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The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Universidad de Buenos Aires
Facultad de Ciencias Exactas
y Naturales

Buenos Aires, diciembre 22 de 1959

Dr. A. Scott
2824 Dante St.
New Orlean 18
U.S.A.

Dear Sir:

L have received the reprint of your last papers, which I appreciated very much.

I would like to know of Minouri Hirano How may I know their adresses for writting them?

With my best wishes for the next year,

I remain sincerely yours

Elsa N. Lacoste de Diaz

Dra Elsa N. L. de Diaz
Departamento de Botanica
Facultad de Ciencias Exactas y Naturales
Florida 656
Buenos Aires
República Argentina

February 14 1959

Dr. John H. Davis,
University of Mandalay,
Mandalay, Burma.

Dear Dr. Davis,

In the January 1959 issue of the AIBS Bulletin there is a notice that you have received a grant from the University of Florida and the Ford Foundation for study in Burma.

I don't know what your line is, but if you are a botanist you might be interested in making some collections of Burmese desmids, which are microscopic freshwater algae. If not, you might come in contact with some of the students at the University of Mandalay, preferably with some knowledge of botany, to whom this would appeal.

I am an independent student of this group of algae, which have been my hobby for the last 20 years, and I have collaborated in the preparation of about 15 papers on the subject. The latest is a large paper on Indonesian desmids that will run to more than 100 pages of text with 63 full-page plates of illustrations; this will be submitted for publication shortly, and will be the most important work ever written on Indonesian freshwater algae. Another large one published recently is in Vol. 3 of "Records of the American-Australian Expedition to Arnhem Land", Melbourne University Press, August 1958, which may be in the library of the Univ. of Mandalay.

Collection of desmids is remarkably simple, the only equipment needed being some wide-mouth jars of 4-, 6- or 8-ounce capacity, a small bottle of formalin, and a medicine dropper. They are found in soft water with a pH of 4.0 to 7.0 or 7.5: limestone regions are not favorable for them because the water is hard.

I would gladly furnish instructions for collecting, also special boxes fitted with empty 3-dram screw-top vials for shipping.

Dr. J. C. Dickinson, Jr., of the Univ. of Florida, knows of me, though I have not met him personally.

I should be glad to hear from you at your convenience.

Sincerely yours,

CABLE ADDRESS - MUSEUM, CHICAGO TELEPHONE: WABASH 2-9410

CHICAGO NATURAL HISTORY MUSEUM
FORMERLY FIELD MUSEUM OF NATURAL HISTORY
ROOSEVELT ROAD AND LAKE SHORE DRIVE
CHICAGO 5, ILLINOIS

27 Sept. 1957

Dear Mr. Scott:

Thank you for yours of the 20th. The publications which you returned arrived safely. The revision should have interested you considerably, since it included the results of our studies of the original specimens of quite a few of the older names of desmids, as well as those of numerous other coccoid non-blue-green algae.

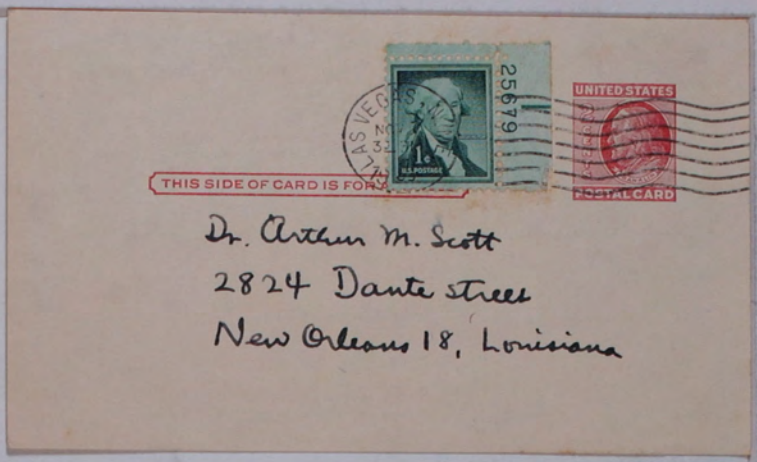
Your numerous projects on tropical and semitropical desmids sound most ambitious, and I wish you all the luck in the world, and godspeed, with them. If I can at any time be of help to you in any way, I hope that you will let me know at once.

With best regards and wishes,

Sincerely,
Francis Drouet

1616 east 50th place, Chicago 15

ADDRESS ALL CORRESPONDENCE, PUBLICATIONS, AND PACKAGES TO
CHICAGO NATURAL HISTORY MUSEUM, CHICAGO 5, ILLINOIS, U.S.A.



Dept. of Biology, Highlands Univ., Las Vegas, New Mexico
7 Nov. 1958

Dear Dr. Scott:

I want to thank you for, and congratulate you on, your paper with Dr. Prescott on the freshwater algae of Arnhem Land just received.

With regards and best wishes,

Sincerely,

Francis Drouet

Sept 20 1957

Dr. Francis Drouet,
1616 East 50th Place,
Chicago 15, Ill.

Dear Dr. Drouet,

Thanks for your postcard, for your book on the coccoid Myxophyceae, and the other reprints that you sent.

However, I must tell you that I am not interested in the blue-greens and know nothing about them, except that I can recognize some of the genera when I find them among my desmids. Therefore I am returning the literature so that you may give it to someone who can make better use of it.

Some words of explanation may be in order. I have no degrees, and no training in botany or any other branch of biology. Until my retirement four years ago I was a structural engineer, with more than forty years of practice in New Orleans. Twenty years ago I was attracted to the desmids simply from curiosity about the strange shapes of these beautiful little plants, and I started collecting them for my own amusement. When I learned, a little later, that practically nothing was known about the desmids of Louisiana and Mississippi, it occurred to me that I might be able to do something for science by recording my finds, and since then I have made the subject a serious hobby, aided enormously by the invaluable help of Dr. Prescott and Dr. Grönblad.

In addition to my own extensive collecting in SE USA I have been able to obtain, by correspondence, some very rich material from distant parts of the world, and I think it is safe to say that I have probably seen more tropical and subtropical desmids than anyone else now living. Prescott and I now have in press a large paper on FW algae from the little-known region of Arnhem Land in North Australia. Also in press is a large paper by Grönblad, Prowse & Scott on Sudanese desmids. Now I am working on another paper that will describe about 500 taxa from Borneo, Java and Sumatra, many of them new to science. Still to be worked up are a large series of collections from the Amazonia region of Brazil, and others from various parts of Australia, in addition to the unpublished known species from my USA collections. This is enough to occupy me for the rest of my life.

With best regards and good wishes,

Sincerely,

UNIVERSIDAD DE BUENOS AIRES
Facultad de Ciencias Exactas y Naturales

Buenos Aires 19 de setiembre de 1958.

Dr.
Arthur Scott
2824 Dante Street
New Orleans 18 LA
E.E.U.U.

De mi consideración:

Al acusar recibo de los separados que nos enviara, aprovecho la oportunidad para agradecer su gentileza y la atención dispensada a nuestro pedido.

Por nuestra parte, prometemos remitirle en el futuro, los trabajos que se realicen en este Departamento sobre algas.

Agradeciendo nuevamente su envío, le ruego nos incluya en su lista de correspondencia.

Saludo a Ud. muy atentamente.

Dic. Elsa Lacoste de Díaz

Elsa Lacoste de Díaz
Departamento de Botánica
Florida 656
Buenos Aires
Argentina

UNIVERSITY OF FLORIDA
GAINESVILLE

THE FLORIDA STATE MUSEUM

May 3, 1956

Mr. Arthur M. Scott
2824 Dante Street
New Orleans 18, Louisiana

Dear Mr. Scott:

Enclosed is a University of Florida check in the amount of $.15. Volume I, No. 1 of the Bulletin will be forwarded under separate cover. No. 2 will follow shortly.

I would like to suggest that we make the following arrangement for No. 2 and on future numbers of this publication. Your name will be added to our permanent mailing list and we will expect you to forward the proper amounts to us upon receipt of each number. I would like to suggest that this be done in the form of a personal check or postal money order in the exact amount to cover the published cost. This will avoid the considerable amount of red tape involved in securing refund checks.

I was glad to hear from you again and look forward to the appearance of your forthcoming publication.

Sincerely,

J. C. Dickinson, Jr.
Curator of Biological Sciences

JCD/mm
Enclosure

May 17 1956

Dr. J. C. Dickinson, Jr.
University of Florida,
Gainesville, Fla.

Dear Dr. Dickinson,

Enclosed is my check for $0.35 in payment for Bulletin No. 2. Sorry that I made so much trouble by sending a dollar bill for the first number, and I can easily imagine that it required a lot of argumentation to pry a refund check for 15¢ out of your Treasury Dept. Really, I had no idea of getting the 15¢ change; I thought you would just drop the dollar in the cashbox and forget it.

The first number of the Bulletin was very interesting, since it deals with the phytogeography and geology of a region in which I have done some collecting with fairly good catches of desmids, though I find that in NW Florida the coastal flatwoods region has many more favorable habitats than the rolling country just to the north. On my trips to Florida I have consequently concentrated on the regions that are more favorable for desmids, but if I had more time available it would be quite interesting to seek out the many small swamps and bogs that are mentioned in the Bulletin. I think I have seen the peculiar bog just west of Hosford, and in fact I found a rather desmid there which has not previously been found in the southern States.

From the list of investigations of the fauna of the region in Bulletin No. 1, and the fact that No. 2 is devoted entirely to a little-known genus of snakes, I get the impression that perhaps the Bulletin will deal principally with zoological subjects rather than botanical. If this is the case the journal would not be of much value to me, because my only interest is in desmids. The information that I hoped to get from the journal is just such as was given in No. 1, namely the phytogeography and geology of various parts of Florida, so that I could obtain a better understanding of these subjects, and perhaps find some new localities favorable for desmids.

Sincerely yours,

NOTES ON INDONESIAN FREAHWATER ALGAE. II.

A NEW DESMID GENUS FROM SUMATRA.

Arthur M. Scott and Gerald W. Prescott.

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, ~~xxxxx~~ South Sumatra, about 75 km north of Telukbetung, at the extreme southern end of the island. The water of the swamp was clear, with a pH of 6.5, and one sample was taken from open water, while the other was taken just above submerged vegetation. There was not much difference in the desmid content of the two vials.

During our preliminary examination of this material we came across the very peculiar desmid shown in our Figs. 3, 4, 5. It is ~~xxxx~~ 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 the first glance. First, the unusual curvature of the whole cell, and the different degrees of curvature of the two semicells, one being almost straight and the other decidedly and asymmetrically curved. Second, the different structure of the two poles, one of a 'fishtail' shape with a small circular incisiion in the center, and the other with the angles produced laterally, the center slightly raised and witha shallow depression in the center. Third, the large, intermeshing teeth at the base of the semicells. 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 different genera. Curved cells are almost universal in Closterium, ~~xxx~~ in certain species of Mesotaenium and Roya, and in some local ~~strains~~ forms of Triploceras gracile and an American form of Pleurotaenium verrucosum, ~~var. bullatum~~. The fishtail pole suggests Ichthyocercus, and indeed the overall ~~xxxxxx~~ appearance of the plant has a certain general resemblance to this genus, particularly Ichth. longispinus. 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 also there are some species with polar structures similar to those illustrated, and the two pairs of mucus pores are a Euastrum characteristic.

Because of the discovery by Scott, about a year previously, of the genus Amscottia from Brazil, of which all of 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. Krieger in Germany, to Dr. Rolf Grönblad in Finland, and to Dr. Einar Teiling in Sweden, all of whom replied that in their opinions the unique characters 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, plus another 10 specimens seen by Sachlan, a total of 24 all alike and with differing semicells. But the 25th specimen, shown in our Fig. 1, proved a surprise, since both semicells had poles of the fishtail shape. It then became evident that there must exist another form with poles of the slightly elevated shape 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 cultured and submitted to experiment by experts in this line. ~~In April 1955~~ 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 larger variety of species than plankton collections. Also we hoped that perhaps one of these aquatic macrophytes might afford a ~~slightly different~~ micro-habitat that because of slightly different physico-chemical characteristics would prove somewhat better for this particular desmid, and thus provide more specimens. In April 1955 Mr. Sachlan very

From an examination of our illustrations it will be noted that in the dichotypical forms 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 infoation. This is borne out in the cells with similar semicells, but since only two specimens of each kind ~~xxxx~~ have been found, it is not certain that this is always 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 exceot Closterium.

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 it is well recognized that a desmid 'species' is not one particular form exemplified by a single specimen or 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 differences between them. It is hoped that at some future time it may be possible to obtain additional living material that can be cultured successfully and subjected to experimentation that may reveal the relationship between the two different forms.

Note. I suggest the name EUASTROIDES because when they are tabulated, all of nearly all of the characteristics are to be found in various species of Euastrum, and there is only a superficial resemblance to Ichthyocercus or Docidium. For a generic name Euastropsis would be preferable, but this is already in use, as is also Euastridium. I don't know whether Euastroides would be masculine or neuter; will you please check this?

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 11 of the best samples to us, and also two tubes containing living specimens of the new desmid to Dr. Paavo Kallio in 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, although some other larger and apparently more robust desmids lived and were thriving nicely at last reports. The two tubes sent to Indiana University were in even worse condition, though also sent by airmail, and Dr. Starr was unable to get any of the desmids to grow.

In the ~~11~~ 13 new samples received at the end of April 1955 the new desmid is still so extremely rare that it is hardly possible to draw any conclusions as to whether one of the macrophytes was more favorable than the others. Specimens of the new ~~pinoc~~ desmid have been found in Sachlan's collections marked E, K, P and R, (our numbers Sumatra _____). No specimens have been found so far in the other vials, but it is still possible that they may turn up on further examination.

The situation at present is this: in the 2 original collections made in 1954 and the ~~11~~ 13 from 1955, a total of 59 dichotypical specimens has been seen, 28 by us and 31 by Sachlan. Of the 'basic' type with 'fishtail' poles 3 specimens have been seen, 2 by us and 1 by Sachlan, and of the other 'basic' type with 'elevated' poles 4 have been seen, 2 by us and 3 by Sachlan. The dichotypical cells therefore are about 8 times as plentiful as the two basic types combined, which shows that the dichotypy must be an inherited character, as it evidently is in Amscottia and in the varieties of Staurastrum Wildemani described by us (Scott & Prescott 1955?).

In all of the specimens seen by us the chloroplast was deteriorated to such an extent that its structure could not be determined. Two or three examples still showed the pyrenoids, which appear to be either five or six in each semicell, arranged along the longitudinal centerline.

NOTES ON INDONESIAN FRESHWATER ALGAE. II.

ICHTHYODONTUM, A NEW DESMID GENUS FROM SUMATRA.

*ARTHUR M. SCOTT AND GERALD W. PRESCOTT.**

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

Ichthyodontum Sachlanii Scott & Prescott sp. 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,

Footnote:

*2824 Dante St., New Orleans 18, La., U.S.A.

**Dept. of Botany, Michigan State University, East Lansing, Mich., U.S.A.

and bearing a xx 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 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 μ, maximum width 19-22 μ, maximum thickness about 2 μ less than the maximum width, width at poles 22-24 μ, size of opening in isthmus (1 specimen) 12x10 μ. 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 suicirculari non /b 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 /e pari pororum mucosorum oppositorum in membrana praeditis; basibus semicellularum /s subtumidis, ordinem dentium implexorum incisionem mediam cingentium habentibus. Semicellulae a basi visae late ellipticae, 10 undulationes marginales, et ellipsem /e intramarginalem 10 circulorum parvorum (aspectum a polo dentium basalium) et ellipsem interiorem (foramen isthmi) praebentes; chloroplastus laminaformis taeniaformisve (?)

ordinem 5 vel 6 pyrenoideorum prominentium continens. Longitudo cellulae cum spinis 142-150 μ, latitudo maxima 19-22 μ, crassitudo maxima ca. 2 μ minor quam latitudo maxima; latitudo ad polos 22-24 μ, magnitudo foraminis in isthmo (uno in specimine) 12x10 μ. Typus speciei ut planta in figura nostra 1 depicta designatur.

Ichthyodontum Sachlanii 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 xx a sharp, fine, downwardly curved spine; semicells slightly swollen /c at the base with one lateral margin more inflated than the other and bearing a xxxxxx supraisthmian row of 10 longitudinal 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 μ, maximum width 22-24 μ; maximum thickness about 2 μ less than the maximum width, width at poles 17-21 μ, size of opening in isthmus about 12x10 μ. 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 aliquantulum elevati, depressionem mediam non profundam habentes, utroque angulo apicali lateraliter producto in dentem crassum, spinam tenuem acutam deorsum curvatam ferentem; semicellulae ad /a basim subinflatae, uno margine laterali plus inflato quam altero, et ordinem supra-isthmialem 10 plicarum longitudinalium (5 visibilium) praebentes; plica quaque dentem

priminentem 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 inflatione 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 laminaformis taeniaformisve (?) ordinem 5 vel 6 pyrenoideorum prominentium continens. Longitudo cellulae 132-136 µ, lat. max. 22-24 µ, crass. max. ca. 2 µ minor quam lat. max., lat. ad polos 17-21 µ, foramen isthmi ca. 12x10 µ. 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 not 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 foliacea, 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 Ich. 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 Gröhblad 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 ny 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 dichotypy must be a genetic character, as it evidently is in Amscottia and in the varieties of Staurastrum Wildemani described by us (Scott & Prescott 1955 ?).

From an examination of our illustrations, Figs. 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 survature 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 (l.c.) 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 behavior 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 dichotypy.

Explanation of the illustrations.

Fig. 1. Ichthyodontum Sachlanii Scott & Prescott gen. et sp. nov.

2. Ichthyodontum Sachlanii var. parorthium Scott & Prescott var. nov.

3-5. Dichotypical specimens combining the species and the variety.

6. Ich. Sachlanii. Front, side and basal views of a semicell.

7. " " Larger detail of the polar structure.

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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.

NOTES ON INDONESIAN FRESHWATER ALGAE. II.

~~EUASTROIDES~~ Ichthyodontum, A NEW DESMID GENUS FROM SUMATRA.

ARTHUR M. SCOTT AND GERALD W. PRESCOTT.

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. The water of the swamp was clear, with a pH of 6.5, ~~and~~ one sample was taken from open water, ~~while~~ whereas the other was ~~taken~~ collected just above submerged vegetation. There was not much difference in the desmid-content of the two vials.

During our preliminary examination of this material we came across upon the very peculiar desmid shown in ~~our~~ 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 ~~different~~ structure of the two poles, is different one of a 'fishtail' shape with a small circular incision in the center, and the other having the angles produced laterally, the center slightly raised and with a small median shallow depression in the center. Third, the large intermeshing interlocking teeth at the base of the semicells. 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 Ichth. 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.

Because of the discovery by Scott, about a year previously, of the genus Amscottia from Brazil, of which all of 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 opinion 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, plus another 10 specimens seen by Sachlan, a total of 24 all alike and with differing semicells. But the 25th specimen, shown in our Fig. 1, proved a surprise, since both semicells had poles of the fishtail shape. It then became evident that there must exist another form with poles of the slightly elevated shape 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 cultured and submitted to experiment by experts in this line. 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 larger variety of desmid species than plankton collections. Also we hoped that perhaps one of these aquatic macrophytes might afford a micro-habitat that because of slightly different physico-chemical characteristics would prove somewhat better for this particular desmid, and thus provide more specimens. In April 1955 Mr. Sachlan very kindly revisited the sawmp at Menggala and made 32 collections from different places, including squeezings from Limnanthemum indicum, Najas, Cabomba, Unticularia, and grass, also some plankton samples. He sent 13 of the best samples to us, and also

two tubes containing living specimens of the new desmis to Dr. Paavo Kallio at the University of Turku, Finaland, 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 get any of the desmids to grow.

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 macrophytes was more favorable than the others. Specimens of the new desmid have been found in Sachlan's collections marked E, K, P and R (our numbers Sumatra _____). No specimens have been found so far in the other vials, but it is still possible that they may turn up on 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 with fishtail poles, 3 specimens have been seen, 2 by us and 3 by Sachlan, and of the other basic type with elevated poles 4 have been seen, 2 by us and 2 by Sachlan. The dichotypical cells therefore are about 8 times as plentiful as the two basic types combined, which shows that the dichotypy must be an inherited character, as it evidently is in Amscottia and in the varieties of Staurastrum Wildemani described by us (Scott & Prescott 1955?).

From an examination of our illustrations it will be noted that in the dichotypical forms 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 cells with similar semicells, but since only 2 specimens of each type have been seen, it is not certain that this is always 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.

In all the specimens seen by us the chloroplast was 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 5 or 6 in each semicell, arranged along the longitudinal centerline.

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 differences between them. 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 dichotypy.

References.

1954. Grönblad, R., and P. Kallio. A new Genus and a new Species among the Desmids. Bot. Notiser 1954:2, 167-178, and correction 1954:4, 433.

1955. Scott, A.M., and G.W.Prescott. Notes on Indonesian freshwater algae I. Staurastrum Wildemani Gutw. (Desmidiaceae). Reinwardtia ___:

Explanation of the illustrations.

Fig. 1. Ichthyodontum Euastroides Sachlanii Scott & Prescott, gen. et sp. nov.

2. Ichthyodontum Euastroides Sachlanii var. parorthius Scott & Prescott, var. nov.

3, 4, 5. Dichotypical specimens combining the species and the variety.

6. Front, side and basal views of a semicell (of the specific form.)

7. Larger detail of the polar structure (of the specific form.)

Note: I have suggested the name EUASTROIDES because when they are tabulated, nearly all of the characteristics are seen to be Euastrum features, and that there is only a superficial resemblance to Ichthyocercus or Docidium. Please check whether Euastroides is masculine or neuter.

Insert for bottom of p. 3, if you think worth while.

Bipolarity in desmids, especially in artificial (culture) conditions has been demonstrated and discussed by Kallio (Grønblad ~~and Karis~~ & Kallio 1954) and by Waris (1950-1951). The "cytoplasmic structural units" postulated by Kallio (l.c.) would satisfactorily explain asymmetry in Micrasterias with which he was 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 ~~Euastroides~~ Ichthyodontum Sachlanii be brought into culture, to follow the behavior of cells undergoing division and to trace the appearances 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 inconseivable 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.

EUASTROIDES, Gen. nov., Scott & Prescott

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 longitudinally or ~~xxx~~ 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. (The type of the genus is designated as the plant shown in our figure 1.)

EUASTROIDES SACHLANII, sp. nov., Scott & Prescott

Cells of medium size, length 6 to 7 times the width, in front view elongate-cylindric and considerably curved, apices truncate ~~xxxxxxxxxxxxxxxxxxx~~ with a shallow median subcircular notch with a prominent tubercle at each side, 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 (or 12?) longitudinal folds (5 or 6? showing) which bear each a prominent~~x~~, downwardly directed tooth, the teeth of one semicell (intermeshed) with those of the other thus ~~xxxxxx~~ 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 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 (or 12?) marginal undulations, an intramarginal ellipse of 10 (or 12?) small circles representing the end view of the basal teeth, and an inner ellipse representing the opening of the isthmus; chloroplast ~~probably~~ a plate or ribbon (?) containing a row of 5 or 6 prominent pyrenoids. Length including spines 142-150 u, width maximum 19-22 u, thickness maximum about 2 u less than the maximum width, width at poles 22-24 u, width of isthmian notch in front view 18-19 u, size of hole in isthmus (one specimen) 12x10 u. The type of the species is designated as the plant shown in our figure 1.

EUASTROIDES PARORTHIUS, var. nov., Scott & Prescott

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 fine, sharp, downwardly curved spine; semicells slightly swollen at the base with one lateral margin more inflated than the other, and bearing a spuraisthmian row of 10 (or 12?) longitudinal folds (5 or 6?) showing which bear each a prominent diwnwardly directed tooth, the teeth of one semicell intermeshed 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 (or 12?) marginal undulations, an intramarginal ellipse of 10 (or 12?) small circles representing the end view of the basal teeth, and an inner ellipse representing the opening of the isthmud; chloroplast probably a plate or ribbon containing a row of 5 or 6 prominent pyrenoids. Length 132-136 u, width maximum 22-24 u, thickness maximum about 2 u less than the maximum width, width of isthmian notch in front view 18-21 u, size of hole in isthmus (one specimen) 12x10 u. The type of the variety is designated as the plant shown in our figure 2.

Ichthyodontum

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

ICHTHYODONTUM SACHLANII sp. nov. Scott & Prescott

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 basem 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 taeniaformisve (?) ordinem 5 vel 6 pyrenoideorum prominentium continens. Longitudo cellulae cum spinis 142-150 µ, latitudo maxima 19-22 µ, crassitudo maxima ca. 2 u minor quam latitudo maxima; latitudo ad polos 22-24 u, magnitudo foraminis in isthmo (uno in specimime) 12 x 10 µ. Typus speciei ut planta in figura nostra 1 depicta designatur.

ICHTHYODONTUM SACHLANII var. PARORTHIUM

Cellulae mediocres, ca. 6 plo longiores quam latae, a fronte visae elongato-cylindricae, fere sed non omnino rectae; apices truncatae et aliquantulum elevati, depressionem mediam non profundam habentes, utroque angulo apicali lateraliter producto in dentem crassum, spinam tenuem acutam deorsum curvatam ferentem; ~~lateraliter producto~~; semicellulae ad basem 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 ~~semi~~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 inflatione 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 taeniaformisve (?) ordinem 5 vel 6 pyrencideorum prominentium continens. Longitudo cellulae 132-136 µ, lat. max. 22-24 µ, crass. max. ca. 2 µ minor quam lat. max., lat. ad polos 17-21 µ, foramen isthmi ca. 12 x 10 µ. Typus varietatis ut planta in figura nostra 2 depicta designatur.

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 ~~infraction~~ supraisthmian row of blunt teeth, the two series of teeth interlocking and completely enclosing the shallow median incision; side view of cell elongate subfusiform; basal view broadly elliptic.

ICHTHYODONTUM SACHLANII Scott & Prescott sp. nov.

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 alternating and 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 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 interlocking 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 u, maximum width 19-22 u, maximum thickness about 2 u less than the maximum width, width at poles 22-24 u, size of opening in isthmus (1 specimen) 12x10 u. The type of the species is designated as the plant shown in our figure 1.

ICHTHYODONTUM SACHLANII var. PARORTHIUM Scott & Prescott var. nov.

Cells of medium size, length about 6 times the width, in front view alongate-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 fine, sharp, 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 longitudinal folds (5 showing) which bear each a prominent basally directed tooth, the teeth of one semicell alternating and interlocking with those of the other, thus completely enclosing the shallow median incision of the semicell; 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 semicell slightly tumid, with a row of interlocking 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 u, maximum width 22-24 u, maximum thickness about 2 u less than the maximum width, width at poles 17-21 u, size of opening in isthmus about 12x10 u. The type of the variety is designated as the plant shown in our figure 2.

Feb 8 1956

Dr. M. A. Donk,
Prins Mauritslaan 18,
The Hague, The Netherlands.

Dear Dr. Donk,

I have written another short paper in collabboration with Prof. Prescott, describing a new desmid genus from Sumatra, and am awaiting the Latin translations of the diagnoses before typing the final draft. There will be about 9 or 10 pages of typescript, double spaced, and 1 plate of illustrations.

Are you continuing to assist with editing Reinwardtia, and would you suggest that I send the paper to you for handling, or direct to Mr. (Dr.?) Anwar Dilmy, Head of the Bogor Herbarium?

Mr. Sachlan said he thought our first paper would be printed about it the end of 1955. Do you know if/has appeared yet?

Sachlan also wrote that the Herbarium has a larger appropriation which will enable them to print several issues of Reinwardtia this year, and he is very anxious about a larger paper that we have in preparation. Unfortunately I have had to put the Indonesian material aside temporarily, in order to get out an important paper with Dr. Grönblad, describing a large number of novelties from my USA desmid collections, some of which have been waiting for 17 years!

With my best regards,

Sincerely yours,

NOTES ON INDONESIAN FRESHWATER ALGAE, I.

STAURASTRUM WILDEMANI GUTW. (DESMIDIACEAE).

ARTHUR M. SCOTT* AND GERALD W. PRESCOTT**

At various times during the last four years Mr. M. Sachlan, of the Laboratory for Inland Fisheries at Bogor, Java, has sent us collections of freshwater algae from the larger islands of the Indonesian Archipelago, - Borneo, Java and Sumatra. To him we express our sincere thanks for his care and effort in obtaining this material, and for affording us the opportunity of studying it. A report on the algae is in course of preparation, and will be published on completion.

During our examination we have encountered some curious cases of dichotypy in a species of Staurastrum, involving four different forms, which, if considered separately, might be thought to belong to four different species. They throw a new light upon the relationship between St. Wildemani Gutw. and St. subtrifurcatum var. majus West & West, whose similarity has been noted and commented upon by other authors. (Schmidle, 1902, p. 73; Gutwinski, 1902, p. 605; West & West, 1907, p. 215; Krieger, 1933, p. 209; Rich, 1925, p. 151; Fritsch & Rich, 1937, p. 213).

The descriptions of these plants requires more space and more illustrations than would be appropriate in the general report; therefore we think it advisable to publish them in this preliminary paper.

Our illustrations were all drawn to a magnification of about 1200, and in the reduction for printing were reduced by one-half, making the final magnification about 600. All dimensions are given in microns.

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** Dept. of Botany, Michigan State College, East Lansing, Mich., U.S.A.

Because of some duplication in the numbering of Mr. Sachlan's samples, we found it necessary, in certain cases, to assign new numbers to them. In the following liat, which includes only those collections mentioned in this paper, our number is given first, followed by Sachlan's in parentheses:

Borneo. Sachlan X. A lake in East Borneo, 1941. Coll. Dr. K. F. Vaas.

Sachlan 38. Lake Semedo, West Borneo, June 1949, Coll. Dr. K. F. Vaas.

Java. Sachlan T. A lake in the environs of Bogor.

Sumatra. 108, 109. (Sachlan VIII, IX). Danau Teloko, near Palembang, S. Sumatra, Aug. 1951.

110, ~~111~~. (Sachlan M) ~~P-1~~. Swamp near Menggala, South Sumatra, April 12 1954.
112. (Sachlan P-1). Swamp Pang-pangan, near Danau Teloko, south Palembang. 1954.

In addition to these Indonesian samples, we refer in the text to two African collections, also containing St. Wildemani, which we have been privileged to examine through the courtesy of Dr. Rolf Grönblad and the collectors:

Uganda 4. Dam near Soroti. Coll. Miss E. M. Lind.

Sudan 1. Lake Ambadi, Bahr-el-Ghazal. Coll. Dr. Gerald A. Prowse.

1. Staurastrum Wildemani Gutwinski 1902. Figs. 1-6.

Syn. Staurastrum subtrifurcatum fa. bidens Schmidle 1902.

Gutwinski described this species from a collection made by Dr. M. Raciborski in Sitve (= Situ or Sitoe?) Tjibenong near Bogor, Java. He was aware of Schmidle's publication, earlier in the same year, of St. subtrifurcatum fa. bidens, because he suggests a comparison with it. Since then St. Wildemani has been reported from Java and Sumatra by Krieger (1933), and by the present authors from Arnhem Land in the Northern Territory of Australia in a paper now in press. In Sachlan's Indonesian material it occurs rather frequently, sometimes in association with St. subtrifurcatum var. majus West & West, and forms dichotypical cells with the latter, as will be described later. In 1927 Dr. Rolf Grönblad, of Karis, Finland, found at Sulkova, Finland, a Staurastrum which he identified as St. Wildemani; it is somewhat larger than the Indonesian plants, but otherwise in agreement. He has kindly permitted us to use his unpublished drawings, one of which is reproduced here, to our larger scale, as Fig.5. Note that this specimen possesses three spines on one angle of the upper semicell, and only two spines on all the others. His original notes on the drawings, made in 1927,

show that he considered St. Wildemani and St. subtrifurcatum var. majus as synonyms. Also through the courtesy of Dr. Grönblad we have recently had the opportunity of examining some material from Uganda in which both St. Wildemani and St. subtrifurcatum var. majus occur in the same gathering; and another sample from Lake Ambadi in the Sudan in which a small form of St. Wildemani occurs together with a correspondingly small form of St. subtrifurcatum var. majus and also dichotypical cells combining the two. Rich (1935) reported St. Wildemani and its zygospore from Southern Rhodesia, and Fritsch & Rich (1937) found St. subtrifurcatum var. major (sic) in material from Belfast Pan in the Transvaal. Incidentally it may be noted that the remarks of Fritsch & Rich regarding 'granules' on Krieger's illustration (1933, Pl. XIX, Fig. 2) are based on a misinterpretation of the drawing; the black dots represent pores or small scrobiculations, not granules. We have shown such a group of larger pores in the center of the apical surface in some of our drawings, and it is to be understood that they occur in all the specimens that we have seen, where it was possible to distinguish the markings on the cell-wall; such groups are present in many other desmids.

2. Staurastrum Wildemani var. subtrifurcatum (West & West) Scott & Prescott, comb. nov. Figs. 8-12.

Syn. St. subtrifurcatum Schm. 1898 (non West & West 1896).

St. subtrifurcatum fa. major West & West 1900.

St. subtrifurcatum var. majus West & West 1907.

West & West (1896) applied the name St. subtrifurcatum to a new species which they found in a tube of material sent to them by the Rev. Francis Wolle, containing sediments from a number of tubes from various parts of the United States; the locality where this desmid occurred is therefore unknown. It must be quite rare for it has not been found since then, to the best of our knowledge. The name subtrifurcatum was based on a supposed resemblance to St. trifurcatum Turn., found by Wallich in India and named by Turner (1892), who gave a Latin diagnosis but no illustration; he did, however, give an illustration of St. trifurcatum var. reversum Turn., in which the relative positions of the single and paired spines at each of the angles is reversed, the single spine being uppermost in var. reversum.

Schmidle (1898), evidently unaware of the previous publication by West & West, applied the name St. subtrifurcatum to a similar but different plant from Zanzibar, East Africa. Having noticed the error, West & West (1900) changed the name of Schmidle's plant to St. subtrifurcatum fa. major, and a few years later (1907), having found the same plant in Burmese material, they raised it to varietal rank under the name St. subtrifurcatum var. majus. Some authors have cited it, incorrectly, as var. major.

For easier comparison, we give in Fig. 7 a copy, enlarged to the same scale as our other figures, of West & West's 1896 illustration of St. subtrifurcatum from the United States, and because they showed only a semicell in front view we have added the lower semicell, by reversing the upper one, to give a better idea of what the whole cell probably looked like. When Fig. 7 is compared with Figs. 8 and 9, which show typical examples of var. majus, it is seen that there are important differences, and if Schmidle had seen West & West's illustration it seems highly probable that he would have used some other name for his African specimens; had he done so the confusion in taxonomy would never have arisen. In the American plant the ventral margins of the semicells are concave outwards, an unusual feature, while in var. majus, no matter whether it comes from Burma, Indonesia, North Australia, Central or South Africa, the ventral margins are strongly convex. Also in front view of the American plant, the spines extend out horizontally, forming an almost straight line with the apical margin of the semicell; in var. majus the upper paired spines are usually strongly curved upwards. In vertical view of the American plant the margins of the triangular semicell are deeply concave and merge imperceptibly into the line forming the outer edge of the spines, with no constriction at the point of junction, and the spines themselves are only slightly divergent. In vertical view of var. majus the margins of the semicell are somewhat concave in the center and convex near the angles, two adjacent sides meeting at the point where the single spine arises; the upper paired spines are more strongly divergent, and their slightly inflated bases are intramarginal.

Viewing the American plant as a whole, and taking account of these differences, we are impressed by its considerable resemblance to St. trifidum Nordst., as figured by West & West on the same plate (1896, Pl. V, Figs. 20, 21), rather than to St. trifurcatum or St. subtrifurcatum var. majus. A priori it seems more likely that a plant known

only from the United States might be related to one first found in Brazil (St. trifidum), than to another one known only from southeastern Asia, North Australia and Africa. Other workers, besides ourselves, have found in the United States and Canada a number of desmid species formerly known only from South America.

The most potent argument against the supposed relationship between var. majus and the American species St. subtrifurcatum is that var. majus forms dichotypical cells with St. Wildemani, and the latter, in turn, forms dichotypical cells with two new varieties to be described below, var. horizontale and var. unispinum. It is quite evident that this group of four different forms is closely inter-related; therefore we conclude that if there is any genetic relationship with the American plant it must be a much more remote one.

For these reasons we have transferred St. subtrifurcatum var. majus West & West to St. Wildemani Gutw. as var. subtrifurcatum Scott & Prescott comb. nov. A strict adherence to the International Rules of Botanical Nomenclature would require the retention of the varietal name majus in the new combination, but this would give a misleading name, for the variety is no larger than the species to which it has been transferred. Accordingly we have chosen the varietal name subtrifurcatum, which is both descriptive and indicative of the derivation.

As will be seen from the illustrations, there is considerable variation between the plants from different regions, in size of cell, and in the length, stoutness and direction of the spines. At some future time, when more is known about their distribution, these different forms may perhaps be separated on a geographical basis. It is to be noted that for each of the forms of St. Wildemani there is a corresponding form of var. subtrifurcatum and also a dichotypical form combining the two. For instance, the small cell of St. Wildemani from the Sudan, with its slender and upstanding spines, shown in Fig. 6, has its counterpart in var. subtrifurcatum shown in Fig. 11, and a dichotypical form shown in Fig. 14. The short-spined plant from Sumatra, Fig. 4, is represented in var. subtrifurcatum by Fig. 10, and its dichotypical form by Fig. 15.

3. Staurastrum Wildemani Gutw. var. horizontale Scott & Prescott var. nov. Fig. 16.

Cells of about the same size and shape as in the species. In front view semicells cyathiform, the ventral margins strongly convex, the apical margin slightly convex and somewhat elevated; at each upper lateral angle two long, stout spines extending horizontally and paired in the horizontal plane. In vertical view hexagonal, with three long and three short sides, all strongly concave; at each of the six angles a long, stout, slightly recurved spine, forming three widely divergent pairs, angle of divergence 90 degrees or slightly more. Wall punctate with a group of somewhat larger pores in the center of the apical surface.

Latin diagnosis.

Length 45-48; width with spines 99-106; isthmus 18-20.

Habitats: Borneo X and 38; Sumatra 110.

This variety should be compared with St. bifidum var. hexagonum Schaarschmidt 1882, p. 273, fig. 19, which is similar in vertical view but differs considerably in front view; also it appears to be much smaller than our plants, if our photocopy is a full-size reproduction of Schaarschmidt's plate.

4. Staurastrum Wildemani Gutw. var. unispinum Scott & Prescott var. nov. Figs. 19, 20.

Cells of about the same size and shape as in the species. In front view semicells cyathiform, the ventral margins strongly convex, the apical margin slightly convex and somewhat elevated; at each upper lateral angle a single long spine extending horizontally. In vertical view triangular, the lateral margins slightly concave in the center and convex near each angle, each angle produced into a single long stout spine. Wall punctate with a group of somewhat larger pores in the center of the apical surface.

Latin diagnosis.

Length 50-54; width with spines 98-102; isthmus 18-21.

Habitats: Sumatra 108. and 112.

The dichotypical cells which form the basis for this paper fall into three different types, which may be designated as Types A, B and C. Type A, shown in Figs. 13-15, is a combination of St. Wildemani with var. subtrifurcatum, and occurs in habitats Borneo X and 38, also in Sudan 1.

Type B, Figs. 17,18, combines St. Wildemani with var. horizontale, and was found in habitats Borneo X and 38, and Sumatra 110.

Type C, Figs. 20-22, combines St. Wildemani with var. unispinum, found in habitat Sumatra 108.

Other combinations would seem to be possible and may be discovered in the future, for it is not to be supposed that we were lucky enough to find all of them in this one series of collections. It should be borne in mind that these are not isolated or single occurrences, as might be the case if merely local variant clones were involved; in each type we have seen a dozen or more examples of dichotypy, together with numerous specimens of the species and varieties concerned. Type A occurs in such widely separated places as Indonesia and the Sudan, and type B is found in Borneo and ~~two habitats in the same region of~~ South Sumatra.

In the Desmidiaceae the existence of 'combination forms' with differing semicells has long been known, and the phenomenon may be divided into two classes. In the first and more frequent one the two semicells obviously belong to the same species, but exhibit differing degrees of radiation. Thus in a normally 3-radiate Staurastrum, one semicell will have the usual number of processes, while the other may have four or five or six. Such cases have been ably discussed by Teiling (1948, 1950, 1952), who has devised the name 'Janus-form' for them. In the other and much rarer class the individuals have differing semicells, differing so much that they would appear to that apparently belong to different varieties or even species, as in the examples of St. Wildemani described herein. For this class Teiling (1948) has coined the expressive and convenient terms 'dichotypical' and 'dichotypy'. Such dichotypical cells occur most frequently in the more highly elaborated species of Euastrum, Micrasterias and Staurastrum, and since they are usually found only as single individuals, or at best in very small numbers, they give rise to puzzling taxonomical problems, though occasionally, as with St. Wildemani

and with Micrasterias floridensis var. subjohnsonii (Prescott & Scott 1952), the chance find of dichotypical cells gives an insight into the true relationship between apparently different forms.

Concerning the causes which give rise to dichotypical cells not much is known at present. Desmid cells are normally quite symmetrical about both the vertical and horizontal axes, and heretofore it has been supposed that in vegetative division, which is far more common than sexual reproduction, each semicell could produce only an exact replica of itself. Recent discoveries prove that this is not correct in all cases; that under some circumstances, the conditions of which are not or only partially known, vegetative division of a dichotypical cell may result in a new dichotypical cell, which means that each of the two different semicells has produced, not a replica of itself, but of the other and different semicell. Such a case is illustrated by the new Brazilian desmid Amscottia mira Grönbl., (Grönblad & Kallio 1954), in which the approximately 100 specimens seen were all dichotypical, and one individual was found that consisted of an adult semicell with an attached young and partially developed semicell of the opposite type. We now have under study a new Ichthyocercus-like desmid from one of Sachlan's collections (Sumatra 110), which also, apparently, shows inherited dichotypy. Because of certain puzzling features we are postponing publication of this plant pending receipt of additional material, which may, we hope, provide a solution of the problem.

Recent work on the cultivation of desmids and their subjection to artificial conditions of light, heat or cold, and centrifugal force, promise important increases in our knowledge concerning the cytological processes of asexual reproduction and the morpogenetics of desmids. (Waris 1950a, 1950b, 1951, 1953; Kallio 1951, 1953a, 1953b, 1954; Grönblad & Kallio 1954).

Another remarkable discovery was made by Starr (1954a, 1954b), who has isolated two strains of Cosmarium botrytis var. tumidum Wittr., "in which sexuality can be induced at will by mixing the two strains in a liquid medium", while other strains of the same plant, from the same habitat and collection, do not reproduce sexually, or only very rarely, even when mixed with either of the two fertile strains. In a personal communication Dr. Starr informs us that he has since succeeded in isolating

sexual strains in other species of Cosmarium and Closterium. The results of further work in this investigation will be awaited with great interest.

We wish to thank Dr. Hannah Croasdale for providing the Latin diagnoses of the new varieties, and Scott also expresses his thanks to Mrs. Dorothy Perine for inking his pencil drawings.

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Staurastrum Wildemani Gutw. var. horizontale Scott & Prescott, var. nov.

Cellulae eis speciei magnitudine formaque subsimiles. Semicellulae a fronte visae cyathiformes, marginibus ventralibus valde convexis, margine apicali subconvexo, paululum elevato; omni angulo laterali superiore binis spinis longis eodem in plano horizontaliter extensis praedito. Semicellulae a vertice visae hexagonales, latera tria longa ac tria brevia, omnia valde concava praebentes; omnes sex anguli spina longa crassa subrecurvata praediti, spinis in paribus tribus late divergentibus, angulo divergentiae 90° vel paululo plus. Membrana punctata, poris aggregatis media in parte superficiei apicalis paulo maioribus.

Cellulae 45-48 μ long., 99-106 μ lat. cum spinis; 18-20 μ lat. isth.

Staurastrum Wildemani Gutw. var. unispiniferum var. nov.

Cellulae eis speciei magnitudine formaque subsimiles. Semicellulae a fronte visae cyathiformes, marginibus ventralibus valde convexis, margine apicali subconvexo ac paululum elevato; omni angulo laterali superiore unica spina longa horizontaliter extensa praedito. Semicellulae a vertice visae triangulares, marginibus lateralibus media in parte paululum concavis atque ad angulos convexis, omni angulo in unicam spinam longam crassam producto. Membrana punctata, poris aggregatis media in parte superficiei apicalis paulo maioribus.

Cellulae 50-54 μ long., 98-102 μ lat. cum spinis; 18-21 μ lat. isth.

Staurastrum Wildemani Gutw. var. horizontale Scott & Prescott, var. nov. Fig. 16.

Cells of about the same size and shape as in the species. In front view semicells cyathiform, the ventral margins strongly convex, the apical margin slightly convex and somewhat elevated; at each upper lateral angle two long spines extending horizontally and paired in the horizontal plane. In vertical view hexagonal, with three long and three short sides, all strongly concave; at each of the six angles a long, stout, slightly recurved spine, forming three widely divergent pairs, angle of divergence 90 degrees or slightly more. Wall punctate with a group of somewhat larger pores in the center of the apical surface.

Length 45-48; width with spines 99-106; isthmus 18-20.

Habitats: Borneo X and 38; Sumatra 110.

Staurastrum Wildemani Gutw. var. unispinum Scott & Prescott, var. nov. Figs. 19, 20.

Cells of about the same size and shape as in the species. In front view semicells cyathiform, the ventral margins strongly convex, the apical margin slightly convex and somewhat elevated; at each upper lateral angle a single long spine extending horizontally. In vertical view triangular, the lateral margins slightly concave in the center and convex near each angle, each angle produced into a single long, stout spine. Wall punctate with a group of somewhat larger pores in the center of the apical surface.

Length 50-54; width with spines 98-102; isthmus 18-21.

Habitat: Sumatra 108.

October 26, 1955

Arthur M. Scott
2824 Dante Street
New Orleans 18, LA.
U.S.A.

Dear Mr. Scott,

I am really very sorry not to have had the opportunity of meeting you in The Hague. Your trip to Europe must have been very interesting and I do not doubt that it will prove to be very profitable to desmidiology. (I met Dr. Rolf Grönblad at the Congress at Stockholm in 1950.)

As to your paper to be published in Reinwardtia, after I had sent the proofs to you, Mr. Sachlan told me that they would not reach you in time in view of your trip to Europe. After that information I paid attention to the proofs once more to see what I could do as to typographical and similar errors which I had not particularly chased because I thought that you would take care of those. I hope that I picked out the most obvious ones. You may still mail the corrected proofs to me and I may still perhaps be able to make use of them before your paper will be printed!

After I left Bogor the already low speed of printing slackened down still more and I am now not sure when the present number will be ready. I still did not get the proofs of its last paper. The situation is not improving in Indonesia and I don't think that after the finishing of the current volume I would care much for assisting the Bogor Herbarium for the next one. In any case, as matters stands now, I hardly would advise you to trust the forthcoming larger paper to the people there, without stipulating an active rôle in supervising its printing (or perhaps entrusting that to me). If I had still been at Bogor I would certainly have considered it a great privilege to see it through the press.

With many thanks and my best regards,

Sincerely Yours

M. A. Donk

(M. A. Donk)

Prins Mauritslaan 18
The Hague, The Netherlands.

Nov 1 1955

Dr. M. A. Donk,
Prins Mauritslaan 18,
The Hague. Nederland.

Dear Dr. Donk,

In accordance with your letter of October 26 I am enclosing herewith the galley proof of our paper on Staurastrum wildemani, in which I have made numerous small corrections, which I hope can be made before the paper is printed.

On page 1 of the proof I have changed the name Gerald A. Prowse to Julian Rzoska. I met these two gentlemen in London and learned then that although the samples had been forwarded by Dr. Prowse, they actually were collected by Dr. Rzoska. (This name, by the way, is pronounced like the two French words "jusqu'à"). Lower on page 1, the name "Sitve Tjibenong" is spelled thus in Gutwinski's original paper.

On page 4 I have inserted designations of the types of the two new varieties, to comply with Art. 44 bis of the 1954 Paris Congress. On this same page you have two pencilled marks "x" in the margin, but I do not quite understand what you mean, unless you think that the names of the habitats should be repeated in Latin.

In the abbreviations of the names of periodicals there seem to be some inconsistences. For instance, compare "Trans. roy. Soc. S. Africa" and "Ann. R. bot. Gdn. Calcutta". In the latter the word "royal" is capitalized, in the former not.

Also compare "Trans. Amer. micros. Soc." with "Soc. zool.-bot. fenn. Vanamo" and "K. svenska Vetensk.-Akad. Handl.". In the former the word "American" is capitalized, in the two latter the words "fennica" and "svenska" are not capitalized. Personally I think that such minutiae are not of great importance.

Sorry to note your remarks about the future prospects of publishing in Reinwardtia. I have seen only one issue of this journal, sent to me by Mr. Sachlan, and it impressed me as being extremely well edited, printed and illustrated. But if a much larger paper contained a proportionately greater number of typographical errors it would be a terrible job to catch all of them. When the time comes I shall certainly write you and ask for your advice.

With my best regards and thanks,
Sincerely yours,

CHANGE OF ADDRESS

Please note that as from August 1, 1955 my address will be,

Prins Mauritslaan 18
The Hague,
The Netherlands

(Dr. M. A. Donk)

Old address:

Herbarium Bogoriense
Kebun Raya Indonesia
Bogor, Indonesia

Oct 3 1955

Dr. M. A. Donk,
Prins Mauritslaan 18,
The Hague. Nederland.

Dear Dr. Donk,

My wife and I have been in Europe for the last five months, so I received your letter of July 9th only on our return three days ago, with the enclosed proof of the paper "Notes on Indonesian freshwater algae, I". We stayed for two days in The Hague, on July 21st and 22nd, probably a few days before you arrived there; it is a pity that I could not have the pleasure of meeting you.

The few editorial changes that you made in the manuscript are perfectly acceptable, and I also have to thank you for correcting the proof. There are still a few typographical errors and misspellings, but they are not important, and anyway it is too late to do anything about them. The reproductions of my drawings are very good.

No doubt you were able to tell from my manuscript that I have not had much experience in writing for publication. In explanation I may tell you that I am a structural engineer, now retired, and that the study of the Desmidiaceae is a hobby that I have been following for the last eighteen years. During the last few years I have obtained some international recognition of my work, and one of the principal objects of my visit to Europe was to make personal acquaintance with some of the desmidiologists with whom I have been corresponding. Prof. J. Heimans and his wife came to see me at the Schiphol Airport in Amsterdam, and I chatted with them for an hour while awaiting my plane for Stockholm. In Sweden I spent a week with Lektor Einar Telling, who has some rather advanced and unorthodox views on desmid genetics and evolution. In Finland I stayed for three weeks with Dr. Rolf Grönblad, who is, in my opinion, the world's best desmidiologist, since the regretted death of Dr. W. Krieger of Berlin, last year. Grönblad and I worked up more than 3000 of my desmid drawings from the USA, Brazil, and the Sudan, and the papers when finished will be published by the Soc. Sci. Fennica.

I am still unable to say when the larger paper on Indonesian freshwater algae will be ready, but when the time comes I shall write to Mr. Sachlan and to the Keeper of the Herbarium Bogoriense. If Reinwardtia is unable to publish it, I am pretty sure that Prof. van Oye would take it for Hydrobiologia, or if that is considered undesirable by the Indonesian authorities, there is another possibility in Botaniska Notiser.

With many thanks for your cooperation, and my best regards,

Sincerely yours,

KEMENTERIAN PERTANIAN
DJAWATAN PENJELIDIKAN ALAM (KEBUN RAYA INDONESIA)

HERBARIUM BOGORIENSE

All communications
to be addressed to
The Keeper
Herbarium Bogoriense
Bogor, Indonesia.

BOGOR, July 9, 1955.-

No. Fl/D/ 231/.-

Lampiran:
Enclosure: Proofs.
Perihal :
Subject:

Dr. M. A. Scott
2824 Dante Street
NEW ORLEANS, La
U.S.A.

Dear Sir,

Through the intermediance of Mr. M. Sachlan from Bogor, I received, now about a month ago, in good order, your manuscript entitled, "Notes on Indonesian freshwater algae, I."

Please accept my sincere thanks for your kindness to place this interesting paper on dichotypy in desmids at the disposal of "Reinwardtia."

This week Part 2 Vol. 3 will be issued. The next issue will be a thin one (September) to be followed by Part 4 (December), wich will close the current volume. I have squeezed your paper in Part 3. Please find enclosed herewith a set of proofs.

As you will notice I have made hardly any editorial alterations. An exception has been made as to the citation of literature in which we follow the "International code of abbreviations for titles of periodicals," as applied in the "World list of scientific periodicals," (3d Ed., 1952). I hope that this will be acceptable to you.

Mr. Sachlan also told me that you are preparing a fuller account on Indonesian freshwater algae and that you are kind enough to offer it also for publication in Reinwardtia. I gather from what he said, that that paper will be an extesive one of perhaps 150 pages of our periodical (a separate Part of a Volume). It is difficult to be explicit as to this generous offer just know. The rising costs of printing here are rapidly outdating our budget and the situation may have become still more unfavourable by the next year (Volume 4). In additional I am sailing for The Netherlands next month and shall not return. There remains the possibility that I shall continue to take care of editing Reinwardtia for still one more year. I have urgently suggested the raising of some additional funds especially for this more extensive paper of yours, but I am not yet in the position to promise anything. Please note the enclosed change of address.

With kindest regards,

Sincerely Yours

M. A. Donk

(M. A. Donk)

F as far as the lower plants are concerned.

Because of some duplication in the numbering of Sachlan's samples, we found it necessary, in some cases, to assign new numbers to them. In the following list, which includes only those collections mentioned in this paper, our number is given first, followed by Sachlan's in parentheses.

Borneo. Sachlan X. A lake in East Borneo, 1941. Coll. Dr. K. F. Vaas.

Sachlan 38. Lake Semedo, West Borneo, June 1949. Coll. Dr. K. F. Vaas.

Java. Sachlan T. A lake in the environs of Bogor, 1944.

Sumatra. 108. (Sachlan VIII). Danau Teloko, near Palembang, South Sumatra, August 1951.
109 IX
110. (Sachlan M). Swamp near Menggala, South Sumatra, April 12 1954.
111. " Pw

In addition to these Indonesian samples, we refer in the text to two African collections, also containing St. Wildemani, which we have been privileged to examine through the courtesy of Dr. Rolf Grönblad, Karis, Finland. They are:
and of the collectors Dr Gerald A Prowse

Uganda 4. Dam near Soroti. Coll. Miss E. M. Lind.

Sudan 1. Lake Ambadi, Bahr-el-Ghazal. Coll. Dr. Gerald A. Prowse.

Herb at Khartoum, now in London, England

and Miss E M Lind at

1. Staurastrum Wildemani Gutwinski 1902. Figs 1-6.

Syn. Staurastrum subtrifurcatum fa. bidens Schmidle 1902.

Gutwinski described this species from a collection made by Dr. M. Raciborski in Sitve (= Situ or Sitoe ?) Tjibenong near Bogor, Java. He was aware of Schmidle's publication, earlier in the same year, of St. subtrifurcatum fa. bidens, because he suggests a comparison with it. Since then St. Wildemani has been reported from Java and Sumatra by Krieger (1933), and by the present authors from Arnhem Land in the Northern Territory of Australia in a paper now in press. In Sachlan's Indonesian collections it occurs rather frequently, sometimes in association with St. subtrifurcatum var. majus, and forms dichotypical cells with the latter, as will be described later. In 1927 Dr. Rolf Grönblad, of Karis, Finland, found at Sulkova, Finland, a Staurastrum which he has identified as St. Wildemani; it is somewhat larger than the Indonesian plants, but otherwise in agreement. He has kindly permitted us to use his unpublished drawings, which are reproduced here, to our larger scale, as Figs. _____. Note that one of the specimens, Fig. _____, possesses three spines on one angle of the upper semicell, and only two spines on all the others. His original notes on the drawings, made in 1927, show that he considered St. Wildemani and St. subtrifurcatum var. majus as synonyms. Also through the courtesy of Dr. Grönblad we have recently had the opportunity of examining some material from Uganda, Central Africa, collected by Miss E. M. Lind, in which both St. Wildemani and St. subtrifurcatum var. majus occur in the same collection. Rich (1935) recorded St. Wildemani and its zygospore from Southern Rhodesia, and Fritsch & Rich (1937) found St. subtrifurcatum var. major (sic) in material from Belfast Pan in the Transvaal. Incidentally it may be noted that the remarks of Fritsch & Rich regarding 'granules' on Krieger's illustration (1933, Pl. XIX, fig. 2) are based on a misinterpretation of the drawing; the black dots represent pores or small scrobiculations, not granules.

2. Staurastrum Wildemani var. subtrifurcatum (West & West) Scott & Prescott, comb.nov. Figs 8-12

Syn. St. subtrifurcatum Schm. 1902 (non West & West 1896).

St. subtrifurcatum fa. major West & West 1900.

St. subtrifurcatum var. majus West & West 1907.

West & West (1896) applied the name St. subtrifurcatum to a new species

which they found in a tube of material containing the sediments ~~of~~ from a number of tubes from various parts of the United States, sent to them by the Rev. Francis Wolle; the locality where this desmid occurred is therefore unknown. It must be quite rare, for it has not been found since then, to the best of our knowledge. The name subtrifurcatum was based on a resemblance to St. trifurcatum Turn., found by Wallich in India and named by Turner (1892), who gave a Latin diagnosis but no illustration; he did, however, give an illustration of St. trifurcatum var. reversum Turn., in which the relative positions of the single and paired spines at each of the angles is reversed, the single spine being uppermost in var. reversum.

Schmidle (1898), evidently unaware of the previous publication by West & West, applied the name St. subtrifurcatum to a similar but different plant from Zanzibar, East Africa. Having noticed the error, West & West (1900) changed the name of Schmidle's plant to St. subtrifurcatum fa. major, and a few years later (1907), having found the same plant in Burmese material, they raised it to varietal rank under the name St. subtrifurcatum var. majus. Some authors have cited it, erroneously, as var. major.

For easier comparison, we give in Fig. 7 a copy, ~~xxxxxxxxxxx~~ enlarged to the same scale as our other figures, of West& West's 1896 illustration of St. subtrifurcatum from the United States, and because they showed only a semicell in front view we have added the lower semicell in dashed lines, to give a better idea of what the whole cell probably looked like. When Fig. 7 is compared with Figs 8+9, ~~xxxxxx~~ which shows typical examples of var. majus, it is seen that there are important differences. In the American plant the ventral margins of the semicells are concave outwards, an unusual feature, while in var. majus, no matter whether it comes from Burma, Indonesia, North Australia, Central or South Africa, the ventral margins are strongly convex. Also in front view of the American plant, the spines extend out horizontally, forming almost a straight line with the apical margin of the semicell; in var. majus the upper paired spines are usually strongly curved upwards. In vertical view of the American plant the margins of the triangular semicell are deeply concave and merge imperceptibly into the line forming the outer edge of the spines, with no constriction at the point of junction, and the spines themselves are only slightly

divergent. In vertical view of var. majus the margins of the semicell are somewhat concave in the center and convex at the angles, two adjacent sides meeting at the point where the single spine arises; the upper paired spines are more strongly divergent, and their slightly inflated bases are intramarginal, ~~and all spines solid.~~

Viewing the American plant as a whole, and taking account of these differences, we are impressed by its considerable resemblance to St. trifidum Nordst., as figured by West & West on the same plate (1896, Pl. V, Figs. 2o, 21), rather than to var. majus. St. trifurcatum A priori it seems more likely that a plant known only from the United States might be related to one first found in Brazil, than to another one known only from southeastern Asia, North Australia and Africa. Other workers, besides ourselves, have found in the United States and Canada a number of desmid species formerly known only from South America.

The most potent argument against the supposed relationship between var. majus and the American species St. subtrifurcatum is that var. majus forms dichotypical cells with St. Wildemani, and the latter, in turn, forms dichotypical cells with two other new varieties to be described below, var. horizontale and var. unispinum. It is quite evident that this group of four different forms is closely inter-related; therefore we conclude that if there is any genetic relation with the American plant it must be a much more remote one.

For these reasons we have transferred St. subtrifurcatum var. majus West & West to St. Wildemani Gutw. as var. subtrifurcatum Scott & Presc., comb. nov. A strict adherence to the International Rules of Botanical Nomenclature would require the retention of the varietal name majus in the new combination, but this would give a misleading name, for the variety is no larger than the species to which it has been transferred. Accordingly we have chosen the varietal name subtrifurcatum, which is both descriptive and indicative of the derivation.

As will be seen from the illustrations, there is considerable variation of cell, and in the between the plants from various regions, in size, length and stoutness and direction of the spines; at some future time when more is known about their distribution these different forms may perhaps be separated on a geographical basis. It is to be noted that for each of the forms of St. Wildemani there is a corresponding form of var. subtrifurcatum and also a dichotypical form combining the two. For instance, the small cell of the specific form with slender and upstanding spines from the Sudan, shown in Fig. 6 has its counterpart in var. subtrifurcatum shown in Fig. 11, and a dichotypical form shown in Fig. 14. The short-spined plant from Sumatra, Fig. 4, is represented in var. subtrifurcatum by Fig. 10, and its dichotypical counterpart by Fig. 15.

may be discovered in the future, for it is not to be supposed that we were lucky enough to find all of them in this one series of collections. It should be borne in mind that these are not isolated or single occurrences, as might be the case if merely local variant clones were involved; in each type we have seen a dozen or more examples of dichotypy. Type A occurs in such widely separated places as Indonesia and Central Africa, and type B is found in Borneo and two habitats in the same region of South Sumatra. It is evident that this proves a very close genetic relationship.

In the Desmidiaceae the existence of 'combination forms' with differing semicells has long been known, and the phenomenon may be divided into two different classes. In the first and commonest one, the two semicells obviously belong to the same species, but exhibit different degrees of 'radiation' (Teiling 1948, 1950). Thus in a normally 3-radiate Staurastrum, one semicell will have the usual number of processes while the other may have four or five or six. Such cases have been ably discussed by Teiling (1948, 1950, 1952), who has devised the name 'Janus-form' for them. In the other and much rarer class, the individuals have differing semicells that apparently belong to different varieties or even species, as in the examples of St. Wildemani described herein. For this class Teiling (1948 loc. cit.) has coined the expressive and convenient terms 'dichotypical' and 'dichotypy'. Such dichotypical cells occur most frequently in the more highly elaborated species of Euastrum, Micrasterias and Staurastrum, and since they are usually found only as single individuals, or at best in very small numbers, they give rise to puzzling taxonomical problems, though occasionally, as with St. Wildemani and Micrasterias floridensis var. subjohnsonii (Prescott & Scott 1952), the chance find of dichotypical cells gives an insight into the true relationship between apparently different forms.

Concerning the causes which give rise to dichotypical cells not much is known at present. Desmid cells are normally quite symmetrical about both the vertical and horizontal axes, and it has heretofore been supposed that in asexual reproduction, which is far more common than the sexual process, each semicell could produce only an exact replica of itself. Recent discoveries prove that this is not correct in all cases; that under some circumstances, the conditions of which are not or only partially known, vegetative division of a dichotypical cell results in a new dichotypical cell, which means that each of two different semicells has produced, not a replica of itself, but of the other and different semicell. Such a case is illustrated by the new Brazilian desmid Amscottia mira Grönbl., (Grönblad & Kallio 1954), in which the approximately 100 specimens seen were all dichotypical, and one individual was found that consisted of an adult semicell with an attached young and partially developed semicell of the opposite type. We now have

under study a new Ichthyocercus-like desmid from one of Mr. Sachlan's collections (Menggala, South Sumatra) which also, apparently, shows inherited dichotypy. Because of certain puzzling features, we are postponing publication of this plant pending the receipt of additional material, which may, we hope, provide a solution of the problems.

Recent work in the cultivation of desmids and their subjection to artificial conditions of heat or cold, and centrifugal force, promise important increases in our knowledge concerning the cytological processes of asexual reproduction and the morphogenetics of desmids. (Waris, 1950a, 1950b, 1951, 1953; Kallio, 1951, 1953a, 1953b, 1954; Grönblad & Kallio 1954).

Another remarkable discovery was made by Starr (1954a, 1954b), who has isolated two strains of Cosmarium botrytis v. subtumidum Wittr., "in which sexuality can be induced at will by mixing the two strains in a liquid medium", while other strains of the same plant, from the same habitat and collection, do not reproduce sexually, or only very rarely, even when mixed with either of the two fertile strains. In a personal communication Dr. Starr informs us that he has since succeeded in isolating sexual strains in other species of Cosmarium and Closterium. The results of further work in this investigation will be awaited with great interest.

We wish to thank Dr. Hannah Croasdale for providing the Latin translation of the diagnoses, and Scott also expresses his thanks to Mrs. Dorothy Perine for inking his pencil drawings.

April 4 1955

District Director, Internal Revenue Service,
New Orleans, La.

Employer's Quarterly Tax Return, Household Employees.
Alice Elloy, Soc. Sec. #436-46-7074.

Dear Sir,

Since I shall be out of the country at the time this return is due for the second quarter, I am paying the tax in advance with the enclosed check #1983 in the amount of $9.36, representing 4% tax on $234.00.

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JANUARY, 1950

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We wish to thank you for your letter of January 9th and we have had pleasure in sending the one yard of #25 Standard Genuine Swiss Silk Bolting Cloth, unstamped 40" width Parcel Post Insured. We are sorry that we have not had any calls for the #20 Standard silk bolting cloth and have never stocked it, although we believe the Swiss mill does weave it. The next mesh which we have in stock below the #25 Standard Silk, is #17 Standard which we are quoting on the accompanying sheet. The bolting cloth is woven with an interlocking weave and is considerably higher in price than the Taffeta weave Tetcosilks. Price Cards BT-6 and WT-9 are enclosed for the Blue and White Swiss Tetcosilks, which you may find of interest.

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May 12, 1953

Mr. Arthur M. Scott
2824 Dante Street
New Orleans 18, La.

POLYVINYL ALCOHOL 71-30

Dear Mr. Scott:

Thank you for your letter of May 5, in which you indicate that you are anxious to obtain a small quantity of polyvinyl alcohol for a friend in South America.

Inasmuch as our product is to be used as a mounting medium, we believe that grade 71-30 will be found suitable. Our smallest standard package is, however, a 10 lb. net fibre carton which is greatly in excess of the quantity required for this microscopic work. We suggest, therefore, that you contact Delkote, Inc., P. O. Box 1335, Wilmington, Delaware, from whom polyvinyl alcohol 71-30 may be purchased in various smaller packages.

The enclosed reprint of an article entitled "A Method of Quieting Paramecium for Observation" may be of interest to you and to your friend.

Very truly yours,

R. T. Hanley

R. T. Hanley
Export Division

RTH/mls

A METHOD OF QUIETING PARAMECIUM FOR OBSERVATION

From: The Amer. Biology
Teacher
Vol. 7, #3, Dec. 1944
Published at Lancaster,
Pennsylvania

The polyvinyl alcohol method of quieting paramecium and other micro-organisms is not new, but it is probable that many readers of THE AMERICAN BIOLOGY TEACHER have not had it brought to their attention.

A solution of completely hydrolyzed, medium viscosity polyvinyl alcohol is prepared by stirring the powdered alcohol* into water until the solution is as thick as heavy molasses - approximately 12 to 14 grams of dry alcohol in 100 cubic centimeters of water. This should be done over a steam bath and the solution left until all bubbles rise to the surface, after which the solution will be glass clear, and may then be kept indefinitely in a stoppered wide-mouth bottle.

In use, two drops of a thick suspension of paramecia or other similar micro-organisms are placed on a slide and two drops of the polyvinyl alcohol solution added. The whole is thoroughly stirred with a needle and covered with a cover glass. The animals are brought almost to a standstill at once and will remain so in good condition for over four hours. Abrupt and striking reversals of ciliary beating and many other details are clearly visible. The frequency of pulsation of the contractile vacuoles usually becomes slower after three hours. The cover glasses are self-sealing because the polyvinyl alcohol dries to form a firm membrane that prevents further evaporation. The slides can be cleaned merely by soaking briefly in water.

STENTOR presents a handsome object when immobilized by this method. The same holds for the larger hypotrichs and various small aquatic worms like NAIS and CHAETOGASTER.

G. B. MOMENT,
GOUCHER COLLEGE
BALTIMORE, MARYLAND

71-30

*"Elvanol" 90-25 or ~~71-24~~ polyvinyl alcohol, obtained from E. I. duPont de Nemours & Company, Electrochemicals Department, Wilmington 98, Delaware. Other grades of "Elvanol" can be used, but they go into solution with more difficulty and remain cloudy in solution.

May 17 1953

Delkote, Inc.,
P.O.Box 1335,
Wilmington, Del.

Gentlemen,

The E.I.Dupont de Nemours Co. informs me that you can supply polyvinyl alcohol 72-30 in small quantities. For experimental purposes in making a mounting medium for microscopic biological specimens I wish to obtain a small amount, - two ounces would be enough, four ounces would last for many years.

If you will be kind enough to send this to me, with your invoice, I shall send you a check immediately.

Very truly yours,

Apl 12 1953

Dover Publications, Inc., Dept. 149.
1780 Broadway,
New York 19. N.Y.

Gentlemen,

Please send me "Mathematical Recreations", by Kraitchik, for which I enclose my check for $1.60.

Also please send your complete catalogue.

Very truly yours,

A. M. Scott.

Apl 30 1950

Dr. J. C Dickinson, Jr.,
Dept. of Biology,
University of Florida,
Gainesville, Fla.

Dear Dr. Dickinson,

Please accept my thanks for your courtesy in sending me the reprint of your paper on the Biota of Ponds and Ditches of Northern Florida.

From your use of the word "biota" I had hoped that the microflora would have been treated, as well as the microfauna; consequently I am a little bit disappointed to see the algae so poorly represented. But no doubt you, as a zoologist, would be equally disappointed in such a report written entirely from a botanist's viewpoint. Nevertheless, your very clear descriptions of the habitats have enabled me to form a good idea of their value to me as possible hunting grounds for desmids. This confirms my previous impression, gained from observations made while driving through the vicinity of Gainesville, that this particular district is not very favorable for my pets, because of the high pH and the probable high calcium content of the waters. Any waters in which Polygonum (Persicaria) or Eichhornia is growing are so unfavorable for desmids that I never bother to stop to collect from them, if any other type of habitat can be found. On the otherhand, the presence of Nymphaea (Castalia), Sphagnum, Utricularia, Myriophyllum, etc., is definitely an indicator of a low pH and conditions favorable for desmids. Such is the case in your Stations 16 and 17.

If you would like to have the desmids in your collections identified, I should be glad to undertake the work if you will send me some of the material. But there are so many new species and varieties to be found in Florida that it is quite likely that there may be some that I cannot name, and these would have to wait until Prof. G. W. Prescott, with whom I am collaborating, could get around to them.

Under separate cover I am sending you two reprints of papers by Prescott and myself on desmids from the southeastern states. These deal principally with the plants from Louisiana and Mississippi, and only a few from Florida are mentioned. But practically all of the forms are also found in northern Florida, and so the papers may be useful in identifying the desmids which you may find in your collections. Since you may not be particularly interested in algae, perhaps you will be good enough to pass these reprints on to someone in your botany department. Mr. M. A Brennon might be glad to get them. Future papers will deal more extensively with desmids from Florida; your state is a veritable paradise for these beautiful plants, and I have found a number of new species and many new varieties, all the way from Pensacola to the Keys.

Sincerely yours,

April 8 1950

Dr. Dickinson,
University of Florida,
Gainesville, Fla.

Dear Sir,

Dr. C. S. Nielsen has suggested that I write you, asking for a reprint of your paper on "Biota of some ponds in north Florida", provided you have one to spare.

I am very much interested in fresh-water algae, especially desmids, and have made several hundred collections in your State. Any information bearing on the subject of limnology will be welcome, as it will help me to find new habitats.

Thanking you in advance,

Sincerely yours,