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PART I

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Turning now to the Moraceae it may be noted that the family as a whole generally differs from *Scyphostegia* in not usually having paracytic (rubiaceous) stomata, whilst laticiferous canals, unknown in *Scyphostegia*, are characteristic of many members of the Moraceae. The wood of the Moraceae differs from that of *Scyphostegia* in having vessels that are mostly solitary; parenchyma that is typically paratracheal, and usually aliform or confluent. Uniseriate rays are uncommon in the family, and, where they do occur, they are not of the same type as those in *Scyphostegia*. On the other hand the wood of *Scyphostegia* resembles that of both the Moraceae and Monimiaceae in having septate fibres, but this character, although of diagnostic value because of its restricted occurrence, is to be found sporadically throughout the Dicotyledons, and it occurs in families between which there are no close affinities.

Taking all of these facts into consideration, the anatomical evidence seems to suggest that *Scyphostegia* can best be treated as a distinct family the Scyphostagiaceae, having some taxonomic affinities with the Flacourtiaceae.

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#### MATERIAL EXAMINED

Sample 927 from the Botanic Gardens, Penang.

Herbarium specimens collected by J. and M. S. Clemens, reference no. 26062.

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## NOTES ON INDONESIAN FRESHWATER ALGAE II.

*Ichthyodontum*, a new desmid genus from Sumatra.

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#### SUMMARY

Described and figured are *Ichthyodontum*, a new genus belonging to the desmidiaceous algae, with *I. sachlanii*, a new species with its new variety *parorthium*, showing a peculiar bipolarity. From southern Sumatra.

#### *Ichthyodontum* Scott & Prescott, *gen. nov.*

Cells elongate-cylindric and rectangular in front view, the poles truncate and bearing at each angle a blunt spine or tooth which may be either vertically or laterally directed, the apical margin with a shallow median notch or depression; semicells slightly swollen at the base, with a circumferential supraisthmian row of blunt teeth, the two series of teeth intermeshing and completely enclosing the shallow median incision; side view of cell elongate subfusiform; basal view broadly elliptic.

Cellulae a fronte visae elongato-cylindricae reetangularesque, polis truncatis et in utroque angulo spinam obtusam vel dentem verticaliter lateraliterve directum ferentibus, margine apicali incisuram medianam non profundam vel depressionem praebente; semicellulae ad basim subinflatae dentibus obtusis in ordine circumferentiali supraisthmiali praeditae, dentibus amborum ordinum implexis et incisionem medianam non profundam omnino includentibus; cellula a latere visa elongato-subfusiformis; a basi visa late elliptica.

#### *Ichthyodontum sachlanii* Scott & Prescott, *spec. nov.*—Fig. 1

Cells of medium size, length 6 to 7 times the width, in front view elongate-cylindric and decidedly curved, apices truncate with a shallow median subcircular notch with a prominent tubercle at each side on the margin, each apical angle bearing a stout upwardly directed tooth that is prolonged into a sharp fine spine; semicells slightly swollen at the base with one lateral margin more inflated than the other, and bearing a supraisthmian row of 10 longitudinal folds (5 showing) which bear each a prominent basally directed tooth, the teeth of one semicell intermeshing (not interlocking) with those of the other, thus completely enclosing the shallow median incision of the cell; cell wall sparsely punctate and having

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a pair of horizontally disposed mucilage pores just below the apical margin; lateral view elongate-subfusiform with the poles broadly rounded and showing an apical spine, and with a pair of opposite mucilage pores in the wall, the bases of the semicells slightly tumid, with a row of intermeshing teeth encircling the median incision; basal view broadly elliptic with 10 marginal undulations, an intramarginal ellipse of 10 small circles representing the end view of the basal teeth, and an inner ellipse representing the opening of the isthmus; chloroplast a plate or ribbon (?) containing a row of 5 or 6 prominent pyrenoids. Length including spines 142—150  $\mu$  (x, maximum width 19—22 p., maximum thickness about 2 y, less than the maximum width, width at poles 22—24 p., size of opening in isthmus (1 specimen) 12 x 10 p. The type of the species is designated as the plant shown in our figure 1.

Cellulae mediocres, 6—7-plo longiores quam latae, a fronte visae elongato-cylindricae et perspicue curvatae; apices truncati incisura media subcirculari non profunda, tuberculum prominens utrimque in margine habente, praediti, utroque angulo apicali dentem crassum sursum directum, in spinam acutam tenuem productum, ferente; semicellulae ad basim subinflatae, uno margine laterali plus inflato quam altero, et ordinem supraisthmialem 10 plicarum longitudinalium (5 visibilium) praebentes, plica quaque dentem prominentem basaliter versum ferente, dentibus unius semicellulae illis alterius, ut incisionem mediam non profundam omnino includant, alternantibus ac implexis; membrana cellulae sparse punctata, pari pororum mucosorum horizontaliter dispositorum, admodum infra marginem apicalem praedita; cellulae a latere visae elongato-subfusiformes, polis late rotundatis, spina apicali atque pari pororum mucosorum oppositorum in membrana praeditis; basibus semicellularum subtumidis, ordinem dentium implexorum incisionem mediam cingentium habentibus. Semicellulae a basi visae late ellipticae, 10 undulationes marginales, et ellipsem intramarginalem 10 circulorum parvorum (aspectum a polo dentium basalium) et ellipsem interiorem (foramen isthmi) praebentes; chloroplastus laminaeformis taeniaeformisve (?) ordinem 5 vel 6 pyrenoideorum prominentium continens. Longitudo cellulae cum spinis 142—150 $\mu$ , latitudo maxima 19—22 $\mu$ , crassitudo maxima ca. 2  $\mu$ , minor quam latitudo maxima; latitudo ad polos 22—24  $\mu$ , magnitudo foraminis in isthmo (uno in specimine) 12 x 10  $\mu$ . Typus speciei ut planta in figura nostra 1 depicta designatur.

ICHTHYODONTUM SACHLANI var. parorthium Scott & Prescott,  
var. nov.—Fig. 2

Cells of medium size, length about 6 times the width, in front view elongate-cylindric and almost but not quite straight, apices truncate and slightly elevated with a shallow median depression, each apical angle produced laterally into a stout tooth that bears a sharp, fine, downwardly curved spine; semicells slightly swollen at the base with one lateral margin more inflated than the other and bearing a supraisthmian row of 10 longi-

tudinal folds (5 showing) which bear each a prominent basally directed tooth, the teeth of one semicell alternating and intermeshing (not interlocking) with those of the other, thus completely enclosing the shallow median incision of the cell; cell wall sparsely punctate and having a pair of horizontally disposed mucilage pores just below the apical margin; lateral view elongate-subfusiform with the poles broadly rounded with a tubercular swelling, and with a pair of opposite mucilage pores in the wall, the bases of the semicells slightly tumid, with a row of intermeshing teeth encircling the median incision; basal view broadly elliptic with 10 marginal undulations, an intramarginal ellipse of 10 small circles representing the end view of the basal teeth, and an inner ellipse representing the opening of the isthmus; chloroplast a plate or ribbon (?) containing a row of 5 or 6 prominent pyrenoids. Length 132—136  $\mu$ , maximum width 22—24  $\mu$ ; maximum thickness about 2 p. less than the maximum width, width at poles 17—21  $\mu$ , size of opening in isthmus about 12 x 10  $\mu$ . The type of the variety is designated as the plant shown in our figure 2.

Cellulae mediocres, ca. 6-plo longiores quam latae, a fronte visae elongato-cylindricae, fere sed non omnino rectae; apices truncati et aliquantum elevati, depressionem mediam non profundam habentes, utroque angulo apicali lateraliter productum in dentem crassum, spinam tenuem acutam deorsum curvatam ferentem; semicellulae ad basim subinflatae, uno margine laterali plus inflato quam altero, et ordinem supraisthmialem 10 plicarum longitudinalium (5 visibilium) praebentes; plica quaque dentem prominentem basaliter versum ferente, dentibus unius semicellulae illis alterius tam alternantibus et implexis ut incisionem cellulae mediam non profundam omnino includant; membrana cellulae sparse punctata, pari pororum mucosorum horizontaliter dispositorum admodum infra marginem apicalem praedita; cellulae a latere visae elongato-subfusiformes, polis late rotundatis inflations tuberculari et pari pororum mucosorum oppositorum in membrana praeditis; basibus subtumidis, ordine dentium implexorum incisionem mediam circumdantium praeditis; semicellulae a basi visae late ellipticae, 10 undulationes marginales, et ellipsem intramarginalem 10 circulorum parvorum (aspectum a polo dentium basalium), et ellipsem interiorem (foramen isthmi) praebentes; chloroplastus laminaeformis taeniaeformisve (?) ordinem 5 vel 6 pyrenoideorum prominentium continens. Longitudo cellulae 132—136 $\mu$ , lat. max. 22—24  $\mu$ , crass. max. ca. 2  $\mu$  minor quam lat. max., lat ad polos 17—21  $\mu$ , foramen isthmi ca. 12 x 10 $\mu$ . Typus varietatis ut planta in figura nostra 2 depicta designatur.

Among the many samples of freshwater algae sent to us by Mr. M. Sachlan, of the Laboratory for Inland Fisheries at Bogor, Java, there were two of special interest, not only for their content of many unusual and little-known desmids, but because they contained the strange new genus described herein. These samples were collected from a swamp near the town of Menggala, South Sumatra, about 75 km. north of Telukbetung



at the extreme southern end of the island. One sample was taken from open water, whereas the other was collected just above submerged vegetation; the pH of both was 6.5. There was no difference in the desmid-content of the two vials.

During our preliminary examination of this material we came upon the very peculiar desmid shown in Figs. 3, 4 and 5. It is extremely rare, and a search of perhaps 25 slides revealed only 7 specimens. All of them were alike, except for very small variations in size. There are several peculiarities that are apparent at first glance. First is the unusual curvature of the whole cell, and the different degree of curvature of the two semicells, one being almost straight and the other decidedly and asymmetrically curved. Second, the structure of the two poles is different, one of a fishtail shape with a small circular incision nearly but not quite in the center, and the other having the angles produced laterally, the center slightly raised and with a small shallow depression in the center. Third, the large intermeshing teeth at the base of the semicells. (Note that we have intentionally used the word 'intermeshing' instead of 'interlocking'. Even in the filamentous desmids like *Onychonema* and *Micrasterias foliaceae*, whose apical processes are described as interlocking, there is not, and cannot be, any real 'lock' between adjacent cells). Fourth, the existence of two large mucus pores just below the apices. Such a combination of characters is not possessed by any existing desmid genus, though the individual characters are to be found in several different genera. Curved cells are almost universal in *Closterium*, in certain species of *Mesotaenium* and *Roya*, in some local forms of *Triploceras gracile*, and one or two species of *Pleurotaenium*. The 'fishtail' pole suggests *Ichthyocercus*, and indeed the overall appearance of the plant has a certain general resemblance to this genus, particularly *I. longispinus*. Semicells of *Docidium* and some species of *Euastrum* have basal teeth; in *Euastrum* the teeth sometimes overlap slightly, but they never intermesh completely as in the new plant. In *Euastrum* there are also some species with polar structures similar to those illustrated, and the two pairs of mucus pores are a *Euastrum* characteristic.

In all the specimens seen by us the chloroplast had deteriorated to such an extent that its structure could not be determined, though it seems to be an axile plate or ribbon. Two or three examples still showed the pyrenoids, which appear to be either five or six in each semicell, arranged along the axis.

Because of the discovery by Scott, about a year previously, of the genus *Amscottia* from Brazil, of which all the 100 or more specimens

possessed unlike semicells, it was thought that the new plant from Menggala was of a similar nature. Sketches of it were sent to the late Dr W. Krieger in Germany, to Dr Rolf Grönblad in Finland, and to Lektor Einar Teiling in Sweden, all of whom replied that in their opinions the unique features of the plant justified the creation of a new genus. In the meantime our examination had been continuing, and altogether we had found 14 specimens, while another 10 specimens had been seen by Sachlan, providing a total of 24 all alike and with differing semicells. But the 25th specimen, shown in our Fig. 1, proved a surprise, because both semicells were alike, with poles of the fishtail type. It then became evident that there probably existed another form with both poles of the slightly elevated type and with laterally produced angles, so a deliberate hunt for it was started. After several days of rather tedious search a single example was found, illustrated in our Fig. 2. Clearly, then, the first 24 specimens were dichotypical cells, combinations of what may be called the two different 'basic' types.

In view of the exceptional interest of this plant, we asked Mr Sachlan to try to obtain some living material that could be submitted to experts for culture. We suggested that he take a number of samples from various places in the swamp, and particularly squeezings from as many different aquatic plants as possible, since squeezings generally yield a greater number of individuals and a wider diversity of desmid species than do plankton collections. In April 1955 Mr Sachlan very kindly revisited the swamp at Menggala and made 32 collections from, different places, including squeezings from *Limnanthemum indicum*, *Najas*, *Cabomba*, *Utricularia* and grass, also some plankton samples. He sent 13 of the best collections to us, two tubes containing living specimens of the new desmid to Dr Paavo Kallio at the University of Turku, Finland, and two more with living specimens to Dr Richard C. Starr at Indiana University, U.S.A. Although they were sent by airmail, the samples when received in Finland were in poor condition, with many of the desmids dead or dying. Dr Kallio found a few specimens of the dichotypical cells but they failed to survive when transferred to a culture medium, though some other larger and apparently more robust desmids lived and were thriving nicely at last reports. The material in the two tubes sent to Dr Starr was in even worse condition, no doubt owing to the longer time in transit, and he was unable to induce any of the desmids to develop.

In the 13 samples received by us during 1955 the new plant is still so extremely rare that it is not possible to draw any conclusions as to whether one of the macrophyte habitats was more favorable than others.



Specimens of the new desmid have been found in Sachlan's collections marked E, K, P and R (our numbers Sumatra 112, 113, 114, 115). No specimens have been found so far in the other vials, but it is still possible that they may appear after further examination.

The situation at present is this: in the two original collections made in 1954 and the 13 from 1955 a total of 59 dichotypical specimens has been seen, 28 by us and 31 by Sachlan. Of the basic type, symmetrical with fishtail poles, 5 specimens have been seen, 2 by us and 3 by Sachlan, and of the other symmetrical type with elevated poles 4 have been seen, 2 by us and 2 by Sachlan. The dichotypical cells therefore are about 7 times more plentiful than the two basic types combined, which shows that the dichotomy must be a genetic character, as it evidently is in *Amscottia* and in the varieties of *Staurastrum wildemani* described by us (Scott & Prescott 1956).

From an examination of our illustrations, Fig. 3—5, it will be noted that in the dichotypical form of this plant the semicells of the fishtail type differ from those with the somewhat elevated poles, being more curved, more slender, and longer, with a less pronounced basal inflation. This is borne out in the individuals with similar cells, but because only 2 specimens of each have been seen by us, it is not certain that this always would be true. The unequal and asymmetrical curvature of the lateral margins in both the species and the variety is a very peculiar feature, quite unknown in any other genus except *Closterium*.

Bipolarity in desmids in artificial (culture) conditions has been demonstrated and discussed by Kallio (Grönblad & Kallio 1954) and by Waris (1950—1951). The "cytoplasmic structural units" postulated by Kallio (*I.e.*) would satisfactorily explain asymmetry in *Micrasterias* with which he is working. Whether such "units" are universally operative in desmids is of course open to conjecture and worthy of experimental studies. It will be of interest, should *Ichthyodontum sachlanii* be brought into culture, to follow the behaviour of cells undergoing division and to trace the appearance of bipolarity following conjugation. We need to know whether polarity that may exist at or immediately after zygospore germination persists through successive generations of new semicells. Does the semicell with an incised polar lobe, for example, produce a similar semicell (as in the case of *Micrasterias*), or is the new daughter cell dichotypical? The large number of bipolar specimens indicates that the latter is true. Thus, if cytoplasmic structural units are operative in this plant, it follows that there must be polarity within the units themselves. When they are severed at division of a bipolar cell the portion of the unit near the base of the

semicell may retain a character or an 'influence' possessed by the other half of the unit. Thus, when the new semicell is constructed on the two asymmetrical old semicells, they each form a new semicell similar to their previously possessed semicells, continuing bipolarity therefore through successive generations. Inasmuch as it is inconceivable that the properties of the "cytoplasmic structural units" are not under the control of the nucleus and its genetic composition, there remains the obvious necessity of studying such dichotypical plants through gametic union. Therein lies a field of research replete with possibilities of contributions to our knowledge of genetics in the algae.

In order to differentiate between the two basic forms it has been necessary for us arbitrarily to designate one of them as the species and the other as a variety, though there is nothing to indicate which of them, if either, is entitled to the higher rank. We recognize, of course, that a desmid species is not one particular form exemplified by one or a few specimens or by a single drawing, but a population in which the individuals may exhibit considerable variation in size, shape and ornamentation, or in other cases may be so nearly alike that microscopical examination fails to reveal any appreciable difference between them. Although the dichotypical form of our plant was first seen and has occurred in larger numbers, it seems necessary to treat the symmetrical plant as the type for diagnostic purposes. It is hoped that at some future time it may be possible to obtain additional living material that can be cultured successfully and submitted to experimentation that may reveal the relationship between the two different forms and the causes that are responsible for the dichotomy.

We wish to acknowledge with many thanks the assistance rendered by Dr Hannah Croasdale, who made the Latin translations of the diagnoses, and by Mrs Dorothy Perine, who inked Scott's pencil drawings.

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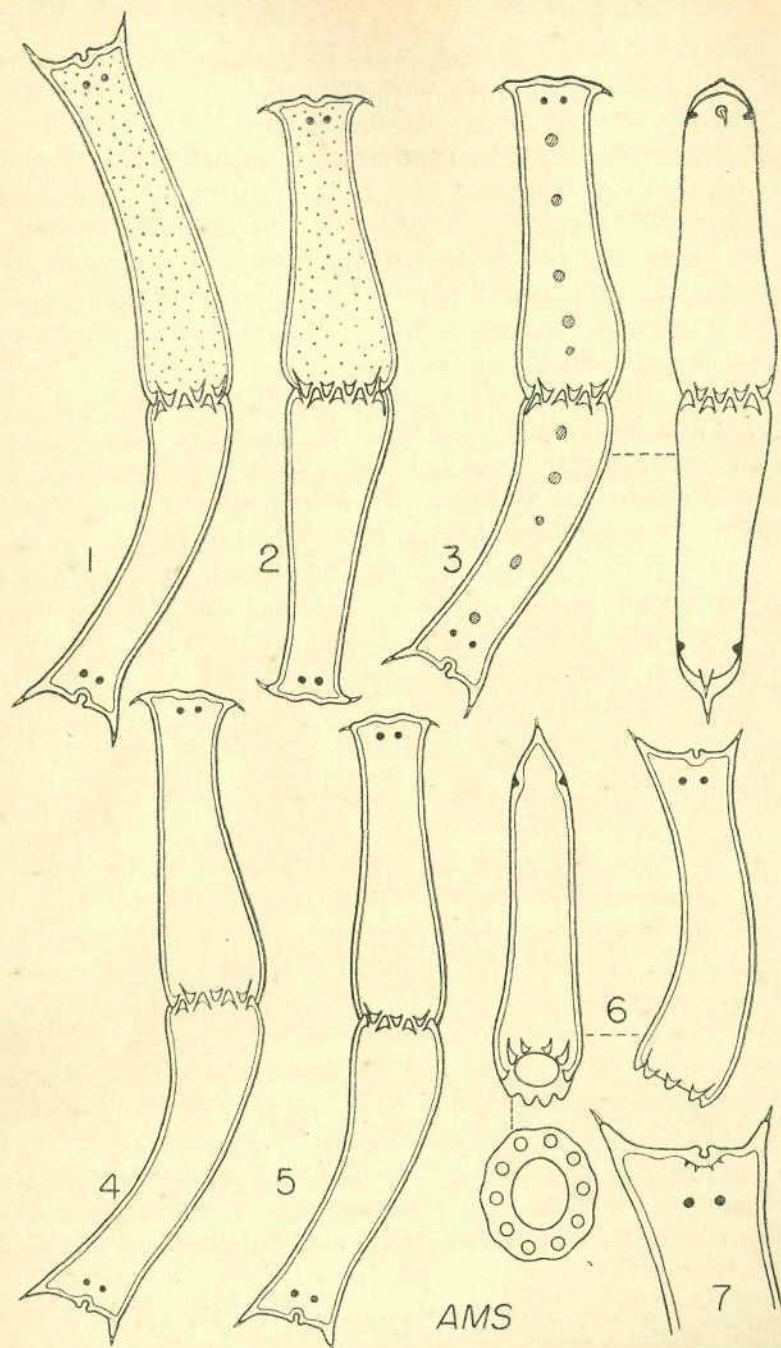


FIG 1. *Ichthyodontum sachlanii* Scott & Prescott, *gen. et sp. nov.*; 2. *Ichthyodontum sachlanii* var. *parorthium* Scott & Prescott var. *noy.*; 3-5. Dichotypical specimens combining the species and the variety; 6. 7. *sachlanii*. Front, side and basal views of a semicell; 7. *idem*. Larger detail of the polar structure.

## THE GENERIC NAMES PROPOSED FOR HYMENOMYCETES—VI\*

### Brachybasidiaceae, Cryptobasidiaceae, Exobasidiaceae

M. A. DONK \*\*

#### SUMMARY

1. In this continuation of the author's nomenclatorial enumeration not only the three families mentioned in the subtitle are taken into consideration: about ten generic names of fungi which at one time or another have been attributed to the Exobasidiaceae and which are now excluded from the Hymenomyces, are also dealt with.

2. The name 'Cryptobasidiaceae' is validly published.

INTRODUCTION.—This paper forms the sixth of a series planned to give an annotated nomenclatorial enumeration of all generic names proposed for Hymenomyces. For some introductory remarks to the series and the explanation of some nomenclatorial terms, see Part I (Donk *in Reinwardtia* 1:199-203. 1951).

The three families mentioned in the subtitle represent the strictly 'biophilous' element (strictly parasitic in herbaceous and often green portions of vascular host plants) of the holobasidious Hymenomyces. They have sometimes been considered related to the so-called Heterobasidiae, among which the Uredinales are reminiscent as regards their parasitism. Of the families dealt below, Brachybasidiaceae is monotypic. Another, Cryptobasidiaceae, has recently been delimited and surveyed by Malençon (*in Bull. Soc. mycol. France* 69: 77-100. 1953).

The basidiomycetous nature of this latter family has been doubted, and the information furnished by Malençon would seem insufficient to accept it as being basidiomycetous for the present. That author (*op. cit.* p. 96) called it "Cryptobasidieae," which is inadmissible as the required termination is '-aceae.' In addition he did not supply a Latin description. Since I accept the family taxonomically, its name is validly published herewith:

\* Part I of the present series ("Cyphellaceae") was published *in Reinwardtia* 1: 199-220. 1951; Part II (Hymenolichenes), *in Reinwardtia* 2: 435-440. 1954; Part III ("Clayariaceae"), *in Reinwardtia* 2: 441-493. 1954; Part IV (Boletaceae), *in Reinwardtia* 3: 275-313. 1955; Part V ("Hydnaceae"), *in Taxon* 5: 69-80, 95-115. 1956.

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