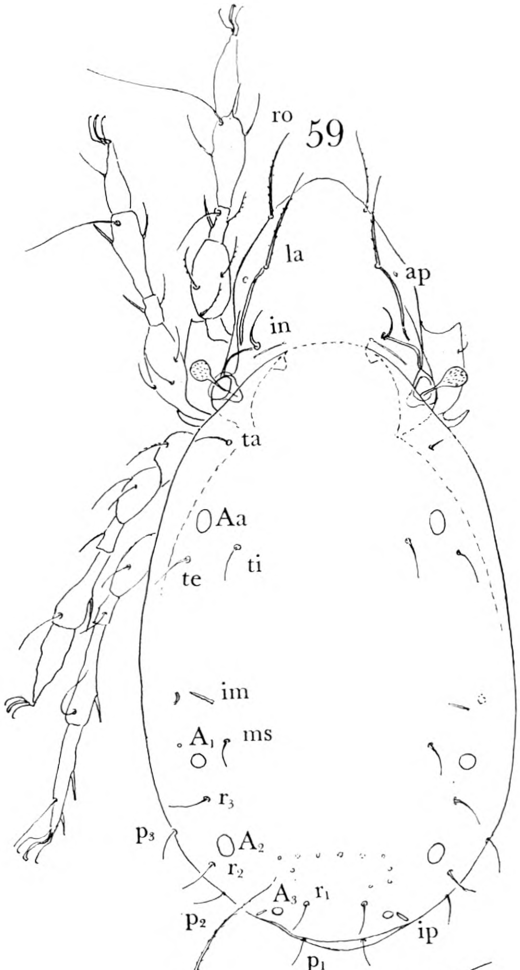
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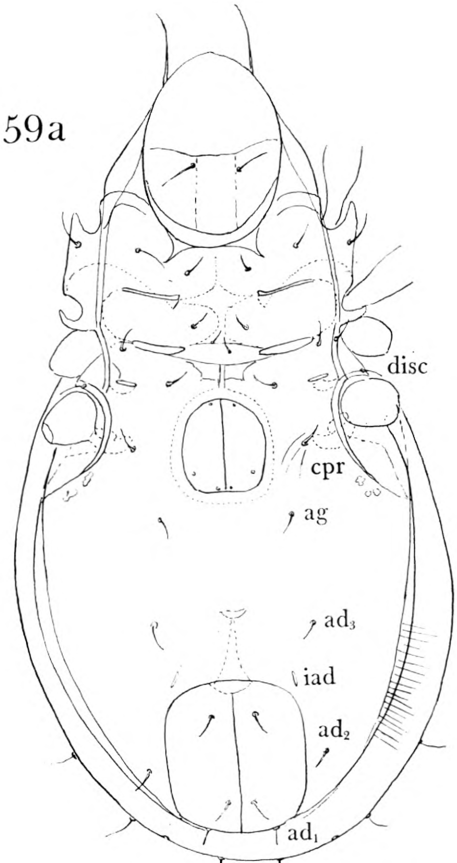
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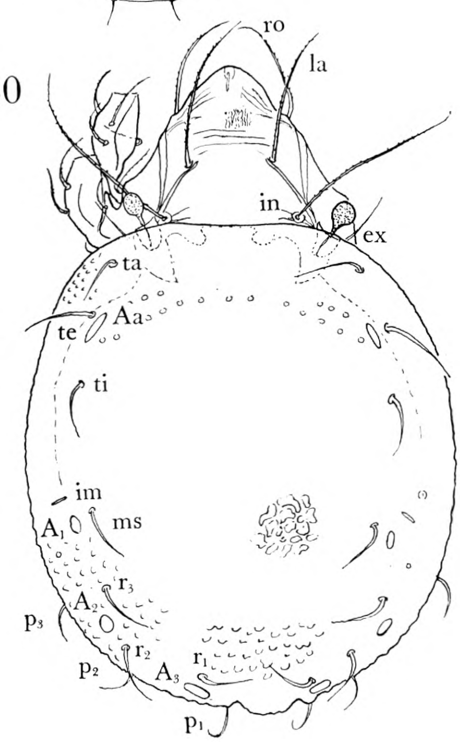
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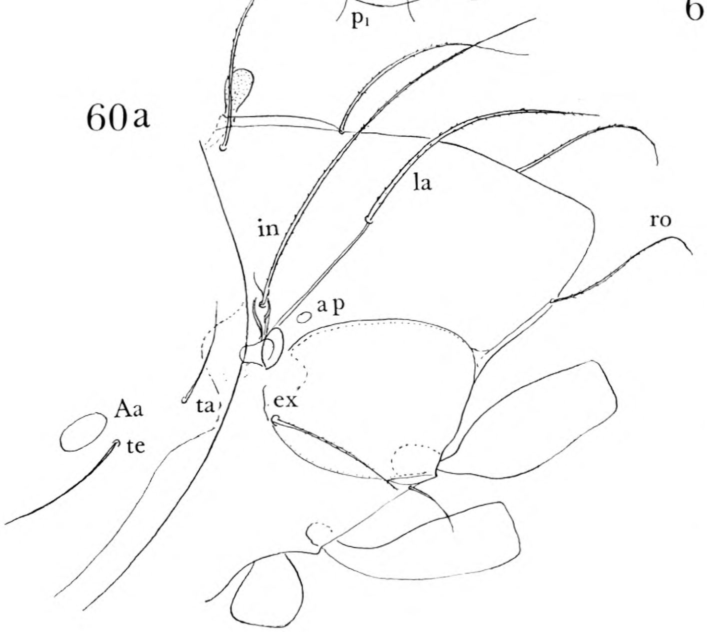
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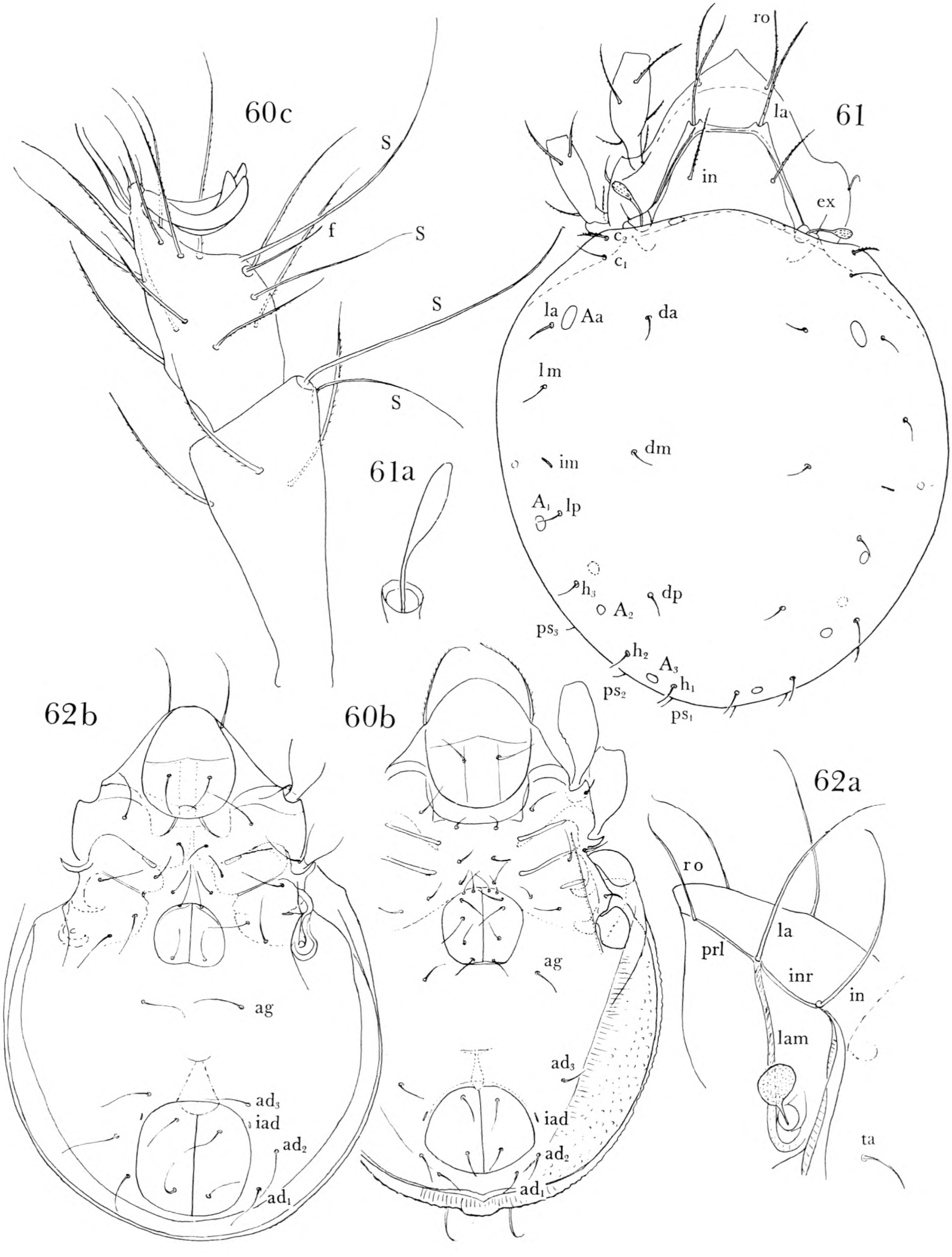
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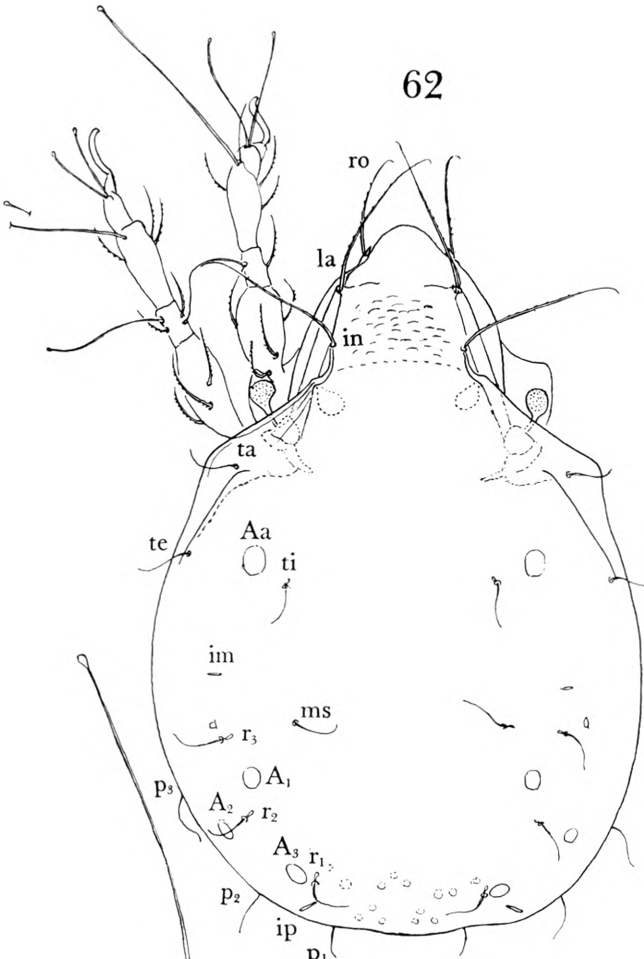

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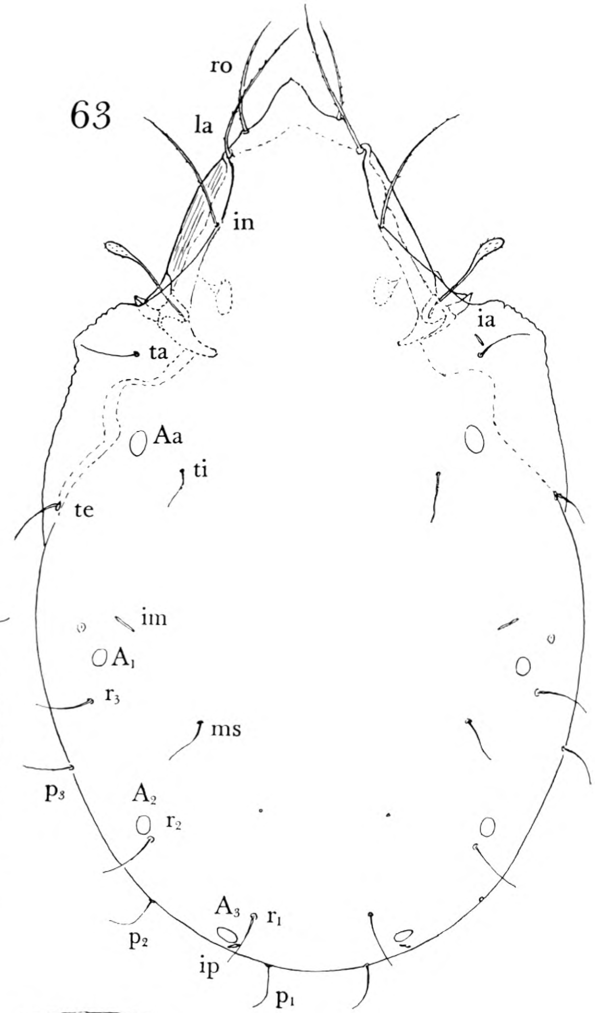

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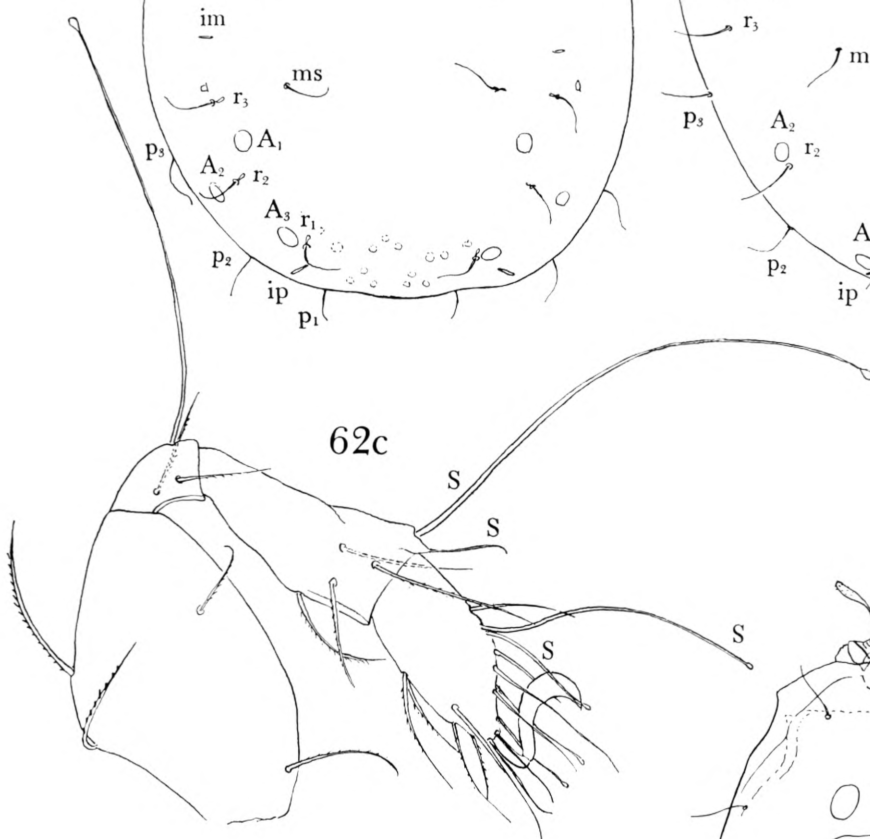

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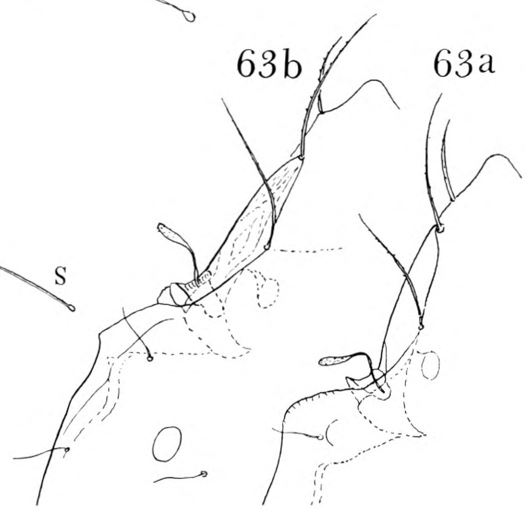

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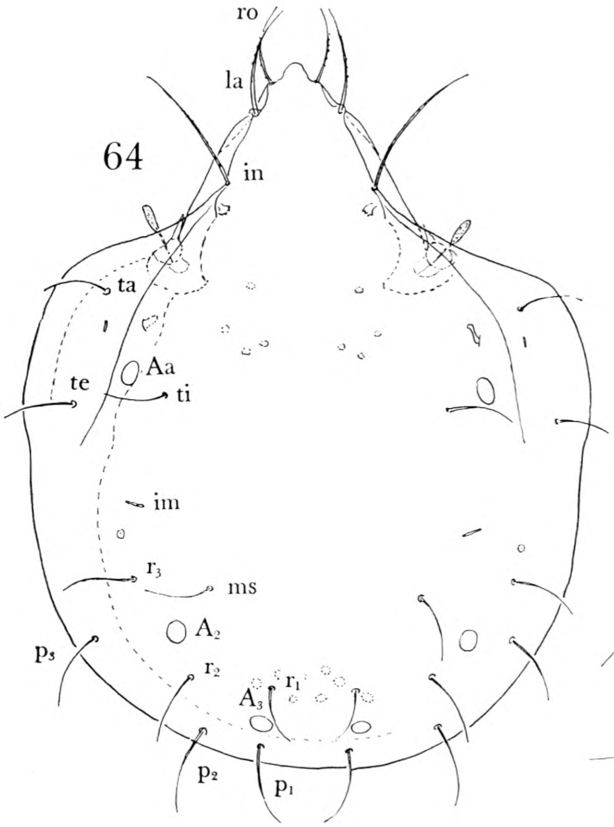

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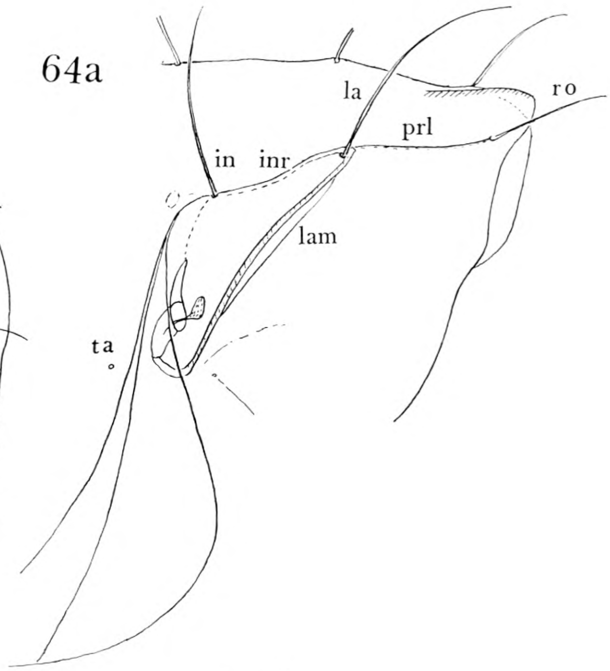

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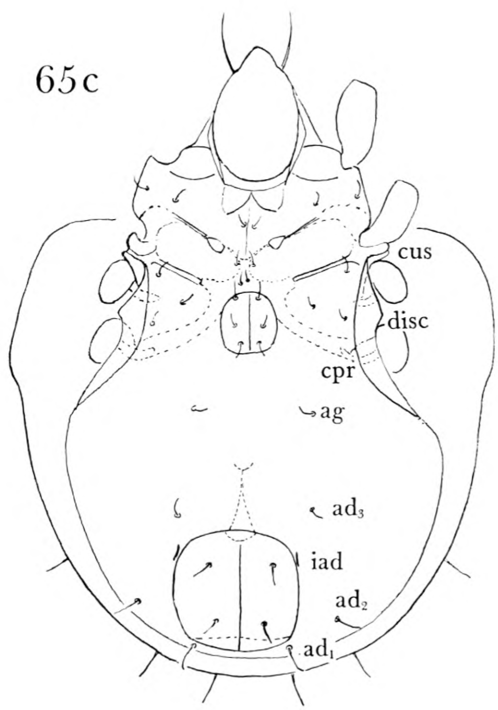

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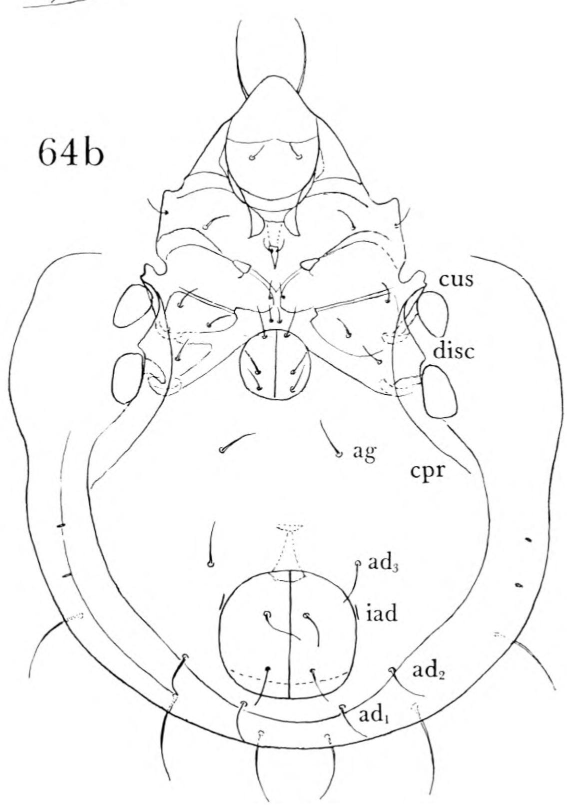

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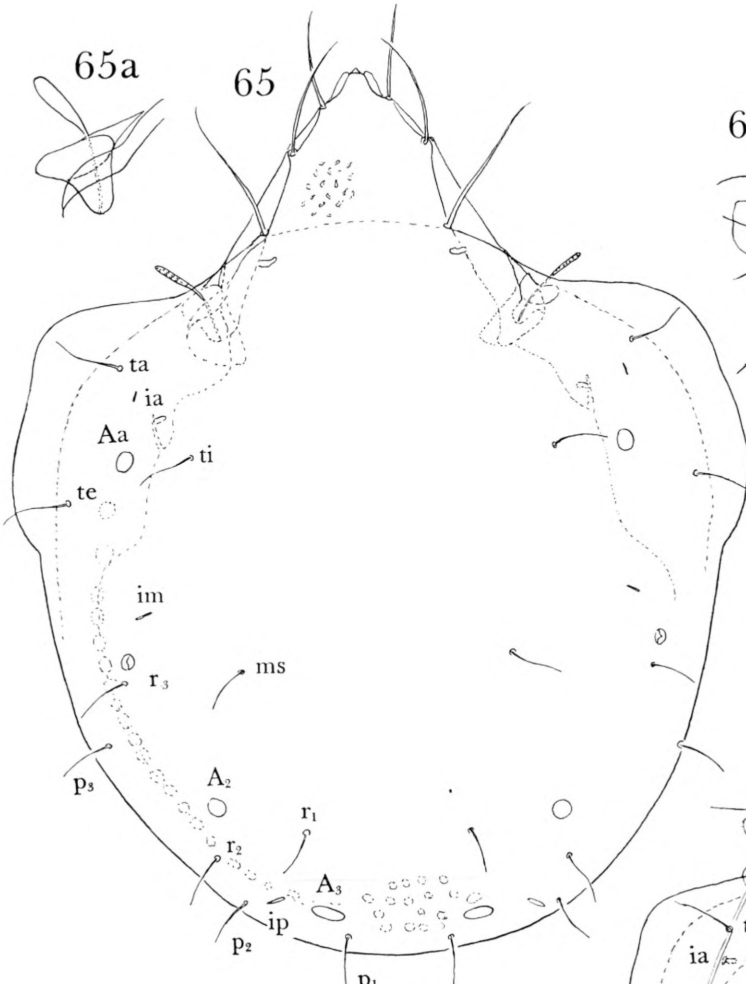

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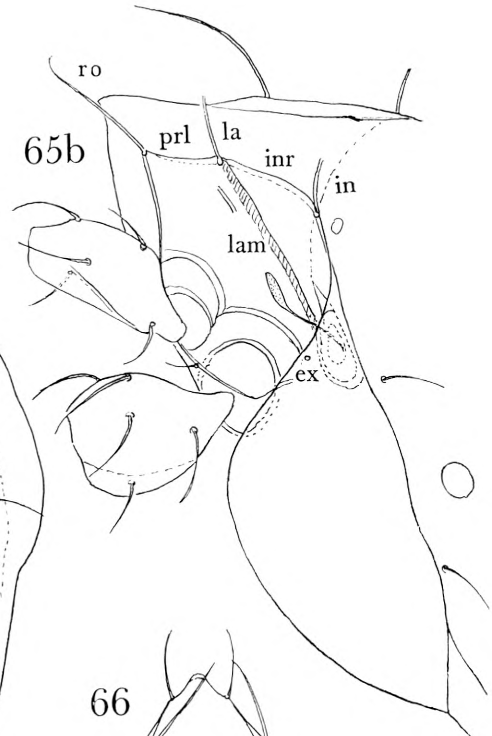

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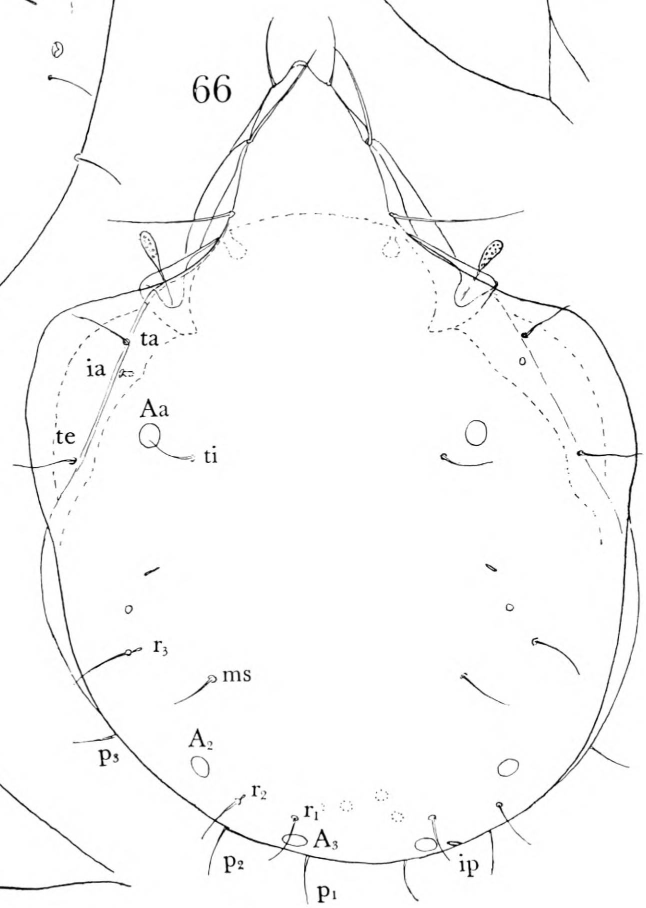

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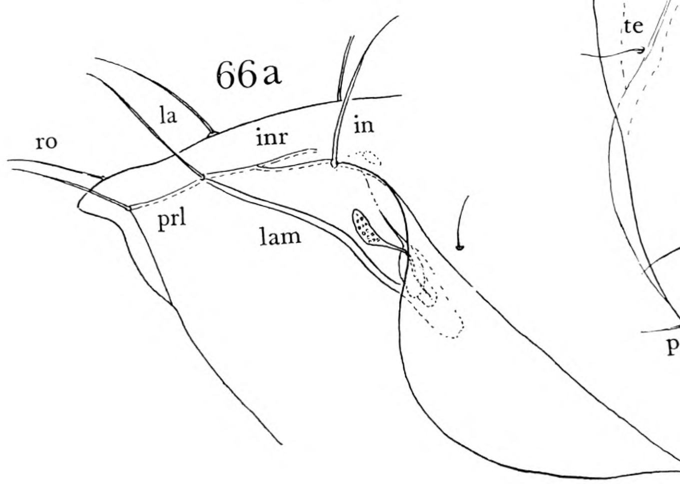

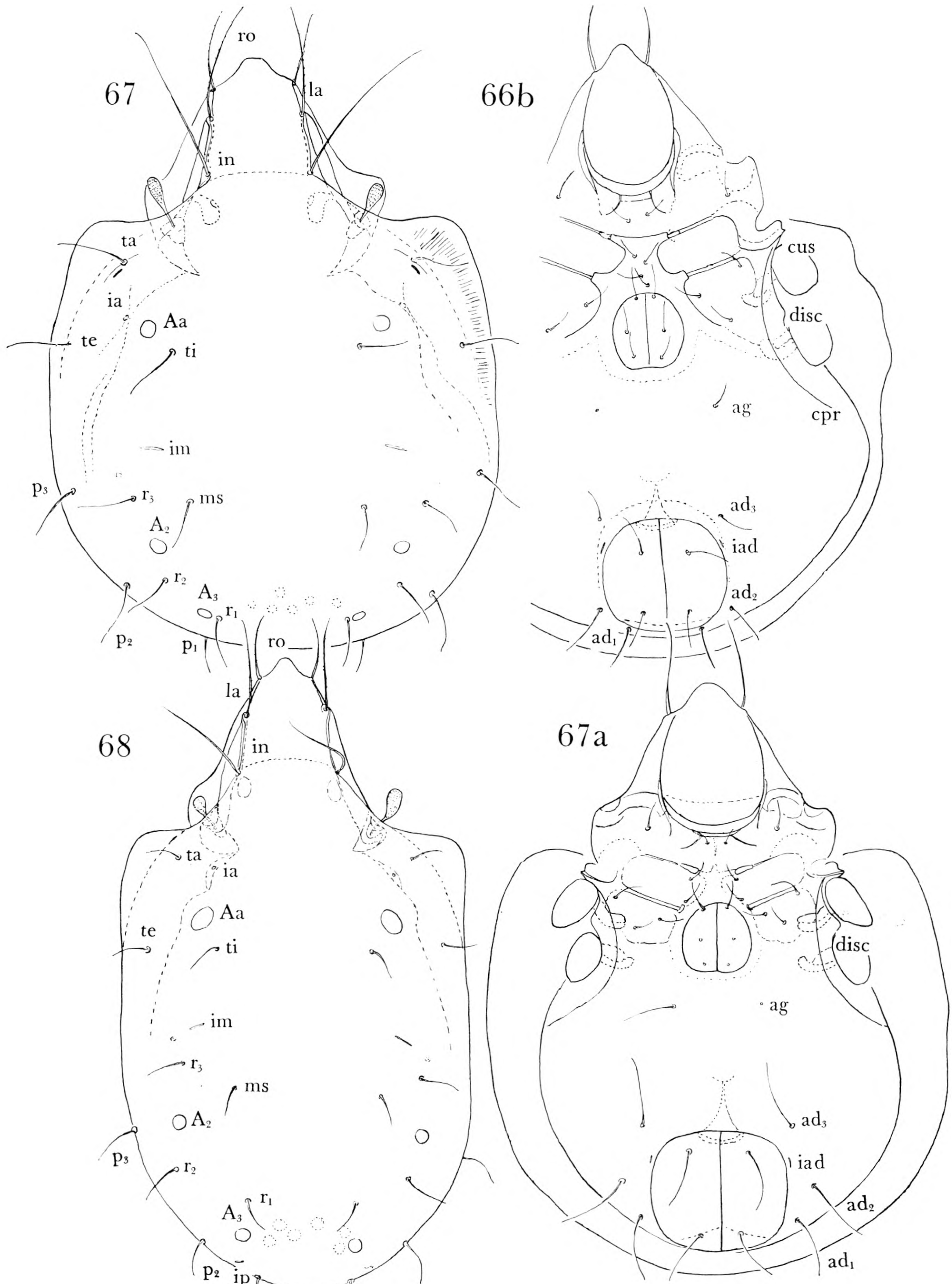
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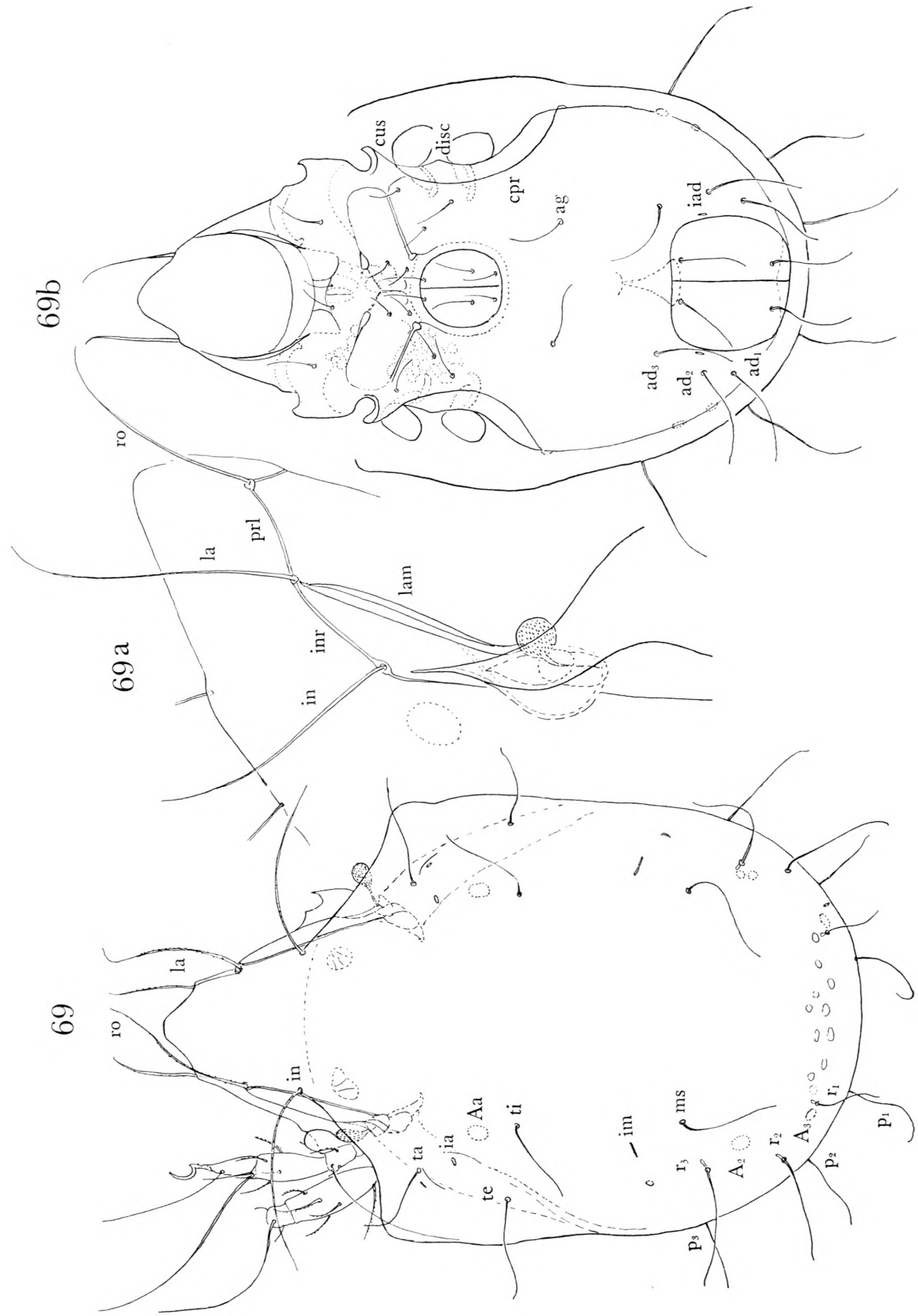
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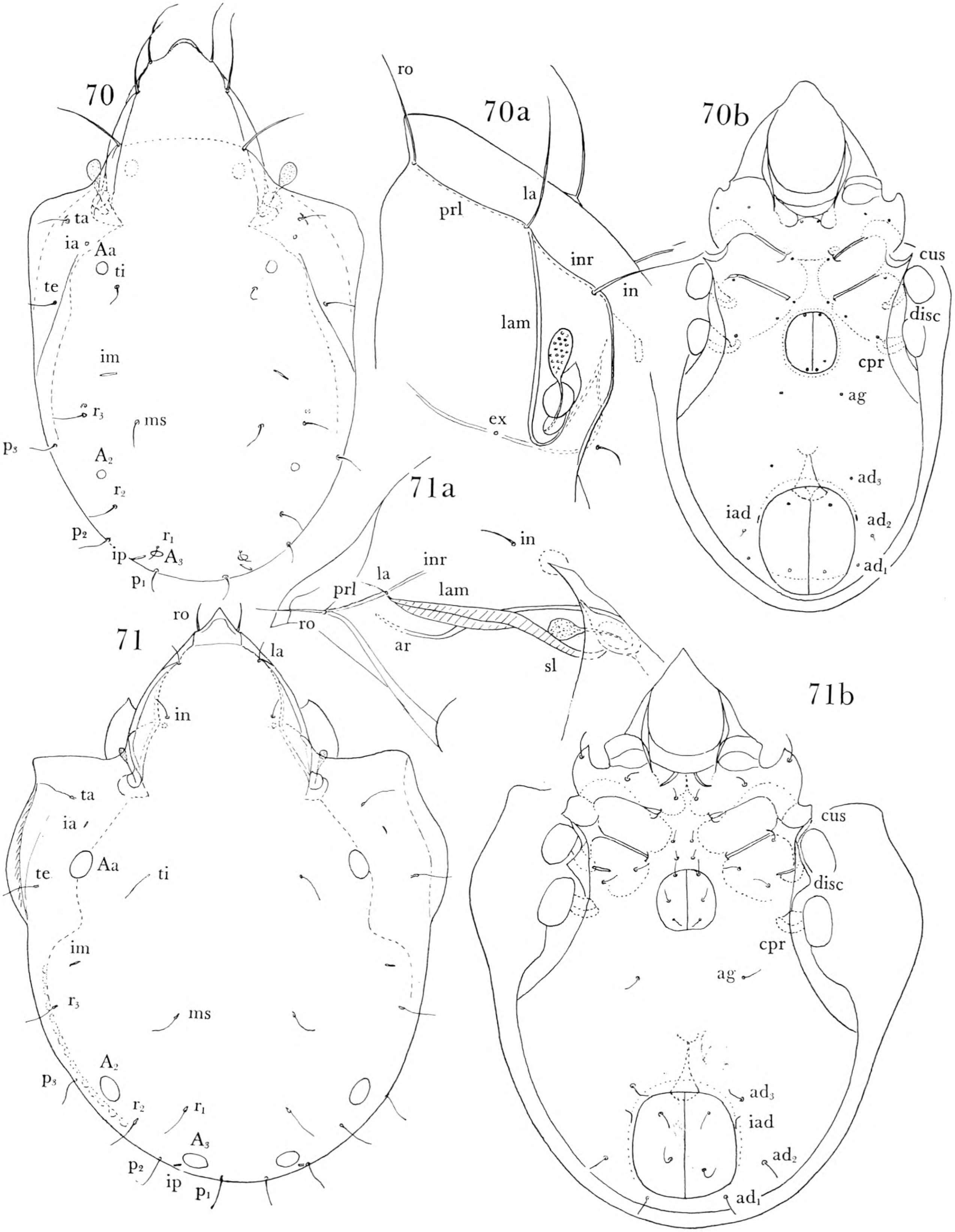
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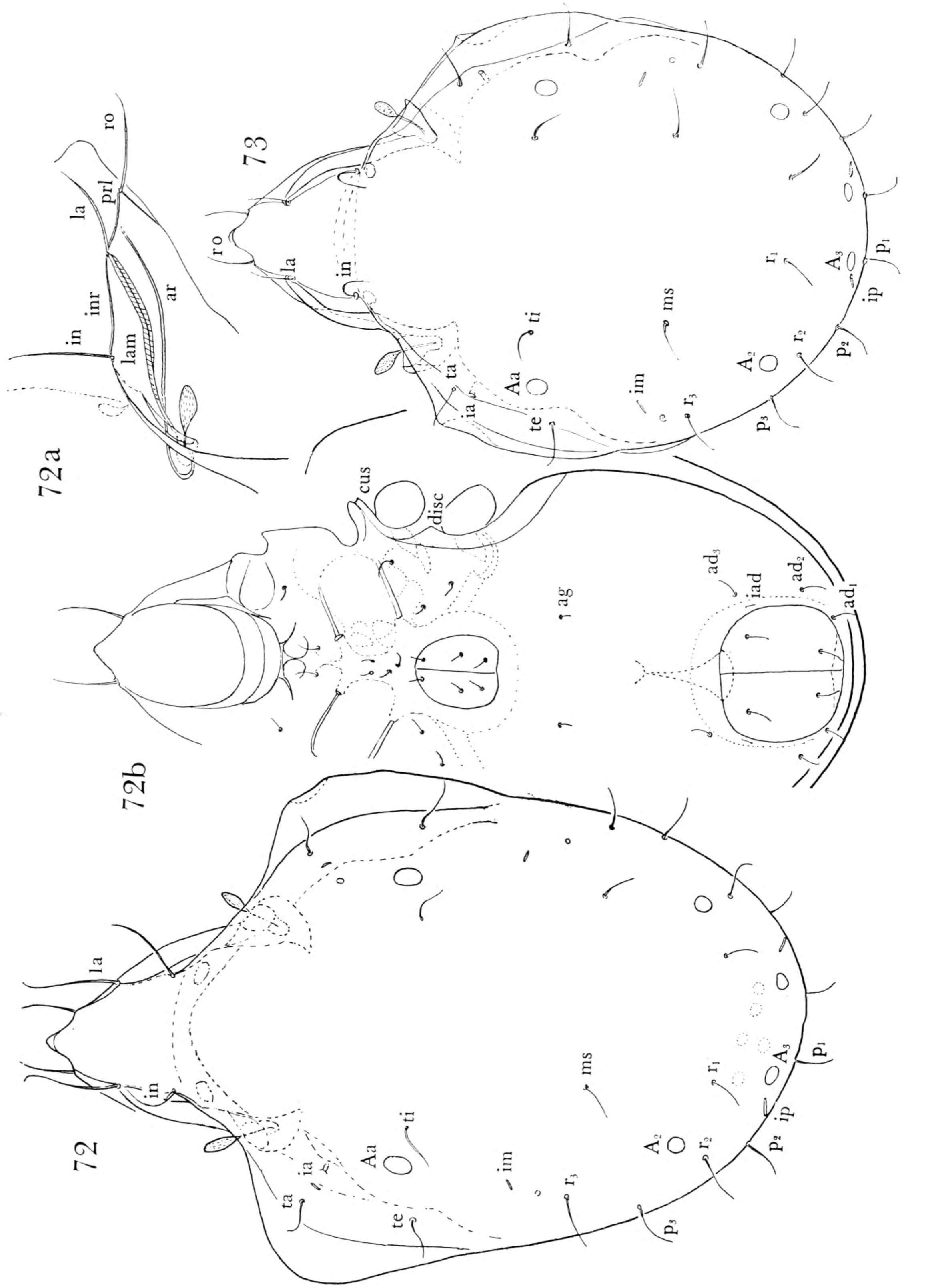
Plate XXXVI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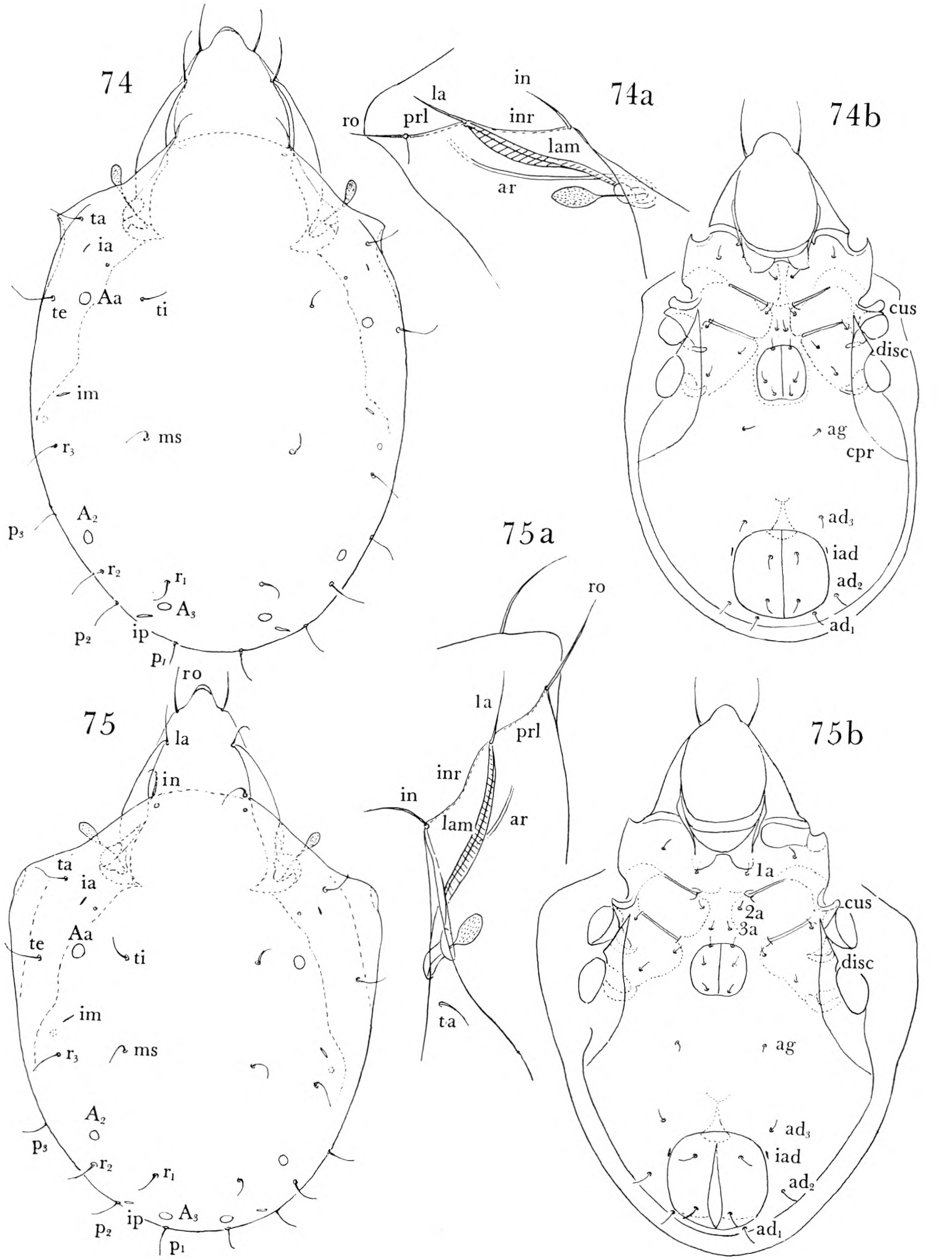
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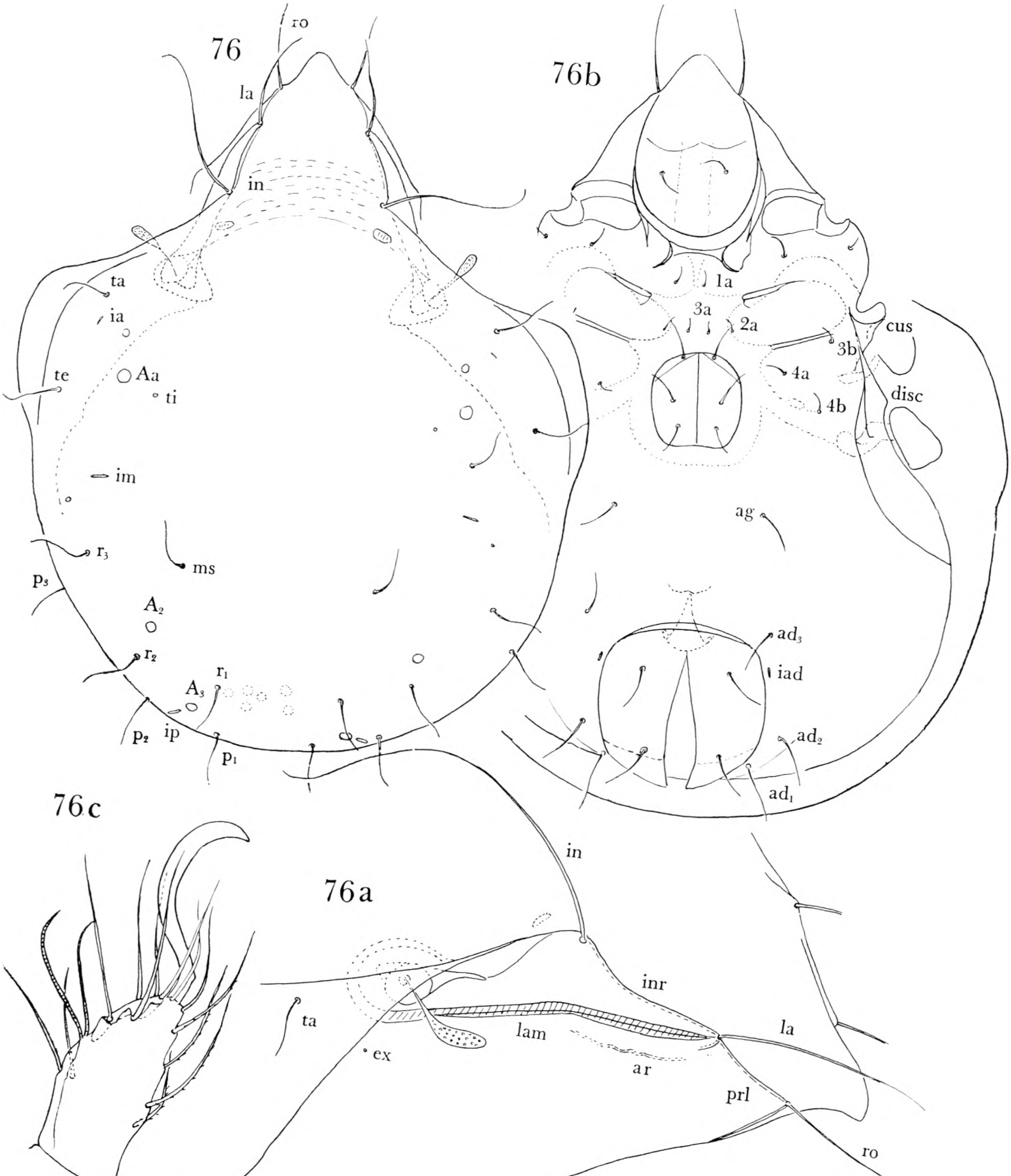
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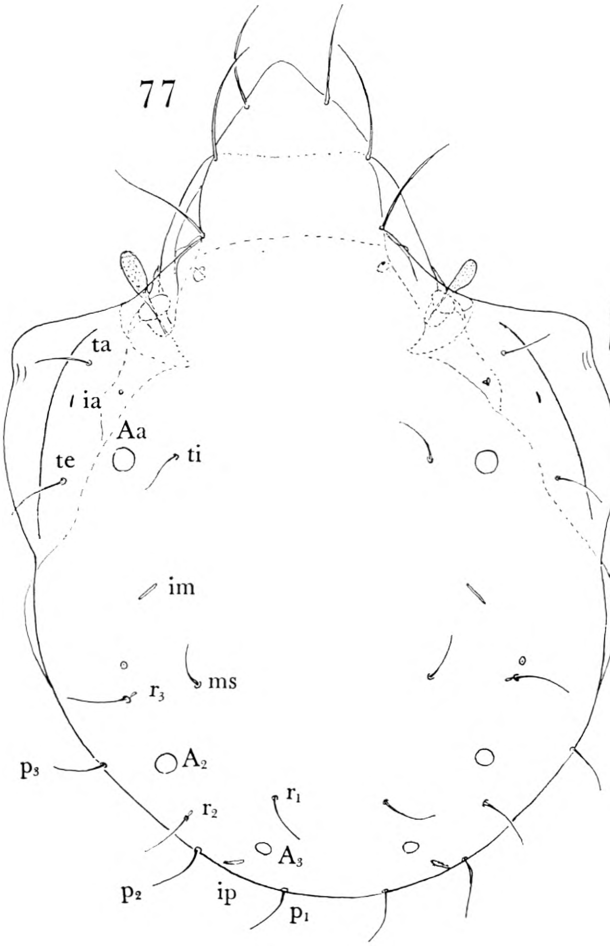

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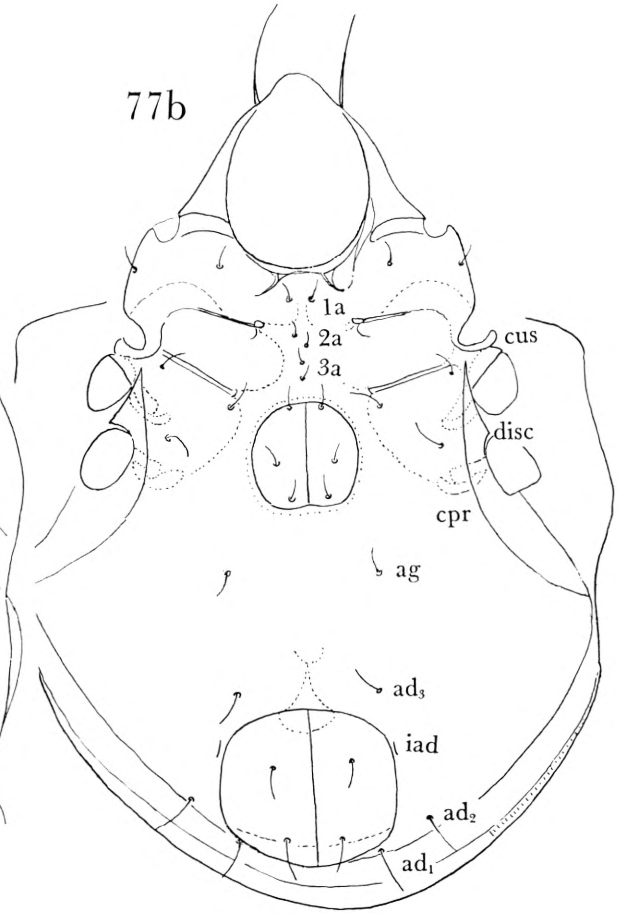

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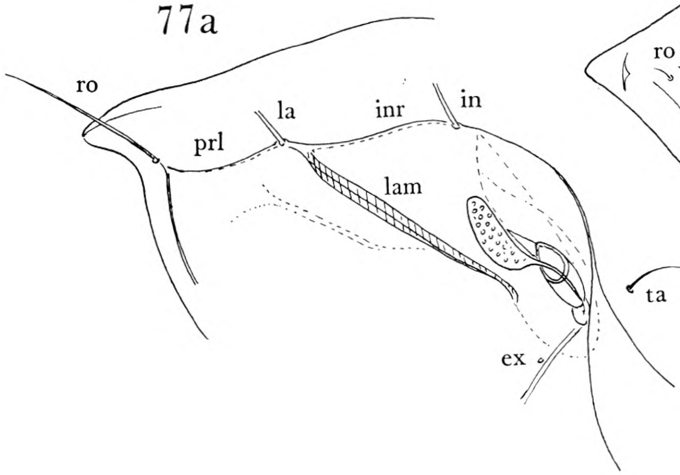

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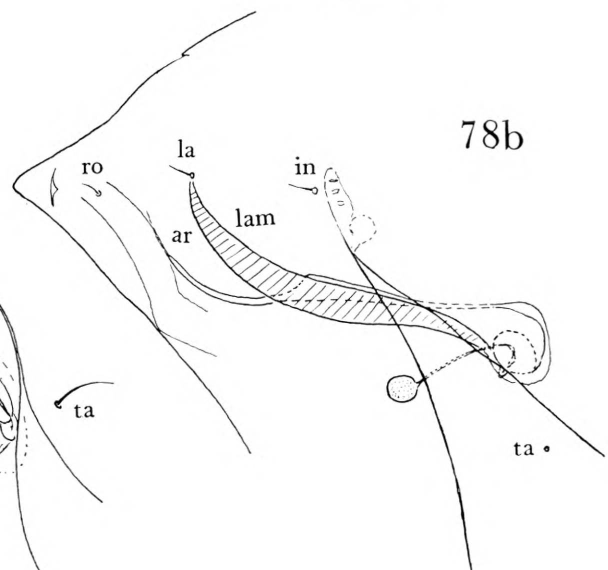

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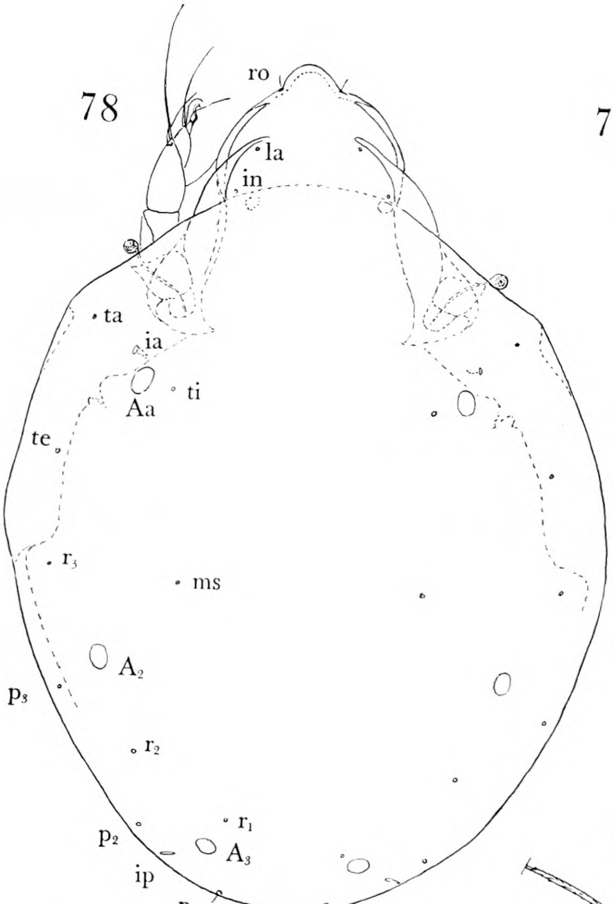
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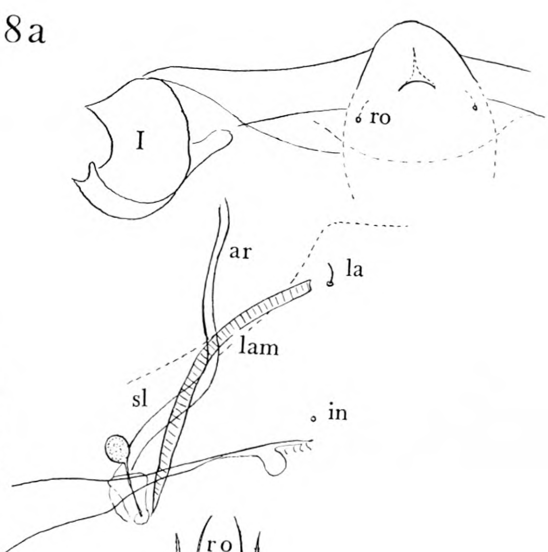
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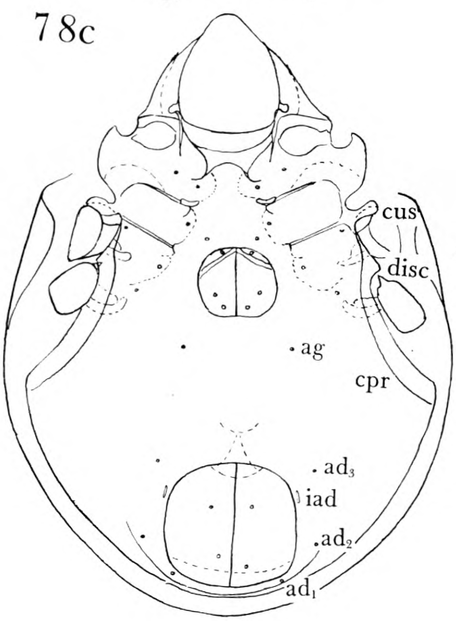
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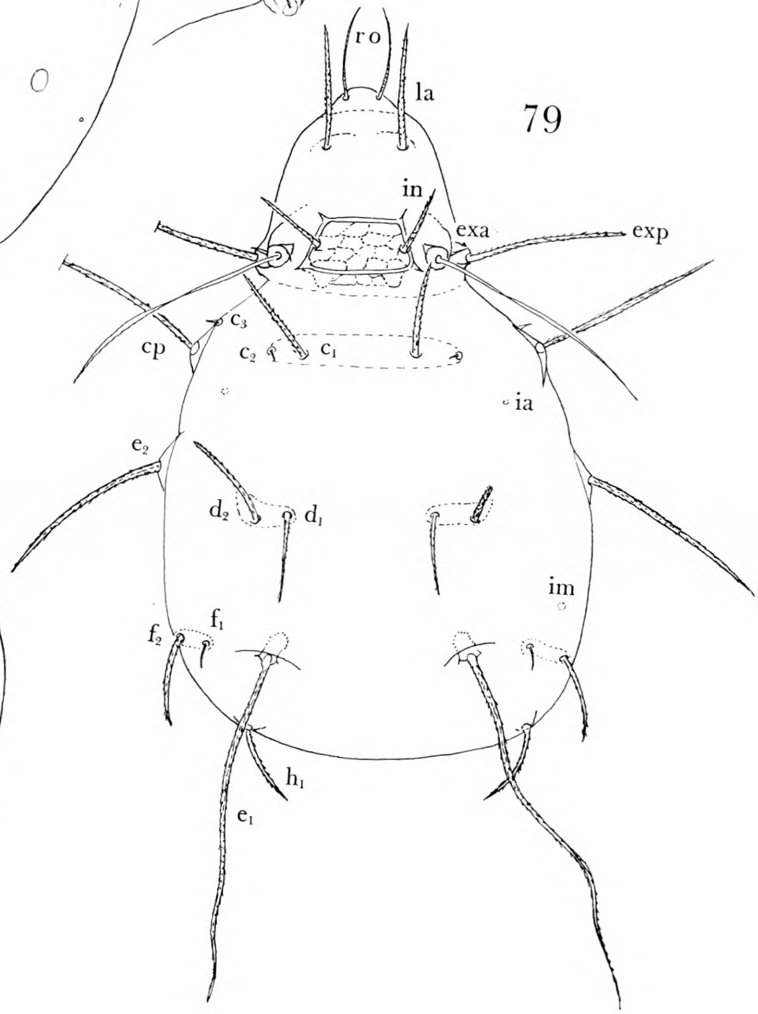
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