

ROOM USE ONLY

ABSTRACT

CONTRIBUTION TO THE KNOWLEDGE OF THE DESMIDS OF THE STATE OF SÃO PAULO, BRAZIL (INCLUDING A FEW FROM THE STATE OF MINAS GERAIS)

BY CARLOS EDUARDO DE MATTOS BICUDO

THE PRESENT THESIS IS A CONTRIBUTION TO THE KNOWLEDGE OF THE DESMIDS (CHLOROPHYCEAE) OF THE STATE OF SÃO PAULO, BRAZIL, INCLUDING A FEW FROM 2 LOCALITIES IN THE NEIGHBOURING STATE OF MINAS GERAIS.

THE STUDY OF THESE FRESH-WATER ALGAE HAS BEEN NEGLECTED BY THE BRAZILIAN BOTANISTS. BORGE, IN 1918, MADE THE ONLY MORE EXTENSIVE STUDY ON THE DESMIDS OF THE STATE OF SÃO PAULO, WHILE SEVERAL OTHER PERSONS HAVE REPORTED SPECIES FROM THIS AREA. NO OTHER FORMAL STUDY, HOWEVER, HAS EVER BEEN MADE ON THE TAXONOMY AND DISTRIBUTION OF THIS GROUP OF ALGAE OF THE AREA COVERED BY THIS INVESTIGATION. THE CHIEF OBJECTIVES OF THIS STUDY HAVE BEEN, THEN, THE COLLECTION AND IDENTIFICATION OF THE DESMIDS OF THE STATE OF SÃO PAULO.

IN ORDER TO CARRY OUT THE MAJOR OBJECTIVES OF THIS STUDY, REPRESENTATIVE ALGAL SAMPLES WERE PERSONALLY COLLECTED FROM VARIOUS CITIES IN THE STATE OF SÃO PAULO, AND INCLUDED SOME THAT

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MR. IVANY FERRAZ MARQUES VÁLIO HAS COLLECTED DURING HIS EXCURSIONS TO THE STATE OF MINAS GERAIS.

THE SAMPLES WERE CAREFULLY SCRUTINIZED IN THE LABORATORY AND EACH SPECIES, VARIETY OR FORMA OF DESMID OBSERVED WAS RECORDED. FROM THE 50 COLLECTIONS AT MY DISPOSAL I HAVE BEEN ABLE TO RECORD 95 SPECIES, 66 VARIETIES, AND 16 NAMED FORMAE, A TOTAL OF 177 TAXA OF WHICH 20, OR APPROXIMATELY 11.3 PER CENT, I HAVE CONSIDERED AS NEW TO SCIENCE.

FOR EACH MATERIAL A DESCRIPTION, THE MOST COMPLETE POSSIBLE, THE NECESSARY MEASUREMENTS FOR IDENTIFICATIONAL PURPOSES, AND THE RESPECTIVE BRAZILIAN GEOGRAPHICAL DISTRIBUTION IS GIVEN. 18 PLATES OF SELECTED DRAWINGS MADE BY USE OF THE CAMERA LUCIDA AND 2 MAPS SUPPLEMENT THE WRITTEN TEXT.

AFTER PRESENTING A LIST OF THE PLANTS I HAVE RECORDED FROM THE AREA, SOME INTERESTING BIOGEOGRAPHICAL OBSERVATIONS CAN BE MADE: 1) A PREVALENCE OF SPECIES OF COSMARIUM AND CLOSTERIUM OVER THE OTHER GENERA; 2) AN EXTREMELY HIGH NUMBER OF THE MOST COMMON COSMOPOLITAN FORMS; 3) THE PRESENCE OF A TROPICAL AMERICAN ENDEMIC GROUP RELATIVELY DISCRETE; 4) THE RELATIVE ABSENCE OF THE GREATER FORMS OF MICRASTERIAS AND EUASTRUM, AND OF THE FILAMENTOUS FORMS; 5) THE EXISTENCE OF A PANTROPICAL RESIDUAL GROUP WHICH IS SOMEWHAT MUCH REDUCED.

THE DESMID FLORA OF THE REGION I HAVE STUDIED HAS MANY

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INTERESTING SIMILARITIES WITH THE DESMID FLORA OF THE REGION
KRIEGER CALLED INDO-MALAYAN-NORTH AUSTRALIAN. ABOUT 27 PER CENT
OF THE TOTAL TAXA PRESENTLY LISTED FOR THE STATE OF SÃO PAULO
AND THE 2 LOCALITIES IN THE STATE OF MINAS GERAIS, ARE ALSO KNOWN
TO OCCUR IN THE INDO-MALAYAN-NORTH AUSTRALIAN AREA. STAURASTRUM
TOHOPEKALIGENSE WOLLE F. MINUS (TURN.) SCOTT & PRESC. IS AN
ORIENTAL AND BRAZILIAN FORM; THIS IS ALSO TRUE FOR PLEUROTAE-
NIUM OVATUM NORDST..

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OF THE STATE OF SÃO PAULO, BRAZIL (INCLUDING A FEW FROM
THE STATE OF MINAS GERAIS)

B Y

CARLOS EDUARDO DE MATTOS BICUDO

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TO MY FATHER AND MOTHER

TO MY WIFE

TO MY DAUGHTER

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I N T R O D U C T I O N

SINCE THE ESTABLISHMENT OF ITS FIRST GENUS (CLOSTERIUM NITZSCH) IN 1817, THE DESMIDIACEAE, A FAMILY OF GREEN ALGAE, HAVE ATTRACTED THE ATTENTION OF MANY INVESTIGATORS IN THE WORLD . THE VARIETY OF GEOMETRIC FORMS AND THE NUMEROUS PATTERNS IN WALL DECORATION OF THE THOUSANDS OF SPECIES, IN ADDITION TO THE VARIOUS SHAPES OF CHLOROPLASTS, WOULD EXPLAIN THE AESTHETIC INTEREST IN THE DESMIDS (PRESCOTT, 1948).

FURTHERMORE, THE UNIQUE FEATURES FOUND IN THE MODE OF CELL DIVISION, METHODS OF SEXUAL REPRODUCTION, AND THEIR WALL STRUCTURES ARE EXAMPLES OF PHENOMENA WHICH COME UP FOR REPEATED INVESTIGATION.

THE RECOGNIZED IMPORTANCE OF THIS FAMILY WITH SPECIAL REFERENCE TO WATER SUPPLIES WAS VERY WELL SUMMARIZED BY PALMER (1959), AS FOLLOWS: 1) MEMBERS OF THE FAMILY ARE KNOWN TO GIVE

TASTE AND ODOR TO WATER SUPPLIES; 2) SOME SPECIES WERE FOUND TO GIVE A GREEN COLORATION TO WATER SUPPLIES; 3) OTHER SPECIES USUALLY CLOGG SAND FILTERS; 4) STILL OTHER SPECIES ARE WIDELY USED AS WATER SOURCE INDICATOR ORGANISMS FOR CLEAN WATER, SOFT WATER LAKES WITH OUTLET, ACID BOG LAKES, ETC..

LEFEVRE (1931) AND SAMPAIO (1946) HAVE SOME EVIDENCES , FROM THEIR CULTURAL STUDIES, THAT A MEMBER OF THE FAMILY, CLOSTERIUM ACEROSUM (SCHR.) EHR., WHICH WAS ALSO COLLECTED IN THE CITY OF SÃO PAULO FROM SOME ARTIFICIAL POOLS NEAR THE MARGINS OF THE PINHEIROS RIVER, CAN PRODUCE BACTERICIDAL ACTION COMPARABLE TO THAT OF PENICILLIN.

FROHNE (1939, 1942) USED DESMIDS AS A PARTICULAR REFERENCE FOR HIS PRELIMINARY NATURAL CLASSIFICATION OF THE SMALL BODIES OF QUIET FRESH-WATER, NATURALLY OR ARTIFICIALLY IMPOUNDED, AND OCCUPIED BY LARGER PLANTS.

HOWEVER, DESPITE ITS ECONOMIC IMPORTANCE, VERY LITTLE HAS BEEN DONE ON THE DESMIDIACEAE OF THE STATE OF SÃO PAULO. UP TO DATE ONLY 17 PAPERS HAVE BEEN PUBLISHED FROM STUDIES ON SUCH FASCINATING MATERIAL.

WITTRICK & NORDSTEDT (1880) WAS THE FIRST REPORT OF THE OCCURRENCE OF THE FAMILY IN THE STATE OF SÃO PAULO, FROM MATERIAL COLLECTED FROM THE PROXIMITY OF THE CITY OF PIRASSUNUNGA . BÖRGESSEN (1890), BORGE (1918), BICUDO & BICUDO (1962, 1965) , LEMMERMANN (1915), NORDSTEDT (1889), WILLE (1884), WITTRICK &

NORDSTEDT (1882, 1883A, 1883B, 1886, 1889), WITTRICK, NORDSTEDT & LAGERHEIM (1896, 1903) ARE THE OTHER PAPERS DEALING WITH THE TAXONOMY OF THE 'PAULISTAS' DESMIDS.

KLEEREKOPER (1939, 1944) MENTIONS SEVERAL SPECIES OF DESMIDS FOR THE STATE OF SÃO PAULO IN HIS LIMNOLOGICAL STUDIES . BRANCO (1960) AND KOLKWITZ (1933) REPORT SOME DESMIDS IN THEIR PAPERS DEALING WITH ECOLOGY, WHILE PALMER (1961) MENTIONS A FEW DESMID GENERA IN A PAPER DEALING WITH SANITATION. LEOPOLDO E SILVA (1938) MENTIONS TRIPLOCERAS GRACILE BAIL. AND TRIPLOCERAS VERTICELLATUM BAIL. FOR THE ISLAND OF SÃO VICENTE, IN A PAPER ON THE GEOGRAPHICAL DISTRIBUTION OF THE GENUS.

BESIDES ALL THE ABOVE MENTIONED LITERATURE, JOLY (1963) - WITH DIDACTICAL PURPOSE - LISTS SEVERAL DESMID GENERA FOR THE CITY OF SÃO PAULO AND NEIGHBOURHOOD.

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M A T E R I A L A N D M E T H O D S

THE PRESENT THESIS IS BASED ON A NUMBER OF SAMPLES COLLECTED IN VARIOUS PLACES IN THE STATE OF SÃO PAULO AND 2 LOCALITIES OF THE STATE OF MINAS GERAIS, AS ASSIGNED ON PLATE 1.

FROM THE 50 COLLECTIONS AT MY DISPOSAL I HAVE BEEN ABLE TO RECORD 95 SPECIES, 66 VARIETIES, AND 16 NAMED FORMAE OF DESMIDS, FOR A TOTAL OF 177 TAXA OF WHICH 20, OR APPROXIMATELY 11.3 PER CENT, I HAVE CONSIDERED AS NEW TO SCIENCE.

SOME OF THESE COLLECTIONS CAN BE CONSIDERED AS 'DESMID RICH', WHEREAS SOME CONTAIN ONLY A FEW DESMIDS. THIS COULD BE EXPLAINED BY CONSIDERING THE FACT THAT THE LATTER SAMPLES WERE COLLECTED BY PERSONS WHO WERE NOT PRIMARILY INTERESTED IN DESMIDS; THUS, THE HABITATS FROM WHICH THEY COLLECTED PROBABLY INCLUDED MANY THAT WERE POORLY OR NOT AT ALL SUITABLE FOR DESMIDS, WHICH PREFER SOFT OR SLIGHTLY ACID WATERS. ON THE OTHER HAND,

THE COMPARATIVELY 'DESMID RICH' COLLECTIONS WERE THE ONES I HAVE PERSONALLY COLLECTED FROM SEVERAL LOCALITIES WITHIN THE SÃO PAULO BOTANICAL GARDEN, OR THOSE I GATHERED DURING SOME EXCURSIONS TO THE 'CERRADO' REGION OF RIO CLARO, BROTAS, PIRASSUNUNGA, ETC. 'DESMID RICH' SAMPLES ALSO CAN BE CONSIDERED SOME OF THE ONES MR. IVANY FERRAZ MARQUES VÁLIO HAS COLLECTED IN CAETÉ AND PARACATU, IN THE STATE OF MINAS GERAIS. ALTHOUGH HE WAS NOT AN EXPERT ON ALGAE, HE TRIED TO FIND FAVOURABLE HABITATS FOR HIS GATHERINGS; IN THIS HE HAS EVIDENTLY BEEN QUITE SUCCESSFUL.

MOST OF THE SAMPLES I HAVE COLLECTED IN THE CITY OF SÃO PAULO AND ADJACENT PLACES WERE COLLECTED FROM SHALLOW PERMANENT PONDS, USUALLY RICH IN DECCAYING PLANT MATERIAL, AND WITH A PH RANGE OF 4.0 TO 5.5. THE SAMPLES GATHERED FROM THE 'CERRADO' REGION OF RIO CLARO, BROTAS, PIRASSUNUNGA, ETC., WERE COLLECTED FROM CREEKS AND STREAMS WITH THE PH VARYING FROM 5.5 TO 6.0.

THE REGION FROM WHICH I HAVE COLLECTED BELONGS PHYTOGEOGRAPHICALLY TO THE AREA KRIEGER (1937) CALLED TROPICAL AMERICA. AS IT IS GENERALLY ACCEPTED, THE DESMID FLORAS REPRESENTATIVE OF SUCH REGION ARE COMPOSED OF A COMPLEX IN WHICH ENDEMICS ARE CONSPICUOUS, AND EVEN DOMINANT IN SOME COLLECTIONS.

FROM THE STUDY OF THE DESMIDS OF THE STATE OF SÃO PAULO AND THE 2 LOCALITIES IN THE STATE OF MINAS GERAIS, THE FOLLOWING REMARKS CAN BE MADE: 1) A PREVALENCE OF SPECIES OF COSMARIUM AND CLOSTERIUM OVER THE OTHER GENERA; 2) AN EXTREMELY HIGH NUM-

BER OF THE MOST COMMON COSMOPOLITAN FORMS; 3) THE PRESENCE OF A TROPICAL AMERICAN ENDEMIC GROUP RELATIVELY DISCRETE; 4) THE RELATIVE ABSENCE OF THE GREATER FORMS OF MICRASTERIAS AND EUASTRUM, AND OF THE FILAMENTOUS FORMS, AND 5) THE EXISTENCE OF A PANTROPICAL RESIDUAL GROUP WHICH IS SOMEWHAT VERY REDUCED.

THE DESMID FLORA OF THE REGION I HAVE STUDIED ALSO HAS MANY INTERESTING SIMILARITIES WITH THE DESMID FLORA OF THE REGION KRIEGER CALLED INDO-MALAYAN-NORTH AUSTRALIAN. ABOUT 27 PER CENT OF THE TOTAL ENTITIES PRESENTLY LISTED FOR THE STATE OF SÃO PAULO AND THE 2 LOCALITIES IN THE STATE OF MINAS GERAIS, ARE ALSO KNOWN TO OCCUR IN THE INDO-MALAYAN-NORTH AUSTRALIAN AREA.

STAURASTRUM TOHOPEKALIGENSE WOLLE F. MINUS (TURN.) SCOTT & PRESG. IS AN ORIENTAL AND BRAZILIAN FORMA; THIS IS ALSO TRUE FOR PLEU-ROTAENIUM OVATUM NORDST..

THE EXAMINATION OF THE PLANTS WAS MADE WITH A SPENCER BREWMASER'S MICROSCOPE, MODEL NO. 33MO. ALL DRAWINGS WERE MADE WITH THE HELP OF A SPENCER CAMERA LUCIDA, MODEL NO. 500.

ABBREVIATIONS OF PERIODICALS, WHEN POSSIBLE, FOLLOW THE P. BROWN & G. B. STRATTON, EDIT.. 1963-1965. WORLD LIST OF SCIENTIFIC PERIODICALS, PUBLISHED IN THE YEARS 1900-1960. BUTTERWORTHS SCIENTIFIC PUBLICATIONS. WASHINGTON. 4TH. ED..

SINCE THE AREA FROM WHICH I HAVE COLLECTED IS SOMEWHAT RESTRICTED COMPARED WITH THAT OF THE STATE OF SÃO PAULO, THE PRESENT THESIS IS FAR FROM REPRESENTING THE DESMID FLORA OF THE

ENTIRE STATE. IT IS ONLY A CONTRIBUTION TO THE KNOWLEDGE OF SUCH A PROFUSE FLORA, AN INCENTIVE AND PROBABLE HELP TO THE FUTURE STUDENTS WHO WOULD BE INTERESTED IN THE BRAZILIAN DESMIDS.

ALL THE MATERIAL I CITE IN THE PRESENT THESIS IS AVAILABLE AT THE CRYPTOGAMIC SECTION OF THE 'INSTITUTO DE BOTÂNICA DE SÃO PAULO', CAIXA POSTAL 4005, SÃO PAULO, BRAZIL.

THE MAIN PART OF THIS MATERIAL IS PRESERVED IN 4 PER CENT FORMALIN AND SOME HAVE BEEN KEPT AS EXSICCATAE.

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A GEOLOGICAL NOTE ON THE REGION STUDIED

THE BRAZILIAN RELIEF IS CHARACTERISTIC, IN ITS OUTLINE, BY THE GREAT PREVALENCE OF PENEPLANES. A GLANCE AT THE TOPOGRAPHICAL MAP OF THE STATE OF SÃO PAULO SHOWS ITS RELATIVELY SIMPLICITY OF FORMS, ASSOCIATED WITH AN EQUALLY SIMPLE STRUCTURE. PARALLEL TO THE COASTAL LINE THERE IS THE SO CALLED 'SERRA DO MAR' (SEA MOUNTAINS) THAT, ACCORDING TO THE GEOMORPHOLOGISTS, SHOULD BE BETTER DEFINED AS THE SCARP OR SLOPE OF THE AMAZONIAN SHIELD, SINCE THE OPPOSITE SLOPE REALLY DOES NOT EXIST. HERE WE HAVE EXPOSURE OF THE CRYSTALLINE BED, THE MORE STRESSED FORMS DEMONSTRATING THE MORE JAGGED TOPOGRAPHY OF CERTAIN AREAS. HOWEVER, EVEN IN THESE AREAS IN WHICH THE UNDERLYING STRATA ARE SLOPING, BECAUSE OF ANCIENT FOLDINGS, THERE ARE COMMONLY OBSERVED ENORMOUS FLATTENED SURFACES DUE TO INTENSIVE EROSION.

WHEN ONE CLIMBS THE 'SERRA DO MAR' THE CRYSTALLINE BED

MAY BE SEEN SLOPING TO THE WEST, EVENTUALLY REPLACED AT THE SURFACE BY SEDIMENTARY STRATA (USUALLY ARENITE) AND LAYERS OF ERUPTIVE BASIC ROCKS.

IN THE PARANÁ VALLEY, THE ENORMOUS INTRUSION OF BASIC LAVA IN THE BEGINING OF THE MESOZOIC - THE PARANÁ TRAP - GAVE ORIGIN TO A GIGANTIC STAIRWAY DIRECTED TO THE WEST AND NORTHWEST. ARENITES AND BASALTS WILL, HOWEVER, SHOW THEIR STRATA GENTLY SLOPING AND, TOPOGRAPHICALLY, FORMING THE WIDE UNDULATIONS OF A TYPICAL PENEPLANE.

THE SOUTH PART OF THE STATE IS VERY DISTINCT BY THE OCCURRENCE OF LIMESTONE FROM THE ORDOVICIAN, DIRECTLY OVERLYING PRE-CAMBRIAN STRATA FROM THE ALGONKIAN. THIS IS A PARTICULARLY BEAUTIFUL REGION, FAMOUS FOR ITS CALCAREOUS CAVES IN WHICH A FANTASTIC WONDERFUL WORLD OF SCULPTURES DUE TO THE HANDIWORK OF THE UNDERGROUND WATER IS CONSTANTLY DISPLAYED.

AS A RULE FOR ALL THE BRAZILIAN TERRITORY, THE STATE OF SÃO PAULO IS VERY RICH IN RIVERS AND STREAMS AND, CONVERSELY, POOR IN LAKES AND PONDS. HOWEVER, BECAUSE OF ITS GEOGRAPHICAL LOCATION AND AN AVERAGE ANNUAL RAINFALL OF ABOUT 1,500 MILIMETERS (OR ABOUT 60 INCHES), INNUMERABLE TEMPORARY POOLS CAN BE FORMED, IN WHICH ALGAE CAN GROW PROFUSELY FOR THE MOST PART OF THE YEAR.

THE WATER IS TYPICALLY SOFT AND SLIGHTLY ACID (PH 4.5-6.0); HARD WATER CAN ONLY BE FOUND IN THE SOUTH CALCAREOUS REGION OF APIAHY.

S Y S T E M A T I C A C C O U N T

M E S O T A E N I A C E A E

MESOTAENIUM NÄGELI, 1849

MESOTAENIUM DE GREYI TURN. VAR. BREVE W. WEST

J. LINN. SOC. (BOT.) [LONDON]. 29: 131, PL. 20, FIG. 6. 1892.

(PL. III, FIG. 5)

CELLS CYLINDRICAL, STRAIGHT OR CURVED AND WITH ROUNDED
POLES; CHLOROPLAST AN AXILE PLATE.

LENGTH OF CELL 51.0u; BREADTH 22.1u.

ZYGOSPORE UNKNOWN.

HAB. - ON DAMP SOIL AT 'FAZENDA GERIZA', CAETÉ, MINAS
GERAIS (C.E.M.B. 17).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS IS ONE OF THE LARGEST AND MOST CHARACTERISTIC SPECIES OF THE GENUS. IT CAN BE CONFUSED WITH MESOTAENIUM MACROCOC-
CUM (KÜTZ.) ROY & BISS. AND MESOTAENIUM CHLAMYDOSPORUM DE BARY ,
FROM WHICH IT DIFFERS, HOWEVER, BY BEING MUCH WIDER AND HAVE
DIFFERENT CELL PROPORTIONS.

MESOTAENIUM ENDLICHERIANUM Næg.

EINZ. ALG. [ZURICH]. 108, T. 6, FIGS. B A-F. 1849.

(PL. III, FIG. 6)

CELLS CYLINDRICAL, STRAIGHT AND WITH BROADLY ROUNDED APICES; CHLOROPLAST AN AXILE PLATE WITH 1 PYRENOID IN EACH SEMI-CELL.

LENGTH OF CELL 40.8 μ ; BREADTH 10.2 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

MESOTAENIUM MACROCOCCUM (Kütz.) ROY & BISS.

ANN. SCOT. NAT. HIST. [EDINBURGH]. 1893 (12): 254. 1894.

(PL. III, FIG. 8)

CELLS CYLINDRICAL, STRAIGHT, WITH ROUNDED APICES; CHLOROPLAST AN STOUT AXILE PLATE OFTEN WITH TOOTHED MARGINS.

LENGTH OF CELL 27.2 μ ; BREADTH 10.2 μ .

ZYGOSPORE SUBQUADRATE WITH ROUNDED ANGLES.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA

GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

IF THE CHLOROPLAST IS NOT WELL PRESERVED, THIS MATERIAL CAN BE CONFUSED WITH MESOTAENIUM ENDLICHERIANUM NAG.. FORTUNATELY, THE PRESENCE OF CHLOROPLAST WITH DEFINITELY TOOTHED MARGIN IN THE BRAZILIAN PLANTS ALLOWED THE AUTHOR TO CONSIDER IT AS MESOTAENIUM MACROCOCCUM (KÜTZ.) ROY & BISS..

MESOTAENIUM MACROCOCCUM (KÜTZ.) ROY & BISS. VAR. MICROCOCCUM

(KÜTZ.) WEST & WEST

TRANS. YORKS. NAT. UN. [LEEDS]. 22: 41. 1900.

(PL. III, FIG. 9)

CELLS MUCH SHORTER THAN IN THE TYPICAL FORM.

LENGTH OF CELL 18.7 μ ; BREADTH 10.2 μ .

ZYGOSPORE UNKNOWN.

HAB. - ON DRIPPING STONES OF A WATER FALL IN PARACATU , MINAS GERAIS (C.E.M.B. 94).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE ONLY DIFFERENCE BETWEEN THIS VARIETY AND THE TYPICAL ONE IS THE LENGTH OF THE CELL. THE CELLS OF THE PRESENT VARIETY

ARE MUCH SHORTER THAN THOSE OF THE TYPE, BUT IN THEIR BREADTH AND OTHER RESPECTS THEY ARE PRECISELY SIMILAR.

MESOTAENIUM MIRIFICUM ARCH.

PROC. DUBL. NAT. HIST. SOC. [DUBLIN]. 4 (1): 30, PL. 1, FIGS. 20-31. 1864.

(PL. III, FIG. 7)

CELLS ELLIPTICAL, STRAIGHT OR RARELY SLIGHTLY CURVED ;
CHLOROPLAST A VERY NARROW AXILE PLATE WHICH IS OFTEN CURVED.

LENGTH OF CELL 25.5-30.6 μ ; BREADTH 13.6 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 19, 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

SPIROTAENIA DE BRÉBISSE, 1848

SPIROTAENIA OBSCURA RALFS

RALFS BRIT. DESM. [LONDON]. 179, T. 34, FIG. 2. 1848.

(PL. III, FIG. 4)

CELLS CYLINDRICAL OR FUSIFORM, ATTENUATED TOWARD THE A-

PICES, WHICH ARE ROUNDED; CHLOROPLAST AXILE, NOT QUITE REACHING THE POLES OF THE CELL, CRISTATE, WITH 3-8 PLATES SPIRALLY TWISTED TO THE LEFT, RARELY ALMOST STRAIGHT; PLATES THICKENED AT THE FREE MARGINS; PYRENOIDS SEVERAL.

LENGTH OF CELL 96.9 μ ; BREADTH 17.1 μ .

ZYGOSPORE GLOBOSE, AREOLATE.

HAB. - IN A DRAINAGE DITCH BEHIND THE MUSEUM BUILDING, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 90).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA (BORGE 1918; WITTRICK & NORDSTEDT 1880).

CYLINDROCYSTIS MENEGHINI, 1838

CYLINDROCYSTIS BREBISSEI MENEGH.

R. ACCAD. SCI. LET. ARTI PADOVA [PADOVA]. 4: 350. 1838.

(PL. III, FIGS. 1-2)

CELLS CYLINDRICAL, UNCONSTRICTED, WITH ROUNDED APICES; CELL WALL COLORLESS AND SMOOTH; CHLOROPLASTS WITH A FEW RADIATING PLATES.

LENGTH OF CELL 37.4-68.0 μ ; BREADTH 15.3-28.9 μ .

ZYGOSPORE INITIALLY QUADRATE AND THEN SPHERICAL OR SUBSPHERICAL TO SUBQUADRATE.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE MARGINS OF A CLEAN FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 66); FORMING GREENISH SLIPERY MATS ON A CEMENT WALL AT 'ALTO DA SERRA' BIOLOGICAL STATION, PARANAPIACABA, SÃO PAULO (SP 28877).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: ALTO DA SERRA, BELÉM DO DESCALVADO (BORGE 1918), PIRASSUNUNGA (WITROCK & NORDSTEDT 1882), SÃO PAULO (BORGE 1918); MINAS GERAIS: CALDAS (WILLE 1884).

CYLINDROCYSTIS BREBISSONII MENEGH. VAR. MINOR WEST & WEST
TRANS. R. IR. ACAD. [DUBLIN]. 32 B: 20, PL. 2, FIG. 7. 1902.
(PL. III, FIG. 3)

CELLS NARROWER AND SHORTER THAN IN THE TYPICAL FORM.

LENGTH OF CELL 25.2-30.6u; BREADTH 8.5-11.9u.

ZYGOSPORE SUBQUADRATE.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45); IN GELATINOUS MASSES ATTACHED TO THE MARGINS OF A CLEAN FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 65).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

CYLINDROCYSTIS CRASSA DE BARY VAR. NOV.

(PL. IV, FIGS. 1-4)

CELLS ELLIPTICAL, UNCONSTRICTED AND UNISERIATELY ARRANGED WITHIN A GELATINOUS, BRANCHED, FILAMENTOUS MASS; APICAL VIEW CIRCULAR; CHLOROPLASTS AXILE, WITH 6 LONGITUDINAL RADIATING PLATES; FREE MARGINS OF PLATES ENTIRE; A SINGLE PYRENOID IN EACH SEMICELL; CELL WALL HYALINE AND SMOOTH.

LENGTH OF CELL (34.8-) 36.2-42.0u; BREADTH 17.4-19.0u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE MARGINS OF A CLEAN FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 68).

THIS VARIETY IS SUFFICIENTLY DISTINCT BY REASON OF THE FORM OF THE CELLS AND THE STRUCTURE OF ITS CHLOROPLASTS. THE UNISERiate ARRANGMENT OF THE CELLS WITHIN GELATINOUS BRANCHED STRANDS CAN BE ALSO CONSIDERED AS A GOOD CHARACTERISTIC TO DELIMIT THIS VARIETY. THIS KIND OF HABIT WAS ALREADY MENTIONED BY GRÖNBLAD (1933) FOR THE TYPE MATERIAL, FROM A SUBAERIAL SAMPLE GATHERED FROM KARIS, FINLAND. IN THE BRAZILIAN MATERIAL, HOWEVER, THE FILAMENTOUS HABIT IS MUCH MORE EVIDENT AND BRANCHING

IS OF COMMON OCCURRENCE.

SUGGESTED NAME FOR THE NEW VARIETY: CYLINDROCYSTIS
CRASSA DE BARY VAR. ITIRAPINENSIS.

ROYA WEST & WEST, 1896

ROYA OBTUSA (BRÉB.) WEST & WEST

J. R. MICROSC. SOC. [LONDON]. 152. 1896.

(PL. III, FIG. 10)

CELLS CYLINDRICAL, VERY SLIGHTLY CURVED, APICES BROADLY
ROUNDED; CHLOROPLAST AN AXILE PLATE WITH 4-8 PYRENOIDS; CELL
WALL HYALINE AND SMOOTH.

LENGTH OF CELL 125.8-136.0u; BREADTH 6.8-7.7u.

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE MARGINS OF
A CLEAN FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BRO-
TAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 66).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS SPECIES BEARS CONSIDERABLE RESEMBLANCE TO ROYA
CAMBRICA WEST & WEST, BUT IS DISTINGUISHED BY ITS APICES BROAD-

LY ROUNDED, NOT SLIGHTLY ATTENUATED, AND BY THE SMALLER NUMBER OF ITS PYRENOIDS.

NETRIUM (NÄGELI, 1849) ITZIGSOHN & ROTHE IN RABENHORST, 1856.

NETRIUM DIGITUS (EHR.) ITZ. & ROTHE VAR. LAMELLOSUM

(BRÉB.) GRÖNBL.

ACTA SOC. FAUNA FLORA FENN. [HELSINGFORSIAE]. 47 (4): 13. 1920.
(PL. III, FIGS. 11-12)

CELLS VERY SLIGHTLY CONSTRICTED IN THE MIDREGION, TAPERING TO THE APICES; APICES ROUNDED; CHLOROPLASTS AXILE, WITH ABOUT 6 LONGITUDINAL PLATES AND DEEPLY NOTCHED AT THE FREE MARGINS; CELL WALL SMOOTH.

LENGTH OF CELL 283.8 μ ; BREADTH 52.5 μ .

ZYGOSPORE SPHERICAL, SMOOTH AND THICK-WALLED.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT THE 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 19).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAMPINAS (KLEEREKOPER 1944), PIRASSUNUNGA, SÃO PAULO (BORGE 1918); MATO GROSSO: COXIPÓ (BORGE 1903); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: CACHOEIRA (BORGE 1903).

NETRIUM DIGITUS (EHR.) ITZ. & ROTHE VAR. NÄGELII (BRÉB.) KR.
 RABENH. KRYPT. FL. [LEIPZIG]. 13 (1): 218, T. 8, FIGS. 4-5 .
 1937.
 (PL. 111, FIG. 14)

CELLS OBLONG-LANCEOLLATE, APICES BROADLY ROUNDED.

LENGTH OF CELL 85.0-120.0u; BREADTH 23.5-33.5u.

ZYGOSPORE UNKNOWN.

HAB. - ON DRIPPING STONES OF A SMALL WATER FALL AT THE
 'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B.
 79); PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS
 (C.E.M.B. 100).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖR-
 GESEN 1890): ITAPURA (LEMMERMANN 1915), PIRASSUNUNGA (BORGE
 1918); MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING
 1892); GOIÁS: FORMOSO (PRESCOTT 1957); MATO GROSSO: CORUM-
 BÁ, COXIPÓ (BORGE 1903); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO
 DE JANEIRO (NORDSTEDT 1877).

THIS VARIETY DIFFERS FROM THE TYPICAL BY ITS SMALLER
 SIZE AND BY HAVING SOMEWHAT NARROWER CELLS. SOMETIMES IT IS
 VERY DIFFICULT TO DELIMIT THIS VARIETY FROM THE TYPICAL, BECAUSE
 A WIDE RANGE OF FORMS MAY OCCUR.

NETRIUM INTERRUPTUM (BRÉB.) LÜTK. VAR. MINOR (BORGE) KR.

ARK. BOT. [UPPSALA, STOCKHOLM]. 8 (13): 69, T. 7, FIG. 3. 1909
(PL. III, FIG. 13)

CELLS CYLINDRICAL WITH BROADLY ROUNDED POLES; CHLOROPLASTS 2 IN EACH SEMICELL, EACH WITH ABOUT 8 LONGITUDINAL PLATES; FREE MARGIN OF PLATES ENTIRE; APICAL VACUOLE CONSPICUOUS AND CONTAINING A SOLITARY MOVING GRANULE.

LENGTH OF CELL 61.2-62.9 μ ; BREADTH 13.6-17.0 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (C.E.M.B. 97).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE BRAZILIAN MATERIAL IS SMALLER THAN THE MINIMUM LIMITS GIVEN BY BORGE (1909) AND KRIEGER (1937). HOWEVER, THIS DIFFERENCE IS INSUFFICIENT TO JUSTIFY THE CREATION OF A NEW FORMA WITHIN THE VARIETY, SINCE IN SHAPE AND OTHER RESPECTS THE BRAZILIAN AND THE TYPICAL PLANTS ARE SIMILAR.

GONATOZYGAEE

GONATOZYGON DE BARY, 1856

GONATOZYGON BREBISSEI DE BARY VAR. MINUTUM WEST & WEST
 J. R. MICROSC. SOC. [LONDON]. 282, PL. 5, FIG. 1. 1890.
 (PL. IV, FIG. 5)

CELLS ABOUT 10 TIMES LONGER THAN THEIR DIAMETER, NARROWLY CYLINDRICAL AND SLIGHTLY ATTENUATED TO THE APICES, WHICH ARE SUBCAPITATE; CELL WALL COLORLESS, MINUTELY AND DENSELY GRANULATE, GRANULES SOMETIMES SCARCELY VISIBLE, SOMETIMES STRONGLY DEVELOPED AND VERY SHARP; CHLOROPLASTS AXILE, EACH WITH 5-16 PYRENOIDS.

LENGTH OF CELL 73.1 μ ; BREADTH 8.5 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE MARGINS OF A CLEAN FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 65).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY DIFFERS FROM THE TYPICAL GONATOZYGON BREBISSEI DE BARY IN THE CONSIDERABLY SMALLER SIZE OF ITS CELLS.

THIS VARIETY CAN BE CONFUSED WITH GONATOZYGON MONOTAENIUM DE BARY, FROM WHICH IT IS USUALLY DISTINGUISHED BY THE FORM OF THE CELLS. IN GONATOZYGON BREBISSEI DE BARY VAR. MINUTUM WEST & WEST THE CELLS ARE MOSTLY SOMEWHAT FUSIFORM WITH SUBCAPITATE POLES. GONATOZYGON MONOTAENIUM DE BARY HAS QUITE CYLIN-

DRICAL CELLS, NEVER ATTENUATED TOWARD THE POLES.

GONATOZYGON MONOTAENIUM DE BARY

RABENH. ALG. No. 539. 1856.

(PL. IV, FIGS. 6-7)

CELLS CYLINDRICAL WITH SLIGHTLY DILATED APICES; CELL WALL MINUTELY AND DENSELY GRANULATE; GRANULES SOMETIMES VERY INDISTINCT AND SOMETIMES STRONG AND SHARP, EVEN PAPILLIFORM; 6-9 PYRÉNOIDS IN EACH CHLOROPLAST.

LENGTH OF CELL 73.1-255.0u; BREADTH 8.5-15.0u.

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46); IN GELATINOUS MASSES ATTACHED TO THE MARGINS OF A CLEAN FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 65).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-RASSUNUNGA (BORGE 1918); MATO GROSSO: CORUMBÁ (BORGE 1903), PORTO DO CAMPO (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945).

A FEW SPECIMENS FOUND IN THE SAMPLE NO. 65 WERE SOMEWHAT SMALLER THAN THE USUAL LIMITS GIVEN BY WEST & WEST (1904)

AND KOSSINSKAJA (1952). GRÖNBLAD (1945) MENTIONS ONE SPECIMEN MEASURING $69.0 \times 9.2\mu$ FROM HIS SAMPLE NO. 164, GATHERED FROM A SMALL POND ('TUMPEL') FROM 'FAZENDA TAPERINHA', IN THE STATE OF PARÁ, WHICH HE REFERS IN HIS PLATE 1, FIG. 3, AS FORMA MINOR. NO DESCRIPTION WAS GIVEN BY GRÖNBLAD AND I PREFER TO CONSIDER BOTH PLANTS AS TYPICAL FORMS.

DESMIDIACEAE

PENIUM DE BRÉBISSE, 1844

PENIUM CYLINDRUS (EHR.) BRÉB.

RALFS BRIT. DESM. [LONDON]. 150, T. 25, FIG. 2. 1848.

(PL. IV, FIG. 8)

CELLS ABOUT 2-4 (-6) TIMES LONGER THAN THEIR DIAMETER, CYLINDRICAL, NOT CONSTRICTED IN THE MIDREGION, APICES TRUNCATELY ROUNDED; CELL WALL REDDISH-BROWN IN COLOR (YOUNG PARTS OFTEN COLORLESS), FURNISHED WITH LONGITUDINAL ROWS OF MINUTE GRANULES, WHICH ARE OFTEN SCATTERED ESPECIALLY NEAR THE EXTREMITIES; CHLOROPLASTS LAMELLATE, WITH 1 OR 2 PYRENOIDS.

LENGTH OF CELL $25.7-27.5\mu$; BREADTH $11.9-13.6\mu$.

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP.

FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL (BORGE 1903).

PENIUM MARGARITACEUM (EHR.) BRÉB.

RALFS BRIT. DESM. [LONDON]. 149, T. 25, FIGS. 1 A-C, T. 33, FIG. 3. 1848.

(PL. IV, FIGS. 9-10)

CELLS ABOUT 3-13 TIMES LONGER THAN THEIR DIAMETER, CYLINDRICAL, SLIGHTLY BUT DISTINCTLY CONSTRICTED AT THE MIDDLE, APICES BROADLY ROUNDED; CELL WALL SOMEWHAT REDDISH-BROWN IN COLOR, FURNISHED WITH LONGITUDINAL ROWS OF GRANULES; CHLOROPLASTS WITH ABOUT 10 LONGITUDINAL PLATES, OFTEN SHOWING A SLIGHTLY MEDIAN INTERRUPTION, AND 1 ROD-LIKE OR 2 GLOBOSE PYRENOIDS.

LENGTH OF CELL 121.2-208.3 μ ; BREADTH 23.4-26.0 μ .

ZYGOSPORE GLOBOSE AND SMOOTH (MOSTLY SOMEWHAT LONGER THAN BROAD).

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEI-

ROS RIVER, SÃO PAULO (C.E.M.B. 97).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: SANTO AMARO (KLEEREKOPER 1939); MATO GROSSO: SÃO LUÍS DE CÁCERES (BORGE 1925); PARÁ: MONTE ALEGRE (DICKIE 1881).

PENIUM MARGARITACEUM (EHR.) BRÉB. F. GLABRA MESS.

ARCH. HYDROBIOL. [STUTT GART] 47 (4): 550, T. 4 ,
FIGS. 4-4'''''. 1953.

(PL. IV, FIG. 11)

CELL WALL CONSPICUOUSLY SMOOTH AND COLORLESS; SIMILAR TO THE TYPE IN ALL THE OTHER CHARACTERISTICS.

LENGTH OF CELL 78.2u; BREADTH 15.3u.

ZYGOSPORE UNKNOWN.

HAB. - ON DAMP SOIL AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 27).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE PLANTS COLLECTED FROM RÄTIKON, SWITZERLAND, AND DESCRIBED BY MESSIKOMMER (1953) ARE MORE THAN TWICE THE LENGTH OF THE BRAZILIAN MATERIAL FROM CAETÉ, MINAS GERAIS. HOWEVER, THEY PERFECTLY AGREE IN ALL THE OTHER RESPECTS.

THE CONSPICUOUSLY SMOOTH AND COLORLESS CELL WALL OF THE

PLANTS OF THIS FORM IS THE ONLY CHARACTERISTIC TO DISTINGUISH IT FROM THE TYPICAL PENIUM MARGARITACEUM (EHR.) BRÉB..

PENIUM SILVAE NIGRAE RAB. F. MINOR BOUR. & MANG.

ALG. GUADEL. [PARIS]. 217, T. 27, FIG. 469. 1952.

(PL. IV, FIG. 12; PL. V, FIG. 1)

CELLS ABOUT TWICE AS LONG AS BROAD, SUBCYLINDRICAL, SLIGHTLY CONSTRICTED AT THE MIDDLE, VERY GRADUALLY ATTENUATED TOWARD THE APICES, WHICH ARE TRUNCATELY ROUNDED; CELL WALL COLORLESS, WITH STRAIGHT ROWS OF BROKEN STRIAE, WHICH APPEAR AS ROWS OF DASHES RATHER THAN AS PUNCTAE; CHLOROPLASTS LAMELLATE, WITH A SINGLE PYRENOID.

LENGTH OF CELL 37.4-40.8u; BREADTH 17.0-18.7u; BREADTH OF ISTHMUS 15.3-17.0u.

ZYGOSPORE UNKNOWN.

HAB. - ON DRIPPING STONES OF A WATER FALL IN PARACATU, MINAS GERAIS (C.E.M.B. 94).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

PENIUM SILVAE NIGRAE RAB. VAR. PARALLELUM KR. F. NOV.

(PL. IV, FIG. 13)

CELLS MUCH SMALLER, CYLINDRICAL, WITH APICES BROADLY TRUNCATE; ALL OTHER CHARACTERISTICS VERY SIMILAR TO THE TYPE.

LENGTH OF CELL 34.0u; BREADTH 12.8u; BREADTH OF ISTHMUS 11.9u.

ZYGOSPORE UNKNOWN.

HAB. - ON DRIPPING STONES OF A WATER FALL IN PARACATU, MINAS GERAIS (C.E.M.B. 94).

THE CONSISTENTLY SMALLER SIZE OF THE CELLS OF THE PRESENT FORM IS THE ONLY DIFFERENCE BETWEEN IT AND THE TYPICAL PENIUM SILVAE NIGRAE RAB. VAR. PARALLELUM KR..

SUGGESTED NAME FOR THE NEW FORM: PENIUM SILVAE NIGRAE RAB. VAR. PARALLELUM KR. F. MINUS.

CLOSTERIUM NITZSCH, 1817

CLOSTERIUM ABRUPTUM W. WEST

J. R. MICROSC. SOC. [LONDON]. 719, T. 9, FIG. 1. 1892.

(PL. V, FIGS. 13-14)

CELLS SLIGHTLY CURVED, THE MEDIAN PORTION ALMOST STRAIGHT, THE VENTRAL MARGIN MORE CURVED TOWARD THE EXTREMITIES, GRADUALLY BUT SLIGHTLY ATTENUATED TOWARD THE APICES; APICES RELATIVELY BROAD AND TRUNCATE; CELL WALL SMOOTH, COLORLESS OR

STRAW-COLORED; CHLOROPLASTS WITH 2 OR 3 LONGITUDINAL PLATES AND CONTAINING A CENTRAL ROW OF 4-6 PYRENIDS; APICAL VACUOLES WITH A SINGLE LARGE MOVING GRANULE.

LENGTH OF CELL 180.0u; BREADTH 15.0u.

ZYGOSPORE SELDOM OBSERVED. ACCORDING TO WEST & WEST (1896) IT IS GLOBOSE AND SMOOTH; GRÖNBLAD (1920), HOWEVER, DESCRIBES IT AS ELLIPTICAL, NOT SO ROUNDED.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO BRANCO: SERRA DA LUA (FÖRSTER 1963).

CLOSTERIUM ACEROSUM (SCHR.) EHR.

SYMB. PHYS. PHYTOZOA [BEROLINI]. T. 2, FIG. 9. 1828.

(PL. VI, FIG. 2)

CELLS ALMOST STRAIGHT, NARROWLY FUSIFORM, THE OUTER MARGIN SLIGHTLY CURVED AND THE INNER MARGIN ALMOST STRAIGHT OR SLIGHTLY CONVEX; SEMICELLS GRADUALLY TAPERING TO THE APICES; APICES SLIGHTLY RECURVED, NARROW AND ROUNDED-TRUNCATE, OFTEN SLIGHTLY THICKENED; CELL WALL COLORLESS AND SMOOTH OR YELLOWISH-

BROWN AND VERY DELICATELY STRIATE; CHLOROPLASTS LAMELLATE, WITH A MEDIAN SERIES OF 6-16 PYRENOIDS; APICAL VACUOLES WITH A NUMBER OF MOVING GRANULES.

LENGTH OF CELL 203.5-365.0u; BREADTH 32.0-60.0u.

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (C.E.M.B. 97).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAMPINAS (BORGE 1918), SÃO PAULO (WITTROCK & NORDSTEDT 1889); MATO GROSSO: CORUMBÁ (BORGE 1925), CUIABÁ (BORGE 1903); GOIÁS: FORMOSO (PRESCOTT 1957); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL (BORGE 1903).

THE CELL WALL IS USUALLY COLORLESS AND SMOOTH IN THE YOUNG CELLS, BECOMING YELLOWISH-BROWN AND VERY DELICATELY STRIATE IN THE OLDER SPECIMENS. STRIAE, WHEN PRESENT, FINE AND IMPOSSIBLE TO COUNT EVEN IN THE OLDER INDIVIDUALS.

THIS ALGA, IF PRESENT, OFTEN OCCURS ABUNDANTLY, THE CELLS USUALLY IRREGULARLY IN OUTLINE DUE TO RAPIDITY OF CELL-DIVISION.

CLOSTERIUM CORNU EHR.

PHYS. ABH. AKAD. [WIEN]. 53: 62. 1830.

(PL. V, FIG. 5)

CELLS MODERATELY CURVED, INNER MARGIN SLIGHTLY CONCAVE AND USUALLY STRAIGHT IN THE MEDIAN PART, GRADUALLY TAPERING TO THE APICES; APICES NARROW, ROUNDED TO ROUNDED-TRUNCATE; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS WITH 2-5 PYRENOIDS; APICAL VACUOLES WITH 1 MOVING GRANULE.

LENGTH OF CELL 91.8u; BREADTH 6.8u.

ZYGOSPORE VARIABLE. THE BODY IS SUBQUADRATE OR RECTANGULAR, SIDES STRAIGHT, CONCAVE OR SLIGHTLY CONVEX, ANGLES ROUNDED AND SUBMAMILLATE.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892); GOIÁS: FORMOSO (PESCOTT 1957); PARÁ: SANTARÉM (GRÖNBLAD 1945).

THIS SPECIES BEARS CONSIDERABLE RESEMBLANCE TO CLOSTERIUM GRACILE BRÉB., BUT THE CELLS ARE MORE STRONGLY CURVED AND THE APICES MORE TRUNCATE. THE ZYGOSPORE SEEMS TO BE THE BEST

CHARACTERISTIC TO SEPARATE THE SPECIES.

CLOSTERIUM COSTATUM CORDA

ALM. CARLSB. [PRAGUE]. 1835: 185, 190, 194, 209, T. 5,

FIGS. 61-63. 1835.

(PL. VII, FIGS. 8-9)

CELLS MODERATELY CURVED AND GRADUALLY ATTENUATED TO THE APICES; APICES ROUNDED, TRUNCATELY ROUNDED, OR TRUNCATE-CONICAL; CELL WALL REDDISH-BROWN, COSTATE; 6-10 COSTAE VISIBLE ACROSS THE CELL; CHLOROPLASTS LAMELLATE, EACH WITH 6-12 PYRENOIDS IN ONE AXILE SERIES; APICAL VACUOLES WITH NUMEROUS MOVING GRANULES.

LENGTH OF CELL 224.4u; BREADTH 30.6u.

ZYGOSPORE EXTREMELY RARE, GLOBOSE OR OVOID-GLOBOSE ; SMOOTH.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: SÃO PAULO (BORGE 1918).

CLOSTERIUM CYNTHIA DE NOT.

DESM. ITAL. [GENOVA]. 65, T. 7, FIG. 71. 1867.

(PL. VII, FIG. 10)

CELLS STRONGLY CURVED, INNER MARGIN NOT TUMID IN THE MIDREGION, GRADUALLY ATTENUATED TOWARD THE APICES; APICES OB-
TUSELY ROUNDED; CELL WALL PALE YELLOW TO YELLOWISH-BROWN IN
COLOR AND FINELY STRIATE; 14-16 STRIAE VISIBLE ACROSS THE CELL;
CHLOROPLASTS 2 OR 3 LAMELLATE AND WITH 3-6 PYRENOIDS IN ONE A-
XILE SERIES; APICAL VACUOLES WITH 1 MOVING GRANULE.

LENGTH OF CELL 119.0-170.0u; BREADTH 14.5-25.5u.

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE
GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO
(C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-
RASSUNUNGA (BORGE 1918); MATO GROSSO: COXIPÓ (BORGE 1925);
PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO DE JANEIRO: ITATIAIA
(KRIEGER 1950).

THIS SPECIES CAN BE CONFUSED WITH CLOSTERIUM PARVULUM
NÄG. AND CLOSTERIUM VENUS KÜTZ.. THE BEST CHARACTERISTIC USUAL-
LY USED TO SEPARATE CLOSTERIUM CYNTHIA DE NOT. FROM THE TWO ABO-
VE MENTIONED SPECIES IS THE STRIATION OF THE CELL WALL, NOT PRES-

ENT IN CLOSTERIUM PARVULUM NÄG. AND CLOSTERIUM VENUS KÜTZ..

CLOSTERIUM DIANAE EHR.

INFUS. [LEIPZIG]. 92, T. 5, FIGS. XVII, 1-6. 1838.

(PL. V, FIGS. 11-12)

CELLS MODERATELY CURVED, INNER MARGIN CONCAVE TO SLIGHTLY TUMID IN THE MEDIAN PART, GRADUALLY ATTENUATED TOWARD THE APICES; APICES OBTUSELY ROUNDED, WITH THE DORSAL MARGIN OBLIQUELY TRUNCATE AND THICKENED; CELL WALL SMOOTH, REDDISH-BROWN IN COLOR; CHLOROPLASTS LAMELLATE, WITH A SINGLE ROW OF 5-8 PYREN-
OIDS; APICAL VACUOLES WITH MANY MOVING GRANULES.

LENGTH OF CELL 235.5 μ ; BREADTH 17.0 μ .

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - INTERMINGLED WITH A FLOATING MASS OF SPIROGYRA SP. AND ZYGNEMA SP. IN A CLEAN SLOW FLOATING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 48).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890); GOIÁS: CONCEIÇÃO (FÖRSTER 1964); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO DE JANEIRO: RIO D'OURO (WILLE 1884).

CLOSTERIUM DIANAE EHR. VAR. ARCUATUM (BRÉB.) RABENH.

FL. EUR. ALG. [LIPSIAE]. 3: 133. 1868.

(PL. VI, FIG. 1)

CELLS SOMEWHAT SMALLER AND CONSPICUOUSLY MORE ARCUATE THAN THE TYPICAL FORM; CELL WALL PALE-YELLOW IN COLOR AND SMOOTH; CHLOROPLASTS OBSCURELY LAMELLATE, WITH A SINGLE SERIES OF ABOUT 6 PYRENOIDS.

LENGTH OF CELL 146.2-149.6 μ ; BREADTH 13.6 μ .

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45); IN GELATINOUS MASSES ATTACHED TO THE MARGINS OF A CLEAN FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 66).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

CLOSTERIUM DIDYMOTOCUM RALFS VAR. MINUS WEST & WEST

ANN. R. BOT. GDN. CALCUTTA [CALCUTTA]. 6 (2): 191, T. 13,

FIG. 18. 1907.

(PL. VI, FIGS. 5-6)

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CELLS SLIGHTLY CURVED, INNER MARGIN VERY SLIGHTLY CONCAVE OR ALMOST STRAIGHT, GRADUALLY AND SLIGHTLY ATTENUATED TOWARD THE APICES; APICES BROAD AND TRUNCATE, WITH ROUNDED ANGLES; CELL WALL REDDISH-BROWN OR YELLOWISH-BROWN IN COLOR, SMOOTH OR VERY FINELY STRIATE; CHLOROPLASTS LAMELLATE, WITH A SERIES OF 5-7 PYRENOIDS IN EACH; APICAL VACUOLES WITH MANY MOVING GRANULES.

LENGTH OF CELL 247.5-257.5 μ ; BREADTH 33.8-35.7 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: BAHIA: MINAS DE CONTAS (FÖRSTER 1964).

CLOSTERIUM GRACILE BRÉB.

CHEV. MICR. [PARIS]. 272. 1839.

(PL. VII, FIGS. 1-2)

CELLS SLENDER, ALMOST STRAIGHT FOR MORE THAN HALF THEIR LENGTH, INNER MARGIN STRAIGHT OR SLIGHTLY CONVEX, GRADUALLY NARROWED AND GRACEFULLY CURVED TOWARD THE APICES; APICES TRUNCATE; CELL WALL SMOOTH, COLORLESS OR SELDOM YELLOWISH-BROWN; CHLOROPLASTS SOMETIMES SUBUNDULATE, WITH 5-7 PYRENOIDS; APICAL VA-

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CUOLES WITH 1 TO SEVERAL MOVING GRANULES.

LENGTH OF CELL 117.3-240.0u; BREADTH 5.1-8.5u.

ZYGOSPORE VARIABLE, RARELY GLOBOSE AND MORE OFTEN ANGULAR-GLOBOSE OR SUBQUADRATE WITH ROUNDED ANGLES, SMOOTH.

HAB. - INTERMINGLED WITH A FLOATING MASS OF SPIROGYRA SP. AND ZYGNEMA SP. IN A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 47); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 57); PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92); PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MATO GROSSO: COXIPÓ, CUIABÁ, SERRA DA CHAPADA (BORGE 1903), PORTO DO CAMPO, SÃO LUÍS DE CÁ CERES (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: PORTO ALEGRE (BORGE 1903).

CLOSTERIUM GRACILE BRÉB. IS A COMMON SPECIES. IT CAN BE CONFUSED WITH CLOSTERIUM CORNU EHR., FROM WHICH DIFFERS BASICALLY BY ITS LESS UNIFORM CURVATURE, ITS PROPORTIONATELY GREATER LENGTH AND STRAIGHTER MEDIAN PART OF THE CELL, AND BY THE FORM OF THE ZYGOSPORE.

CLOSTERIUM INFRACTUM MESS. VAR. NOV.

(PL. V, FIGS. 6-7)

CELLS NOT CURVED, INNER MARGIN STRAIGHT OR VERY SLIGHTLY CONCAVE, OUTER SIDE CONVEX, USYMMETRICALLY ATTENUATED TO THE APICES; APICES BROADLY TRUNCATE, WITH ONE LARGE THICKENING ; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS WITH A SINGLE PYRENOID; APICAL VACUOLES NOT SEEN.

LENGTH OF CELL 28.9-34.0u; BREADTH 14.5-17.0u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93).

THIS VARIETY DIFFERS FROM THE TYPICAL FORM BY THE OUTLINE OF ITS CELL AND ITS RELATIVELY GREATER DIAMETER. IT IS CLOSELY ALLIED TO CLOSTERIUM PUSILLUM HANTZ. VAR. MONOLITHUM WITTR. F. TERRESTRE SKUJA, FROM WHICH CAN BE DISTINGUISHED BY ITS SOMEWHAT GREATER DIAMETER, ITS STRAIGHT OR VERY SLIGHTLY CONCAVE INNER MARGIN, AND THE PRESENCE OF A LARGE THICKENING IN EACH APEX OF THE CELL WALL.

SUGGESTED NAME FOR THE NEW VARIETY: CLOSTERIUM INFRACTUM MESS. VAR. SANPAULENSIS.

CLOSTERIUM KÖTZINGII BRÉB. VAR. LAEVE (RAC.) KR.

RABENH. KRYPT. FL. [LEIPZIG]. 13 (1): 353, T. 2, FIG. 10. 1937.

(PL. VII, FIG 5)

CELLS ALMOST STRAIGHT, MEDIAN PORTION FUSIFORM-LANCEOLATE, ATTENUATED TOWARD EACH EXTREMITY INTO LONG, COLORLESS, SETACEOUS PROCESSES; APICES SLIGHTLY INCURVED, ROUNDED; CELL WALL COLORLESS AND SMOOTH; CHLOROPLASTS LAMELLATE AND WITH A MEDIAN ROW OF 4-7 PYRENOIDS; APICAL VACUOLES LARGE, SITUATED AT THE BASE OF THE APICAL PROCESSES, CONTAINING SEVERAL MOVING GRANULES.

LENGTH OF CELL 487.5u; BREADTH 13.6u.

ZYGOSPORE SUBRECTANGULAR, SIDES STRAIGHT OR CONCAVE, ANGLES TRUNCATE OR TRUNCATELY ROUNDED.

HAB. - INTERMINGLED WITH FILAMENTS OF OSCILLATORIA SP. IN A SLUGGISH CREEK AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 4).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: GOIÁS: FORMOSO (PRESCOTT 1957); PARÁ: NEAR QUATIPURU (SIOLI 1960).

THIS VARIETY DIFFERS FROM THE TYPICAL BY HAVING A COLORLESS AND SMOOTH CELL WALL.

THE BRAZILIAN MATERIAL IS CONSISTENTLY LONGER THAN THE LIMITS PROPOSED BY RACIBORSKI (1892), FIRSTLY DESCRIBED AS CLOS-

TERIUM SETACEUM EHR. F. LAEVIS RAC.. THIS DIFFERENCE, HOWEVER, IS NOT TOO GREAT IF WE CONSIDER THE MEASUREMENTS GIVEN IN KRIEGER (1937). I DID NOT CONSIDER SUCH DIFFERENCE SUFFICIENT TO CREATE A NEW FORMA OR VARIETY, BECAUSE ONLY ONE SPECIMEN WAS SEEN. IT AGREES PERFECTLY WITH THE DESCRIPTION FOR CLOSTERIUM KÜTZINGII BRÉB. VAR. LAEVE (RAC.) KR., IN ALL THE OTHER RESPECTS.

CLOSTERIUM LATERALE NORDST.

WITTR. & NORDST. ALG. EXSIC. [LUNDÆ]. 8: No. 383. 1880.

(PL. VI, FIGS. 9-10, 13-14)

CELLS SLIGHTLY CURVED, INNER MARGIN TUMID, GRADUALLY ATTENUATED TO THE APICES; APICES TRUNCATE OR SUBTRUNCATE; CELL WALL STRAW-COLORED, FINELY STRIATE, 45-60 STRIAE VISIBLE ACROSS THE CELL; CHLOROPLASTS WITH ABOUT 10 RIDGES, AND A SINGLE SERIES OF MANY PYRENOIDS IN EACH RIDGE; APICAL VACUOLES WITH MANY MOVING GRANULES.

LENGTH OF CELL 322.5-357.0u; BREADTH 32.3-51.0u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 96).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890): PIRASSUNUNGA (WITTROCK & NORDSTEDT 1880, BERGE

1918); PARÁ: SANTARÉM (GRÖNBLAD 1945).

CLOSTERIUM LEIBLEINII KÜTZ.

LINNAEA [GENÈVE]. SER. I, 8: 596, T. 18, FIG. 79. 1833.

CELLS MODERATELY TO STRONGLY CURVED, INNER MARGINS SLIGHTLY TO MODERATELY TUMID IN THE MIDREGION, GRADUALLY ATTENUATING TO THE APICES; APICES ACUTELY ROUNDED; CELL WALL USUALLY COLORLESS AND VERY SELDOM STRAW-COLORED OR YELLOWISH-BROWN, SMOOTH; CHLOROPLASTS LAMELLATE AND WITH 3-9 PYRENOIDS DISPOSED IN A SINGLE SERIES; APICAL VACUOLES LARGE, WITH SEVERAL MOVING GRANULES.

LENGTH OF CELL 85.0-183.0 μ ; BREADTH 25.0-30.0 μ .

ZYGOSPORE SELDOM OBSERVED, SUBGLOBOSE AND SMOOTH.

HAB. - PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890); SÃO PAULO (BICUDO & BICUDO 1962), SANTO AMARO (BORGE 1918); GOIÁS: FORMOSO (PRESCOTT 1957); MATO GROSSO: CORUMBÁ (BORGE 1903, 1925), PORTO DO CAMPO, SÃO LUÍS DE CÁCERES (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: CACHOEIRA, SILVEIRA MARTINS (BORGE 1903); RIO DE JANEIRO: RIO D'OURO (WILLE 1884).

IT IS NEAREST TO CLOSTERIUM MONILIFERUM (BORY) EHR. ,
FROM WHICH IT IS DISTINCT BY ITS GREATER CURVATURE AND ITS SOME-
WHAT SMALLER SIZE.

CLOSTERIUM LIBELLULA FOCKE VAR. INTERMEDIUM (ROY & BISS.)

G. S. WEST

MÉM. SOC. NEUCHÂT. SCI. NAT. [NEUCHÂTEL]. 5: 1031, T. 23 ,
FIGS. 60-61. 1914.

(PL. V, FIG. 2)

CELLS ELLIPTIC-OBLONG, GRADUALLY ATTENUATED FROM THE
MIDDLE TO THE APICES; APICES ROUNDED-TRUNCATE; CELL WALL COLOR-
LESS OR YELLOWISH-BROWN, SMOOTH; CHLOROPLASTS WITH 8-12 LONGITU-
DINAL LAMELLAE AND SEVERAL PYRENOIDS IN A SINGLE SERIES; APICAL
VACUOLES WITH SEVERAL MOVING GRANULES.

LENGTH OF CELL 88.2-110.5 μ ; BREADTH 22.1-28.9 μ .

ZYGOSPORE RARELY SEEN, GLOBOSE AND SMOOTH.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A
CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO
PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52); IN GELA-
TINOUS MASSES ATTACHED TO THE BOTTOM AND MARGINS OF A VERY CLEAN
AND FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS
ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 59); ON DRIPPING STONES OF

A SMALL WATER FALL AT THE 'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B. 79).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA, SANTO AMARO (BORGE 1918); MATO GROSSO: PORTO DO CAMPO, SÃO LUÍS DE CÁCERES (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945).

THIS VARIETY HAS CELLS SHORTER THAN IN THE TYPICAL FORM, BUT OTHERWISE PRECISELY SIMILAR. IT ALSO BEARS A GREAT RESEMBLANCE TO CLOSTERIUM NAVICULA (BRÉB.) LÜTK., FROM WHICH DIFFERS IN HAVING THE ZYGOSPORE GLOBOSE AND SMOOTH AND IN THE LARGER SIZE OF THE CELLS.

SOME AUTHORS PREFER TO CONSIDER THIS PLANT AS PENIUM LIBELLULA (FOCKE) NORDST. VAR. INTERMEDIUM ROY & BISS., BUT ASSIGNMENT IS DIFFICULT SINCE THIS IS ONE OF THE CASES WHERE THE DISTINCTION BETWEEN PENIUM AND CLOSTERIUM COMPLETELY BREAKS DOWN.

CLOSTERIUM LÖFGRENII BORGE

ARK. BOT. [UPPSALA, STOCKHOLM]. 15 (13): 19, T. 2, FIG. 2. 1918.
(PL. VII, FIGS. 12-13)

CELLS MODERATELY CURVED, INNER MARGIN STRAIGHT OR SLIGHT-

LY TUMID, GRADUALLY ATTENUATED TOWARD THE APICES; APICES VERY SLIGHTLY INFLATED AND SOMEWHAT OBLIQUELY ROUNDED; CELL WALL STRAW-COLORED AND COSTATE; 16-19 COSTAE VISIBLE ACROSS THE CELL; CHLOROPLASTS LAMELLATE AND WITH AN AXIAL ROW OF PYREN- OIDS; APICAL VACUOLES WITH ONE MOVING GRANULE.

LENGTH OF CELL 277.5u; BREADTH 60.0u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEI- ROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI- RASSUNUNGA, SANTO AMARO (BORGE 1918).

THE BRAZILIAN SPECIMENS ARE SOMEWHAT NARROWER THAN THO- SE DESCRIBED BY BORGE (1918). THEY AGREE, HOWEVER, IN ALL THE OTHER RESPECTS WITH THE ORIGINAL DESCRIPTION OF THE SPECIES.

THIS SPECIES CAN BE CONFUSED WITH CLOSTERIUM LAGOENSE NORDST. AND CLOSTERIUM MALMEI BORGE. IT DIFFERS FROM CLOSTERIUM MALMEI BORGE IN HAVING THE CELL WALL STRAW-COLORED AND A GREATER NUMBER OF COSTAE ACROSS THE CELL. FROM CLOSTERIUM LAGOENSE NORDST. IT CAN BE DISTINGUISHED ONLY BY ITS LARGER SIZE OF THE CELLS. THE PROBABILITY OF THE PRESENT SPECIES BEING ONLY A VA- RIETY OF CLOSTERIUM LAGOENSE NORDST. MUST BE CONSIDERED.

CLOSTERIUM MONILIFERUM (BORY) EHR.

INFUS. [LEIPZIG]. 91, T. 5, FIG. 16. 1838.

(PL. V, FIG. 9)

CELLS MODERATELY CURVED, INNER MARGIN DISTINCTLY INFLATED IN THE MIDDLE, UNIFORMLY NARROWED TO THE APICES; APICES OB-
TUSELY ROUNDED; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS
LAMellate AND WITH A SINGLE SERIES OF 4-8 PYRENOIDS; APICAL VA-
CUOLES WITH NUMEROUS MOVING GRANULES.

LENGTH OF CELL (198.0-) 212.0-240.0u; BREADTH 37.5-
52.5u.

ZYGOSPORE RARE, ELLIPSOIDAL AND SMOOTH, WITH AN EXTER-
NAL MUCUOUS, LAMELLOSE COAT.

HAB. - PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRAN-
CE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PE-
DRA BRANCA (BORGE 1918), SÃO PAULO (WITTROCK & NORDSTEDT 1889,
BICUDO & BICUDO 1962); MINAS GERAIS: LAGOA SANTA (NORDSTEDT
1870, WARMING 1892); MATO GROSSO: CORUMBÁ (BORGE 1903), SEPO-
TUBA (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE
DO SUL (BORGE 1903).

CLOSTERIUM MONILIFERUM (BORY) EHR. IS DISTINGUISHED

FROM CLOSTERIUM LEIBLEINII KÜTZ. BY ITS LESSER CURVATURE AND USUALLY LARGER SIZE OF THE CELLS. FROM CLOSTERIUM EHRENBERGII MENEGH. IT DIFFERS IN ITS SOMEWHAT SMALLER SIZE AND IN HAVING THE PYRENOIDS DISPOSED IN ONE SINGLE SERIES IN THE CHLOROPLASTS.

CLOSTERIUM NAVICULA (BRÉB.) LÜTK.

BEITR. BIOL. PFL. [BRESLAU]. 8: 395, 405, 408. 1902.

(PL. V, FIG. 3)

CELLS STRAIGHT, ELLIPTIC-OB LONG, SYMMETRICALLY ATTENUATED TOWARD THE APICES; APICES BROADLY ROUNDED; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS LAMELLATE AND USUALLY WITH 1 OR RARELY 2 PYRENOIDS; APICAL VACUOLES WITH 2 OR 3 MOVING GRANULES.

LENGTH OF CELL 36.5-68.0u; BREADTH 11.5-17.0u.

ZYGOSPORE SUBQUADRATE, COMPRESSED, WITH RATHER SHARPLY PRODUCED ANGLES TO WHICH THE EMPTY HALF-CELLS ARE ATTACHED.

HAB. - ON DAMP SOIL AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 26); INTERMINGLED WITH A FLOATING MASS OF SPIROGYRA SP. AND ZYGNEMA SP. IN A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 48); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM AND MARGINS OF A VERY CLEAN AND FAST CREEK BETWEEN KM.

221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 58); PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 95).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA (BORGE 1918), SÃO PAULO (BICUDO & BICUDO 1962); MATO GROSSO: NEAR CUIABÁ, NEAR THE HEADWATER OF THE XINGU RIVER (SCHMIDLE 1901), PORTO DO CAMPO, SÃO LUÍS DE CÁCERES (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945).

THIS PLANT IS CONSIDERED BY SOME AUTHORS AS A SPECIES OF PENIUM - PENIUM NAVICULA BRÉB. - BUT, AS WEST & WEST (1904) POINT OUT, "THERE ARE EQUALLY GOOD REASONS FOR RETAINING IT IN THE GENUS CLOSTERIUM". IT IS ANOTHER CASE IN WHICH THE DIFFERENCES BETWEEN PENIUM AND CLOSTERIUM COMPLETELY DESAPPEAR.

CLOSTERIUM NAVICULA (BRÉB.) LÜTK. IS VERY CLOSELY ALLIED TO CLOSTERIUM LIBELLULA FOCKE, DIFFERING IN ITS SOMEWHAT SMALLER SIZE AND IN THE ANGULARITY OF THE ZYGOSPORE.

CLOSTERIUM PARVULUM NAG.

EINZ. ALG. [ZÜRICH]. 106, T. 6C, FIG. 2. 1849.

(PL. V, FIG. 10)

CELLS STRONGLY CURVED, INNER MARGIN CONCAVE, GRADUALLY ATTENUATED TO THE APICES; APICES ACUTELY ROUNDED; CELL WALL CO-

LORLESS OR VEV SELDOM YELLOWISH-BROWN, SMOOTH; CHLOROPLASTS LAM-
MELLATE AND WITH A SINGLE SERIES OF (1-) 2-6 PYRENOIDS; APICAL
VACUOLES WITH SEVERAL MOVING GRANULES.

LENGTH OF CELL (43.5-) 79.9-132.6u; BREADTH (8.0-) 9.5-
15.3u.

ZYGOSPORE ELLIPSOIDAL OR SUBGLOBOSE, SMOOTH.

HAB. - ON DAMP SOIL AT 'FAZENDA GERIZA', CAETÉ, MINAS
GERAIS (C.E.M.B. 27); IN GELATINOUS MASSES ATTACHED TO THE BOT-
TOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON
THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52,
53); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM AND MARGINS OF
A VERY CLEAN AND FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO
PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 59); PLANKTON-
IC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BO-
TANICAL GARDEN, SÃO PAULO (C.E.M.B. 95).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: SÃO
PAULO (BICUDO & BICUDO 1962); GOIÁS: FORMOSO, PEIXE (PRESCOTT
1957); MATO GROSSO: FORMOSO CREEK (SCHMIDLE 1901), CORUMBÁ,
CUIABÁ (BORGE 1903), PORTO DO CAMPO (BORGE 1925); PARÁ: MONTE
ALEGRE (DICKIE 1881), SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO
SUL: CACHOEIRA, SILVEIRA MARTINS (BORGE 1903).

THE LESSER CURVATURE OF CLOSTERIUM PARVULUM NAG. DISTIN-
GUISHES IT FROM CLOSTERIUM VENUS KÜTZ., AND IT IS INVARIABLY OF

GREATER DIMENSIONS. IF ZYGOSPORES ARE AVAILABLE, DISTINCTION BETWEEN BOTH SPECIES BECOMES VERY EASY.

CLOSTERIUM PORRECTUM NORDST. VAR. ANGUSTATUM WEST & WEST
MONOGR. BRIT. DESM. [LONDON]. 1: 116, PL. 11, FIG. 13. 1904.
(PL. VII, FIG. 11)

CELLS STRONGLY CURVED, INNER MARGIN CONCAVE, GRADUALLY ATTENUATED TOWARD THE APICES; APICES NARROW AND OBTUSELY ROUNDED; CELL WALL COSTATE, BROWNISH IN COLOR; 4-8 COSTAE VISIBLE ACROSS THE CELL; CHLOROPLASTS LAMELLATE, WITH SEVERAL PYRENOIDS IN A SINGLE SERIES; VACUOLES WITH A FEW MOVING GRANULES.

LENGTH OF CELL 144.5 μ ; BREADTH 13.6 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM AND MARGINS OF A VERY CLEAN AND FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 59).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945).

THIS VARIETY HAS CONSIDERABLE RESEMBLANCE TO CLOSTERIUM ARCHERIANUM CLEVE, FROM WHICH DIFFERS BY THE SOMEWHAT MORE COARSE STRIATION OF THE CELL WALL. HOWEVER, THERE ARE MORE COARSELY

STRIATE FORMS OF THE LATTER WHICH DEFINITELY CAN NOT BE SEPARATED FROM CLOSTERIUM PORRECTUM NORDST. VAR. ANGUSTATUM WEST & WEST.

CLOSTERIUM PRITCHARDIANUM ARCH. VAR. MAXIMUM NORDST.

ÖFVERS. K. VETENSKAKAD. FÖRH. [STOCKHOLM]. 34 (3-4): 16. 1877.

(PL. VI, FIGS. 3-4)

CELLS SLIGHTLY CURVED, INNER MARGIN STRAIGHT OR VERY SLIGHTLY CONCAVE, NOT TUMID IN THE MIDREGION, GRADUALLY ATTENUATED TO THE APICES; APICES SLIGHTLY CURVED, NARROWED, AND TRUNCATE-ROUNDED; CELL WALL FINELY STRIATE, YELLOWISH- TO REDDISH-BROWN IN COLOR; 35-60 STRIAE VISIBLE ACROSS THE CELL; CHLOROPLASTS LAMELLATE, WITH 10-14 PYRENOIDS ARRANGED IN A CENTRAL SERIES; APICAL VACUOLES WITH MANY MOVING GRANULES.

LENGTH OF CELL 780.0u; BREADTH 82.5u.

ZYGOSPORE ONLY OCCASIONALLY FOUND, GLOBOSE, SUBGLOBOSE, OR OVOID, SMOOTH.

HAB. - IN TEMPORARY POOLS NEAR THE CITY OF PIASSUNUNGA, SÃO PAULO (SP 7449).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE BRAZILIAN MATERIAL EXCEEDED A LITTLE THE LIMITS GIVEN IN NORDSTEDT (1877). HOWEVER, FRITSCH (1918) REPORTS SOME

PLANTS FROM KAPLAND, AFRIKA, WITH UP TO 1,700u IN LENGTH.

THIS VARIETY IS NEAREST TO CLOSTERIUM TURGIDUM EHR.,
FROM WHICH IT DIFFERS IN ITS MUCH NARROWER AND TRUNCATE APICES.

CLOSTERIUM RALFSII BRÉB.

JENNER TUNBR. WELLS [TUNBRIDGE WELLS]. X. 1845.

(PL. VII, FIGS. 3-4)

CELLS SLIGHTLY CURVED, INNER MARGIN TUMID IN THE MID-
REGION FOR OVER HALF THE LENGTH OF THE CELL, SOMEWHAT SUDDENLY
ATTENUATED TOWARD THE EXTREMITIES SOMEWHAT INCURVED AND DRAWN
OUT; APICES OBTUSE; CELL WALL FINELY STRIATE AND YELLOWISH-
BROWN OR REDDISH-BROWN IN COLOR; 28-33 STRIAE VISIBLE ACROSS
THE CELL; CHLOROPLASTS OBSCURELY LAMELLATE, WITH A MEDIAN SE-
RIES OF 5-9 PYRENOIDS; APICAL VACUOLES WITH A FEW MOVING GRAN-
ULES.

LENGTH OF CELL 450.0-525.0u; BREADTH 60.0u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRAN-
CE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖR-
GESEN 1890).

CLOSTERIUM ROSTRATUM EHR.PHYS. ABH. AKAD. [WIEN]. 1831: 67. 1832.

(PL. VII, FIG. 6)

CELLS SLIGHTLY CURVED, WITH THE MEDIAN PORTION FUSIFORM-LANCEOLATE, INNER MARGIN CONVEX, EXTREMITIES PROLONGUED INTO LONG, COLORLESS PROCESSES; CELL WALL STRAW-COLORED, FINELY STRIATE; 20-30 STRIAE VISIBLE ACROSS THE CELL; CHLOROPLASTS LAMellate, WITH A SERIES OF 3-5 PYRENOIDS; APICAL VACUOLES LARGE, SITUATED WITHIN THE BASE OF THE APICAL PROCESSES, CONTAINING MANY MOVING GRANULES.

LENGTH OF CELL 187.0-251.6u; BREADTH 22.1-25.5u.

ZYGOSPORE VERY COMMON, SOMEWHAT RECTANGULAR, WITH RETUSE MARGINS, ANGLES TRUNCATE AND CONCAVE.

HAB. - IN A DRAINAGE DITCH NEAR THE CITY OF PIRASSUNUNGA, SÃO PAULO (SP 7451).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MATO GROSSO: PARANATINGA (SCHMIDLE 1901).

THIS SPECIES CAN BE CONFUSED WITH CLOSTERIUM KÜTZINGII BRÉB., FROM WHICH DIFFERS IN HAVING MUCH SHORTER AND MORE ROBUST APICAL PROCESSES, AND CELL WALL MORE FINELY AND DELICATELY STRIATE.

CLOSTERIUM SETACEUM EHR.

PHYS. ABH. AKAD. [WIEN]. 1833: 239. 1833.

(PL. VII, FIG. 7)

CELLS FUSIFORM-LANCEOLATE, ALMOST STRAIGHT, MEDIAN PORTION NARROW, BOTH MARGINS EQUALLY CONVEX, EXTREMITIES PROLONGUED INTO SLENDER, SETACEOUS, COLORLESS PROCESSES, WHICH ARE SLIGHTLY INCURVED; APICES OBTUSE; CELL WALL COLORLESS OR STRAW-COLORED, FINELY STRIATE; 7-15 STRIAE VISIBLE ACROSS THE CELL; CHLOROPLASTS LAMELLATE, WITH 1-3 PYRENOIDS; APICAL VACUOLES WITHIN THE BASE OF THE APICAL PROCESSES, WITH A FEW MOVING GRANULES.

LENGTH OF CELL 217.5-238.0u; BREADTH 8.5-10.0u.

ZYGOSPORE OFTEN FOUND, SUBQUADRATE OR CRUCIFORM, WITH DEEPLY CONCAVE SIDES AND TRUNCATE ANGLES.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 57); PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890): PIRASSUNUNGA (BORGE 1918), SÃO PAULO (BICUDO & BICUDO 1962); MATO GROSSO: CUIABÁ (BORGE 1903), SÃO LUÍS DE CÁCERES (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945).

THE STRIATIONS ON THE CELL WALL OF THIS SPECIES ARE VERY FAINT AND IN SOME OF THE SMALLER SPECIMENS ARE SCARCELY EVIDENT.

CLOSTERIUM TUMIDUM JOHNS.

BULL. TORREY BOT. CLUB [NEW YORK]. 22 (7): 291, PL. 239,

FIG. 4. 1895.

(PL. V, FIG. 4)

CELLS SLIGHTLY CURVED, INNER MARGIN SLIGHTLY TO BROADLY TUMID IN THE MEDIAN PORTION, GRADUALLY ATTENUATED TOWARD THE APICES; APICES TRUNCATELY ROUNDED; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS LAMELLATE, WITH 1-4 PYRENOIDS AXIALLY ARRANGED; APICAL VACUOLES WITH ONLY 1 MOVING GRANULE.

LENGTH OF CELL 71.4-168.3 μ ; BREADTH 13.6-22.1 μ .

ZYGOSPORE SUBRECTANGULAR, WITH RETUSE SIDES; ANGLES PRODUCED AND TRUNCATELY ROUNDED; SIDE VIEW ELLIPTICAL.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 41, 57).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA (BORGE 1918); MATO GROSSO: CORUMBÁ, SÃO LUÍS DE CÁCERES (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945).

THIS SPECIES DIFFERS FROM CLOSTERIUM PUSILLUM HANTZ.
 VAR. MAJOR RAC. IN HAVING THE INNER MARGIN TUMID IN THE MIDRE-
 GION AND THE APICES MORE TRUNCATELY ROUNDED. THERE ARE, HOWEVER,
 MANY INTERMEDIATE FORMS IN WHICH DISTINCTION BETWEEN BOTH PLANTS
 IS VERY DIFFICULT, SPECIALLY IF WE DO NOT HAVE REPRODUCTIVE MA-
 TERIAL. THE ZYGOSPORES ARE VERY PECULIAR, IN BOTH PLANTS.

CLOSTERIUM TURGIDUM EHR.

INFUS. [LEIPZIG]. 95, T. 6, FIG. VII. 1838.

(PL. VI, FIGS. 7-8)

CELLS SLIGHTLY TO MODERATELY CURVED, INNER MARGIN NOT
 TUMID IN THE MIDREGION, GRADUALLY ATTENUATED TOWARD THE EXTREMI-
 TIES, WHICH ARE SLIGHTLY RECURVED; APICES SUBTRUNCATE; CELL
 WALL YELLOWISH-BROWN OR REDDISH-BROWN, FINELY STRIATE; 30-55
 STRIAE VISIBLE ACROSS THE CELL; CHLOROPLASTS LAMELLATE, WITH A
 CENTRAL SERIES OF 7-15 PYRENOIDS; APICAL VACUOLES WITH MANY MO-
 VING GRANULES.

LENGTH OF CELL 592.5-622.5 μ ; BREADTH 52.5-75.0 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS NEAR THE CITY OF PIRASSUNUN-
 GA, SÃO PAULO (SP 7449).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-
 RASSUNUNGA (WITTROCK & NORDSTEDT 1880, BERGE 1918); MINAS GE-
 RAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892); MATO GROS-
 SO: CUIABÁ (BERGE 1903), SÃO LUÍS DE CÁ CERES (BERGE 1925);
 PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO DE JANEIRO (BERGE 1899).

CLOSTERIUM TURGIDUM EHR. VAR. GIGANTEUM NORDST.

WITTR. & NORDST. ALG. EXSIC. [LUNDAE]. 8: No. 382. 1880.

CELLS MUCH LONGER THAN IN THE TYPICAL FORM; APICES
 BROADLY ROUNDED, DORSAL MARGIN OBLIQUELY TRUNCATE AND WITH 2
 OR 3 THICKENINGS; MORE THAN 100 PYRENOIDS PER CELL. IN THE
 OTHER RESPECTS THEY ARE PRECISELY SIMILAR.

LENGTH OF CELL 656.2-1,207.0 μ ; BREADTH 52.1-84.5 μ .

ZYGOSPORE UNKNOWN.

HAB. - FORMING INVERTED FLOATING CONES OF CELLS ON THE
 WATER, OR COMPLETELY COVERING THE BOTTOM OF AN ARTIFICIAL POND
 BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO
 PAULO (C.E.M.B. 14, 15, 16); IN TEMPORARY POOLS AT THE MARGINS
 OF THE PINHEIROS RIVER, SÃO PAULO (C.E.M.B. 97).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAM-
 PINAS (BERGE 1918), PIRASSUNUNGA (WITTROCK & NORDSTEDT 1880,

BORGE 1918); GUANABARA: TIJUCA (BORGE 1925); MATO GROSSO: PORTO DO CAMPO, SÃO LUÍS DE CÁCERES (BORGE 1925).

THIS IS ONE OF THE LARGEST KNOWN DESMIDS, REACHING A LENGTH OVER 1,500u. IT SOMETIMES OCCURS IN IMMENSE QUANTITIES, STICKING TOGETHER BY THEIR MUCOUS ENVELOPE, AND FORMING INVERTED FLOATING CONES UP TO 2 INCHES HIGH, OR COMPLETELY COVERING THE BOTTOM OF CLEAN QUIET PONDS.

CLOSTERIUM ULNA FOCKE

PHYS. STUD. [BREMEN]. 1: 59, T. 3, FIG. 30. 1847.

(PL. VI, FIGS. 11-12)

CELLS SLIGHTLY CURVED, INNER MARGIN CONCAVE, VERY SLIGHTLY ATTENUATED TOWARD THE APICES; APICES TRUNCATE; CELL WALL COLORLESS OR PALE YELLOW, VERY FINELY STRIATE; 9-20 STRIAE VISIBLE ACROSS THE CELL; CHLOROPLASTS LAMELLATE, WITH A MEDIAN SERIES OF 6-19 PYRENOIDS; APICAL VACUOLES USUALLY WITH ONLY 1 LARGE MOVING GRANULE.

LENGTH OF CELL 187.0-352.5u; BREADTH 11.9-18.7u.

ZYGOSPORE RARELY SEEN. ACCORDING TO DICK (1919) IT IS GLOBOSE AND SMOOTH.

HAB. - INTERMINGLED WITH A FLOATING MASS OF SPIROGYRA

SP. AND ZYGNEMA SP. IN A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 48, 49).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

CLOSTERIUM ULNA FOCKE IS DISTINGUISHED FROM CLOSTERIUM INTERMEDIUM RALFS BY ITS MORE CURVED CELLS AND ITS SOMEWHAT LESS ATTENUATED APICES.

CLOSTERIUM VENUS KÜTZ.

PHYCOL. GERM. [NORDHAUSEN], 130. 1845.

CELLS STRONGLY CURVED, INNER MARGIN CONCAVE, GRADUALLY ATTENUATED TO THE APICES; APICES ACUTE OR ACUTELY ROUNDED ; CELL WALL SMOOTH, COLORLESS OR MORE RARELY YELLOWISH-BROWN; CHLOROPLASTS LAMELLATE, WITH 1 OR 2 PYRENOIDS; APICAL VACUOLES WITH SEVERAL MOVING GRANULES.

LENGTH OF CELL 78.0-83.5 μ ; BREADTH 9.5-11.0 μ .

ZYGOSPORE NOT FREQUENTLY FOUND, OBLONG-RECTANGULAR WITH ROUNDED ANGLES, SHORTER SIDES RETUSE, LONGER SIDES CONVEX AND INFLATED IN THE MIDDLE; OFTEN TWISTED, THE 2 ANGLES AT ONE END OF THE ZYGOSPORE BEING DISPOSED IN A PLANE AT RIGHT ANGLES TO THAT CONTAINING THE 2 ANGLES OF THE OPPOSITE END.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: SÃO PAULO (BICUDO & BICUDO 1962); MATO GROSSO: BANDEIRA, CORUMBÁ, COXIPÓ, CUIABÁ (BORGE 1903), PORTO DO CAMPO, SÃO LUÍS DE CÁ CERES (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: CACHOEIRA (BORGE 1903).

THIS SPECIES DIFFERS FROM CLOSTERIUM PARVULUM NÄG. BY ITS GREATER CURVATURE AND USUALLY SMALLER DIMENSIONS. CLOSTERIUM VENUS KÜTZ. HAS ALSO A VERY CHARACTERISTIC ZYGOSPORE, WHICH IS AT ONCE SUFFICIENT TO SEPARATE THIS SPECIES FROM ALL ITS PROBABLY ALLIES.

KÜTZING, IN THE ORIGINAL DESCRIPTION OF THE SPECIES, DOES NOT MENTION THE EXACT KIND OF CHLOROPLAST IT HAS. HIS STATEMENT OF "OBSCURE CHLOROPLASTS" AGREES PERFECTLY WITH HIS ORIGINAL DRAWING PUBLISHED LATER BY RALFS (1848).

SOME OBSERVERS HAVE REMARKED ABOUT THE PRESENCE OF RIDGES IN THE CHLOROPLASTS OF THIS SPECIES. I HAVE EXAMINED MORE THAN 20 SPECIMENS FROM DIFFERENT LOCALITIES WITHIN THE SÃO PAULO BOTANICAL GARDEN, AND HAVE NEVER YET DETECT THEM.

CLOSTERIUM VENUS KÜTZ. VAR. INCURVUM (BRÉB.) KR.

RABENH. KRYPT. FL. [LEIPZIG]. 13 (1): 273, T. 16, FIGS. 6-7.
1937.

(PL. V, FIG. 8)

CELLS SHORTER AND SOMEWHAT MORE CURVED THAN IN THE TYPICAL FORM.

LENGTH OF CELL 51.0-52.7 μ ; BREADTH 8.5-15.3 μ .

ZYGOSPORE JUST ONE REPORTED. ACCORDING TO DELPONTE (1876) IT IS GLOBOSE AND SMOOTH.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 33); INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45, 50).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE GREATER DEGREE OF CURVATURE OF THE CELLS OF THIS VARIETY IS THE ONLY AVAILABLE CHARACTERISTIC TO SEPARATE IT FROM THE TYPICAL FORM, IF ZYGOSPORES ARE NOT AVAILABLE, SINCE MEASUREMENTS OVERLAP IN MOST INSTANCES.

PLEUROTAENIUM NÄGELI, 1849.PLEUROTAENIUM EHRENBURGII (BRÉB.) DE BARY

CONJUGAT. [LEIPZIG]. 75. 1858.

(PL. VIII, FIGS. 3-4)

CELLS ABOUT 15-20 TIMES LONGER THAN THEIR DIAMETER, CYLINDRICAL; SEMICELLS SOMEWHAT VARIABLE IN FORM, NOT AT ALL OR SOMETIMES SLIGHTLY ATTENUATED FROM BASE TO APEX, WITH A SMALL BUT DISTINCT BASAL INFLATION AND 1 UNDULATION (SOMETIMES 2) IMMEDIATELY ABOVE IT, APICES TRUNCATE, BORDERED BY A RING OF 7-10 CONICAL OR ROUNDED TUBERCLES (4 OR 5 VISIBLE ACROSS THE APEX); CELL WALL COLORLESS, PUNCTATE; CHLOROPLASTS PARIETAL, NUMEROUS, EACH WITH 1 TO SEVERAL PYRENOIDS.

LENGTH OF CELL 258.4-345.0 μ ; BREADTH AT BASE OF SEMICELL 25.5-47.6 μ ; BREADTH OF ISTHMUS 23.8-39.1 μ .

ZYGOSPORE GLOBOSE OR ELLIPSOID-GLOBOSE, SMOOTH.

HAB. - NEAR PIRASSUNUNGA CITY, SÃO PAULO - THE EXACT PLACE NOT SPECIFIED (SP 7455).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAMPINAS (BORGE 1918); MATO GROSSO: CORUMBÁ (BORGE 1903); RIO DE JANEIRO (BORGE 1899).

MANY INDIVIDUALS SHOWED A DISTINCT SHORTENING AND TUMID-

NESS OF THE SEMICELLS, BUT THERE WERE ALL GRADATIONS BETWEEN THESE AND THE TYPICAL FORMS. IDENTICAL OBSERVATION HAVE ALREADY BEEN MADE BY TAFT (1945) FROM MATERIAL GATHERED FROM PELÉE ISLAND IN THE WEST END OF LAKE ERIE, ONTARIO, CANADA.

PLEUROTAENIUM MINUTUM (RALFS) DELP. VAR. MINUS (RAC.) KR.

ARCH. HYDROBIOL. [STUTTGART]. SUPPL. 11: 168. 1932.

(PL. VII, FIG. 14)

CELLS ABOUT 8-10 TIMES LONGER THAN THEIR DIAMETER; SEMICELLS ALMOST CYLINDRICAL, WITHOUT A BASAL INFLATION, SOMETIMES VERY SLIGHTLY ATTENUATED TOWARD THE APICES, WHICH ARE TRUNCATE; CELL WALL COLORLESS, SMOOTH OR VERY FINELY PUNCTATE; CHLOROPLASTS AXILE, IRREGULARLY LAMELLATE, WITH A CENTRAL ROW OF ABOUT 6 PYRENOIDS.

LENGTH OF CELL 62.9-74.8 μ ; BREADTH AT BASE OF SEMICELL 10.2 μ ; BREADTH OF ISTHMUS 9.3 μ .

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: RIO BRANCO: SER-

RA DA LUA (FÖRSTER 1963).

THE POSITION OF THIS ALGA IN THE GENUS PLEUROTAENIUM IS SOMEWHAT QUESTIONABLE. WEST & WEST (1904) PREFERRED TO CONSIDER IT AS PENIUM.

PLEUROTAENIUM OVATUM NORDST.

ÖFVERS. K. VETENSKAKAD. FÖRH. [STOCKHOLM]. 3: 18. 1877.

(PL. VIII, FIGS. 9-10)

CELLS ABOUT 3-4 TIMES LONGER THAN THEIR DIAMETER; SEMICELLS NEARLY OVATE, APICES TRUNCATE, BORDERED BY A RING OF 7-10 CONICAL OR ROUNDED TUBERCLES (4 OR 5 VISIBLE ACROSS THE APEX); CELL WALL COLORLESS, PUNCTATE; CHLOROPLASTS PARIETAL, NUMEROUS, EACH WITH A SINGLE PYRENOID.

LENGTH OF CELL 368.5-390.0u; BREADTH AT BASE OF SEMICELL 96.5-127.5u; BREADTH OF ISTHMUS 75.0-85.0u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92); PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93, 95); NEAR PIRASSUNUNGA, AT LAGEADO CITY, SÃO PAULO - THE EXACT PLACE NOT SPECIFIED (SP 7452).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-RASSUNUNGA (BORGE 1918), SÃO PAULO (BICUDO & BICUDO 1962); MINAS GERAIS: CAPIVARI (NORDSTEDT 1877); MATO GROSSO: SÃO LUÍS DE CÁCERES (BORGE 1925).

THIS IS ONE OF THE COMMONEST SPECIES OF THE GENUS IN THE AREA I HAVE COLLECTED, AND WELL CHARACTERIZED BY ITS SOMEWHAT HOUR-GLASS-SHAPED CELLS. IT WAS FOUND MOSTLY IN ASSOCIATION WITH MICRASTERIAS DENTICULATA BRÉB. IN SEVERAL LOCALITIES AT THE SÃO PAULO BOTANICAL GARDEN, ALWAYS IN WATER WITH PH RANGE OF 4.2 TO 5.5. PURE GATHERINGS OF THESE TWO SPECIES ARE NOT UNCOMMON.

IN THE GREAT MAJORITY OF THE SPECIMENS I HAVE EXAMINED, IT WAS NOTED THE PRESENCE OF A REDDISH-BROWN GIRDLE AROUND THE ISTHMUS OF THE CELLS, MADE UP OF AN IRON COMPOUND, AND PROBABLY $\text{Fe}(\text{OH})_3$.

PLEUROTAENIUM OVATUM NORDST. VAR. TUMIDUM (MASK.) G. S. WEST

VICTORIAN NAT. [MELBORNE]. 23: 21. 1906.

(PL. VIII, FIG. 11)

STOUTER THAN THE TYPE; CELLS ABOUT 2 OR 3 TIMES LONGER THAN THEIR DIAMETER; LATERAL MARGINS OF SEMICELLS MUCH MORE TUMID JUST ABOVE THE ISTHMUS.

LENGTH OF CELL 375.0-427.5 μ ; BREADTH AT BASE OF SEMI-

CELL 127.5-157.7u; BREADTH OF ISTHMUS 75.0-97.5u.

ZYGOSPORE, AS DESCRIBED BY G. S. WEST (1909) FROM YAN YEAN RESERVOIR, AUSTRALIA, GLOBOSE; OUTER LAYER OF CELL WALL SMOOTH; MEDIAN LAYER WITH A NUMBER OF SCATTERED WARTS, 2.0-2.7u LONG; INNER LAYER LAMELLATE. LATTERLY, SOME MORE ZYGOSPORES WERE FOUND IN SAMPLES COLLECTED IN THE NEIGHBOURHOOD OF TENMALAI, WESTERN GHATS, AND REPORTED BY RAMANATHAN (1962). UNLIKE THE ONE RECORDED BY WEST, THE SPINES SEEN IN THE PRESENT SPECIMENS WERE SHORT AND POINTED, ARISING FROM THE OUTER COAT OF THE ZYGOSPORE CELL WALL AS IN ALL OTHER DESMIDS.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92); PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93); NEAR PIRASSUNUNGA, AT LAGEADO CITY, SÃO PAULO - THE EXACT PLACE NOT SPECIFIED (SP 7452).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAMPINAS (KLEEREKOPER 1944); BAHIA: MINAS DE CONTAS (FÖRSTER 1964).

THIS VARIETY APPROACHES VERY MUCH THE TYPICAL PLEUROTAE-
NIUM OVATUM NORDST., EXCEPT FOR ITS MUCH MORE CONSPICUOUS TUMID-
NESS OF THE LATERAL MARGINS OF ITS SEMICELLS.

PLEUROTAENIUM TRABECULA (EHR.) NÅG.

EINZ. ALG. [ZURICH]. 129, T. 20, FIGS. 8-11. 1849.

(PL. VII, FIGS. 15-17)

CELLS ABOUT 11-18 TIMES LONGER THAN THEIR DIAMETER ,
 SUBCYLINDRICAL; SEMICELLS WITH 1-3 BASAL INFLATIONS, SLIGHT AND
 GRADUALLY ATTENUATED TOWARD THE APICES, LATERAL MARGINS ALMOST
 STRAIGHT, GENERALLY FAINTLY CONVEX, APICES TRUNCATE-ROUNDED, DES-
 TITUTE OF TUBERCLES; CELL WALL COLORLESS, PUNCTATE; CHLORO-
 PLASTS PARIETAL, ARRANGED IN IRREGULAR BANDS, ABOUT 4 PER CELL,
 WITH SEVERAL PYRENOIDS.

LENGTH OF CELL 237.5u; BREADTH AT BASE OF SEMICELL
 33.8u; BREADTH OF ISTHMUS 30.0u.

ZYGOSPORE ELLIPSOID AND SMOOTH.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA
 GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-
 RASSUNUNGA (BORGE 1918); GOIÁS: FORMOSO (PRESCOTT 1957), SER-
 RA DE GOIÁS (FÖRSTER 1964); PARÁ: SANTARÉM (GRÖNBLAD 1945).

PLEUROTAENIUM TRABECULA (EHR.) NÅG. VAR. RECTUM (DELP.) WEST

& WEST

MONOGR. BRIT. DESM. [LONDON]. 1: 212, PL. 30, FIGS. 9-10. 1904.

(PL. VIII, FIGS. 1-2)

CELLS SMALLER, 12-18 TIMES LONGER THAN THEIR DIAMETER;
LATERAL MARGINS OF SEMICELLS ABOVE THE SLIGHT BASAL INFLATION
STRAIGHT; CELL WALL COLORLESS AND SMOOTH.

LENGTH OF CELL 173.4-221.0u; BREADTH AT BASE OF SEMI-
CELL 13.6-17.0u; BREADTH OF ISTHMUS 10.2u.

ZYGOSPORE UNKNOWN.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA
SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO
(C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MATO GROSSO: POR-
TO DO CAMPO (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945).

PLEUROTAENIUM TRABECULA (EHR.) NÄG. VAR. RECTUM (DELP.)
WEST & WEST ONLY DIFFERS FROM THE TYPICAL VARIETY IN THE SOME-
WHAT SMALLER SIZE OF ITS CELLS AND IN THE STRAIGHTER LATERAL MAR-
GINS OF ITS SEMICELLS.

PLEUROTAENIUM TRUNCATUM (BRÉB.) NÄG.

EINZ. ALG. [ZÜRICH]. 104. 1849.

(PL. VIII, FIGS. 7-8)

CELLS ABOUT 6-9 TIMES LONGER THAN THEIR DIAMETER, SUB-

CYLINDRICAL; SEMICELLS WITH A DISTINCT BASAL INFLATION, SLIGHTLY TUMID AT THE MIDDLE, AND THEN GRADUALLY ATTENUATED TOWARD THE APICES, WHICH ARE BROADLY TRUNCATE OR TRUNCATELY ROUNDED, WITH A RING OF 13-15 SMALL, DEPRESSED TUBERCLES (7 OR 8 VISIBLE ACROSS THE APEX); CELL WALL COLORLESS, PUNCTATE; CHLOROPLASTS PARIENTAL, NUMEROUS, WITH MANY PYRENOIDS.

LENGTH OF CELL 465.0-840.0u; BREADTH AT BASE OF SEMICELL 45.0-55.0u; BREADTH OF ISTHMUS 48.5u.

ZYGOSPORE UNKNOWN.

HAB. - IN A DRAINAGE DITCH BEHIND THE MUSEUM BUILDING, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 90) ; PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA (BORGE 1918), SANTO AMARO (KLEEREKOPER 1939), SÃO PAULO (BICUDO & BICUDO 1962); MINAS GERAIS: CAPIVARI (NORDSTEDT 1877); GOIÁS: FORMOSO (PRESCOTT 1957).

PLEUROTAENIUM WALLICHIANUM (TURN.) KR. F. NOV.

(PL. VIII, FIGS. 5-6)

CELLS NARROWER THAN THE TYPE, ABOUT 18-20 TIMES LONGER

THAN THEIR DIAMETER, SUBCYLINDRICAL; SEMICELLS WITH A BASAL INFLATION AND 1-3 UNDULATIONS IMMEDIATELY ABOVE IT, SIDES STRAIGHT, NOT AT ALL OR SLIGHTLY ATTENUATED TOWARD THE APICES, WHICH ARE TRUNCATE, WITH A RING OF 24-30 MAMMILATE TUBERCLES (13 OR 16 VISIBLE ACROSS THE APEX); CELL WALL COLORLESS, PUNCTATE; CHLOROPLASTS PARIETAL, NUMEROUS, WITH SEVERAL PYRENOIDS.

LENGTH OF CELL 675.0u; BREADTH AT BASE OF SEMICELL 35.7u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

THIS NEW FORMA IS VERY DISTINCT FROM THE TYPICAL PLEU-ROTAENIUM WALLICHIANUM (TURN.) KR., IN HAVING THE CELLS MUCH MORE ELONGATE, 18-20 TIMES AS LONG AS THEIR DIAMETER.

SUGGESTED NAME FOR THE NEW FORMA: PLEUROTAENIUM WALLICHIANUM (TURN.) KR. F. ELONGATUM.

TETMEMORUS RALFS, 1844.

TETMEMORUS BREBISSENI (MENECH.) RALFS VAR. MINOR DE BARY

CONJUGAT. [LEIPZIG]. 73, T. 5, FIG. 9. 1858.

(PL. IX, FIG. 2)

CELLS SUBCYLINDRICAL, 3 OR 4 TIMES LONGER THAN THEIR DIAMETER, CONSPICUOUSLY CONSTRICTED AT THE MIDDLE, SINUS A SHALLOW ACUTE-ANGLED OR NEARLY RECTANGULAR INCISION; SEMICELLS VERY SCARCELY ATTENUATED TOWARD THE APEX, LATERAL MARGINS STRAIGHT OR VERY SLIGHTLY RETUSE, APICES BROADLY ROUNDED, WITH A DEEP LINEAR MEDIAN INCISION; LATERAL VIEW OF CELL MORE FUSIFORM, SEMICELLS ATTENUATED; CELL WALL COLORLESS, MINUTELY SCROBICULATE OR PUNCTATE, PUNCTATIONS ARRANGED IN DISTINCT LONGITUDINAL LINES; CHLOROPLASTS AXILE, WITH A SINGLE MEDIAN SERIES OF 4 OR 5 PYRENOIDS.

LENGTH OF CELL 95.2-115.6u; BREADTH (MAXIMUM) 22.1-25.5u; BREADTH OF ISTHMUS 18.7u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46); IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: BAHIA (FÖRSTER 1964).

TETMEMORUS GRANULATUS (BRÉB.) RALFS

ANN. MAG. NAT. HIST. [LONDON]. 14: 257, PL. 8, FIG. 2. 1844.

(PL. IX, FIG. 1)

CELLS NEARLY FUSIFORM, BOTH IN FRONT AND LATERAL VIEWS, 4-6 TIMES AS LONG AS THEIR DIAMETER, WITH A SLIGHT MEDIAN CONSTRICTION, SINUS VERY SHALLOW; SEMICELLS GRADUALLY ATTENUATED TO THE APICES, LATERAL MARGINS SLIGHTLY CONVEX, APICES ROUNDED, WITH A DEEP LINEAR MEDIAN INCISION; CELL WALL COLORLESS, FINELY SCROBICULATE, SCROBICULATIONS USUALLY ARRANGED IN HORIZONTAL SERIES JUST ABOVE THE ISTHMUS; CHLOROPLASTS AXILE, WITH A MEDIAN SERIES OF 3-7 PYRENIDS.

LENGTH OF CELL 180.0-200.6 μ ; BREADTH (MAXIMUM) 45.5-47.6 μ ; BREADTH OF ISTHMUS 37.5-44.3 μ .

ZYGOSPORE GLOBOSE, WITH A THICK SMOOTH CELL WALL.

HAB. - ON DRIPPING STONES OF A SMALL WATER FALL AT THE 'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B. 79); PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892); PARÁ: MONTE ALEGRE (DICKIE 1881).

THIS SPECIES SOMEWHAT RESEMBLES TETMEMORUS BREBISSEI

VE

WCP

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SIN

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F

AX

(MENEGH.) RALFS, FROM WHICH IS DISTINCT BY ITS MORE SLENDER AND MORE FUSIFORM CELLS, AND BY THE DIFFERENT ARRANGEMENT OF THE MARKINGS ON THE CELL WALL.

EUASTRUM EHRENBURG, 1832

EUASTRUM ANSATUM EHR.

PHYS. ABH. AKAD. [WIEN]. 1831: 82. 1832.

CELLS ABOUT TWICE AS LONG AS BROAD, DEEPLY CONSTRICTED, SINUS NARROWLY LINEAR WITH A SLIGHTLY DILATED APEX; SEMICELLS PYRAMIDATE, BASAL ANGLES BROADLY ROUNDED, LOWER PART OF LATERAL MARGINS CONVEX WITH A SLIGHT UNDULATION ABOVE THE BASAL ANGLES, UPPER PART OF MARGINS SLIGHTLY CONCAVE, APEX TRUNCATE-ROUNDED, WITH A NARROW AND MODERATELY DEEP MEDIAN INCISION; SEMICELLS WITH 5 INTUMESCENCES, 3 NEAR THE BASE AND 2 ACROSS THE CENTER OF EACH SEMICELL, A PORUS NEARLY IN THE MIDDLE OF EACH SEMICELL; LATERAL VIEW OF SEMICELLS ELONGATE-PYRAMIDATE, WITH A PROTUBERANCE JUST ABOVE THE BASE ON EACH SIDE, UPPER PART OF MARGINS CONCAVE, APEX ROUNDED; APICAL VIEW ELLIPTIC, WITH ONE PROTUBERANCE IN THE MIDDLE ON EACH SIDE, ANOTHER CLOSE TO THE MARGIN, NEAR EACH POLE ON EACH SIDE; CELL WALL COLORLESS, PUNCTATE; CHLOROPLASTS AXILE, EACH WITH 1-3 PYRENOIDS.

LENGTH OF CELL 83.5-96.5u; BREADTH 38.0-44.5u; BREADTH OF ISTHMUS 7.5-14.5u.

ZYGOSPORE GLOBOSE, ORNAMENTED WITH NUMEROUS ABRUPTLY-POINTED SPINES.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-RASSUNUNGA (BORGE 1918), SÃO PAULO (BICUDO & BICUDO 1962); MINAS GERAIS: CALDAS (WILLE 1884), LAGOA SANTA (WILLE 1884, WARMING 1892); RIO BRANCO: SERRA DA LUA (FÖRSTER 1963).

THERE IS SOME CONFUSION ABOUT THE AUTHORITY FOR THIS SPECIES.

WEST & WEST (1905) STATES THAT "THE EUASTRUM ANSATUM DESCRIBED BY EHRENBERG IN 1832 IS A COSMARIUM WHICH IS NOW KNOWN TO OCCUR IN SEVERAL PARTS OF THE WORLD. THE EUASTRUM ANSATUM AS KNOWN TO ALL RECENT AUTHORS IS THE ONE ORIGINALLY DESCRIBED BY RALFS IN HIS BRITISH DESMIDS, AND THEREFORE RALFS MUST BE REGARDED AS THE AUTHORITY FOR THIS SPECIES".

ENRENBERG'S ORIGINAL DESCRIPTION FOR THE PRESENT SPECIES IS VERY BRIEF AND SOMEWHAT POOR. BESIDES THIS, NO ILLUSTRATION WAS GIVEN IN 1832, WHICH COULD BE USED TO PRECISELY CIR-

CUMSCRIBE THE SPECIES. HOWEVER, IN 1838, THE SAME AUTHOR REDESCRIBED THE SPECIES AND AS WELL AS GAVE SOME ILLUSTRATIONS THAT FULLY AGREE WITH THOSE IN RALFS (1848) FOR EUASTRUM ANSATUM. FURTHERMORE, BELOW HIS DESCRIPTION FOR THE SPECIES, EHRENBURG (1838) INCLUDED, AMONG OTHERS, EUASTRUM ANSATUM EHR. IN PHYS. ABH. AKADE. [WIEN]. 1831: 82. 1832, AS A PLANT THAT WAS REGARDED AS IDENTICAL MATERIAL TO THAT HE WAS REDESCIBING CURRENTLY.

IN THESE CIRCUNSTANCES, AS DO MANY OTHER AUTHORS, I PREFER TO CONSIDER EHRENBURG AS THE AUTHORITY FOR EUASTRUM ANSATUM, AS DID RALFS IN 1848.

EUASTRUM ANSATUM EHR. VAR. CONCAVUM KR.

RABENH. KRYPT. FL. [LEIPZIG]. 12 (1): 487, T. 58, FIG. 12. 1937.

(PL. IX, FIG. 6)

SEMICELLS WITH THE LOWER PART OF THE LATERAL MARGINS CONVEX, WITH A SLIGHT PROTUBERANCE AT SOME DISTANCE ABOVE THE BASAL ANGLES, UPPER PART OF MARGINS CONCAVE, APEX ELONGATE AND SOMETIMES SLIGHTLY DILATED, WITH A NARROW AND FAIRLY DEEP MEDIAN INCISION; A SINGLE INTUMESCENCE ABOVE THE ISTHMUS, IN THE MIDDLE OF EACH SEMICELL.

LENGTH OF CELL 91.8u; BREADTH 40.8u; BREADTH OF ISTHMUS 15.3u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MATO GROSSO: PORTO DO CAMPO (BORGE 1925).

THE PLANTS I HAVE COLLECTED AT THE SÃO PAULO BOTANICAL GARDEN ARE A LITTLE BIT LARGER THAN THE MAXIMUM LIMITS GIVEN IN KRIEGER (1937). HOWEVER, IN ALL THE OTHER RESPECTS THEY AGREE PERFECTLY WITH KRIEGER'S DESCRIPTION FOR THE PRESENT VARIETY.

COSMARIUM ANSATUM EHR. VAR. CONCAVUM KR. DIFFERS FROM THE TYPICAL IN HAVING THE BASAL LOBES SOMEWHAT MORE CONICAL AND BY THE DIFFERENT NUMBER AND LOCATION OF THE PROTUBERANCES IN EACH SEMICELL.

EUASTRUM ARCIFERUM BORGE

ARK. BOT. [UPPSALA, STOCKHOLM]. 15 (13): 59, T. 5, FIG. 2.
1918.

(PL. X, FIG. 5)

CELLS ALMOST AS LONG AS BROAD, DEEPLY CONSTRICTED, SINUS NARROWLY LINEAR OR OPEN WITH AN ACUTE OR LINEAR APEX; SEMICELLS 3-LOBED, BASAL LOBES SUBRECTANGULAR, APEX TRUNCATE, EACH ANGLE FURNISHED WITH A SMALL, SOMETIMES ROUNDED SPINE, AND AN-

OTHER SPINE BETWEEN THEM, CLOSE TO THE APICAL MARGIN, APICAL LOBE WIDEST, SOMEWHAT SUBRECTANGULAR, WITH A MODERATE AND RELATIVELY OPEN MEDIAN INCISION, ANGLES FURNISHED WITH 2 OR 3 SPINES, INTERLOBULAR INCISION MODERATELY DEEP AND WIDELY OPEN, WITH A PROTUBERANCE IN THE MIDDLE ABOVE THE ISTHMUS OF EACH SEMICELL ; LATERAL VIEW OF SEMICELLS SOMEWHAT ELONGATE-PYRAMIDATE, WITH A TRUNCATE PROMINENCE IN THE MIDDLE OF EACH SIDE, UPPER PORTION OF MARGIN CONCAVE, APEX 3-ACULEATE; APICAL VIEW NEARLY ELLIPTIC, WITH A TRUNCATE PROTUBERANCE IN THE MIDDLE OF EACH SIDE AND 3-ACULEATE POLES; CELL WALL COLORLESS, SMOOTH; CHLOROPLASTS AXILE, EACH WITH 1 PYRENOID.

LENGTH OF CELL 25.5u; BREADTH 22.1u; BREADTH OF ISTHMUS 5.1u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA (BORGE 1918).

EUASTRUM BINALE (TURP.) EHR. VAR. HIANS W. WEST
J. LINN. SOC. (BOT.) [LONDON] 29: 140, PL. 20, FIG. 14. 1892.

(PL. IX, FIG. 13)

CELLS ABOUT $1 \frac{1}{3}$ - $1 \frac{1}{5}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED, SINUS NARROWLY LINEAR; SEMICELLS SUBPYRAMIDATE, BASAL ANGLES SUBACUTE, OBLIQUELY TRUNCATE TOWARD THE SINUS, UPPER PART OF LATERAL MARGINS STRAIGHT OR SLIGHTLY CONCAVE, APEX BROAD AND TRUNCATE, RETUSE-EMARGINATE IN THE MIDDLE, UPPER ANGLES DILATED TO FORM A MINUTE APICULUS; LATERAL VIEW OF SEMICELLS OVATE, APEX ACUTELY-ROUNDED, WITH A SLIGHT PROTUBERANCE NEAR THE BASE ON EACH SIDE; APICAL VIEW ELLIPTIC, WITH A PROTUBERANCE IN THE MIDDLE OF EACH SIDE; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS AXILE, EACH WITH A SINGLE PYRENOID.

LENGTH OF CELL 20.4μ ; BREADTH 16.1μ ; BREADTH OF ISTHMUS 6.8μ .

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY DIFFERS FROM THE TYPICAL COSMARIUM BINALE (TURP.) EHR. IN THE OUTWARD APPEARANCE OF THE BASAL LOBE OF ITS SEMICELLS AND ON THE AVERAGE SMALLER SIZE OF THE PLANT.

EUASTRUM BRASILIENSE BERGE

ARK. BOT. [UPPSALA, STOCKHOLM]. 1: 112, T. 5, FIG. 1. 1903.

(PL. IX, FIG. 3)

CELLS ABOUT TWICE AS LONG AS BROAD, SOMEWHAT DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR WITH A DILATED APEX; SEMICELLS ELONGATE-TRAPEZIFORM, SOMEWHAT 3-LOBED, BASAL ANGLES SUBRECTANGULAR-ROUNDED, BASAL LOBES SLIGHTLY RETUSE, POLAR LOBE NEARLY PYRAMIDATE, APEX BROADLY TRUNCATE, ROUNDED, WITH A MODERATELY DEEP, LINEAR MEDIAN INCISION, A CONSPICUOUS INTUMESCENCE AT THE MIDDLE OF EACH SEMICELL, JUST ABOVE THE ISTHMUS; LATERAL VIEW OF SEMICELLS ELONGATE-PYRAMIDATE, BASE STRAIGHT, ANGLES SUBRECTANGULAR ROUNDED, LOWER PORTION OF LATERAL MARGINS PARALLEL, UPPER PART CONVERGENT TOWARD THE APICES BROADLY ROUNDED; APICAL VIEW ELLIPTIC WITH AN INFLATION IN THE MIDDLE ON EACH SIDE; CELL WALL PUNCTATE, COLORLESS; CHLOROPLASTS AXILE, WITH 2 OR 3 PYREN-
OIDS.

LENGTH OF CELL 86.1u; BREADTH 35.7u; BREADTH OF ISTHMUS 13.6u.

ZYGOSPORE UNKNOWN.

HAB. - PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-

RASSUNUNGA, SANTO AMARO, SÃO PAULO (BORGE 1918); AMAZONAS: 'I-GARAPÉ' TIPORON OF THE IÁ RIVER (FÖRSTER 1963); MATO GROSSO: COXIPÓ (BORGE 1903); RIO GRANDE DO SUL: PORTO ALEGRE (BORGE 1903).

EUASTRUM BRASILIENSE BORGE VAR. MINUS G. S. WEST

MÉM. SOC. NEUCHÂT. SCI. NAT. [NEUCHÂTEL] 5: 1032, T. 22,

FIG. 37. 1914.

(PL. IX, FIG. 4)

SMALLER THAN THE TYPE; SEMICELLS WITH 1 OR 3 PROTUBERANCES, ALWAYS 1 IN THE MIDDLE, JUST ABOVE THE ISTHMUS, AND SOMETIMES ANOTHER ONE NEARLY IN THE MIDDLE OF EACH BASAL LOBE, CLOSE TO THE MARGIN; APICAL VIEW OF CELL SOMEWHAT ELLIPTICAL, WITH 1 OR 3 PROTUBERANCES ON EACH SIDE, IF WITH 3 THE MEDIAL ONE IN A LOWER PLANE.

LENGTH OF CELL 61.2u; BREADTH 32.2u; BREADTH OF ISTHMUS 10.2u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-RASSUNUNGA (BORGE 1918).

EUASTRUM BRASILIENSE BORGE VAR. MINUS G. S. WEST DIFFERS FROM THE TYPICAL FORM IN HAVING 1 OR 3 PROTUBERANCES ON EACH SEMICELL, AND BY THE SMALLER SIZE OF ITS CELLS.

IN ITS ORIGINAL DESCRIPTION G. S. WEST (1914) REPORTS THE CELL WALL AS PUNCTATE. HOWEVER, BORGE'S (1918) ILLUSTRATIONS FOR THE SAME VARIETY DO NOT SHOW UP SUCH PUNCTATION. THE PRESENT MATERIAL GATHERED IN THE CITY OF SÃO PAULO IS IN PERFECT AGREEMENT WITH BORGE'S FROM PIRASSUNUNGA.

EUASTRUM BRASILIENSE BORGE VAR. SIMPLICIUS BORGE
ARK. BOT. [UPPSALA, STOCKHOLM]. 1: 113, T. 5, FIG. 2. 1903.
(PL. IX, FIG. 5)

SOMEWHAT SMALLER THAN THE TYPE; SEMICELLS COMPLETELY DESTITUTE OF INTUMESCENCES; LATERAL VIEW OF SEMICELLS NEARLY OVATE, BASAL ANGLES BROADLY ROUNDED; APICAL VIEW BROADLY ELLIPTIC; CELL WALL SMOOTH.

LENGTH OF CELL 49.3-66.3 μ ; BREADTH 25.5-34.0 μ ; BREADTH OF ISTHMUS 10.2 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52); IN A DRAIN-

AGE DITCH NEAR THE CITY OF PIRASSUNUNGA, SÃO PAULO (SP 7451).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: RIO GRANDE DO SUL:
CACHOEIRA, PORTO ALEGRE (BORGE 1903).

THIS VARIETY CAN BE DISTINGUISHED FROM THE TWO PRECEED-
ING ONES CHIEFLY IN HAVING ITS SEMICELLS COMPLETELY DESTITUTE OF
INTUMESCENCES.

EUASTRUM DIVARICATUM LUND. VAR. TIETEENSE LÖFGR. & NORDST.
WITT. & NORDST. ALG. EXSIC. [STOCKHOLM]. 12: No. 554. 1883.
(PL. X, FIG. 4)

CELLS ABOUT $1 \frac{1}{5}$ - $1 \frac{1}{4}$ TIMES LONGER THAN BROAD, DEEP-
LY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A DILA-
TED APEX; SEMICELLS TRAPEZIFORM, SLIGHTLY 3-LOBED, BASAL ANGLES
ACUTE AND FURNISHED WITH A SMALL SPINE, BASAL LOBES SOMEWHAT CO-
NICAL, POLAR LOBE VERY BROAD, SOMEWHAT PYRAMIDATE-TRUNCATE, APEX
BROADLY TRUNCATE, WITH A DEEP AND OPEN MEDIAN INCISION; LATERAL
VIEW OF SEMICELLS OVATE, WITH A SWELLING AT EACH SIDE NEAR THE
BASE; APICAL VIEW ELLIPTIC, WITH A SPINE AT EACH POLE; CELL
WALL COLORLESS, IRREGULARLY GRANULATE, JUST A FEW GRANULES RES-
TRICTED TO THE APICAL PORTION OF EACH ONE OF THE 3 LOBES, CENTER
OF SEMICELLS SMOOTH; CHLOROPLASTS AXILE, EACH WITH A SINGLE CEN-
TRAL PYRENOID.

LENGTH OF CELL 35.7μ ; BREADTH 27.2μ ; BREADTH OF ISTHMUS 6.8μ .

ZYGOSPORE GLOBOSE, SOMETIMES FURNISHED WITH ROUNDED SPINES.

HAB. - PLANKTONIC IN THE TIETÊ RIVER, SÃO PAULO (SP 7454).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: SÃO PAULO (WITTROCK & NORDSTEDT 1883, BERGE 1918).

EUASTRUM DIVARICATUM LUND. VAR. TIETEENSE LÖFGR. & NORDST.
CAN BE DISTINGUISHED FROM THE TYPICAL FORM BY ITS NONORNAMENTED
INFLATION IN THE MIDDLE AND JUST ABOVE THE ISTHMUS ON EACH SEMI-
CELL, AND BY ITS SHORTER SPINE AT THE BASAL LOBES.

EUASTRUM EVOLUTUM (NORDST.) WEST & WEST VAR. NOV.

(PL. X, FIG. 9)

CELLS ABOUT $1 \frac{3}{5}$ TIMES AS LONG AS BROAD, DEEPLY CONSTRICTED, SINUS LINEAR WITH A DILATED APEX; SEMICELLS 5-LOBED, BASAL LOBES SOMEWHAT RECTANGULAR, APICAL MARGIN RETUSE AND FURNISHED WITH A FEW SMALL SPINES, ANGLES PRODUCED INTO A SMALL STOUT SPINE (THE BIGGEST ONE AT THE BASAL ANGLE), SUBPOLAR LOBES BROADLY ROUNDED, WITH SEVERAL SHORT SPINES AT THE APICES, POLAR LOBE

SOMEWHAT CUNEATE, APEX CRENATE, WITH A DEEP AND OPEN MEDIAN INCISION, THE UPPER ANGLES PROVIDED WITH A VERY STRONG AND STOUT SPINE, INTERLOBULAR INCISIONS DEEP AND WIDELY OPEN, ONE SCROBICULATION IN THE MIDDLE OF EACH SEMICELL, JUST ABOVE THE ISTHMUS ; LATERAL VIEW OF SEMICELLS PYRAMIDATE, WITH A SCROBICULATION JUST ABOVE THE BASE ON EACH SIDE, APEX FURNISHED WITH A STRONG, STOUT SPINE; APICAL VIEW SOMEWHAT ELLIPTIC, WITH A SCROBICULATION IN THE CENTER, ON EACH SIDE, POLES WITH A FEW SPINES; CELL WALL COLORLESS, WITH A CONSPICUOUS SCROBICULATION IN THE CENTER OF EACH SEMICELL; CHLOROPLASTS UNKNOWN.

LENGTH OF CELL 51.0u; BREADTH 30.6u; BREADTH OF ISTHMUS 8.5u.

ZYGOSPORE UNKNOWN.

HAB. - PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100).

EUASTRUM EVOLUTUM (NORDST.) WEST & WEST VAR. NOV. CAN BE RECOGNIZED AT ONCE BY ITS CRENATE APEX OF THE POLAR LOBES AND BY ITS RELATIVELY LARGE SCROBICULATION IN THE CENTER OF THE SEMICELLS.

SUGGESTED NAME FOR THE NEW VARIETY: EUASTRUM EVOLUTUM (NORDST.) WEST & WEST VAR. VALIOI. THE PLANT WILL BE NAMED IN HONOR TO MR. IVANY FERRAZ MARQUES VÁLIO, WHO KINDLY COLLECTED

THE MATERIAL DURING ONE OF HIS EXCURSIONS TO THE STATE OF MINAS GERAIS.

EUASTRUM GEMMATUM BRÉB.

ANN. MAG. NAT. HIST. [LONDON]. 14: 191, PL. 7, FIG. 4. 1844.

(PL. X, FIG. 10)

CELLS ABOUT $1 \frac{1}{3}$ - $1 \frac{2}{3}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR AND DILATED TO THE APEX; SEMICELLS 3-LOBED, BASAL LOBES SOMEWHAT DIVIDED INTO 2 LOBULES BY A SHALLOW MEDIAN INCISION, LOBULES BROADLY ROUNDED, APEX MINUTELY CRENATE, POLAR LOBE SUBCUNEATE, APEX BROADLY ROUNDED, WITH A DEEP, LINEAR MEDIAN INCISION, INTERLOBULAR INCISIONS MODERATELY DEEP AND WIDELY OPEN; LATERAL VIEW OF SEMICELLS SOMEWHAT PYRAMIDATE-TRUNCATE, WITH A LARGE PROTUBERANCE ON EACH SIDE JUST ABOVE THE BASE, LATERAL MARGINS NEARLY DEEPLY CONCAVE AND WIDENING TOWARD THE APEX RETUSE; APICAL VIEW SOMEWHAT ELLIPTICAL WITH 8 ROUNDED PROTUBERANCES AROUND THE PERIPHERY; CELL WALL COLORLESS, IRREGULARLY PUNCTATE, WITH 3 PROTUBERANCES IN FRONT VIEW FURNISHED WITH CONSPICUOUS PORES, THE CENTRAL ONE IN THE MIDDLE OF EACH SEMICELL JUST ABOVE THE ISTHMUS, THE OTHER NEARLY IN THE MIDDLE OF EACH BASAL LOBE, CLOSE TO THEIR APICAL MARGIN; 2 CHLOROPLASTS PER SEMICELL, EACH WITH A SINGLE PYRENOID.

LENGTH OF CELL 71.0u; BREADTH 39.1u; BREADTH OF ISTH-

MUS 11.6u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: SÃO PAULO (BORGE 1918); GOIÁS: PORTA AZUL (FÖRSTER 1964); MATO GROSSO: PORTO DO CAMPO (BORGE 1925).

THE PRESENT MATERIAL FROM SÃO PAULO HAS A DEFINITE MODERATELY DEEP, LINEAR, MEDIAN INCISION AT THE POLAR LOBES, RATHER THAN THE USUAL SHALLOW ONE COMMONLY MENTIONED IN THE LITERATURE.

EUASTRUM GEMMATUM BRÉB. VAR. NOV.

(PL. X, FIG. 11)

SEMICELLS WITH THE BASAL LOBE SLIGHTLY DIVIDED INTO 2 LOBULES BY A VERY SHALLOW MEDIAN INCISION, APICES OF LOBULES SOMEWHAT TRUNCATE-ROUNDED AND THICKENED, APICAL LOBE NEARLY RECTANGULAR, VERY SLIGHTLY DILATED TOWARD THE APEX TRUNCATE-ROUNDED, WITH A SOMEWHAT DEEP OPEN MEDIAN INCISION, AND THE OUTER ANGLES OBLIQUELY TRUNCATE AND THICKENED, A LARGE PROTUBERANCE IN THE MIDDLE OF EACH SEMICELL, JUST ABOVE THE ISTHMUS, AND A SMALLER ONE CLOSE TO THE APICAL MARGIN OF EACH LOBULE; CELL WALL FINELY

AND UNIFORMLY PUNCTATE, COLORLESS.

LENGTH OF CELL 47.6-58.1u; BREADTH 30.6-35.7u; BREADTH OF ISTHMUS 8.5-10.2u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

THIS VARIETY DIFFERS FROM EUASTRUM GEMMATUM BRÉB. VAR. ALATUM TAFT, ITS CLOSE ALLIED, IN HAVING THE POLAR LOBE MORE DEEPLY INCISED AND BY THE POSSESSION OF 5 INTUMESCENCES PER SEMICELL IN FRONT VIEW.

SUGGESTED NAME FOR THE NEW VARIETY: EUASTRUM GEMMATUM BRÉB. VAR. PINHEIRENSIS.

EUASTRUM INSULARE (WITTR.) ROY VAR. NOV.

(PL. X, FIG. 3)

CELLS ABOUT $1 \frac{1}{3}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR AND DILATED TO THE APEX; SEMICELLS 3-LOBED, BASAL LOBES SOMEWHAT SUBRECTANGULAR, ANGLES BROADLY ROUNDED AND APICAL MARGINS RETUSE, POLAR LOBE WIDEST, NEARLY CUNEATE, ANGLES BROADLY ROUNDED, WITH A WIDE, SHALLOW MEDIAN INCISION; LATERAL VIEW OF SEMICELLS OVATE, WITH A SLIGHT

PROTUBERANCE NEAR THE BASE ON EACH SIDE; APICAL VIEW ELLIPTIC,
WITH A SLIGHTLY PROTUBERANCE AT THE MIDDLE ON EACH SIDE; CELL
WALL SMOOTH, COLORLESS; CHLOROPLASTS AXILE, EACH WITH ONE PYR-
ENOID.

LENGTH OF CELL 37.4u; BREADTH 28.9u; BREADTH OF ISTH-
MUS 8.5u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEI-
ROS RIVER, SÃO PAULO (SP 7441).

BY THE OUTWARD APPEARANCE OF ITS SEMICELLS THE NEW VA-
RIETY CAN BE READILY DISTINCT FROM ALL ITS POSSIBLE ALLIES. IT IS
ALSO SLIGHTLY LARGER THAN THE TYPICAL EUASTRUM INSULARE (WITTR.)
ROY AND ITS VARIETIES.

SUGGESTED NAME FOR THE NEW VARIETY: EUASTRUM INSULARE
(WITTR.) ROY VAR. PINHEIRENSIS.

EUASTRUM PAULENSE BÖRGES.

VIDENSK. MEDDR. DANSK NATURH. FOREN. KBH. [KJØBENHAVN]. 1890 :

938, T. 3, FIG. 17. 1890.

(PL. X, FIGS. 6-7)

CELLS ABOUT $1 \frac{1}{4}$ TIMES AS LONG AS BROAD, DEEPLY CONS-

TRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR, SLIGHTLY OPEN TO THE APEX; SEMICELLS 3-LOBED, BASAL LOBES DIVIDED BY A SHALLOW INCISION INTO 2 LOBULES, EACH LOBULE WITH BOTH ANGLES PRODUCED INTO SHORT DENTICULATE PROJECTIONS AND A THIRD DENTICULATE BETWEEN BOTH, CLOSE TO THE APICAL MARGIN OF LOBULES, POLAR LOBE SUBCUNEATE, WITH A DEEPER MEDIAN INCISION, OUTER ANGLES 3-DENTATE (THE MEDIAL ONE WITHIN THE MARGIN), A INFLATION IN THE MIDDLE OF EACH SEMICELL, CLOSE TO THE ISTHMUS; LATERAL VIEW OF SEMICELLS SOMEWHAT OVATE, WITH 8 DENTICULATIONS AROUND THE PERIPHERY; APICAL VIEW SUBELLIPTIC, EACH POLE FURNISHED WITH 3 DENTICULATIONS, SIDES SLIGHTLY INFLATED, SMOOTH; CELL WALL COLORLESS, SMOOTH; CHLOROPLASTS UNKNOWN.

LENGTH OF CELL 32.3-37.4_u; BREADTH 22.1-25.5_u;
BREADTH OF ISTHMUS 6.8-8.5_u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH A FLOATING MASS OF SPIROGYRA SP. AND ZYGNEMA SP. IN A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 49, 50); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890): PIRASSUNUNGA (BORGE 1918).

THE SPECIMENS COLLECTED IN ITIRAPINA HAVE THE ANGLES OF THE BASAL AND POLAR LOBES PRODUCED INTO MORE PROMINENT DENTICULAR PROJECTIONS THAN THOSE ILLUSTRATED BY BÖRGESEN (1890). THE LATERAL VIEW OF THE PRESENT MATERIAL ALSO DIFFERS FROM BÖRGESEN'S ORIGINAL DRAWINGS BY HAVING 8 DENTICULATIONS AROUND THE PERIMETRY OF EACH SEMICELL. BÖRGESEN'S ILLUSTRATIONS SHOW PERFECTLY BOTH LATERAL MARGINS AND APICES WITH 3 SLIGHT DENTICLES.

EUASTRUM PECTINATUM BRÉB. VAR. NOV.

(PL. X, FIGS. 1-2)

CELLS ABOUT $1 \frac{1}{4}$ TIMES AS LONG AS BROAD, DEEPLY CONSTRUCTED IN THE MIDDLE, SINUS NARROWLY LINEAR OR SOMETIMES SLIGHTLY OPEN OUTWARDS; SEMICELLS 3-LOBED, BASAL LOBES SUBRECTANGULAR, LATERAL MARGINS RETUSE, POLAR LOBE FROM NEARLY SUBRECTANGULAR TO TRAPEZIFORM, WIDEST, APICAL MARGIN RETUSE; SEMICELLS WITH 5 PROTUBERANCES, A LARGE ONE IN THE CENTER ABOVE THE ISTHMUS, AND A SMALL ONE IN THE MIDDLE AND WITHIN THE APICAL MARGIN OF EACH BASAL LOBE, ANOTHER WITHIN EACH ANGLE OF THE POLAR LOBES; LATERAL VIEW OF SEMICELLS SOMEWHAT PYRAMIDATE-TRUNCATE WITH A LARGE INFLUENCE NEAR THE BASE ON EACH SIDE, AND A SMALLER ONE ON EACH SIDE NEAR THE BROADLY ROUNDED APEX; APICAL VIEW NEARLY ELLIPTIC WITH 3 PROTUBERANCES ON EACH SIDE, AND RETUSE POLES; CELL WALL

COLORLESS AND SMOOTH; CHLOROPLASTS AXILE, EACH WITH SEVERAL SMALL PYRENOIDS.

LENGTH OF CELL 42.7-52.7u; BREADTH 34.0-38.0u; BREADTH OF ISTHMUS 11.9u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

THE NEW VARIETY, BY THE SIZE OF ITS CELLS AND THE NUMBER AND POSITION OF ITS INTUMESCENCES, SOMEWHAT RESEMBLES EUASTRUM PECTINATUM BRÉB. VAR. INEVOLUTUM WEST & WEST, FROM WHICH IT DIFFERS IN THE OUTWARD APPEARANCE OF ITS SEMICELLS, CHIEFLY IN THE SHAPE OF THE POLAR LOBE.

SUGGESTED NAME FOR THE NEW VARIETY: EUASTRUM PECTINATUM BRÉB. VAR. PINHEIRENSIS.

EUASTRUM SUBINTEGRUM NORDST. VAR. BRASILIENSE GRÖNBL.
ACTA SOC. SCI. FENN. [HELSIGFORSIAE]. NOV. SER. B, 11 (6): 14,
T. 4, FIGS. 69-70. 1945.
(PL. X, FIG. 8)

CELLS ABOUT 1 1/3 TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A SLIGHTLY DILATED APEX; SEMICELLS 3-LOBED, BASAL LOBES 2-LOBULATE, UPPER LO-

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BULE UPWARDLY DIRECTED, ROUNDED AND SUBMAMILLIFORM OR SUBQUADRATE, WITH RETUSE APEX AND ACUTELY ROUNDED ANGLES, LOWER LOBULE SUBQUADRATE, RETUSE, HORIZONTALLY DISPOSED, ANGLES ACUTELY ROUNDED, POLAR LOBE WIDE, NEARLY HORIZONTALLY FUSIFORM, WITH ACUMINATE POLES AND A CONVEX APICAL MARGIN, INTERLOBULAR INCISIONS SOMEWHAT DEEP AND LINEAR; 2 LARGE PROTUBERANCES ABOVE THE ISTHMUS, IN THE MIDDLE OF EACH SEMICELL, AND A SMALLER ONE CLOSE TO THE APICAL MARGIN OF EACH ANGLE OF THE LOWER AND UPPER LOBULES; ONE SINGLE SCROBICULATION IN THE CENTER OF EACH SEMICELL, BETWEEN AND ABOVE THE 2 MAIN PROTUBERANCES, AND 3 OTHER ONES CLOSE TO THE APICAL MARGIN, DISPOSED LIKE A TRIANGLE WITH THE VERTICE POINTING DOWNWARD; LATERAL VIEW OF SEMICELLS SOMEWHAT OVATE, WITH THE SIDES INFLATED JUST ABOVE THE BASE, APEX BROADLY ROUNDED; APICAL VIEW SUBELLIPTIC, WITH 4 PROTUBERANCES ON EACH SIDE; CELL WALL FINELY PUNCTATE, COLORLESS; CHLOROPLASTS UNKNOWN.

LENGTH OF CELL 71.4u; BREADTH 51.0u; BREADTH OF ISTHMUS 19.0u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: AMAZONAS: 'IGARAPÉ' IAYANA OF THE IÁ RIVER (FÖRSTER 1963); PARÁ: SANTARÉM (GRÖNBLAD 1945).

THIS VARIETY ONLY DIFFERS FROM THE TYPICAL EUASTRUM SUB-
INTEGRUM NORDST. IN THE PRESENCE OF A SINGLE SCROBICULATION IN
 THE CENTER OF EACH SEMICELL, AND 3 OTHER ONES PLACED LIKE A TRI-
 ANGLE WITH THE VERTICE POINTING DOWNWARD, CLOSE TO THE APICAL
 MARGIN OF THE POLAR LOBES.

EUASTRUM SUBLOBATUM BRÉB.

RALFS BRIT. DESM. [LONDON]. 91, PL. 32, FIG. 4. 1848.

(PL. IX, FIG. 7)

CELLS ABOUT 1 1/2 TIMES AS LONG AS BROAD, DEEPLY CONS-
 TRICTED IN THE MIDDLE, SINUS LINEAR AND WITH A DILATED APEX; SE-
 MICELLS SOMEWHAT TRAPEZIFORM, BASAL ANGLES ROUNDED, LATERAL AND
 APICAL MARGINS RETUSE, WITH AN INTUMESCENCE IN THE CENTER OF
 EACH SEMICELL JUST ABOVE THE ISTHMUS; LATERAL VIEW OF SEMICELLS
 OVATE, WITH A LARGE PROTUBERANCE ON EACH SIDE NEAR THE BASE, UP-
 PER PORTION OF LATERAL MARGINS RETUSE, APEX ROUNDED; APICAL VIEW
 ELLIPTIC, WITH A PROTUBERANCE IN THE MIDDLE ON EACH SIDE, GIVING
 IT A SOMEWHAT CRUCIFORM APPEARANCE; CELL WALL SMOOTH, COLOR-
 LESS; CHLOROPLASTS AXILE, EACH WITH A SINGLE CENTRAL PYRENOID.

LENGTH OF CELL 22.1u; BREADTH 17.0u; BREADTH OF ISTH-
 MUS 5.1u.

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THERE IS SOME DIVERGENCE AMONG THE AUTHORS ABOUT THE PRECISE TAXONOMIC POSITION OF THIS PLANT. ACCORDING TO WEST & WEST (1905), IT IS BETTER TO REGARD IT AS A SPECIES OF EUASTRUM RATHER THAN OF COSMARIUM ON ACCOUNT OF THE RETUSE-EMARGINATE APICAL MARGINS AND THE RELATIVELY LARGE CENTRAL PROTUBERANCE OF THE SEMICELLS, IN FRONT VIEW.

OUR PLANTS STAND NEAR TO COSMARIUM VALIDUM WEST & WEST, BUT THEY DIFFER IN THE ABSENCE OF THE SMALL SCROBICULATION NEAR THE CENTER OF EACH SEMICELL, IN FRONT VIEW, TYPICAL FOR THE FIRST ONE.

EUASTRUM SUBLOBATUM BRÉB. F. NOV.

(PL. IX, FIG. 8)

CELLS PROPORTIONATELY MORE ELONGATE THAN THE TYPICAL, ABOUT TWICE AS LONG AS BROAD.

LENGTH OF CELL 23.8_u; BREADTH 11.9_u; BREADTH OF ISTHMUS 3.4_u.

ZYGOSPORE UNKNOWN.

HAB. - ON DRIPPING STONES OF A WATER FALL IN PARACATU,
MINAS GERAIS (C.E.M.B. 94).

THIS NEW FORMA ONLY DIFFERS FROM THE TYPICAL EUASTRUM
SUBLOBATUM BRÉB. IN ITS PROPORTIONATELY LONGER CELLS.

SUGGESTED NAME FOR THE NEW FORMA: EUASTRUM SUBLOBATUM
BRÉB. F. ELONGATUM.

EUASTRUM SUBLOBATUM BRÉB. VAR. OBTUSATUM (GUTW.) KR.
RABENH. KRYPT. FL. [LEIPZIG]. 13 (1): 545, T. 74, FIGS. 9-11.
1937.
(PL. IX, FIGS. 9-10)

CELLS RELATIVELY LONGER THAN THE TYPICAL FORM; SEMI-
CELLS 3-LOBED, BASAL LOBES SUBQUADRATE, APICAL MARGIN RETUSE, A-
PICAL LOBE NEARLY RECTANGULAR, WIDEST, APICAL MARGIN TRUNCATE-
ROUNDED, WITH A SHALLOW AND WIDELY OPEN MEDIAN INCISION, SLIGHT-
LY OR NOT TUMID IN THE MIDDLE OF EACH SEMICELL JUST ABOVE THE
ISTHMUS; LATERAL VIEW OF SEMICELLS OVATE; APICAL VIEW ELLIPTIC,
WITH A VERY SLIGHT INFLATION IN THE MIDDLE ON EACH SIDE.

LENGTH OF CELL 17.0-28.9_u; BREADTH 11.9-20.4_u; BREADTH
OF ISTHMUS 3.4-6.8_u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 57); PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100); IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 28879).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945).

THIS VARIETY IS DISTINGUISHED FROM THE TYPICAL EUASTRUM SUBLOBATUM BRÉB. BY THE OUTWARD APPEARANCE OF ITS SEMICELLS AND ITS SOMEWHAT LONGER CELLS.

EUASTRUM SUBLOBATUM BRÉB. VAR. OBTUSATUM (GUTW.) KR. CLOSELY RESEMBLES EUASTRUM VALIDUM WEST & WEST, FROM WHICH CAN BE EASILY DISTINCT BY THE ABSENCE OF THE SMALL, SOMEWHAT CENTRAL SCROBICULATION TYPICAL FOR THE SEMICELLS OF THE SECOND ONE.

EUASTRUM TUDDALENSE STRÖM

NYT. MAG. NATURVID. [KRISTIANIA]. 62: 26, T. 3, FIGS. 2-4 .

(PL. IX, FIG. 12)

CELLS ABOUT $1 \frac{1}{3}$ - $1 \frac{1}{2}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED AT THE MIDDLE, SINUS LINEAR OR SLIGHTLY OPEN OUTWARD; SEMICELLS SOMEWHAT 3-LOBED, BASAL LOBES SUBRECTANGULAR, A-

PEX RETUSE AND ANGLES ACUTELY ROUNDED, POLAR LOBE NEARLY RECTANGULAR, APICAL MARGIN SLIGHTLY CONVEX AND WITH A SHALLOW , OPEN MEDIAN INCISION, OUTER ANGLES FURNISHED WITH A SMALL, STOUT SPI-NE; AN INTUMESCENCE IN THE CENTER JUST ABOVE THE ISTHMUS ON EACH SEMICELL; LATERAL VIEW OF SEMICELLS SOMEWHAT PYRAMIDATE-TRUNCATE WITH AN INTUMESCENCE NEAR THE BASE ON EACH SIDE, APEX TRUNCATE-ROUNDED, CRENATE; APICAL VIEW OBLONG, WITH A PROMINENT INFLATION IN THE MIDDLE ON EACH SIDE, POLES CRENATE; CELL WALL COLORLESS, SMOOTH; CHLOROPLASTS AXILE, WITH 1 PYRENOID.

LENGTH OF CELL 20.4u; BREADTH 16.1u; BREADTH OF ISTHMUS 6.8u.

ZYGOSPORE UNKNOWN.

HAB. - PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

EUASTRUM VALIDUM WEST & WEST

TRANS. LINN. SOC. LOND. (BOT.) [LONDON]. 5: 245, PL. 14,

FIGS. 32-33. 1896.

(PL. IX, FIG. 11)

CELLS ABOUT $1\frac{1}{3}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A SLIGHTLY DI-

LATED APEX; SEMICELLS 3-LOBED, BASAL LOBES SUBQUADRATE, APICAL MARGINS BROADLY TRUNCATE, APICAL LOBE RECTANGULAR, APICAL MARGIN TRUNCATE-CONVEX, WITH A SHALLOW AND OPEN MEDIAN INCISION; SEMICELLS WITH A SMALL PAPILLA WITHIN EACH BASAL ANGLE, A LARGE GRANULE IN THE MIDDLE, CLOSE TO THE ISTHMUS, AND A SMALL SCROBICULATION NEAR THE CENTER; LATERAL VIEW OF SEMICELLS OVATE, WITH A GRANULE NEAR THE ISTHMUS ON EACH SIDE; APICAL VIEW ELLIPTIC, WITH A SMALL PAPILLA ON EITHER SIDE OF EACH POLE; CELL WALL COLORLESS AND SMOOTH; CHLOROPLASTS NOT KNOWN.

LENGTH OF CELL 32.3-34.0u; BREADTH 21.3-23.8u; BREADTH OF ISTHMUS 5.1u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945).

THERE IS ALSO SOME CONFUSION REGARDING THE EXACT TAXONOMICAL POSITION OF THIS SPECIES. ACCORDING TO MOST AUTHORITIES, THIS SPECIES IS ON THE BORDER-LINE BETWEEN THE GENERA EUASTRUM AND COSMARIUM. BASED ON ITS DISTINCTLY EMARGINATE APICES IT IS BETTER TO PLACE THIS PLANT AMONG THE EUASTRUM.

THIS SPECIES CAN BE SOMEWHAT CONFUSED WITH EUASTRUM SUB-

LOBATUM BRÉB. AND ITS VAR. OBTUSATUM (GUTW.) KR., FROM WHICH IT IS DIFFERENT IN HAVING A SMALL SCROBICULATION NEAR THE CENTER OF EACH SEMICELL, AND A SMALL PAPILLA WITHIN EACH BASAL ANGLE OF THE SEMICELLS.

MICRASTERIAS C. A. AGARDH, 1827

MICRASTERIAS CRUX MELITENSIS (EHR.) HASS. VAR. JANEIRA

(RAC.) GRÖNBL.

ACTA SOC. SCI. FENN. [HELSINGFORSIAE]. 47: 35, T. 6, FIGS. 17-18. 1920.

(PL. XII, FIGS. 3-4)

CELLS A LITTLE LONGER THAN BROAD, DEEPLY CONSTRICTED AT THE MIDDLE, SINUS OPEN WITH ACUTE OR LINEAR APEX; SEMICELLS 5-LOBED, BASAL AND LATERAL LOBES SUBEQUAL, SHORT AND BROADLY TRUNCATE, DIVIDED INTO 2 LOBULES, EMARGINATE-BIDENTATE AT THE APICES, POLAR LOBE SOMEWHAT CUNEATE, APEX DEEPLY RETUSE, ANGLES PRODUCED INTO SHORT DIVERGING PROCESSES WITH EMARGINATE-BIDENTATE APICES, INTERLOBULAR INCISIONS MODERATELY DEEP AND OPEN, ALL OF THEM APPROXIMATELY THE SAME SIZE; LATERAL VIEW OF SEMICELLS SOMEWHAT ELONGATE-PYRIFORM, APEX WITH A SHORT ACUMINATE PROCESS; APICAL VIEW FUSIFORM, POLES SHARPLY ACUMINATE; CELL WALL COLORLESS AND SMOOTH OR VERY FINELY PUNCTATE; CHLOROPLASTS AXILE, WITH SEVER-

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AL PYRENIDS.

LENGTH OF CELL 102.0-110.5u; BREADTH 102.0-108.0u;
BREADTH OF POLAR LOBE 51.0-56.7u; BREADTH OF ISTHMUS 20.0u.

ZYGOSPORE UNKNOWN.

HAB. - NEAR THE CITY OF PIRASSUNUNGA, SÃO PAULO - THE
EXACT PLACE NOT SPECIFIED (SP 7455).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

MICRASTERIAS CRUX MELITENSIS (EHR.) HASS. VAR. JANEIRA
(RAC.) GRÖNBL. DIFFERS FROM THE TYPICAL FORM IN HAVING BOTH BA-
SAL AND LATERAL LOBES SOMEWHAT SHORTER AND BROADLY TRUNCATE, THE
INCISION BETWEEN THEM SHALLOWER. FURTHERMORE, THE POLAR LOBE IS
SHORTER, ITS APEX NOT SO DEEPLY RETUSE AS IN THE TYPICAL MICRAS-
TERIAS CRUX MELITENSIS (EHR.) HAS..

IT CAN BE EASILY CONFUSED WITH MICRASTERIAS RADIATA
HASS. VAR. PSEUDOCRUX GRÖNBL., FROM WHICH CAN BE DISTINGUISHED
BY ITS RELATIVELY SMALLER SIZE AND MUCH SHORTER AND STOUTER LO-
BULES, WHICH ARE NEVER DEEPLY TRUNCATE.

MICRASTERIAS DENTICULATA BRÉB.

MÉM. SOC. ACAD. FALAI. [FALAISE]. 54, T. 8. 1835.

(PL. XIV, FIG. 1)

CELLS ABOUT $1 \frac{1}{10}$ - $1 \frac{1}{4}$ TIMES LONGER THAN BROAD ,
 DEEPLY CONSTRICTED AT THE MIDDLE, SINUS NARROWLY LINEAR; SEMI-
 CELLS 5-LOBED, BASAL AND LATERAL LOBES ALMOST EQUAL AND BROADLY
 CUNEATE, LATERAL LOBES SOMETIMES A LITTLE LARGER THAN BASAL ONES
 AND DIVIDED INTO 2 LOBULES BY A DEEP LINEAR INCISION, EACH LO-
 BULE FURTHER DIVIDED INTO 2 OR 4 SUBEQUAL, RETUSE OR EMARGINATE
 PARTS, POLAR LOBE NARROWLY CUNEATE, WITH A DILATED APEX AND CON-
 CAVE SIDES, APICAL MARGIN RETUSE WITH A WIDELY OPEN NOTCH IN THE
 CENTER, ANGLES OBTUSE OR SOMETIMES TRUNCATE EMARGINATE, INTERLO-
 BULAR INCISIONS NARROWLY LINEAR; LATERAL VIEW OF SEMICELLS NAR-
 ROWLY PYRAMIDATE, WITH A PROTUBERANCE ON EACH SIDE, NEAR THE
 BASE; APICAL VIEW FUSIFORM, WITH 3 UNDULATIONS AT THE MIDDLE ON
 EACH SIDE; CELL WALL COLORLESS OR SOMEWHAT YELLOWISH, MINUTELY
 OR SOMETIMES COARSELY PUNCTATE; CHLOROPLASTS AXILE, WITH SEVERAL
 SMALL PYRENOIDS.

LENGTH OF CELL 190.4-257.7u; BREADTH 153.0-225.5u;
 BREADTH OF POLAR LOBE 32.0-54.4u; BREADTH OF ISTHMUS 51.0-64.5u

ZYGOSPORE GLOBOSE, FURNISHED WITH SCATTERED, ELONGATE,
 STOUT SPINES WITH 2 OR 3-FURCATE APICES, SOME OF WHICH MAY DIVI-
 DE AGAIN AND BECOME RECURVED.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN
 HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B.
 92); IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER,

SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: SANTO AMARO (BORGE 1918), SÃO PAULO (BORGE 1918, BICUDO & BICUDO 1962); RIO GRANDE DO SUL: CRUZ ALTA, PORTO ALEGRE (BORGE 1903).

MICRASTERIAS INTEGRA NORDST.

WITTR. & NORDST. ALG. EXSIC. [STOCKHOLM]. 12: No. 551. 1883.

(PL. XIII, FIG. 1)

CELLS ABOUT $1 \frac{3}{4}$ - $1 \frac{9}{10}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED AT THE MIDDLE, SINUS OPEN, TRIANGULAR-ACUMINATE, WITH A NARROWED APEX; SEMICELLS 3-LOBED, BASAL LOBES SOMEWHAT CONICAL, LATERAL MARGINS BROADLY CONVEX, APEX MINUTELY BIFID, POLAR LOBE NEARLY CUNEATE, LATERAL MARGINS SLIGHTLY CONVERGENT AT THE LOWER PORTION, FAST WIDENING NEAR THE APEX, APICAL MARGIN BROADLY CONVEX AND SLIGHTLY RETUSE IN THE MIDDLE, ANGLES FURNISHED WITH A SMALL, OBLIQUE TOOTH; LATERAL VIEW OF SEMICELLS PYRIFORM; APICAL VIEW FUSIFORM, POLES ACUTE; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS AXILE, WITH SEVERAL PYRENOIDS.

LENGTH OF CELL 153.0-178.5 μ ; BREADTH 91.8-100.3 μ ; BREADTH OF POLAR LOBE 49.3-59.5 μ ; BREADTH OF ISTHMUS 22.5 μ .

ZYGOSPORE UNKNOWN.

HAB. - NEAR THE CITY OF CAMPINAS, SÃO PAULO - THE EXACT

PLACE NOT SPECIFIED (SP 7457).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAMPINAS (WITTROCK & NORDSTEDT 1883, BERGE 1918), PIRASSUNUNGA, SÃO PAULO (BERGE 1918); GOIÁS: FORMOSO (PRESCOTT 1957); MATO GROSSO: COXIPÓ (BERGE 1903); RIO GRANDE DO SUL: CACHOEIRA (BERGE 1903).

MICRASTERIAS LATICEPS NORDST.

VIDENSK. MEDDR. DANSK NATURH. FOREN. KBH. [KJØBENHAVN].

14-15: 220, T. 2, FIG. 14. 1870.

(PL. XI, FIG. 1)

CELLS ABOUT $1\frac{1}{10}$ - $1\frac{1}{3}$ TIMES BROADER THAN LONG, DEEPLY CONSTRICTED AT THE MIDDLE, SINUS ACUTE-ANGLED, NARROWED AT THE APEX; SEMICELLS 3-LOBED, BASAL LOBES HORIZONTALLY DISPOSED, SUBFUSIFORM, LATERAL MARGINS CONVEX TO ALMOST STRAIGHT, APEX MINUTELY BIFID, POLAR LOBE WIDELY SPREADING, FUSIFORM, WITH ACUTE POLES; LATERAL VIEW OF SEMICELLS OVATE; APICAL VIEW BROADLY FUSIFORM, WITH ACUTE POLES; CELL WALL COLORLESS, PUNCTATE; CHLOROPLASTS AXILE, WITH SEVERAL PYRENOIDS.

LENGTH OF CELL $153.0-178.5\mu$; BREADTH $170.5-210.0\mu$; BREADTH OF POLAR LOBE $170.0-210.0\mu$; BREADTH OF ISTHMUS $22.0-30.0\mu$.

ZYGOSPORE UNKNOWN.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75); PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92); PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 96); NEAR THE CITY OF PIRASSUNUNGA, SÃO PAULO - THE EXACT PLACE NOT SPECIFIED (SP 7455).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: LEME, PIRASSUNUNGA (WITTRICK & NORDSTEDT 1880), SÃO PAULO (BICUDO & BICUDO 1962); MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892); MATO GROSSO: CUIABÁ (BORGE 1903), IN THE HEADWATER OF THE XINGU RIVER (SCHMIDLE 1901); PARÁ: MONTE ALEGRE (DICKIE 1881), SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: CACHOEIRA, PORTO ALEGRE (BORGE 1903).

MICRASTERIAS LATICEPS NORDST. VAR. AEQUILOBATA (BORGE) KR. RABENH. KRYPT. FL. [LEIPZIG]. 13 (2): 15, T. 98, FIG. 5. 1939.
(PL. XI, FIG. 3)

CELLS $1 \frac{1}{7}$ - $1 \frac{1}{3}$ TIMES LONGER THAN BROAD; SEMICELLS WITH BASAL AND POLAR LOBES SIMILAR, BROADLY CONICAL, WITH ACUMI-

NATE ENDS.

LENGTH OF CELL 112.5-119.0u; BREADTH 93.8-105.4u;
BREADTH OF POLAR LOBE 105.0-105.4u; BREADTH OF ISTHMUS 11.9u.

ZYGOSPORE UNKNOWN.

HAB. - ON DRIPPING STONES OF A SMALL WATER FALL AT THE
'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B.
79).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: BAHIA (FÖRSTER
1964); GOIÁS: FORMOSO (PRESCOTT 1957); PLACE NOT SPECIFIED
(FÖRSTER 1963).

THIS VARIETY IS DISTINGUISHED AT ONE FROM THE TYPICAL
MICRASTERIAS LATICEPS NORDST. BY THE SIMILAR SHAPE OF BOTH BASAL
AND POLAR LOBES.

IT DIFFERS FROM MICRASTERIAS LATICEPS NORDST. VAR. ACU-
MINATA (BORGE) KR., ITS CLOSE ALLIED, IN HAVING THE CELLS LONGER
THAN BROAD.

MICRASTERIAS LATICEPS NORDST. VAR. INFLATA KR.
RABENH. KRYPT. FL. [LEIPZIG]. 13 (2): 15, T. 99, FIG. 1. 1939.
(PL. XI, FIG. 2)

SEMICELLS WITH BASAL LOBES VERY BROAD AND SOMEWHAT IN-

FLATED, APICAL MARGIN SOMEWHAT COMPRESSED, UPPER PORTION REMARK-
ABLY SMALLER THAN THE LOWER ONE.

LENGTH OF CELL 113.9μ ; BREADTH 107.1μ ; BREADTH OF
POLAR LOBE 93.5μ ; BREADTH OF ISTHMUS 24.0μ .

ZYGOSPORE UNKNOWN.

HAB. - NEAR THE CITY OF PIRASSUNUNGA, SÃO PAULO - THE
EXACT PLACE NOT SPECIFIED (SP 7455).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-
RASSUNUNGA, SÃO PAULO (BORGE 1918).

THE PLANTS I RECEIVED FROM THE PROXIMITIES OF THE CITY
OF PIRASSUNUNGA ARE SMALLER THAN THE LIMITS GIVEN IN KRIEGER'S
ORIGINAL DESCRIPTION FOR THE VARIETY, AND THE POLAR LOBES ARE
SOMEWHAT MORE CONVEX ALSO. HOWEVER, IN ALL THE OTHER RESPECTS
THEY AGREE WITH BORGE'S (1918) ORIGINAL ILLUSTRATIONS FOR THE
PRESENT VARIETY.

MICRASTERIAS PAPILLIFERA BRÉB. VAR. GLABRA NORDST.

WITTR. & NORDST. ALG. EXSIC. [STOCKHOLM]. 9: No. 466. 1882.

(PL. XIII, FIG. 2)

CELLS USUALLY A LITTLE LONGER THAN BROAD, DEEPLY CONS-
TRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR; SEMICELLS 5-LO-

BED, BASAL AND LATERAL LOBES CUNEATE, ALMOST OF EQUAL BREADTH, EACH DIVIDED BY A MODERATELY DEEP INCISION INTO 2 LOBULES, LOBULES AGAIN DIVIDED INTO 4 ULTIMATE EMARGINATE (RARELY 1- OR 3-DENTICULATE) DIVISIONS, POLAR LOBE CUNEATE, WITH SLIGHTLY CONCAVE LATERAL MARGINS, BROADLY WIDENED AT THE APEX, APICAL MARGIN SOMEWHAT CONCAVE WITH A SLIGHT MEDIAN NOTCH, ANGLES FURCATE-EMARGINATE, A PAIR OF SMALL TEETH ON EACH SIDE OF THE MEDIAN NOTCH, INTERLOBULAR INCISIONS NARROWLY LINEAR; LATERAL VIEW OF SEMI-CELLS ELLIPTIC-OBLONG, WITH A 3-CUSPIDATE APEX; APICAL VIEW NARROWLY OBLONG WITH SUBACUTE POLES; CELL WALL PUNCTATE, COLORLESS; CHLOROPLASTS AXILE, WITH NUMEROUS SMALL PYRENIDS.

LENGTH OF CELL 102.0u; BREADTH 90.1u; BREADTH OF POLAR LOBE CA. 34.0u; BREADTH OF ISTHMUS 23.6u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA (WITTRICK & NORDSTEDT 1882, BORGE 1918), SANTO AMARO, SÃO PAULO (BORGE 1918).

THIS IS A VERY WELL MARKED VARIETY OF MICRASTERIAS PAPILLIFERA BRÉB., DIFFERING IN ITS COMPLETE ABSENCE OF ACUTE GRAN-

ULES OR DENTICULATIONS ON EACH SIDE OF THE SINUS AND OF THE INTERLOBULAR INCISIONS.

MICRASTERIAS PINNATIFIDA (KÜTZ.) RALFS

RALFS BRIT. DESM. [LONDON]. 77, PL. 10. FIG. 3. 1848.

(PL. XI, FIGS. 4-5)

CELLS A LITTLE BROADER THAN LONG, DEEPLY CONSTRICTED AT THE MIDDLE, SINUS AN OPEN ACUTE ANGLE, WITH A NARROWED APEX; SEMICELLS 3-LOBED, BASAL LOBES HORIZONTALLY DISPOSED, FUSIFORM, WITH MINUTELY BIFID APICES, POLAR LOBE WIDELY SPREADING, FUSIFORM, ANGLES BIFID, APICAL MARGIN CONVEX, STRAIGHT OR SOMETIMES VERY SLIGHTLY RETUSE, INTERLOBULAR INCISIONS DEEP AND ROUNDED; LATERAL VIEW OF SEMICELLS NEARLY PYRIFORM, WITH A ROUNDED APEX; APICAL VIEW FUSIFORM, WITH ACUTE POLES; CELL WALL COLORLESS, MINUTELY PUNCTATE; CHLOROPLASTS AXILE, WITH SEVERAL SMALL PYRENOIDS.

LENGTH OF CELL 47.6-59.5u; BREADTH 40.8-57.8u; BREADTH OF ISTHMUS 8.5-11.9u.

ZYGOSPORE GLOBOSE, ADORNED WITH LONG, STOUT, ACUTE SPINES, EACH ARISING FROM A BLUNT PROTUBERANCE.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31); PLANKTONIC IN

SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 95).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890); MATO GROSSO: PORTO DO CAMPO (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945), NEAR QUATIPURU (SIOLI 1960).

ACCORDING TO WEST & WEST (1905), MONSTROSITIES OF THIS SPECIES ARE SOMETIMES FOUND.

MICRASTERIAS TRUNCATA (CORDA) BRÉB.

RALFS BRIT. DESM. [LONDON]. 75, PL. 8, FIG. 4, PL. 10, FIG. 5.
1848.

CELLS A LITTLE LONGER THAN BROAD, DEEPLY CONSTRICTED AT THE MIDDLE, SINUS NARROWLY LINEAR, GENERALLY SLIGHTLY OPEN TO THE OUTSIDE; SEMICELLS 5-LOBED, BASAL AND LATERAL LOBES SOMEWHAT VARIABLE, SUBEQUAL, TYPICALLY 2-LOBULATE, EACH LOBULE EMARGINATE, POLAR LOBE OFTEN WIDELY CUNEATE, SOMETIMES ALMOST FUSIFORM, APEX CONVEX AND USUALLY FLATTENED OR SLIGHTLY RETUSE IN THE MIDDLE, LATERAL ANGLES ACUMINATE, 2-DENTATE OR VERY SELDOMLY 3-DENTATE, INTERLOBULAR INCISIONS MODERATELY DEEP AND USUALLY SOMEWHAT OPEN; LATERAL VIEW OF SEMICELLS BROADLY OVATE; APICAL VIEW FUSIFORM-ELLIPTIC, POLES ACUTE; CELL WALL COLORLESS, DELICATELY

OR SOMETIMES STRONGLY PUNCTATE; CHLOROPLASTS AXILE, WITH MANY SMALL PYRENOIDS.

LENGTH OF CELL 85.0-123.5 μ ; BREADTH 79.8-112.5 μ ;
BREADTH OF POLAR LOBE 61.2-78.0 μ ; BREADTH OF ISTHMUS 15.0-26.3 μ

ZYGOSPORE GLOBOSE, FURNISHED WITH MANY STRONG, ELONGATE AND SOMETIMES WITH SLIGHTLY BENT SPINES.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BØRGESEN 1890): PIRASSUNUNGA (BORGE 1918); GOIÁS: FORMOSO (PRESCOTT 1957); MATO GROSSO: CORUMBÁ (BORGE 1903); RIO GRANDE DO SUL: CACHOEIRA, PORTO ALEGRE (BORGE 1903).

RYPPOWA (1927) REPORTS ONE PLANT OF MICRASTERIAS TRUNCATA (CORDA) BRÉB. WITH THE ANGLES OF THE POLAR LOBE 3-DENTATE . THIS PLANT WAS COLLECTED FROM WSCHODNI, A SMALL POND IN THE PROXIMITY OF THE LAKE WIGRY, POLAND.

MICRASTERIAS TRUNCATA (CORDA) BRÉB. VAR. EXCAVATA NORDST.
WITTR. & NORDST. ALG. EXSIC. [LUNDAE]. 8: No. 374. 1880 .
(PL. XII, FIGS. 1-2)

CELLS ABOUT $1 \frac{1}{8}$ - $1 \frac{1}{3}$ TIMES AS LONG AS BROAD; INCISIONS BETWEEN BASAL AND LATERAL LOBES AND THAT BETWEEN LATERAL AND POLAR LOBES OPEN, NEARLY ACUTE-ANGLED; APICAL MARGIN OF POLAR LOBE NOT CONVEX, NEARLY STRAIGHT OR SLIGHTLY RETUSE IN THE MIDDLE.

LENGTH OF CELL $149.6-172.5\mu$; BREADTH $113.9-153.0\mu$;
BREADTH OF POLAR LOBE $54.0-86.7\mu$; BREADTH OF ISTHMUS $18.0-30.0\mu$.

ZYGOSPORE UNKNOWN.

HAB. - ON DRIPPING STONES OF A SMALL WATER FALL AT THE 'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B. 79); PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92); IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: BELÉM, PIRASSUNUNGA (BORGE 1918); MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892); GOIÁS: PORTA AZUL (FÖRSTER 1964); PIAUÍ: BREJO CORREJO (FÖRSTER 1964); RIO BRANCO: SERRA DA LUA (FÖRSTER 1963).

THIS VARIETY IS WELL-MARKED BY REASON OF THE DIFFERENT FORM OF THE POLAR LOBES AND THE DIFFERENT CELL PROPORTIONS.

FÖRSTER'S (1964) T. 18, FIG. 6 IS AN ILLUSTRATION OF

MICRASTERIAS TRUNCATA (CORDA) BRÉB. VAR. EXCAVATA NORDST. GATHERED FROM BREJO CORREJO, PIAUÍ. ACCORDING TO THAT AUTHOR, THIS PLANT IS A FORMA OF THE VARIETY BECAUSE OF THE 3-DENTATE ANGLES OF THE POLAR LOBES. I HAVE EXAMINED MANY SPECIMENS OF THIS VARIETY AND ONLY ONE PLANT WAS FOUND TO HAVE THE 3-DENTATE ANGLES OF THE POLAR LOBES. SINCE SUCH PLANTS ARE OF VERY RARE OCCURRENCE, I DECIDED IT IS BETTER TO CONSIDER THEM AS ABNORMAL FORMS OF THE VAR. EXCAVATA.

MICRASTERIAS TRUNCATA (CORDA) BRÉB. VAR. PUSILLA G. S. WEST
MÉM. SOC. NEUCHÂT. SCI. NAT. [NEUCHÂTEL]. 5: 1035, T. 22 ,
FIGS. 42-43. 1914.
(PL. XI, FIG. 6)

CELLS REMARKABLY SMALLER THAN THE TYPE, WITH A NEARLY CIRCULAR OUTLINE; SINUS SLIGHTLY OPEN TOWARD THE OUTSIDE.

LENGTH OF CELL 57.8-64.6 μ ; BREADTH 57.8-62.9 μ ; BREADTH OF POLAR LOBE 40.8-45.9 μ ; BREADTH OF ISTHMUS 10.2-17.0 μ .

ZYGOSPORE UNKNOWN.

HAB. - FORMING A GREENISH SCUM IN A SMALL TEMPORARY POOL AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 29) ; IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 33); FLOATING MATERIAL AMONG NITELLA SP.

AND NYPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE CONSIDERABLY SMALLER SIZE, AND THE SOMEWHAT CIRCULAR OUTLINE OF ITS CELLS ARE THE MOST EVIDENT CHARACTERISTICS TO SEPARATE THIS VARIETY FROM THE TYPICAL MICRASTERIAS TRUNCATA (CORDA) BRÉB..

ACTINOTAENIUM (NÄGELI, 1849) TEILING, 1954

ACTINOTAENIUM CRUCIFERUM (DE BARY) TEIL.

BOT. NOTISER [LUND]. 1954 (4): 396, FIGS. 16-17. 1954.

(PL. XII, FIG. 9)

CELLS SUBCYLINDRICAL WITH A SLIGHT MEDIAN CONSTRICTION; LATERAL MARGINS STRAIGHT TO SLIGHTLY CONVEX; APICES BROADLY ROUNDED OR TRUNCATELY ROUNDED; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS STELLOID, WITH 4-8 LONGITUDINAL RIDGES AND 1 CENTRAL PYRENOID.

LENGTH OF CELL 30.6u; BREADTH 17.0u; BREADTH OF ISTHMUS 15.6u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN THE TIETÊ RIVER, SÃO PAULO (SP 7454).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892); GOIÁS: PEIXE (PRESCOTT 1957).

ACTINOTAENIUM CRUCIFERUM (DE BARY) TEIL. F. MINUS TEIL.

BOT. NOTISER [LUND]. 1954 (4): 396, FIG. 15. 1954.

(PL. XII, FIGS. 10-11)

CELLS SIMILAR TO THOSE OF THE TYPICAL FORM BUT SMALLER.

LENGTH OF CELL 13.0-13.6 μ ; BREADTH 7.7-8.5 μ ; BREADTH OF ISTHMUS 6.0-6.8 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31); PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE MATERIAL REPORTED BY FÖRSTER (1963) FROM SERRA DA LUA, NEAR CAIÇARA, RIO BRANCO, APPEARS VERY MUCH LIKE THE PRESENT FORMA, BOTH IN ITS MORPHOLOGICAL ASPECTS AND MEASUREMENTS. HIS ACTINOTAENIUM CURTUM (BRÉB.) TEIL. F. MINIMA FÖRST. & ECKERT COULD

BE CONSIDERED SYNONYMOUS WITH ACTINOTAENIUM CRUCIFERUM (DE BARY) TEIL. F. MINUS TEIL., SINCE THE LATTER HAS PRIORITY ACCORDING TO THE INTERNATIONAL CODE OF BOTANICAL NOMENCLATURE (ART. 11).

ACTINOTAENIUM CRUCIFERUM (DE BARY) TEIL. VAR. NOV.

(PL. XII, FIG. 8)

CELL WALL DISTINCTLY STRIATE, STRIAE SOMETIMES APPEARING AS ROWS OF DASHES RATHER THAN PUNCTAE; ACCORDING TO THE TYPICAL VARIETY IN ALL THE OTHER RESPECTS.

LENGTH OF CELL 22.1u; BREADTH 15.3u; BREADTH OF ISTHMUS 14.5u.

ZYGOSPORE UNKNOWN.

HAB. - PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100).

THE ONLY DIFFERENCE BETWEEN THIS VARIETY AND THE TYPICAL IS THE PRESENCE, IN THE FIRST ONE, OF STRIATION ON THE CELL WALL. THIS CHARACTERISTICS MAKES THE PRESENT FORMA WELL-MARKED WITHIN THE GENUS.

SUGGESTED NAME FOR THE NEW VARIETY: ACTINOTAENIUM CRUCIFERUM (DE BARY) TEIL. VAR. STRIATUM.

ACTINOTAENIUM CUCURBITA (BRÉB.) TEIL.

BOT. NOTISER [LUND]. 1954 (4): 406, FIG. 66. 1954.

(PL. XII, FIGS. 5-6)

CELLS ALMOST CYLINDRICAL, WITH A SLIGHT MEDIAN CONSTRICTION; LATERAL MARGINS SUBPARALLEL AND VERY SLIGHTLY CONVEX; APEX ROUNDED TO ROUNDED-TRUNCATE; CELL WALL PUNCTATE; CHLOROPLASTS AXILE, WITH SEVERAL IRREGULAR RIDGES AND A SINGLE CENTRAL PYRENOID.

LENGTH OF CELL 30.6-35.7 μ ; BREADTH 17.0-23.8 μ ; BREADTH OF ISTHMUS 16.1-22.1 μ .

ZYGOSPORE GLOBOSE AND WITH CONICAL VERRUCAE.

HAB. - INTERMINGLED WITH A FLOATING MASS OF SPIROGYRA SP. AND ZYGNEMA SP. IN A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 48); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52, 53); IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 28879).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: BAHIA (FÖRSTER 1964); GOIÁS: PORTA AZUL (FÖRSTER 1964); MATO GROSSO: PORTO DO CAMPO (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO

BRANCO: SERRA DA LUA (FÖRSTER 1964); RIO DE JANEIRO: SERRA DOS
ÓRGÃOS (KRIEGER 1950).

ACTINOTAENIUM CUCURBITA (BRÉB.) TEIL. VAR. ATTENUATUM

(G. S. WEST) TEIL.

BOT. NOTISER [LUND] 1954 (4): 407, FIGS. 67-69. 1954.

(PL. XII, FIG. 7)

SEMICELLS DISTINCTLY ATTENUATED TOWARD THE APICES; APICES
ROUNDED-TRUNCATE.

LENGTH OF CELL 28.9-30.6u; BREADTH 17.0-20.4u; BREADTH
OF ISTHMUS 16.1-18.7u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A
CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-
BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 53).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: RIO BRANCO: SERRA
DA LUA (FÖRSTER 1964).

ALTHOUGH ATTENUATION OF SEMICELLS IN THE BRAZILIAN MATERIAL IS VERY MARKED, IT IS NOT ALWAYS EASY TO SEPARATE THIS VARIETY FROM THE TYPE BECAUSE MANY INTERMEDIATE STATES MAY EXIST.

ACTINOTAENIUM CUCURBITINUM (BISS.) TEIL. VAR. SUBRETUSUM

(MESS.) TEIL.

BOT. NOTISER [LUND]. 1954 (4): 400, FIG. 38. 1954.

(PL. XIII, FIG. 6)

CELLS ABOUT 2 - 2 1/2 TIMES LONGER THAN BROAD, WITH A DISTINCT MEDIAN CONSTRICTION, SIDES STRAIGHT AND VERY GRADUALLY ATTENUATED TOWARD THE APICES, WHICH ARE BROADLY TRUNCATE; CELL WALL COLORLESS, SMOOTH; CHLOROPLASTS IRREGULARLY LAMELLATE AND WITH 1 OR 2 PYRENOIDS.

LENGTH OF CELL 32.3-34.0u; BREADTH 11.0-11.9u; BREADTH OF ISTHMUS 10.0-10.2u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45, 46).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE MEASUREMENTS GIVEN IN TEILING (1954) FOR THIS VARIETY ARE DEFINITELY WRONG CONSIDERING THE CELL PROPORTIONS OF HIS DRAWINGS.

ACTINOTAENIUM DIPLOSPORUM (LUND.) TEIL. F. MINUS CUSH. EX TEIL.

BOT. NOTISER [LUND]. 1954 (4): 412. 1954.

(PL. XIII, FIG. 4)

CELLS CYLINDRICAL, CONSPICUOUSLY CONSTRICTED AT THE MID-REGION; SEMICELLS ATTENUATED TO BROADLY ROUNDED APICES, THE LATERAL MARGINS SOMEWHAT CONVEX AND CONVERGING FROM THE MIDREGION WHERE THERE IS A BROAD SHALLOW INCISION OR INVAGINATION; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS STELLATE AND WITH A SINGLE PYRENOID EACH.

LENGTH OF CELL 25.5u; BREADTH 13.6u; BREADTH OF ISTHMUS 11.9u.

ZYGOSPORE DOUBLE, CONSISTING OF TWO CUBICAL BODIES WITH ROUNDED PROMINENT ANGLES. SKUJA (1949) DESCRIBES ZYGOSPORES OF THE NORMAL TYPE AND AZYGOSPORES FOR THIS FORMA.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

ACTINOTAENIUM ELONGATUM (RAC.) TEIL. VAR. LANCEOLATUM (TURN.)

TEIL.

BOT. NOTISER [LUND]. 1954 (4): 393, FIG. 8. 1954.

(PL. XIII, FIG. 7)

CELLS ABOUT 4 TIMES LONGER THAN BROAD, SUBCYLINDRICAL, SLIGHTLY CONSTRICTED IN THE MIDDLE, GRADUALLY ATTENUATED TOWARD THE APICES, WHICH ARE ROUNDED AND SLIGHTLY NARROWED; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS LAMELLATE, WITH 1-4 PYRENOIDS IN A CENTRAL ROW.

LENGTH OF CELL 78.2u; BREADTH 22.1u; BREADTH OF ISTHMUS 20.4u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY RESEMBLES VERY MUCH PLEUROTAENIUM MINUTUM (RALFS) DELP. VAR. CRASSUM (W. WEST) KR., FROM WHICH IT DIFFERS BY THE MORE ROUNDED AND SOMEWHAT NARROWED APICES OF ITS CELLS.

ACTINOTAENIUM INCONSPICUUM (W. WEST) TEIL.

BOT. NOTISER [LUND]. 1954 (4): 403, FIGS. 57-58. 1954.

(PL. XIII, FIG. 5)

CELLS ABOUT 3 TIMES LONGER THAN BROAD, VERY SLIGHTLY CONSTRICTED IN THE MIDDLE, GRADUALLY NARROWED TOWARD THE SUB-TRUNCATE APICES; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS LAMELLATE, WITH A SINGLE PYRENOID.

LENGTH OF CELL 20.4 μ ; BREADTH 6.8 μ ; BREADTH OF ISTHMUS NOT TAKEN.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

ACTINOTAENIUM WOLLEI (GRÖNBL.) TEIL.

BOT. NOTISER [LUND]. 1954 (4): 397, FIG. 40. 1954.

(PL. XIII, FIG. 3)

CELLS ALMOST GLOBOID, WITH A FAINT SINUS; CELL WALL PUNCTATE; CHLOROPLASTS AXILE, STELLATE, WITH 6-9 LAMELLATE (SOMETIMES RATHER IRREGULAR).

LENGTH OF CELL 40.8-45.9 μ ; BREADTH 28.9-35.7 μ ; BREADTH OF ISTHMUS 27.2-32.3 μ .

ZYGOSPORE SMOOTH-WALLED AND IRREGULARLY SPHERICAL.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 57); FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HOR-TO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

COSMARIUM CORDA, 1834.

COSMARIUM AMOENUM BRÉB. VAR. CONSTRUCTUM SCOTT & GRÖNBL.

ACTA SOC. SCI. FENN. [HELSINGFORBIAE]. NOV. SER. B, 11 (8): 15,
T. 5, FIG. 18. 1957.
(PL. XV, FIG. 16)

CELLS ABOUT $1\frac{1}{3}$ TIMES LONGER THAN BROAD, SOMEWHAT DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR; SEMICELLS APPROXIMATELY SEMICIRCULAR; LATERAL VIEW OF SEMICELLS OVATE-OB-
LONG; APICAL VIEW ELLIPTIC; CELL WALL GRANULATE, BASAL GRANU-
LES SOMETIMES MORE OR LESS REGULARLY DISPOSED IN VERTICAL PAIRS,
CENTRAL PART OF SEMICELLS WITH LESS PRONOUNCED GRANULES; CHLORO-
PLASTS AXILE, WITH 2 PYRENOIDS IN EACH SEMICELL.

LENGTH OF CELL 40.8-44.2 μ ; BREADTH 28.9-34.0 μ ; BREADTH
OF ISTHMUS 13.6-15.0 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 19).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE DISTINGUISHING FEATURES OF THIS VARIETY ARE POSSESSION OF A DEEP LINEAR SINUS, MORE CONVEX SIDES OF SEMICELLS, AND DIFFERENT CELL PROPORTIONS.

COSMARIUM ANISOCHONDRUM NORDST. VAR. TETRACHODRUM SCOTT & GRÖNBL.
ACTA SOC. SCI. FENN. [HELSINGFORSIAE]. NOV. SER. B, 11 (8): 15,
T. 8, FIG. 3. 1957.
(PL. XVI, FIG. 10)

CELLS ALMOST AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR WITH A SLIGHTLY DILATED APEX; SEMICELLS SUBSEMICIRCULAR, BASE FLAT, LATERAL MARGINS BROADLY CONVEX, APEX WIDELY TRUNCATE AND VERY SLIGHTLY CONVEX; LATERAL VIEW OF SEMICELL OBOVATE-CIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL MINUTELY GRANULATE WITH 4 MAJOR WARTS IN THE CENTER, 2 SUBAPICAL ONES OF LARGER SIZE, AND 2 SMALLER ONES BELLOW AT A WIDER DISTANCE FROM EACH OTHER, AND A SIMPLE ROW OF SMALL GRANULES AT THE BASE OF THE SEMICELLS; CHLOROPLASTS AXILE, WITH A SINGLE PYRENOID EACH.

LENGTH OF CELL 22.1 μ ; BREADTH 20.4 μ ; BREADTH OF 18TH-

MUS 6.8u.

ZYGOSPORE UNKNOWN.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY DIFFERS FROM THE TYPICAL IN HAVING 4 WARTS IN THE CENTER OF ITS SEMICELLS.

SCOTT & GRÖNBLAD (1957), DISCUSSING THEIR VARIETY, QUESTION THE RELATION OF IT TO COSMARIUM ANISOCHONDRUM NORDST.. HOWEVER, AS IT HAS BEEN STATED ELSEWHERE, THERE ARE NO OTHER SPECIES MORE CLOSELY RELATED TO THIS VARIETY.

COSMARIUM ARCTOUM NORDST.

ÖFVERS. K. VETENSKAKAD. FÖRH. [STOCKHOLM]. 1875 (6): 28, T. 7,

FIG. 22. 1875.

(PL. XV, FIGS. 3-5)

CELLS ABOUT $1 \frac{1}{4}$ - $1 \frac{1}{2}$ TIMES LONGER THAN BROAD, VERY SLIGHTLY CONSTRICTED IN THE MIDDLE, SINUS A SHALLOW OBTUSE-ANGLED DEPRESSION; SEMICELLS SUBCUNEATE, SIDES RETUSE AND SLIGHTLY DIVERGENT TOWARD THE APEX OF THE CELL, WHICH IS TRUNCATE ,

STRAIGHT OR VERY SLIGHTLY CONVEX; LATERAL VIEW OF SEMICELLS SEMI-ELLIPTIC, SLIGHTLY NARROWED TOWARD THE BASE; APICAL VIEW BROADLY ELLIPTIC; CELL WALL SMOOTH, OFTEN YELLOWISH OR RARELY COLORLESS; CHLOROPLASTS AXILE, WITH 1 CENTRAL PYRENOID.

LENGTH OF CELL 20.4u; BREADTH 13.8u; BREADTH OF ISTHMUS 12.9u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS SPECIES CAN BE CONFUSED WITH COSMARIUM PSEUDOARCTOUM NORDST., FROM WHICH DIFFERS IN ITS SOMEWHAT MORE TRUNCATE APICES, THE UPWARD NARROWING OF THE SEMICELLS IN LATERAL VIEW, AND IN THE MORE BROADLY ELLIPTIC APICAL VIEW.

THE BRAZILIAN MATERIAL CAN BE ADMITTED, HOWEVER, AS AN INTERMEDIATE FORM BETWEEN COSMARIUM ARCTOUM NORDST. AND COSMARIUM PSEUDOARCTOUM NORDST., SINCE IT HAS CHARACTERISTICS OF BOTH SPECIES. I PREFER TO CONSIDER THE PRESENT MATERIAL COSMARIUM ARCTOUM NORDST. BECAUSE OF THE SHAPE OF THE CELLS, IN DIFFERENT VIEWS, AGREES BETTER WITH NORDSTEDT'S (1875) ORIGINAL DESCRIPTION AND FIGURES FOR THE SPECIES.

COSMARIUM BIOCULATUM BRÉB. VAR. CANADENSE KR. & GERL.

GATT. COSMARIUM [BERLIN-DAHLEN]. 1: 60, T. 15, FIG. 5. 1962.

(PL. XIV, FIG. 10)

CELLS ABOUT AS LONG AS BROAD OR VERY SLIGHTLY LONGER, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR AND WITH A SLIGHTLY DILATED APEX; SEMICELLS NOT PERFECTLY ELLIPTIC, UPPER MARGIN MORE CONVEX THAN THE VENTRAL, LATERAL MARGINS ROUNDED; LATERAL VIEW OF SEMICELL SUBCIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS AXILE, WITH A SINGLE PYRENOID.

LENGTH OF CELL 27.2u; BREADTH 22.1u; BREADTH OF ISTHMUS 6.0u.

ZYGOSPORE UNKNOWN.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY IS DISTINGUISHED FROM THE TYPICAL COSMARIUM BIOCULATUM BRÉB. BY THE SUBELLIPTIC FORM OF ITS SEMICELLS AND SINUS NARROWLY LINEAR.

COSMARIUM BLYTII WILLE

CHRISTIANIA VIDENSK. SELSK. FÖRH. [FÖRHANDLINGAR]. 25, T. 1,

FIG. 7. 1880.

(PL. XVI, FIG. 14)

CELLS SLIGHTLY LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR; SEMICELLS SOMEWHAT TRAPEZIFORM-SEMICIRCULAR, BASAL ANGLES SUBRECTANGULAR, SIDES COMMONLY 4-CRENATE (INCLUDING THE BASAL AND APICAL ANGLES), APEX TRUNCATE AND 4-7-CRENATE (INCLUDING THE 2 UPPER LATERAL CRENACTIONS); LATERAL VIEW OF THE SEMICELL SUBCIRCULAR, WITH A WELL-MARKED GRANULE AT THE MIDDLE OF EACH SIDE; APICAL VIEW ELLIPTIC OR SUBELLIPTIC, WITH A PROMINENT GRANULE AT THE MIDDLE OF EACH SIDE; CELL WALL COLORLESS AND WITH ONE OR TWO SERIES OF SMALL GRANULES WITHIN THE MARGINAL CRENACTIONS, AND WITH A SUBPAPILLATE GRANULE IN THE CENTER; CHLOROPLASTS AXILE, WITH ONE CENTRAL PYRENOID.

LENGTH OF CELL 15.3u; BREADTH 13.6u; BREADTH OF ISTHMUS 4.0u.

ZYGOSPORE UNKNOWN.

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAMPINAS (BORGE 1918); PARÁ: SANTARÉM (GRÖNBLAD 1945).

THIS SPECIES CAN BE CONFUSED WITH COSMARIUM HUMILE (GAY) NORDST., FROM WHICH DIFFERS BY ITS TRAPEZIFORM-SEMICIRCULAR SE-

MICELLS IN FRONT VIEW, AND BY THE MARGINAL CRENATIONS MORE ROUNDED.

COSMARIUM SP. NOV.

(PL. XV, FIG. 10)

CELLS ABOUT $1 \frac{1}{2}$ TIMES AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR TOWARD THE APEX, OPENING OUTWARD; SEMICELLS SOMEWHAT 3-LOBED, LOBES SHORT, BASAL LOBES SOMEWHAT 2-LOBED, WITH ROUNDED ANGLES, APICAL LOBE WIDEST, BROADLY CONVEX; LATERAL VIEW OF SEMICELL SEMIELLIPTIC; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS, SMOOTH; CHLOROPLASTS AXILE AND EACH WITH A SINGLE PYRENOID.

LENGTH OF CELL 28.9μ ; BREADTH 18.7μ ; BREADTH OF ISTHMUS 6.8μ .

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 28879).

THIS SPECIES IS WELL-CHARACTERIZED BY ITS BROADLY CONVEX APICAL LOBES AND ITS SOMEWHAT 2-LOBED BASAL LOBES.

SUGGESTED NAME FOR THE NEW SPECIES: COSMARIUM BRANCOI.
THE PLANT WILL BE NAMED IN HONOR TO MR. SAMUEL MURGEL BRANCO ,

ASSOCIATE PROFESSOR OF SANITARY HYDROBIOLOGY AT THE 'FACULDADE DE HIGIENE E SAÚDE PÚBLICA DA UNIVERSIDADE DE SÃO PAULO', SÃO PAULO, BRAZIL, WHO HAS BEEN DOING A LOT OF RESEARCH ON THE FRESH-WATER ALGAE WITH EMPHASIS ON SANITATION.

COSMARIUM CIRCULARE REINSCH

ACTA SOC. SENCKENB. [FRANCOFURTI AD MOENUM]. 6: 113, T. 220.1, FIGS. 1-4. 1867.

(PL. XIII, FIG. 8)

CELLS ABOUT AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROW AND LINEAR, SLIGHTLY DILATED AT THE APICES; SEMICELLS SEMICIRCULAR, WITH ROUNDED BASAL ANGLES; LATERAL VIEW OF SEMICELL APPROXIMATELY CIRCULAR; APICAL VIEW A NARROW ELLIPSE; CELL WALL PUNCTATE; CHLOROPLASTS AXILE, EACH WITH 2 PYRENIDS.

LENGTH OF CELL 52.7-61.2 μ ; BREADTH 44.2-51.0 μ ; BREADTH OF ISTHMUS 15.3-17.0 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 30, 31); ON DRIPPING STONES OF A SMALL WATER FALL AT THE 'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B. 79).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MATO GROSSO: CORUMBÁ (BORGE 1903).

COSMARIUM CIRCULARE REINSCH SHOULD BE COMPARED WITH COSMARIUM RALFSII BRÉB., FROM WHICH IS DISTINGUISHED IN THE SEMICIRCULAR OUTLINE OF ITS SEMICELLS IN FRONT VIEW, AND IN ITS AXILE CHLOROPLASTS.

THIS SPECIES AND COSMARIUM LUNDELLII DELP. ARE ALSO CLOSELY RELATED. THE SEMICIRCULAR SEMICELLS AND THE ABSENCE OF A THICKENING OF THE CELL IN THE CENTER OF THE SEMICELLS OF COSMARIUM CIRCULARE REINSCH SEPARATE IT FROM COSMARIUM LUNDELLII DELP.

COSMARIUM CONSPERSUM RALFS VAR. CAPENSE HODG.
TRANS. ROY. SOC. S. AFR. [CAPE TOWN]. 13: , FIG. 12 A. 1926.
(PL. XV, FIG. 17)

CELLS ABOUT $1 \frac{1}{3}$ TIMES AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR AND WITH SLIGHTLY DILATED APEX; SEMICELLS SOMEWHAT SEMICIRCULAR, BASAL ANGLES ROUNDED, SIDES ALMOST STRAIGHT FOR A SHORT DISTANCE ABOVE THE BASAL ANGLE, APEX BROADLY CONVEX; LATERAL VIEW OF SEMICELL ALMOST CIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL UNIFORMLY GRANULATE; CHLOROPLASTS AXILE, WITH 2 PYRENOIDS IN EACH.

LENGTH OF CELL 68.0-71.4 μ ; BREADTH 49.3-51.0 μ ; BREADTH

OF ISTHMUS 17.0u.

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 23, 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: GOIÁS: FORMOSO (PRESCOTT 1957).

PRESCOTT (1957) STATES THAT "THIS IS AN ANOMALOUS FORM WHICH APPROACHES SEVERAL SPECIES IN SHAPE OF SEMICELL AND IN ITS PATTERN OF GRANULATION, BUT DOES NOT CONFORM PRECISELY TO ANY. IT SHOULD BE COMPARED WITH SUCH SPECIES AS COSMARIUM SUBBROOMEI SCHM. AND COSMARIUM MARGARITATUM LUND.." I FULLY ACCPET THIS POINT OF VIEW, ALTHOUGH THE PRESENT MATERIAL DOES NOT AGREE PERFECTLY WITH PRESCOTT'S SPECIMEN GATHERED FROM THE NEIGHBOURHOOD OF FORMOSO, GOIÁS.

COSMARIUM CONTRACTUM KIRCHN.

ALG. SCHLES. [BRESLAU]. 2 (1): 147. 1878.

(PL. XV, FIG. 7)

CELLS ABOUT $1 \frac{1}{3}$ - $1 \frac{1}{2}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWED TOWARD THE APEX AND RAPIDLY WIDENING OUTWARD; SEMICELLS SUBELLIPTIC TO BROADLY EL-

ELLIPTIC; LATERAL VIEW OF SEMICELL CIRCULAR; APICAL VIEW ELLIPTIC; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS AND FINELY PUNCTATE; CHLOROPLASTS AXILE, WITH 1 CENTRAL PYRENOID.

LENGTH OF CELL 30.6-32.3 μ ; BREADTH 20.4-22.1 μ ; BREADTH OF ISTHMUS 8.0 μ .

ZYGOSPORE VERY OFTEN OBSERVED, GLOBOSE, ELLIPSOID OR FREQUENTLY ANGULAR, SMOOTH.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945).

IN THE OUTWARD APPEARANCE THE BRAZILIAN MATERIAL BEARS CONSIDERABLE RESEMBLANCE TO COSMARIUM CONTRACTUM KIRCHN. VAR. ELLIPSOIDEUM (ELFV.) WEST & WEST. THE CELL PROPORTIONS WERE THE ONLY CHARACTERISTICS THAT ALLOWED ME TO RELATE THE PRESENT PLANT TO THE TYPICAL FORM OF THE SPECIES.

COSMARIUM CONTRACTUM KIRCHN. VAR. ROTUNDATUM BORGE
ARK. BOT. [UPPSALA, STOCKHOLM] 19 (17): 32, T. 2, FIG. 27.

1925.

(PL. XV, FIG. 8)

SEMICELLS IN FRONT VIEW CIRCULAR OR ALMOST SO; LATERAL VIEW BROADLY ELLIPTIC.

LENGTH OF CELL 28.9_u; BREADTH 18.7_u; BREADTH OF ISTHMUS 5.1_u.

ZYGOSPORE ALMOST SPHERICAL, WITH A SOMEWHAT THICKENED CELL WALL.

HAB. - INTERMINGLED WITH A FLOATING MASS OF SPIROGYRA SP. AND ZYGNEMA SP. IN A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 49).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MATO GROSSO: PORTO DO CAMPO (BORGE 1925).

THIS VARIETY DIFFERS FROM THE TYPICAL BY THE OUTLINE OF ITS SEMICELLS IN FRONT VIEW AND BY ITS ZYGOSPORES ALMOST SPHERICAL, WITH A SOMEWHAT THICKENED CELL WALL.

COSMARIUM DICHONDRUM WEST & WEST

TRANS. LINN. SOC. LOND. (BOT.) [LONDON]. SER. 2, 5 (2): 65 ,

PL. 7, FIG. 12. 1895.

(PL. XVI, FIG. 11)

CELLS ALMOST AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE

MIDDLE, SINUS LINEAR WITH A SLIGHTLY DILATED APEX; SEMICELLS ELLIPTIC, APICAL MARGIN SLIGHTLY CONVEX; LATERAL VIEW OF SEMICELLS SUBCIRCULAR, WITH A WELL-MARKED GRANULE NEAR THE APICAL MARGIN IN EACH SIDE; APICAL VIEW ELLIPTIC, WITH 2 PROMINENT GRANULES AT THE MIDDLE OF EACH SIDE; CELL WALL COLORLESS, IRREGULARLY GRANULATE, 2 MAJOR GRANULES IN THE MEDIAN REGION OF THE SEMICELL NEAR THE APICAL MARGIN, CENTER OF SEMICELL MAY LACK GRANULATION; CHLOROPLASTS AXILE, WITH 1 CENTRAL PYRENOID.

LENGTH OF CELL 17.0u; BREADTH 15.3u; BREADTH OF ISTHMUS 5.9u.

ZYGOSPORE UNKNOWN.

HAB. - PLACE NOT SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945).

IT WAS POSSIBLE TO EXAMINE ONLY ONE SPECIMEN OF THIS MATERIAL, WHICH AGREES PERFECTLY IN SIZE, SHAPE, AND PATTERN OF GRANULATION WITH KRIEGER'S (1932) MATERIAL FROM SUMATRA AND BALI. THIS PLANT, HOWEVER, IS SOMEWHAT SMALLER THAN THE ORIGINAL ONE DESCRIBED BY WEST & WEST (1895) FROM MADAGASCAR.

BORGE (1903) DESCRIBED A VAR. SUBPUNCTULATUM FOR THIS SPECIES, WHICH DIFFERS FROM THE TYPICAL IN HAVING SOMEWHAT TRA-

PEZIFORM SEMICELLS AND CELL WALL GRANULATE, GRANULES CONCENTRIC ARRANGED. THE FIGURE HE GIVES TO ILLUSTRATE HIS NEW VARIETY SHOWS A GREAT SIMILARITY TO THAT GIVEN TO THE TYPICAL FORM. FURTHERMORE, THERE ARE ALMOST NO DIFFERENCES IN MEASUREMENTS AND PATTERN OF GRANULATION BETWEEN BOTH MATERIALS.

AS FAR AS I CAN JUDGE, BORGE'S SPECIMENS SHOULD BE REGARDED AS THE TYPICAL VARIETY, SINCE THERE IS NO OUTSTANDING DIFFERENCES BETWEEN THESE PLANTS.

FÖRSTER (1963) DESCRIBED COSMARIUM SPHALEROSTICHUM NORDST. F. BITUBERCULATUM FÖRST. FROM SERRA DA LUA, NEAR CAIÇARA, RIO BRANCO, BRAZIL, WHICH WITHOUT ANY DOUBT IS IDENTICAL TO COSMARIUM DICHONDRUM WEST & WEST, AND SHOULD BE CONSIDERED MERELY AS A SYNONYMOUS OF THE PRESENT SPECIES.

COSMARIUM FURCATOSPERMUM WEST & WEST

J. R. MICROSC. SOC. [LONDON]. 7, PL. 1, FIG. 13. 1894.

(PL. XVI, FIG. 9)

CELLS A LITTLE LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR OR RARELY OPEN; SEMICELLS SUBSEMICIRCULAR, BASAL ANGLES ROUNDED, APEX SOMEWHAT TRUNCATE; LATERAL VIEW OF SEMICELLS SUBCIRCULAR; APICAL VIEW OBLONG-ELLIPTIC, SIDES SMOOTH AND POLES GRANULATE; CELL WALL COLORLESS AND IRREGULARLY GRANULATE, WITH 2 SERIES OF SMALL GRANULES WITHIN THE WHOLE MAR-

GIN, AND WITH THE CENTRAL REGION OF THE SEMICELLS SMOOTH OR MOST MINUTELY PUNCTATE; CHLOROPLASTS AXILE, WITH A SINGLE CENTRAL PYRENOID.

LENGTH OF CELL 22.1-25.5u; BREADTH 18.7-23.8u; BREADTH OF ISTHMUS 6.8-8.5u.

ZYGOSPORE ANGULAR-GLOBOSE, ORNAMENTED WITH SHORT SLENDER SPINES, 7 OF WHICH ARE VISIBLE AROUND THE PERIPHERY; SPINES VERY DEEPLY 2- OR 3-FURCATE AT THE EXTREMITY.

HAB. - PLANKTONIC IN A LAKE AT THE 'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B. 81); PLANKTONIC IN THE TIETÊ RIVER, SÃO PAULO (SP 7454).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS PLANT BY ITS SMOOTH CENTRAL AREA OF THE SEMICELLS IN FRONT VIEW AND THE SPINY ZYGOSPORE, CAN BE DISTINGUISHED FROM COSMARIUM SPHALEROSTICHUM NORDST., ITS CLOSEST ALLIED.

COSMARIUM GALERITUM NORDST.

VIDENSK. MEDDR. DANSK NATURH. FØREN. KBH. [KJØBENHAVN]. 1869:

(14-15): 209, T. 3, FIG. 26. 1870.

(PL. XIV, FIG. 3)

CELLS UP TO $1\frac{1}{5}$ TIMES LONGER THAN BROAD, DEEPLY CON-

STRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR AND WITH A SLIGHTLY DILATED APEX; SEMICELLS TRUNCATE-PYRAMIDATE, BASAL ANGLES ROUNDED, SIDES ALMOST STRAIGHT, APICAL MARGIN TRUNCATE OR SLIGHTLY CONVEX; LATERAL VIEW OF SEMICELL SUBCIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS AND FINALLY PUNCTATE; CHLOROPLASTS AXILE, EACH WITH 2 PYRENOIDS.

LENGTH OF CELL 47.6u; BREADTH 44.2u; BREADTH OF ISTHMUS 13.6u.

ZYGOSPORE SPHERICAL AND SPINY, THE SPINES WITH A SOMEWHAT SWOLLEN CONE-SHAPED BASE.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892); RIO DE JANEIRO (NORDSTEDT 1877).

THIS SPECIES CAN BE CONFUSED WITH COSMARIUM LUNDELLII DELP. VAR. ELLIPTICUM G. S. WEST, FROM WHICH IT DIFFERS IN HAVING SOMEWHAT SMALLER CELLS AND MORE PYRAMIDATE SEMICELLS IN FRONT VIEW.

COSMARIUM GLOBOSUM BULNH.

HEDWIGIA [DRESDEN]. 2 (9): 52, T. 9, FIG. 8. 1861.

(PL. XV, FIG. 9)

CELLS ABOUT $1 \frac{1}{3}$ - $1 \frac{3}{4}$ TIMES LONGER THAN BROAD, SLIGHTLY CONSTRICTED IN THE MIDDLE, SINUS A VERY OBTUSE-ANGLED DEPRESSION; SEMICELLS SUBCIRCULAR BOTH IN FRONT AND LATERAL VIEWS; APICAL VIEW MOSTLY CIRCULAR, SELDOM VERY SLIGHTLY COMPRESSED; CELL WALL COLORLESS, PUNCTATE, PUNCTATIONS SOMETIMES VERY OBSCURE, BUT FREQUENTLY VERY DISTINCT; CHLOROPLASTS AXILE, WITH A NUMBER OF VERTICALLY-DISPOSED LOBES AND A SINGLE CENTRAL PYRENOID.

LENGTH OF CELL 29.6-35.7 μ ; BREADTH 22.1-27.2 μ ; BREADTH OF ISTHMUS 19.0-23.8 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 57); IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 28879).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA (BORGE 1918); PARÁ: MONTE ALEGRE (DICKIE 1881), SANTARÉM (GRÖNBLAD 1945); RIO DE JANEIRO: ITATIAIA (KRIEGER 1950).

COSMARIUM GLOBOSUM BULNH. IS DISTINGUISHED FROM COSMARIUM MONILIFORME (TURP.) RALFS BY ITS RELATIVELY BROADER CELL AND MUCH BROADER ISTHMUS.

ACCORDING TO TEILING (1954) THIS SPECIES SHOULD BE MORE CAREFULLY STUDIED BECAUSE THERE ARE SOME PLANTS IN WHICH THE CHLOROPLASTS WERE DESCRIBED AS STELLATE OR LOBO-STELLATE. IN SUCH INSTANCES, THESE PLANTS SHOULD BE TAKEN INTO CONSIDERATION AS BELONGING TO ACTINOTAENIUM. UNFORTUNATELY, I ONLY HAD OPPORTUNITY TO EXAMINE PRESERVED MATERIAL IN WHICH THE EXACT SHAPE AND DISPOSITION OF THE CHLOROPLASTS WERE OBSCURE.

COSMARIUM LAEVE RABENH.

FL. EUR. ALG. [LIPSIAE] 3: 161. 1868.

(PL. XIV, FIG. 11)

CELLS ABOUT $1 \frac{1}{5}$ - $1 \frac{3}{5}$ TIMES LONGER THAN BROAD, VERY DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR AND WITH A DILATED APEX; SEMICELLS SEMI-ELLIPTIC, BASAL ANGLES ROUNDED, APEX NARROWLY TRUNCATE AND RETUSE; LATERAL VIEW OF SEMICELL OVATE-ELLIPTIC; APICAL VIEW ELLIPTIC; CELL WALL DELICATELY AND SOMEWHAT SPARSELY PUNCTATE; CHLOROPLASTS AXILE, EACH WITH A SINGLE PYRENOID.

LENGTH OF CELL 19.5-28.0u; BREADTH 15.3-17.0u; BREADTH OF ISTHMUS 3.4-5.1u.

ZYGOSPORE ANGULAR-GLOBOSE, SMOOTH, ANGLES DELICATELY THICKENED.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 19, 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: ITAPURA (LEMMERMANN 1915), PIRASSUNUNGA, SÃO PAULO (BORGE 1918); BAHIA (FÖRSTER 1964); MATO GROSSO: PORTO DO CAMPO (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO BRANCO: SERRA DA LUA (FÖRSTER 1963).

COSMARIUM LOGIENSE BISS. F. NOV.

(PL. XVI, FIG. 3)

SYNONYMY:

COSMARIUM LOGIENSE ROY & BISS.: GRÖNBLAD, IN ACTA SOC.

SCI. FENN. [HELSINGFORSIAE]. SER. NOV. B, 11 (6): 19, T. 6, FIG. 125. 1945.

COSMARIUM LOGIENSE BISS. F. PRESCOTT, IN CONTR. SCI.

[LOS ANGELES]. 11: 13, PL. 2, FIGS. 34-36. 1957.

CELLS ABOUT $1 \frac{2}{5}$ - $1 \frac{3}{5}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR AND WITH A SLIGHTLY

DILATED APEX; SEMICELLS SUBSEMICIRCULAR, BASAL ANGLES ROUNDED, APICAL MARGIN BROADLY CONVEX; LATERAL VIEW OF SEMICELLS SUBELLIPTIC; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS, UNIFORMLY GRANULATE, GRANULES ARRANGED IN OBLIQUELY DECUSSATING AND VERTICAL SERIES; CHLOROPLASTS AXILE, EACH WITH 2 PYRENOIDS.

LENGTH OF CELL 42.5-46.0u; BREADTH 27.2-33.5u; BREADTH OF ISTHMUS 10.2-11.5u.

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 30).

THIS NEW FORMA WAS DISCOVERED BY GRÖNBLAD (1945) FROM SAMPLES GATHERED AT THE 'FAZENDA ITAPERINHA', PARÁ, BUT RECORDED BY THE SAME AUTHOR AS THE TYPICAL COSMARIUM LOGIENSE ROY & BISS., IN DISPUTE OF ITS CONSISTENTLY SMALLER SIZE. PRESCOTT (1957) REPORTED IDENTICAL MATERIAL FROM SAMPLES GATHERED BY DR. E. YALE DAWSON IN THE PROXIMITY OF FORMOSO, GOIÁS. PRESCOTT POINTED OUT THE POSSIBILITY OF HIS MATERIAL BEING A NEW FORMA OF COSMARIUM LOGIENSE BISS. AS HE REFERRED IT AS COSMARIUM LOGIENSE BISS. FA.. HOWEVER, HE DID NOT WRITE A LATIN DIAGNOSIS FOR THE PROBABLY NEW FORMA AND DID NOT NAME IT.

GRÖNBLAD'S AND PRESCOTT'S PLANTS ARE ABSOLUTELY IDENTICAL, BOTH IN SIZE AND SHAPE, AND THEY AGREE PERFECTLY WITH THE PRESENT MATERIAL FROM CAETÉ, MINAS GERAIS.

THE NEW FORMA IS SIMILAR TO THE TYPICAL ONE IN ALL RESPECTS, EXCEPT FOR ITS CONSIDERABLY SMALLER DIMENSIONS.

SUGGESTED NAME FOR THE NEW FORMA: COSMARIUM LOGIENSE
BISS. F. MINUS.

COSMARIUM LUNDELLII DELP. VAR. CORRUPTUM (TURN.) WEST & WEST
TRANS. LINN. SOC. LOND. (BOT.) [LONDON]. SER. 2, 6 (3): 172.
1902.

(PL. XIV, FIG. 2)

CELLS ABOUT AS LONG AS BROAD OR A LITTLE LONGER, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR AND WITH A DILATED APEX; SEMICELLS SEMICIRCULAR OR PYRAMIDATE-SEMICIRCULAR, BASAL ANGLES BROADLY ROUNDED, APICAL MARGIN BROADLY CONVEX OR SLIGHTLY SUBTRUNCATE; LATERAL VIEW OF SEMICELL SUBCIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS AND IRREGULARLY SCROBICULATED, SCROBICULATIONS USUALLY LARGER AND MORE DISTINCT NEAR THE MARGIN, CENTER OF SEMICELLS GENERALLY THICKENED; CHLOROPLASTS AXILE, WITH PROMINENT RIDGES AND 2 LARGE PYRENOIDS.

LENGTH OF CELL 61.2u; BREADTH 52.7u; BREADTH OF ISTHMUS 17.0u.

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GE-

RIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 19).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY ONLY DIFFERS FROM THE TYPICAL IN ITS SOMEWHAT SMALLER SIZE, AND IN HAVING THE SCROBICULATIONS LARGER AND MORE DISTINCT NEAR THE MARGINS OF THE SEMICELLS.

COSMARIUM MONILIFORME (TURP.) RALFS

RALFS BRIT. DESM. [LONDON]. 107, T. 17, FIG. 6. 1848.

(PL. XV, FIG. 13)

CELLS ABOUT TWICE AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS WIDELY OPEN; SEMICELLS CIRCULAR OR SUBCIRCULAR; LATERAL VIEW OF SEMICELLS CIRCULAR OR SUBCIRCULAR; APICAL VIEW CIRCULAR; CELL WALL SMOOTH AND COLORLESS; CHLOROPLASTS AXILE, WITH ABOUT 6 RADIATING VERTICAL PLATES AND A SINGLE CENTRAL PYRENOID.

LENGTH OF CELL 17.0-27.2u; BREADTH 10.2-15.3u; BREADTH OF ISTHMUS 6.8-7.7u.

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BE-

TWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 53).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890): PIRASSUNUNGA, SÃO PAULO (BORGE 1918); MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892); MATO GROSSO: CORUMBÁ, CUIABÁ (BORGE 1903), PORTO DO CAMPO (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: QUINTA (BORGE 1903).

COSMARIUM MONILIFERUM (TURP.) RALFS IS DISTINGUISHED FROM COSMARIUM GLOBOSUM BULNH., ITS CLOSE ALLIED, BY ITS RELATIVELY NARROWER CELLS AND MORE NARROWED ISTHMUS.

COSMARIUM NITIDULUM DE NOT.

DESM. ITAL. [GENOVA]. 42, T. 3, FIG. 26. 1867.

(PL. XIV, FIG. 13)

CELLS ABOUT $1\frac{1}{3}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A SLIGHTLY DILATED APEX; SEMICELLS TRUNCATE-PYRAMIDATE, BASAL ANGLES BROADLY ROUNDED, LATERAL MARGINS CONVEX, APICAL MARGIN SLIGHTLY CONVEX, STRAIGHT OR SLIGHTLY RETUSE; LATERAL VIEW OF SEMICELL SUBCIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS AND PUNCTATE, PUNCTAE SOMETIMES SCARCELY VISIBLE; CHLOROPLASTS AXILE, EACH

WITH A SINGLE PYRENOID.

LENGTH OF CELL 34.0u; BREADTH 25.5u; BREADTH OF ISTHMUS 8.5u.

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 30).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESSEN 1890); MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WAR-MING 1892); GUANABARA: LAGOA DO RODRIGO (MÖBIUS 1889); RIO DE JANEIRO: SERRA DOS ÓRGÃOS (KRIEGER 1950); RIO GRANDE DO SUL: PORTO ALEGRE (BORGE 1903).

IT IS OFTEN DIFFICULT TO DISTINGUISH THIS SPECIES FROM COSMARIUM PSEUDONITIDULUM NORDST., SINCE THE ONLY DIFFERENCE IS IN THE NUMBER OF PYRENOIDS.

COSMARIUM NITIDULUM DE NOT. SHOULD ALSO BE COMPARED WITH COSMARIUM SUBTUMIDUM NORDST., FROM WHICH IT IS DIFFERENT BY ITS SOMEWHAT MORE ROUNDED SEMICELLS IN FRONT VIEW, WITH BROADER BASAL ANGLES, MORE CONVEX SIDES, AND LESS ANGULAR APICES.

COSMARIUM NOVAE-SEMLIAE WILLE VAR. SIBIRICUM BOLDT
ÖFVERS. K. VETENSKAKAD. FÖRH. [STOCKHOLM]. 42 (2): 108, T. 5,
FIG. 14. 1885.

(PL. XVI, FIG. 15)

CELLS ABOUT $1 \frac{1}{8}$ TIMES AS LONG AS BROAD, MODERATELY CONSTRICTED IN THE MIDDLE, SINUS RELATIVELY DEEP, ISTHMUS SLIGHTLY ELONGATED; SEMICELLS TRANSVERSELY SOMEWHAT OBLONG, LATERAL MARGINS WITH 2 OR 3 DENTICULATIONS, APICAL MARGIN RETUSE-EMARGINATE; LATERAL VIEW OF SEMICELL OVATE-ELLIPTIC, WITH A PAPILLA AT THE MIDDLE OF EACH SIDE; APICAL VIEW SOMEWHAT NARROWLY ELLIPTIC, WITH ABOUT 5 DENTICULATIONS AROUND THE MARGIN OF EACH POLE, AND A PROMINENT PAPILLA AT THE MIDDLE ON EACH SIDE; CELL WALL IRREGULARLY PAPILLATE, COLORLESS; CHLOROPLASTS AXILE, EACH WITH A CENTRAL PYRENOID.

LENGTH OF CELL 13.6μ ; BREADTH 11.9μ ; BREADTH OF ISTHMUS 5.1μ .

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY IS MAINLY DISTINGUISHED FROM THE TYPICAL COSMARIUM NOVAE-SEMLIAE WILLE BY ITS MUCH MORE DEEP SINUS, ITS NARROWER ISTHMUS, AND ITS DENTICULATIONS NOT SO POINTED, REDUCED IN NUMBER.

IT CAN BE ALSO SOMEWHAT CONFUSED WITH COSMARIUM REGNE-
SII REINSCH, FROM WHICH IT IS DISTINGUISHED BY ITS PROPORTION-
 ATELY GREATER LENGTH OF THE CELL, THE ARRANGEMENT OF THE DENTI-
 CULATIONS, AND BY ITS SMALL PEG-LIKE PAPILLA IN THE CENTER OF
 EACH SEMICELL.

COSMARIUM PHASEOLUS BRÉB. VAR. MINUS (BOLDT) KR. & GERL.
 ÖFVERS. K. VETENSKAKAD. FÖRH. [STOCKHOLM]. 42 (2): 102. 1885.
 (PL. XIV, FIG. 12)

CELLS ABOUT AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE
 MIDDLE, SINUS NARROWLY LINEAR AND WITH A SLIGHTLY DILATED APEX;
 SEMICELLS SUBELLIPTIC, BASAL ANGLES ROUNDED, APICAL MARGIN BROAD-
 LY CONVEX; LATERAL VIEW OF SEMICELLS SUBCIRCULAR, WITH A SLIGHT
 PROTUBERANCE AT THE MIDDLE ON EACH SIDE; APICAL VIEW ELLIPTIC,
 ALSO SHOWING A PROTUBERANCE AT THE MIDDLE ON EACH SIDE; CELL
 WALL COLORLESS, FINELY PUNCTATE; CHLOROPLASTS AXILE, EACH WITH
 A CENTRAL PYRENOID.

LENGTH OF CELL 17.9u; BREADTH 17.0u; BREADTH OF ISTH-
 MUS 4.3u.

ZYGOSPORE SPHERICAL AND ADORNED WITH DELICATE SPINES,
 WITH ABOUT 10 SPINES VISIBLE AROUND THE PERIPHERY, ACCORDING TO
 HOLMFELD (1929).

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THE SMALLER SIZE OF ITS CELLS AND THE SUBELLIPTIC OUT-LINE OF ITS SEMICELLS IN FRONT VIEW, ARE THE ONLY EVIDENT CHARACTERISTICS TO SEPARATE THIS VARIETY FROM THE TYPICAL COSMARIUM PHASEOLUS BRÉB.. ACCORDING TO KRIEGER & GERLOFF (1962) IT IS NOT ALWAYS THAT WE CAN SEE THE PROTUBERANCE AT THE MIDDLE OF THE SEMICELLS.

COSMARIUM PSEUDOCONNATUM NORDST.

VIDENSK. MEDDR. DANSK NATURH. FOREN. KBH. [KJØBENHAVN]. 1869:

(14-15): 214, T. 3, FIG. 17. 1870.

(PL. XV, FIGS. 14-15)

CELLS ALMOST 1 1/2 TIMES LONGER THAN BROAD, VERY SLIGHTLY CONSTRICTED IN THE MIDDLE BY A BROAD AND VERY SHALLOW SINUS ; SEMICELLS SEMI-ELLIPTIC, WITH A SLIGHTLY NARROWED BASE, BOTH IN FRONT AND LATERAL VIEWS; APICAL VIEW CIRCULAR OR SUBCIRCULAR; CELL WALL COLORLESS AND PUNCTATE, THE PUNCTATIONS NEAR THE ISTHMUS BEING SOMETIMES ARRANGED IN TRANSVERSE SERIES; CHLOROPLASTS AXILE OR PARIETAL, 1-4 PER SEMICELL, EACH PART OR CHLOROPLAST

WITH ONE TO SEVERAL PYRENOIDS.

LENGTH OF CELL 43.4-56.1u; BREADTH 30.6-45.9u; BREADTH OF ISTHMUS 28.9-42.5u.

ZYGOSPORE UNKNOWN.

HAB. - ON DAMP SOIL AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 26); IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 30); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52); ON DRIPPING STONES OF A SMALL WATER FALL AT THE 'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B. 80); PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92); PLANKTONIC IN SOME PERMANENT Pools AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 95).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESSEN 1890): PIRASSUNUNGA, SÃO PAULO (BORGE 1918), SANTO AMARO (WITTRICK & NORDSTEDT 1883, BORGE 1918); MINAS GERAIS: CALDAS (WILLE 1884), LAGOA SANTA (NORDSTEDT 1870, WILLE 1884, WARMING 1892); GOIÁS: FORMOSO (PRESCOTT 1957); MATO GROSSO: COLUMBÁ, PORTO DO CAMPO, SÃO LUÍS DE CÁCERES (BORGE 1925), NEAR CUIABÁ, NEIGHBOURHOOD OF THE XINGU RIVER HEADWATERS, FORMOSO CREEK (SCHMIDLE 1901); PARÁ: MONTE ALEGRE (DICKIE 1881), SAN-

TARÉM (GRÖNBLAD 1945).

COSMARIUM PSEUDOCONNATUM NORDST. IS DISTINGUISHED FROM COSMARIUM CONNATUM BRÉB. BY ITS RELATIVELY SMALLER CELLS, WITH A SLIGHTER CONSTRICTION AND MORE ROUNDED SEMICELLS.

ACCORDING TO WEST & WEST (1908) THERE ARE 4 PARIETAL CHLOROPLASTS IN EACH SEMICELL OF COSMARIUM PSEUDOCONNATUM NORDST. EACH WITH 1 PYRENOID. TEILING (1952), HOWEVER, MAKING A MORPHOLOGICAL AND PHYLOGENETICAL STUDY OF THE CHLOROPLASTS IN DESMIDS, REPORTS THESE OF THE PRESENT SPECIES AS BEING OF AXILE TYPE. HE ALSO STATES THAT THE CONNECTING PART MAY BE LACKING AND A PARIETAL KIND OF CHLOROPLASTS MAY OCCUR, EACH PART CONTAINING ONE, OR USUALLY SEVERAL PYRENOIDS.

IN ALL THE SPECIMENS I HAD EXAMINED IT WAS PRESENT THE 4-RADIATE AXILE TYPE OF CHLOROPLAST, EACH PROJECTION WITH A SINGLE PYRENOID.

COSMARIUM PSEUDOEXIGUUM RAC.

PAM. WYDZ. AKAD. UMIEJ. KRAKOW [KRAKOW]. 10: 71, T. 10. FIG. 8
1885.

(PL. XIV, FIG. 9)

CELLS ABOUT TWICE AS LONG AS BROAD OR A LITTLE LONGER,
VERY DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR AND

WITH A SLIGHTLY DILATED APEX; SEMICELLS SUBQUADRATE, BASAL ANGLES ROUNDED, LATERAL MARGINS STRAIGHT FOR MORE THAN TWO THIRDS FROM THE BASE OF THE SEMICELL, OR VERY SLIGHTLY CONVEX, APICAL MARGIN SLIGHTLY TO BROADLY ROUNDED, RARELY STRAIGHT OR VERY FAINTLY RETUSE; LATERAL VIEW OF SEMICELLS SUBELLIPTIC; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS AND SMOOTH; CHLOROPLASTS PARIETAL.

LENGTH OF CELL 28.9u; BREADTH 17.0u; BREADTH OF ISTHMUS 5.1u.

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO DE JANEIRO (KRIEGER 1950).

IT WAS ONLY POSSIBLE TO SEE ONE SPECIMEN OF THIS PLANT FROM THE COLLECTIONS I HAVE AT MY DISPOSAL. UNFORTUNATELY, IT WAS PRESERVED MATERIAL AND I WAS NOT ABLE TO SATISFACTORILY MAKE OUT THE DISPOSITION OF THE CHLOROPLASTS, WHICH ARE SAID TO BE PARIETAL ACCORDING TO RACIBORSKI (1885). HOWEVER, THE RELATIVELY DEEPER MEDIAN CONSTRICTION AND THE NARROWLY LINEAR SINUS OF THE BRAZILIAN MATERIAL ALLOWED ME TO CONSIDER IT AS COSMARIUM PSEUDOEXIGUUM RAC. INSTEAD OF ITS CLOSE ALLIED COSMARIUM EXIGUUM

ARCH..

COSMARIUM PUNCTULATUM BRÉB.

MÉM. SOC. SCI. NAT. CHERBOURG [CHERBOURG]. 4: 129, T. 1,

FIG. 16. 1856.

(PL. XVI, FIGS. 4-7)

CELLS ABOUT $1 \frac{1}{5}$ TIMES LONGER THAN BROAD, DEEPLY CON-
STRICTED IN THE MIDDLE, SINUS LINEAR AND WITH A SLIGHTLY DILATED
APEX; SEMICELLS OBLONG-TRAPEZIFORM, BASAL ANGLES ROUNDED,
LATERAL MARGINS CONVEX, APICAL MARGIN BROADLY TRUNCATE, STRAIGHT
OR SLIGHTLY CONVEX; LATERAL VIEW OF SEMICELL CIRCULAR; APICAL
VIEW ELLIPTIC, SOMETIMES WITH THE SLIGHTEST TRACE OF AN INFLA-
TION AT THE MIDDLE ON EACH SIDE; CELL WALL UNIFORMLY GRANULATE
OR GRANULATION REDUCED IN THE CENTRAL AREA OF EACH SEMICELL;
CHLOROPLASTS AXILE, WITH 1 CENTRAL PYRENOID.

LENGTH OF CELL (22.1-) $31.3-37.4\mu$; BREADTH (20.4-)
 $25.5-30.6\mu$; BREADTH OF ISTHMUS (6.8-) $8.5-13.6\mu$.

ZYGOSPORE GLOBOSE, FURNISHED WITH A NUMBER OF FAIRLY
LONG, STOUT SPINES, FROM WHICH ABOUT 11 ARE VISIBLE AT THE PERI-
PHERY; EACH SPINE ARISING FROM A BROADLY CONICAL BASE AND BI-
FURCATE OR DOUBLY BIFURCATE AT THE APEX.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOAT-

ING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE
 SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45);
 PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO
 PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 96); PLACE NOT
 SPECIFIED AT 'FAZENDA MÃE D'ÁGUA', MINAS GERAIS (C.E.M.B. 100);
 IN A DRAINAGE DITCH NEAR THE CITY OF PIRASSUNUNGA, SÃO PAULO
 (SP 7451); PLANKTONIC IN THE TIETÊ RIVER, SÃO PAULO (SP 7454);
 IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO
 PAULO (SP 28879).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-
 RASSUNUNGA (BORGE 1918); MATO GROSSO: FORMOSO CREEK (SCHMIDLE
 1901); RIO GRANDE DO SUL: CACHOEIRA (BORGE 1903).

COSMARIUM PUNCTULATUM BRÉB. VAR. ROTUNDATUM KLEBS

SCHR. PHYS-ÖKON. GES. KÖNIGSB. [KÖNIGSBERG]. 2 (22): 37, T. 3,

FIGS. 52, 54, 56. 1879.

(PL. XVI, FIG. 8)

SEMICELL SOMEWHAT OBLONG, NOT SO PYRAMIDATE IN FRONT
 VIEW, APICAL MARGIN CONVEX; CELL WALL UNIFORMLY GRANULATE.

LENGTH OF CELL 34.0-35.7 μ ; BREADTH 28.9 μ ; BREADTH OF
 ISTHMUS 8.5-10.2 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

COSMARIUM PYGMAEUM ARCH.

PROC. DUBL. NAT. HIST. SOC. [DUBLIN]. 4 (1): 66, PL. 1. 1864.
(PL. XV, FIG. 11)

CELLS ABOUT AS LONG AS BROAD OR SLIGHTLY SHORTER, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROW AND LINEAR; SEMICELLS SOMEWHAT VARIABLE IN SHAPE, USUALLY TRANSVERSELY OBLONG-RECTANGULAR, MORE RARELY OBLONG-HEXAGONAL, BASAL ANGLES OBTUSE, ROUNDED, LATERAL MARGINS SOMEWHAT STRAIGHT OR SLIGHTLY CONVEX, APICAL MARGIN WIDELY TRUNCATE, STRAIGHT OR CONVEX, RARELY SLIGHTLY RETUSE, WITH A SCARCELY CONSPICUOUS PROTUBERANCE IN THE MIDDLE OF EACH SEMICELL AND, SOMETIMES, A MINUTE PAPILLA WITHIN EACH LATERAL ANGLE; LATERAL VIEW OF SEMICELLS SUBCIRCULAR, WITH OR WITHOUT A PROMINENCE AT THE MIDDLE OF EACH SIDE; APICAL VIEW ELLIPTIC AND WITH A MINUTE PAPILLA (RARELY ABSENT) ON EACH SIDE NEAR THE POLES; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS AXILE, EACH WITH A SMALL CENTRAL PYRENOID.

LENGTH OF CELL 10.2u; BREADTH 10.2u; BREADTH OF 15TH-

MUS 3.0u.

ZYGOSPORE GLOBOSE, SUBGLOBOSE OR OBLONG-GLOBOSE, SMOOTH.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

COSMARIUM PYRAMIDATUM BRÉB. F. NOV.

(PL. XIV, FIG. 7)

CELLS ABOUT $1 \frac{1}{2}$ TIMES AS LONG AS BROAD, DEEPLY CON-
STRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A SLIGHTLY DI-
LATED APEX; SEMICELLS TRUNCATE-PYRAMIDATE, BASAL ANGLES SUBREC-
TANGULAR AND ROUNDED, LATERAL MARGINS CONVEX, APICAL MARGIN
BROADLY CONVEX; LATERAL VIEW OF SEMICELLS ELLIPTIC-OBLONG; A-
PICAL VIEW ELLIPTIC; CELL WALL COLORLESS, MINUTELY PUNCTATE;
CHLOROPLASTS AXILE, EACH WITH 2 PYRENOIDS.

LENGTH OF CELL 34.0-35.7u; BREADTH 23.8u; BREADTH OF
ISTHMUS 5.1-6.8u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A
CLEAN AND FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-

BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 59); IN A DRAIN-
AGE DITCH BEHIND THE MUSEUM BUILDING, AT THE SÃO PAULO BOTANICAL
GARDEN, SÃO PAULO (C.E.M.B. 90).

THIS FORMA IS CLEARLY DISTINCT FROM THE TYPICAL COSMA-
RIUM PYRAMIDATUM LUND. IN ITS CONSIDERABLY SMALLER SIZE.

SUGGESTED NAME FOR THE NEW FORMA: COSMARIUM PYRAMIDA-
TUM BRÉB. F. MINUS.

COSMARIUM QUADRUM LUND.

NOVA ACTA R. SOC. SCIENT. UPSAL. [UPSALIAE]. SER. 3, 8: 25,
T. 2, FIG. 11. 1871.
(PL. XVI, FIG. 2)

CELLS ABOUT AS LONG AS BROAD OR VERY SLIGHTLY LONGER,
DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A
SLIGHTLY DILATED APEX; SEMICELLS SUBRECTANGULAR, BASAL ANGLES
SOMEWHAT ROUNDED OR SUBRECTANGULAR, LATERAL MARGINS STRAIGHT OR
VERY SLIGHTLY CONVEX, SOMEWHAT DIVERGENT TOWARD THE APEX, APICAL
MARGIN STRAIGHT OR SOMETIMES VERY SLIGHTLY RETUSE; LATERAL VIEW
OF SEMICELL SUBCIRCULAR; APICAL VIEW OBLONG-ELLIPTIC, WITH
STRAIGHT PARALLEL SIDES; CELL WALL DENSELY AND UNIFORMLY GRANU-
LATE; CHLOROPLASTS AXILE, WITH 2 PYRENOIDS IN EACH SEMICELL.

LENGTH OF CELL 54.4 μ ; BREADTH 51.0 μ ; BREADTH OF 18TH-

MUS 17.0u.

ZYGOSPORE UNKNOWN.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRONBLAD 1945).

THE NARROWLY RECTANGULAR OUTLINE OF THE SEMICELLS OF COSMARIUM QUADRUM LUND. IN FRONT VIEW, WITH A BROAD FLATTENED APICAL MARGIN, ARE SUFFICIENT CHARACTERISTICS TO DISTINGUISH THIS SPECIES FROM ITS CLOSE ALLIES COSMARIUM MARGARITATUM (LUND.) ROY & BISS. AND COSMARIUM CONSPERSUM RALFS.

COSMARIUM RALFSII BRÉB.

RALFS BRIT. DESM. [LONDON]. 93, T. 15, FIG. 3. 1848.

(PL. XV, FIG. 1)

CELLS ABOUT $1 \frac{1}{5}$ TIMES LONGER THAN BROAD, VERY DEEPLY CONSTRICTED AT THE MIDDLE, SINUS LINEAR WITH THE APEX SLIGHTLY DILATED; SEMICELLS SUBTRAPEZIFORM OR NEARLY SEMI-CIRCULAR, BASAL ANGLES ROUNDED OR SOMEWHAT SUBRECTANGULAR, LATERAL MARGINS SLIGHTLY CONVEX, APICAL MARGIN BROADLY ROUNDED OR TRUNCATELY

ROUNDED; LATERAL VIEW OF SEMICELLS NEARLY CIRCULAR; APICAL VIEW RHOMBOID-ELLIPTIC; CELL WALL COLORLESS, FREQUENTLY FINELY PUNCTATE AND SOMETIMES ALMOST SMOOTH; CHLOROPLASTS USUALLY PARIETAL, CONSISTING OF A NUMBER OF LONGITUDINAL IRREGULAR BANDS, EACH WITH SEVERAL RATHER SMALL PYRENOIDS, OR SOMETIMES AXILE, WITH SEVERAL LONGITUDINAL RIDGES.

LENGTH OF CELL 122.4u; BREADTH 102.0u; BREADTH OF ISTHMUS 25.5u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM AND MARGINS OF A VERY CLEAN AND FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 58).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

COSMARIUM RALFSII BRÉB. VAR. NOV.

(PL. XV, FIG. 2)

SEMICELLS WITH THE BASAL ANGLES CONSPICUOUSLY PRODUCED INTO A SHORT AND SOMEWHAT SPINE-LIKE STRUCTURE, LATERAL MARGINS WITH A WIDE AND SHALLOW DEPRESSION, APICAL MARGIN BROADLY TRUNCATE. IN ALL THE OTHER RESPECTS IT AGREES PERFECTLY WITH THE TYPICAL VARIETY OF THE SPECIES.

LENGTH OF CELL 105.4-115.6u; BREADTH 115.6-127.5u;
BREADTH OF ISTHMUS 34.0u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (C.E.M.B. 97).

THIS VARIETY SHOULD BE COMPARED TO COSMARIUM RALFSII BRÉB. VAR. AZORICUM BOHLIN, FROM WHICH IT CAN BE EASILY DISTINGUISHED BY ITS PROPORTIONATELY BROADER THAN LONGER CELLS, BY THE MORE EVIDENT SPINE-LIKE PROJECTIONS OF THE BASAL ANGLES OF THE SEMICELLS, AND BY THE OUTWARD APPEARANCE OF ITS SEMICELLS.

SUGGESTED NAME FOR THE NEW VARIETY: COSMARIUM RALFSII BRÉB. VAR. SKVORTZOVII. THIS PLANT WILL BE NAMED IN HONOR TO DR. BORIS VASILIEVICH SKVORTZOV, EMINENT RUSSIAN PHYCOLOGIST, WHO IS PRESENTLY WORKING AT THE 'INSTITUTO DE BOTÂNICA DE SÃO PAULO', SÃO PAULO, BRAZIL.

COSMARIUM RECTANGULARE GRUN. VAR. HEXAGONUM (ELFV.) WEST & WEST
MONOGR. BRIT. DESM. [LONDON]. 3: 56, PL. 70, FIG. 4. 1908.
(PL. XIV, FIG. 15)

CELLS ABOUT AS LONG AS BROAD OR SLIGHTLY LONGER THAN
BROADER, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR

WITH A DILATED APEX; SEMICELLS SUBHEXAGONAL-RENIFORM, BASAL ANGLES SUBRECTANGULAR AND ROUNDED, SIDES SOMEWHAT STRAIGHT OR SLIGHTLY CONVEX, APEX TRUNCATE AND STRAIGHT; LATERAL VIEW OF SEMICELLS SUBCIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS AND FINELY PUNCTATE; CHLOROPLASTS AXILE, EACH WITH 1 CENTRAL PYRENOID.

LENGTH OF CELL 17.0u; BREADTH 15.3u; BREADTH OF ISTHMUS 5.1u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF SPIROGYRA SP. AND ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 50).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: GOIÁS: NEAR PEIXE (PRESCOTT 1957).

COSMARIUM RECTANGULARE GRUN. VAR. HEXAGONUM (ELFV.) WEST & WEST DIFFERS FROM THE TYPICAL VARIETY OF THE SPECIES IN HAVING PROPORTIONATELY SHORTER CELLS, ABOUT AS LONG AS BROAD OR VERY SLIGHTLY LONGER.

THE BRAZILIAN MATERIAL IS CONSIDERABLY SMALLER THAN THE LIMITS GIVEN IN WEST & WEST (1908). HOWEVER, SUCH A DIFFERENCE ALMOST DISAPPEARS IF WE CONSIDER THE PLANTS FROM THE REGION OF

TROIS RIVIÈRES, CANADA, REPORTED BY IRÉNÉE-MARIE (1956), WHICH ALSO AGREE WITH OUR MATERIAL IN THE SHAPE OF ITS CELLS.

COSMARIUM REGNESII REINSCH VAR. MONTANUM SCHM.

HEDWIGIA [DRESDEN]. 34: 74, T. 1, FIG. 9. 1895.

(PL. XVI, FIG. 16)

CELLS ABOUT AS LONG AS BROAD, SOMEWHAT MODERATELY CON-
STRICTED IN THE MIDDLE, SINUS OPEN, ROUNDED, WIDELY EXCAVATED;
SEMICELLS TRANSVERSELY OBLONG-RECTANGULAR, WITH 3 MINUTE MARGIN-
AL PROTUBERANCES IN FRONT VIEW, 1 CENTRAL AND A LITTLE SMALLER
ONE WITHIN EACH LATERAL MARGIN, APICAL MARGIN SOMEWHAT STRAIGHT
WITH A SHALLOW MEDIAN INCISION; LATERAL VIEW OF SEMICELL SUB-
CIRCULAR-ELLIPTIC; APICAL VIEW NEARLY ELLIPTIC, WITH A CONSPI-
CUOUS PROTUBERANCE IN THE MIDDLE ON EACH SIDE, AND A SMALLER ONE
ON EACH SIDE JUST BELLOW EACH POLE; CELL WALL SMOOTH AND COLOR-
LESS; CHLOROPLASTS AXILE, EACH WITH A CENTRAL PYRENOID.

LENGTH OF CELL 11.1u; BREADTH 10.2u; BREADTH OF ISTH-
MUS 4.3u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN
HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B.
92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY DIFFERS FROM THE TYPICAL COSMARIUM REGNE-
SII REINSCH IN HAVING THREE PROTUBERANCES ON EACH SIDE, IN A
VERTICAL VIEW.

COSMARIUM RENIFORME (RALFS) ARCH.

J. BOT., LOND. [LONDON]. 12: 92. 1874.

(PL. XVI, FIG. 1)

CELLS SLIGHTLY LONGER THAN BROAD, DEEPLY CONSTRICTED IN
THE MIDDLE, SINUS SOMEWHAT NARROWLY LINEAR WITH A WIDELY DILATED
APEX; SEMICELLS RENIFORM; LATERAL VIEW OF SEMICELLS CIRCULAR;
APICAL VIEW ELLIPTIC; CELL WALL COLORLESS, UNIFORMLY GRANULATE,
GRANULES ROUNDED, DISPOSED IN OBLIQUELY DECUSSATING SERIES;
CHLOROPLASTS AXILE, EACH WITH 2 PYRENOIDS.

LENGTH OF CELL 39.1-57.8u; BREADTH 39.1-51.0u; BREADTH
OF ISTHMUS 11.9-18.7u.

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA
GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 19, 30, 31); ON DAMP
SOIL AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 27);
FORMING A GREENISH SCUM ON A TEMPORARY POOL AT 'FAZENDA GERIZA',
CAETÉ, MINAS GERAIS (C.E.M.B. 29).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-
RASSUNUNGA (Borge 1918).

COSMARIUM SEXNOTATUM GUTW. VAR. TRISTRIATUM (LÜTK.) SCHM.

ÖST. BOT. Z. [WIEN]. 45: 458. 1895.

(PL. XVI, FIG. 13)

CELLS ALMOST AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR; SEMICELLS SOMEWHAT PYRAMIDATE-TRAPEZIFORM, BASAL ANGLES SUBRECTANGULAR, LATERAL MARGINS 4-CRENATE OR SOMETIMES ALMOST STRAIGHT; LATERAL VIEW OF SEMICELLS SUBCIRCULAR; APICAL VIEW ELLIPTIC, MARGINS GRANULATE, THE 3 GRANULES AT THE MIDDLE ON EACH SIDE MORE PROMINENT THAN THE OTHERS; CELL WALL GRANULATE AND COLORLESS, WITH A SINGLE SERIES OF SMALL GRANULES IN THE CENTRE OF THE SEMICELLS ABOVE AND RATHER CLOSE TO THE ISTHMUS, ONE OR ALL THE 3 DIVIDED INTO 2 PARTS, GENERALLY INTO A LARGER AND A SMALLER PORTIONS; CHLOROPLASTS AXILE, WITH A CENTRAL PYRENOID.

LENGTH OF CELL 18.7u; BREADTH 17.0u; BREADTH OF ISTHMUS 6.8u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAU-

LO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 53).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM
(GRÖNBLAD 1945).

THE CHIEF DISTINCTION BETWEEN THIS VARIETY AND THE TYPICAL COSMARIUM SEXNOTATUM GUTW. IS THE SOMEWHAT PYRAMIDATE TRAPEZIFORM SHAPE OF ITS CELLS. HOWEVER, COSMARIUM SEXNOTATUM GUTW. VAR. TRISTRIATUM (LÜTK.) SCHM. EXHIBITS SUCH A VARIATION IN THE SIZE OF ITS SEMICELLS THAT IT IS NOT ALWAYS EASY TO SEPARATE THIS VARIETY FROM THE TYPICAL ONE.

DETAILS OF THE CENTRAL GRANULES CAN ALSO VARY CONSIDERABLY.

COSMARIUM SPECIOSUM LUND. VAR. ROSTAFINSKII (GUTW.) WEST & WEST
MONOGR. BRIT. DESM. [LONDON]. 3: 251, PL. 89, FIGS. 8-10. 1908.
(PL. XIV, FIG. 12)

CELLS ABOUT $1 \frac{1}{2}$ TIMES LONGER THAN BROAD, MODERATELY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A DILATED APEX; SEMICELLS PYRAMIDATE, BASAL ANGLES SUBRECTANGULAR, LATERAL MARGINS ABOUT 6-CRENATE AND SLIGHTLY CONVEX, APICAL MARGIN WIDELY TRUNCATE AND FREQUENTLY 4- OR 5-CRENATE; LATERAL VIEW OF SEMICELLS OVATE-OBLONG; APICAL VIEW ELLIPTIC, POLES VERY DELICATELY GRANULATE, GRANULES DISPOSED IN CURVED TRANSVERSE SERIES;

CELL WALL COLORLESS AND GRANULATE, GRANULES IN REGULAR, RADIAL AND CONCENTRIC SERIES; CHLOROPLASTS AXILE, EACH WITH 1 CENTRAL PYRENOID.

LENGTH OF CELL 32.3u; BREADTH 22.1u; BREADTH OF ISTHMUS 8.5u.

ZYGOSPORE UNKNOWN.

HAB. - ON DAMP SOIL AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 26).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY DIFFERS FROM THE TYPICAL COSMARIUM SPECIOSUM LUND. IN HAVING ITS SEMICELLS RATHER MORE REGULARLY PYRAMIDATE, WITH THE APEX EVIDENTLY TRUNCATE.

COSMARIUM SUBCUCUMIS SCHM.

BER. NATURF. GES. FREIBURG. 1 B. [FREIBURG 1 BR.]. 7 (1): 98,
T. 4, FIGS. 20-22. 1893.

(PL. XIV, FIGS. 4-5)

CELLS ABOUT $1 \frac{2}{5}$ - $1 \frac{3}{4}$ TIMES AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS SLIGHTLY OPEN OR LINEAR AND DILATED TOWARD THE APICES; SEMICELLS SEMI-ELLIPTIC, BASAL ANGLES ROUNDED, APEX OFTEN BROADLY CONVEX OR SOMETIMES SOMEWHAT FLATTEN-

ED; LATERAL VIEW OF SEMICELL BROADLY ELLIPTIC; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS, SMOOTH OR FINELY PUNCTATE; CHLOROPLASTS AXILE, EACH WITH 2 PYRENOIDS.

LENGTH OF CELL (40.8-) 59.5-78.5 μ ; BREADTH (22.1-) 37.4-49.3 μ ; BREADTH OF ISTHMUS (6.8-) 11.9-22.1 μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52, 57); IN A DRAINAGE DITCH NEAR THE CITY OF PIRASSUNUNGA, SÃO PAULO (SP 7451); PLANKTONIC IN THE TIETÊ RIVER, SÃO PAULO (SP 7454).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: GOIÁS: PORTA AZUL (FÖRSTER 1964); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO DE JANEIRO: ITATIAIA (KRIEGER 1950).

ALTHOUGH HAVING SEEN A RELATIVELY LARGE NUMBER OF PLANTS FROM 4 DIFFERENT LOCALITIES, I WAS NOT ABLE TO SEE THE "SMOOTH CELL WALL", AS STATED BY WEST & WEST (1905). THE CELL WALL IN OUR MATERIAL IS DEFINITELY FINELY PUNCTATE.

THIS SPECIES DIFFERS FROM COSMARIUM CUCUMIS CORDA EX RALFS, ITS CLOSE ALLIED, IN ITS AXILE CHLOROPLASTS, EACH WITH 2 RATHER LARGE PYRENOIDS.

COSMARIUM SUBCUCUMIS SCHM. F. NOV.

(PL. XIV, FIG. 6)

CELLS NARROWER, ABOUT TWICE AS LONG AS BROAD, VERY DEEPLY CONSTRICTED IN THE MIDDLE. IN ALL THE OTHER RESPECTS IT AGREES PERFECTLY WITH THE TYPICAL FORM.

LENGTH OF CELL 59.5u; BREADTH 26.6u; BREADTH OF ISTHMUS 6.8u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 28879).

THE CONSPICUOUSLY DISTINCT CELL PROPORTIONS OF THE BRAZILIAN PLANT ARE SUFFICIENT TO DISTINGUISH IT FROM THE TYPICAL FORM OF COSMARIUM SUBCUCUMIS SCHM..

THE PRESENT FORMA SOMEWHAT RESEMBLES COSMARIUM SUBCUCUMIS SCHM. VAR. MAGNUM RAC., FROM WHICH IT DIFFERS BY ITS CONSISTENTLY SMALLER SIZE OF THE CELLS AND ITS MORE DEEPLY CONSTRICTED CELLS.

SUGGESTED NAME FOR THE NEW FORMA: COSMARIUM SUBCUCUMIS SCHM. F. COMPRESSUM.

COSMARIUM SUBTUMIDUM NORDST. VAR. KLEBSII (GUTW.) WEST & WEST
 MONOGR. BRIT. DESM. [LONDON]. 2: 193, PL. 63, FIGS. 21-23. 1905.
 (PL. XIV, FIG. 8)

CELLS ABOUT AS LONG AS BROAD OR UP TO $1 \frac{3}{5}$ TIMES LONGER THAN BROAD; SEMICELLS TRUNCATE-PYRAMIDATE, BASAL ANGLES ROUNDED, LATERAL MARGINS CONVEX, SOMEWHAT MORE CONVERGENT THAN IN THE TYPICAL FORM, APEX SOMETIMES THICKENED, TRUNCATE, GENERALLY STRAIGHT.

LENGTH OF CELL $35.7-37.4\mu$; BREADTH 23.8μ ; BREADTH OF ISTHMUS $6.8-8.5\mu$.

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

I AM IN SOME DOUBT IF THE BRAZILIAN MATERIAL SHOULD REALLY BE REFERRED TO COSMARIUM SUBTUMIDUM NORDST. VAR. KLEBSII (GUTW.) WEST & WEST. THIS VARIETY DIFFERS VERY LITTLE FROM THE TYPICAL ONE AND, VERY OFTEN, IT IS SCARCELY POSSIBLE TO DISTINGUISH BETWEEN BOTH.

FURTHERMORE, THE BRAZILIAN PLANTS RESEMBLE VERY MUCH THE SUMATRAN FORM OF THE COSMARIUM GRANATUM BRÉB. REPORTED BY KRIEGER (1932), CHIEFLY IN ITS MEASUREMENTS AND THE PRESENCE OF

A THICKENING AT THE APICAL MARGIN OF THE SEMICELLS.

COSMARIUM SUBTUMIDUM NORDST. F. MINOR BORGE

BOT. NOTISER [LUND]. 1913 (2): 18, T. 1, FIG. 11. 1913.

(PL. XIV, FIG. 14)

SYNONYMY:

COSMARIUM SUBTUMIDUM NORDST. F. MINOR STRÖM NON BORGE:

KRIEGER, IN ARCH. KYDROBIOL. [STUTTGART].

SUPPL. 11: 187, T. 9, FIG. 24. 1932; HIRA-

NO. IN FAUNA FL. NEPAL HIMALAYA [KYOTO]. 1:

27, T. 4, FIG. 13. 1952-53.

COSMARIUM SUBTUMIDUM NORDST. F. PARVA NYG., IN K.

DANSKE VIDENSK. SELSK. SKR. [KJØBENHAVN].

BIOL. 7 (1): 69, FIG. 31. 1949.

COSMARIUM SUBTUMIDUM NORDST. VAR. KLEBSII (GUTW.) WEST

& WEST F. MINOR RICH, IN ANN. MAG. NAT. HIST.

[LONDON]. SER. 10, 10 (57): 248, FIG. 2 1-J.

1932.

COSMARIUM SUBTUMIDUM NORDST. VAR. MINOR J. SAMP.: YA-

CUBSON, IN BOLN SOC. ARGENT. BOT. [LA PLATA].

8 (2): 77, PL. 2, FIG. 15. 1960.

CELLS ABOUT AS LONG AS BROAD OR A LITTLE SHORTER, DEEP-

LY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A SLIGHTLY DILATED APEX; SEMICELLS PYRAMIDATE-SEMICIRCULAR, BASAL ANGLES ROUNDED, LATERAL MARGINS CONVEX, APEX WIDELY TRUNCATE AND USUALLY STRAIGHT; LATERAL VIEW OF SEMICELLS CIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL COLORLESS AND SMOOTH; CHLOROPLASTS AXILE, EACH WITH A SINGLE PYRENOID.

LENGTH OF CELL 13.6u; BREADTH 13.6u; BREADTH OF ISTHMUS 3.4u.

ZYGOSPORE UNKNOWN.

HAB. - ON DRIPPING STONES OF A SMALL WATER FALL AT THE 'HORTO FLORESTAL' OF SÃO PAULO, TREMEMBÉ, SÃO PAULO (C.E.M.B. 80).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THERE IS SOME CONFUSION IN RESPECT TO THE NOMENCLATURE OF THIS FORMA.

THE BRAZILIAN MATERIAL AGREES PERFECTLY WITH THE FORMA MINOR DESCRIBED (?) BY KRIEGER (1932), AND WHICH WAS MORE RECENTLY REPORTED BY HIRANO (1952-53) FROM A POND AT LUITEL BHANJYANG, NEPAL HIMALAYA. KRIEGER'S FORMA, HOWEVER, DUPLICATES A NAME PREVIOUSLY AND VALIDLY PUBLISHED BY BORGE (1913) FOR A TAXON OF THE SAME RANK BASED ON A TYPE HE FOUND IN VASSIJAURE AND KETTERJAURE, SWEDEN. ACCORDING TO THE ART. 64: 2, OF THE INTERNATION-

AL CODE OF BOTANICAL NOMENCLATURE, KRIEGER'S FORMA MUST BE REJECTED AND REGARDED AS A SYNONYMOUS OF THE F. MINOR AS DESCRIBED BY BORGE.

TO COMPLICATE MATTERS, FURTHER A F. PARVA WAS DESCRIBED BY NYGAARD (1949), BASED ON THE SMALLER SIZE OF HIS PLANT AS COMPARED TO THE TYPICAL. HOWEVER, HE OVERLOOKED THE FACT THAT A SMALLER FORM OF THE TYPE HAD ALREADY BEEN DESCRIBED BY RICH (1932) UNDER THE NAME COSMARIUM SUBTUMIDUM NORDST. VAR. KLEBSII (GUTW.) WEST & WEST F. MINOR RICH. AS BOTH PLANTS ARE ABSOLUTELY SIMILAR BOTH IN MEASUREMENTS AND OTHER RESPECTS, THEY ARE TO BE CONSIDERED AS SYNONYMOUS ACCORDING TO THE ART. 64: 1, OF THE INTERNATIONAL CODE OF BOTANICAL NOMENCLATURE. FURTHERMORE, BOTH PLANTS MUST BE REGARDED AS SYNONYMOUS OF COSMARIUM SUBTUMIDUM NORDST. F. MINOR BORGE, WHICH HAS PRIORITY ACCORDING TO THE ART. 57 OF THE SAME CODE.

YACUBSON (1960) REPORTS COSMARIUM SUBTUMIDUM NORDST. VAR. MINOR J. SAMP. FROM CORDOBA, WHICH REALLY SHOULD BE REGARDED AS SYNONYMOUS OF BORGE'S F. MINOR, SINCE IT AGREES EXACTLY WITH IT IN THE MEASUREMENTS AND IN ALL OTHER RESPECTS.

IN RESPECT TO HIRANO'S (1952-53) CITATION OF COSMARIUM SUBTUMIDUM NORDST. F. MINOR STRÖM, I WOULD LIKE TO MENTION THAT THERE IS NO SUCH PLANT DESCRIBED BY STRÖM. KRIEGER APPEARS TO HAVE MADE A MISTAKE IN USING THIS CITATION. STRÖM (1919) DESCRIBED A VAR. MINOR OF THE COSMARIUM SUBTUMIDUM NORDST., BASED

ON SOME SPECIMENS HE FOUND IN WLADIKAAKAS, KASBEK, CAUCASUS, AND WHICH DID NOT DIFFER IN MEASUREMENTS FROM BORGE'S FORMA BUT HAS ITS APICES MORE ROUNDED. HIRANO'S PLANT IS IN ACTUALITY SYNONYMOUS WITH F. MINOR BORGE.

FINALLY, I WOULD PROPOSE THE FOLLOWING MEASUREMENTS LIMITS FOR COSMARIUM SUBTUMIDUM NORDST. F. MINOR BORGE:

LENGTH OF THE CELL (12.0-) 16.0-24.0 (-26.0u)
 BREADTH OF THE CELL (10.0-) 15.0-23.5 (-26.0u)
 BREADTH OF ISTHMUS (3.0-) 4.0-7.0 (-9.0u).

COSMARIUM TINCTUM RALFS

RALFS BRIT. DESM. [LONDON]. 95, PL. 32, FIG. 7. 1848.

(PL. XV, FIG. 12)

CELLS A LITTLE LONGER THAN BROAD, MODERATELY CONSTRICTED IN THE MIDDLE, SINUS NARROW TOWARD THE APEX BUT OPEN OUTWARD; SEMICELLS ELLIPTIC; LATERAL VIEW OF SEMICELLS SUBCIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL SMOOTH AND USUALLY OF A YELLOW TO A REDDISH-BROWN COLOR (VERY SELDOM COLORLESS); CHLOROPLASTS AXILE AND WITH A SINGLE CENTRAL PYRENOID.

LENGTH OF CELL 10.2u; BREADTH 7.6u; BREADTH OF ISTHMUS 5.1u.

ZYGOSPORE SMOOTH AND SUBQUADRATE, WITH ROUNDED POLES

AND RETUSE MARGINS.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: GOIÁS: PORTA AZUL (FÖRSTER 1964); MATO GROSSO: CORUMBÁ (BORGE 1903); PARÁ: SANTARÉM (GRÖNBLAD 1945).

COSMARIUM TINCTUM RALFS CAN BE DISTINGUISHED FROM BOTH COSMARIUM BIOCULATUM BRÉB. AND COSMARIUM TENUE ARCH. BY ITS PROPORTIONATELY LONGER CELLS WHICH ARE NOT SO DEEPLY CONSTRICTED IN THE MIDDLE. THE SEMICELLS ARE ALSO MORE BROADLY ELLIPTIC, THE SINUS MORE OPEN, AND THE CELL WALL IS USUALLY OF A YELLOW TO A REDDISH-BROWN COLOR. THE KIND OF ZYGOSPORE IS ALSO CHARACTERISTIC FOR THIS SPECIES.

COSMARIUM TRILOBULATUM REINSCH

ACTA SOC. SENCKENB. [FRANCOFURTI AD MOENUM]. 6: 118, T. 2211,

FIGS. 1-6. 1867.

(PL. XV, FIG. 6)

CELLS VERY SLIGHTLY LONGER THAN BROAD OR UP TO $1\frac{1}{2}$ TIMES AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS

NARROWLY LINEAR WITH A SLIGHTLY DILATED APEX; SEMICELLS SOMEWHAT 3-LOBED, BASAL LOBES SHORT, SUBRECTANGULAR WITH ROUNDED ANGLES, APICAL LOBE WIDEST, APEX STRAIGHT OR SLIGHTLY CONVEX, INCISIONS BETWEEN LOBES WIDE AND SHALLOW; LATERAL VIEW OF SEMICELL BROADLY ELLIPTIC; APICAL VIEW ELLIPTIC; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS AXILE, WITH A SINGLE CENTRAL PYRENOID.

LENGTH OF CELL 23.8u; BREADTH 17.0u; BREADTH OF ISTHMUS 5.1u.

ZYGOSPORE UNKNOWN.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 28879).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MINAS GERAIS: LAGOA SANTA (WILLE 1884).

IN OUTWARD APPEARANCE THIS SPECIES BEARS CONSIDERABLE RESEMBLANCE TO COSMARIUM HAMMERI REINSCH, FROM WHICH IT DIFFERS ONLY BY ITS SMALLER SIZE.

ARTHRODESMUS EHRENBURG, 1838

ARTHRODESMUS CONVERGENS EHR.

INFUS. [LEIPZIG]. 152, T. 10, FIG. 18. 1838.

(PL. XVI, FIG. 17)

CELLS ABOUT $1 \frac{1}{6}$ - $1 \frac{1}{5}$ TIMES BROADER THAN LONG, INCLUDING THE SPINES, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS ACUTE-ANGLED; SEMICELLS ALMOST PERFECTLY ELLIPTICAL, DORSAL MARGIN USUALLY A LITTLE MORE CONVEX THAN THE VENTRAL ONE, ANGLES SOMETIMES ROUNDED-CONICAL, USUALLY FURNISHED WITH A RATHER SHORT AND SLIGHTLY INCURVED SPINE; APICAL VIEW OF CELL NARROWLY ELLIPTIC, EACH POLE FURNISHED WITH A SHORT STOUT SPINE; CELL WALL COLORLESS, SMOOTH OR VERY FINELY PUNCTATE.

LENGTH OF CELL 28.9-30.6 μ ; BREADTH, INCLUDING SPINES 32.3-34.0 μ ; BREADTH OF ISTHMUS 8.5-10.2 μ .

ZYGOSPORE GLOBOSE AND SMOOTH.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75); PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MATO GROSSO: IN A CREEK NEAR THE XINGU RIVER HEADWATERS (SCHMIDLE 1901); PARÁ: SANTARÉM (GRÖNBLAD 1945).

I PREFER TO CONSIDER THIS PLANT AS BELONGING TO THE GENUS ARTHRODESMUS AND NOT TO STAURODESMUS AS IT WAS SUGGESTED BY LILLIEROTH (1950), BECAUSE OF ITS DEFINITELY 2-RADIATE AND INVAR-

IABLY COMPRESSED APICAL VIEW.

STAURODESMUS TEILING, 1948.

STAURODESMUS CUSPIDATUS (BRÉB.) TEIL. VAR. TRICUSPIDATUS (BRÉB.)

TEIL.

BOT. NOTISER [LUND]. 1948 (1): 60, FIG. 61. 1948.

(PL. XVI, FIG. 23)

CELLS ABOUT AS LONG AS BROAD OR A LITTLE LONGER, DEEP AND BROADLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND OBTUSE, WIDENING OUTWARD; SEMICELLS FUSIFORM, VENTRAL MARGIN MORE CONVEX THAN THE DORSAL, LATERAL ANGLES TERMINATING IN A STOUT SPINE EITHER PARALLEL OR CONVERGING, THE ISTHMUS LONG AND CYLINDRICAL, ABOUT AS LONG AS A SINGLE SEMICELL; APICAL VIEW OF CELL USUALLY 3-ANGULAR, RARELY 4-ANGULAR, SIDES CONCAVE, ANGLES INFLATED, EACH WITH 1 SPINE; CELL WALL SMOOTH AND COLORLESS.

LENGTH OF CELL 20.4-24.5u; BREADTH, INCLUDING THE SPINES 20.0-22.1u; BREADTH OF ISTHMUS 4.0-4.5u.

ZYGOSPORE SPHERICAL, WITH A NUMBER OF LONG STOUT SPINES SWOLLEN AT THE BASE.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B.

92); PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE
SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93, 95, 96).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-
RASSUNUNGA (BORGE 1918), SÃO PAULO (BICUDO & BICUDO 1962), SER-
RA DA BOCAINA (BORGE 1918); MINAS GERAIS: LAGOA SANTA (WILLE
1884); PARÁ: SANTARÉM (GRÖNBLAD 1945).

STAURODESMUS DEJECTUS (BRÉB.) TEIL. F. ANGUSTUS TEIL. NOM. NUD.

VIII CONGR. INT. BOT. [PARIS]. SECT. 17: 129. 1954.

(PL. XVI, FIGS. 18-19)

CELLS ABOUT AS LONG AS BROAD, WITHOUT THE SPINES, DEEP-
LY CONSTRICTED IN THE MIDDLE, SINUS WIDELY OPEN AND ACUTE-ANGLED;
SEMICELLS NEARLY 3-ANGULAR, DORSAL AND LATERAL MARGINS NEARLY
STRAIGHT OR VERY SLIGHTLY CONVEX, ANGLES TERMINATING IN A SHORT
STOUT SPINE, USUALLY DIVERGING, SOMETIMES PARALLEL; APICAL VIEW
OF CELL 3-ANGULAR AND RARELY 4-ANGULAR, SIDES SLIGHTLY CONCAVE,
ANGLES SLIGHTLY TURGID AND TERMINATING IN A STRONG SPINE; CELL
WALL SMOOTH AND COLORLESS.

LENGTH OF CELL, NOT INCLUDING THE SPINES 20.4-25.5u;
BREADTH 20.5-25.5u; BREADTH OF ISTHMUS 4.0-6.0u.

ZYGOSPORE SPHERICAL AND ADORNED WITH A NUMBER OF RATHER
SHORT STOUT SPINES, BROAD AT THEIR BASE.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92); PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

STAURODESMUS DEJECTUS (BRÉB.) TEIL. F. ANGUSTUS TEIL. IS NOT A VALID NAME, SINCE IT WAS "MERELY PROPOSED IN ANTICIPATION OF THE FUTURE ACCEPTANCE OF A PARTICULAR CIRCUMSCRIPTION" (ART. 33 OF THE INTERNATIONAL CODE OF BOTANICAL NOMENCLATURE). TEILING (1954) HAS SUGGESTED THE NAME FORMA ANGUSTUS FOR ALL THE PLANTS HAVING AN ACUTE SINUS RATHER THAN A ROUNDED ONE. BUT, ACCORDING TO THE SAME AUTHOR, IT WOULD BE ONLY A TEMPORARY NAME UNTIL THE VARIABILITY AND TAXONOMIC VALUE OF THAT CHARACTER IS CLEAR.

THUS, I PREFER TO CONSIDER THE NAME PROPOSED BY TEILING (1954) A "NOMEN NUDUM", AND SUCH STATUS SHOULD BE INDICATED AS STAURODESMUS DEJECTUS (BRÉB.) TEIL. F. ANGUSTUS TEIL. NOM. NUD., RATHER THAN STAURODESMUS DEJECTUS (BRÉB.) TEIL. F. ANGUSTUS TEIL. AS USED BY CROASDALE CROASDALE (1957, 1962) AND CROASDALE & GRÖNBLAD (1964).

STAURODESMUS DICKEI (RALFS) LILL.

ACTA LIMNOL. [LUND]. 3: 264. 1950.

(PL. XVI, FIG. 20)

CELLS ABOUT AS LONG AS BROAD OR SLIGHTLY BROADER (NOT INCLUDING THE SPINES), DEEPLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE-ANGLED; SEMICELLS SOMEWHAT SUBELLIPTIC, DORSAL AND VENTRAL MARGINS ALMOST EQUALLY CONVEX, OR THE VENTRAL MARGIN A LITTLE MORE CONVEX THAN THE DORSAL, ANGLES TERMINATING IN A SHORT SLIGHTLY RECURVED SPINE, DIRECTED TO THE OTHER SEMICELL; APICAL VIEW OF CELL 3-ANGULAR, LATERAL MARGINS SOMEWHAT CONCAVE, ANGLES RATHER INFLATED, EACH WITH A SHORT SPINE; CELL WALL COLORLESS, SMOOTH.

LENGTH OF CELL 28.9 μ ; BREADTH, INCLUDING THE SPINES 34.0 μ ; BREADTH OF ISTHMUS 8.5 μ .

ZYGOSPORE GLOBOSE, COVERED WITH NUMEROUS LONG SPINES, WHICH HAVE A BROADER BASE.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 28879).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESSEN 1890); SÃO PAULO (BORGE 1918); MATO GROSSO: CORUMBÁ (BORGE 1903), PORTO DO CAMPO (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: PELOTAS (BORGE 1903).

STAURODESMUS DICKEI (RALFS) LILL. VAR. RHOMBOIDEUM (WEST & WEST)

LILL. F. MINOR POUCQ.

REVUE GÉN. BOT. [PARIS]. 59: 11, FIG. 2, N. 24. 1952.

(PL. XVI, FIG. 21)

CELLS SMALLER THAN THE TYPE, A LITTLE BROADER THAN LONG;
SEMICELLS DISTINCTLY RHOMBOIDAL IN SHAPE, VENTRAL MARGINS
STRAIGHT OR VERY SLIGHTLY CONVEX, ANGLES TERMINATING IN A SHORT
RATHER STRAIGHT SPINE, USUALLY AT RIGHT ANGLE WITH THE VENTRAL
MARGIN.

LENGTH OF CELL 18.7u; BREADTH, INCLUDING THE SPINES
25.5u; BREADTH OF ISTHMUS 6.8u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN
HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B.
92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

STAURODESMUS SUBPYGMAEUM (W. WEST) CROAB. VAR. MINUS (SCOTT &
GRÖNBL.) COMB. NOV. (= STAUSTRUM SUBPYGMAEUM W. WEST VAR. MINUS
SCOTT & GRÖNBL.)

ACTA SOC. SCI. FENN. [HELSINGFORSIAE]. SER. NOV. B, 11 (8): 47,
T. 31, FIGS. 12-13. 1957.

(PL. XVI, FIG. 22)

CELLS ABOUT AS LONG AS BROAD, INCLUDING THE MAMILLATE PROCESSES, OR A LITTLE LONGER, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE-ANGLED; SEMICELLS SOMEWHAT WIDELY CUNEATE, LATERAL MARGINS ALMOST STRAIGHT, APICAL MARGIN CONVEX, ANGLES PRODUCED INTO A MAMILLATE PROCESS NEARLY HORIZONTALLY EXTENDED; APICAL VIEW OF CELL 3-ANGULAR, SIDES CONVEX, ANGLES MAMILLATE; CELL WALL COLORLESS, EITHER SMOOTH OR VERY FINELY PUNCTATE.

LENGTH OF CELL 15.3u; BREADTH, INCLUDING THE PROCESSES 15.3u; BREADTH OF ISTHMUS 5.1u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

THIS VARIETY FULLY AGREES WITH THE TYPICAL STAURODESMUS SUBPYGMAEUM (W. WEST) CROAS. IN ALL THE OTHER RESPECTS BUT ITS CONSISTENTLY SMALLER SIZE, WHICH IS LESS THAN HALF THE TYPICAL PLANT.

XANTHIDIUM EHRENBURG, 1837.XANTHIDIUM FRAGILE BORGE

K. SV. VET.-AKAD. HANDL. [HANDLINGAR]. 24 (12): 17, T. 1,

FIG. 14. 1899.

(PL. XVIII, FIGS. 1-2)

CELLS A LITTLE LONGER THAN BROAD, INCLUDING THE SPINES, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS ACUTE AND OPEN; SEMI-CELLS HEXAGONAL, BASAL MARGINS CONVEX AND WITH A SINGLE MINUTE SPINE BENEATH EACH ANGLE, LATERAL AND APICAL MARGINS CONCAVE, WITH A LOWER SERIES OF 6 ANGLES, THE UPPER ONE WITH 4, ALL ANGLES SLIGHTLY PRODUCED AND FURNISHED WITH 2-6 VERY STOUT SIMPLE SPINES, WHICH ARE FAIRLY LONG, USUALLY CURVED (VERY RARELY STRAIGHT); LATERAL VIEW OF SEMICELL VERY SIMILAR TO THAT OF THE FRONT VIEW, BUT SOMEWHAT NARROWED; APICAL VIEW 6-ANGULAR, SIDES FAINTLY CONCAVE, ANGLES FURNISHED WITH 2-6 STOUT, FAIRLY LONG, USUALLY CURVED SPINES, ANGLES OF THE UPPER SERIES APPEARING WITHIN THE LATERAL MARGINS, ALTERNATING WITH THOSE OF THE LOWER SERIES; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS PARIETAL, 4 IN EACH SEMI-CELL AND EACH WITH USUALLY 1 OR RARELY 2 PYRENOIDS.

LENGTH OF CELL, INCLUDING THE SPINES 105.4u, NOT INCLUDING THE SPINES 78.2u; BREADTH, INCLUDING THE SPINES 85.0u, NOT INCLUDING THE SPINES 64.6u; BREADTH OF ISTHMUS 25.5u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945).

I DO NOT BELIEVE THAT BORGE'S VARIETY DEPAUPERATUM FOR THIS SPECIES IS A GOOD VARIETY SINCE, ACCORDING TO BORGE (1918), IT WOULD ONLY DIFFER FROM THE TYPICAL XANTHIDIUM FRAGILE BORGE IN HAVING 4 SPINES IN THE MEDIAN ANGLE OF THE FRONT VIEW OF ITS SEMICELLS.

AS FAR AS I CAN JUDGE, SUCH CHARACTER IS NOT SUFFICIENT TO DISTINGUISH THAT VARIETY, SINCE IT HAS A WIDE RANGE OF VARIATION, ALL THE POSSIBLE INTERMEDIATE FORMS BEING FOUND. FÖRSTER (1964) REPORTS SOME PLANTS FROM SERRA DA LUA, RIO BRANCO, WHICH HAVE 6 SPINES IN THE MEDIAN ANGLE, AND 3 OR 4 IN THE OTHER ONES.

THUS, I THINK, IT WOULD BE MORE ADVISABLE TO CONSIDER XANTHIDIUM FRAGILE BORGE VAR. DEPAUPERATUM BORGE AS IDENTICAL WITH THE TYPICAL PLANT.

XANTHIDIUM REGULARE NORDST. VAR. NOV.

(PL. XVIII, FIG. 3; PL. XIX, FIG. 4)

SYNONYMY:

XANTHIDIUM REGULARE NORDST. FORMA I FÖRST. & ECKERT., IN
HYDROBIOL. [DEN HAAG]. 23 (3-4): 412, T. 27,
T. 47, PHOT. 23. 1964.

CELLS A LITTLE LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE-ANGLED TO ALMOST RECTANGULAR; SEMICELLS SIMILAR IN BOTH FRONT AND LATERAL VIEWS, ELLIPTIC-HEXAGONAL, BASAL MARGIN CONVEX, LATERAL AND APICAL MARGINS STRAIGHT OR FAINTLY CONCAVE, LOWER AND UPPER ANGLES (8 ANGLES IN THE LOWER SERIES AND 4 IN THE UPPER ONE) FURNISHED WITH A SIMPLE, STOUT, FAIRLY LONG SPINE IN WHICH BASE THERE IS A RING OF 6-8 PROMINENT MAMILLATE PROCESSES; APICAL VIEW OF CELL 8-ANGULAR, EACH ANGLE WITH A SIMPLE, STOUT, RATHER LONG SPINE IN WHICH BASE THERE IS A RING OF 6-8 MAMILLATE PROCESSES, THE SPINES OF THE UPPER ANGLES APPEARING WITHIN THE LATERAL MARGINS AND SOMEWHAT COINCIDENT WITH THE MEDIAN ANGLES OF THE FRONT VIEW; CELL WALL COLORLESS, UNIFORMLY PUNCTATE; CHLOROPLASTS NOT OBSERVED.

LENGTH OF CELL, INCLUDING THE SPINES 82.0-96.0u, NOT INCLUDING THE SPINES 59.5-70.0u; BREADTH, INCLUDING THE SPINES 73.1-85.0u, NOT INCLUDING THE SPINES 42.5-61.0u; BREADTH OF ISTHMUS 30.6-34.0u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD. ITIRAPINA, SÃO PAULO (C.E.M.B. 46).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: RIO BRANCO: SERRA DA LUA (FÖRSTER 1964).

THIS PLANT WAS FIRSTLY DISCOVERED IN THE NEIGHBOURHOOD OF 'SERRA DA LUA', RIO BRANCO, AND REPORTED BY FÖRSTER (1964) AS XANTHIDIUM REGULARE NORDST. FORMA 1.

THE NEW VARIETY IS WELL-MARKED AND READILY DISTINGUISHED FROM THE TYPICAL XANTHIDIUM REGULARE NORDST., ITS CLOSELY ALLIED, BY ITS SOMEWHAT MORE COMPACT CELLS ADORNED WITH 12 SPINES DISTRIBUTED IN 2 SERIES, 8 IN THE LOWER SERIES AND 4 IN THE UPPER ONE, AND BY ITS CELL WALL UNIFORMLY AND CONSPICUOUSLY PUNCTATE.

SUGGESTED NAME FOR THE NEW VARIETY: XANTHIDIUM REGULARE NORDST. VAR. FÖRSTERI. THIS PLANT WILL BE NAMED IN HONOR TO DR. KURT FÖRSTER, GERMANY, WHO IS PRESENTLY MAKING AN INTENSIVE STUDY OF THE BRAZILIAN DESMIDS.

STAURASTRUM MEYEN, 1829; EMEND. RALFS, 1845.

STAURASTRUM ALTERNANS BRÉB.

RALFS BRIT. DESM. [LONDON] 7. 132, T. 21, FIG. 7. 1848.

(PL. XVIII, FIG. 9)

CELLS ABOUT AS LONG AS BROAD, TWISTED AT THE ISTHMUS, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND SOMEWHAT ACUTE-ANGLED; SEMICELLS NEARLY OBLONG-ELLIPTIC, LATERAL ANGLES ROUNDED, APICAL MARGINS FLATTENED IN THE MIDDLE OR CONVEX IF THE CELL IS VERY SLIGHTLY OBLIQUE; APICAL VIEW OF THE CELL 3-ANGULAR, ANGLES OF ONE SEMICELL ALTERNATING WITH THOSE OF THE OTHER, SIDES CONCAVE, ANGLES ROUNDED; CELL WALL FINELY GRANULATE, GRANULES IN CONCENTRIC RINGS AROUND THE ANGLES, BUT SCATTERED AND SOMEWHAT REDUCED IN THE MIDDLE OF THE APEX OF THE SEMICELL.

LENGTH OF CELL 30.6u; BREADTH 28.9u; BREADTH OF ISTHMUS 11.9u.

ZYGOSPORE GLOBOSE AND, ACCORDING TO RALFS (1848), FURNISHED WITH SPINES FORKED AT THE APEX.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PIRASSUNUNGA (BORGE 1918); GOIÁS: NEAR PEIXE (PRESCOTT 1957).

THE ZYGOSPORE OF THIS SPECIES WAS DESCRIBED BY RALFS, BUT NOT FIGURED. ACCORDING TO WEST & WEST (1912), SINCE RALFS

HAD BEEN FOR MANY YEARS GREATLY CONFUSED BETWEEN THIS SPECIES AND STAURASTRUM HEXACERUM (EHR.) WITTR. (= STAURASTRUM TRICORNE RALFS), ONE CAN NOT SURE THAT THE ZYGOSPORE DESCRIBED BY RALFS REALLY BELONGED TO STAURASTRUM ALTERNANS BRÉB..

STAURASTRUM COSMARIOIDES NORDST. VAR. TROPICUM (LAGERH.) BORGE
K. SV. VET.-AKAD. HANDL. [HANDLINGAR]. 24 (12): 28, t. 2,
FIG. 41. 1899.
(PL. XVII, FIG. 10)

CELLS ABOUT TWICE AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR WITH A SLIGHTLY DILATED APEX; SEMICELLS SOMEWHAT SUBRECTANGULAR, BASAL ANGLES RECTANGULAR ROUNDED, LATERAL MARGINS STRAIGHT AND PARALLEL OR SLIGHTLY RETUSE JUST ABOVE THE BASAL ANGLES AND THEN VERY SLIGHTLY CONVERGENT TO THE APICES, WHICH ARE BROADLY ROUNDED OR TRUNCATELY-ROUNDED; APICAL VIEW OF CELL USUALLY 3-ANGULAR, RARELY 4-ANGULAR, WITH BROADLY ROUNDED ANGLES AND VERY SLIGHTLY RETUSE MARGINS; CELL WALL COLORLESS AND COARSELY PUNCTATE.

LENGTH OF CELL 78.2-86.7u; BREADTH 39.1-45.9u; BREADTH OF ISTHMUS 17.0-20.4u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOAT-

ING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46); IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 28879).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-RASSUNUNGA, SÃO PAULO (BORGE 1918).

THIS VARIETY IS READILY DISTINGUISHED FROM THE TYPICAL FORM OF STAURASTRUM COSMARIOIDES NORDST. BY ITS SOMEWHAT RECTANGULAR OR SUBTRAPEZOIDAL OUTLINE OF ITS CELLS.

STAURASTRUM ELLIPTICUM W. WEST F. NOV.

(PL. XVII, FIG. 2)

CELLS ABOUT $1\frac{1}{2}$ TIMES LONGER THAN BROAD, FAIRLY DEEP CONSTRICTED IN THE MIDDLE, SINUS ACUTELY OPEN; SEMICELLS ELLIPTICAL; APICAL VIEW OF CELL 3-ANGULAR, OR MORE SELDOMLY 4-ANGULAR, SIDES STRAIGHT, OR SLIGHTLY CONVEX OR VERY RARELY CONCAVE, ANGLES BROADLY ROUNDED; CELL WALL SMOOTH, COLORLESS.

LENGTH OF CELL 15.3μ ; BREADTH 10.2μ ; BREADTH OF ISTH-MUS 5.1μ .

ZYGOSPORE UNKNOWN.

HAB. - FLOATING MATERIAL AMONG NITELLA SP. AND NYMPHEA SP. IN A LAKE AT THE 'HORTO FLORESTAL' OF RIO CLARO, SÃO PAULO (C.E.M.B. 75).

THE PRESENT PLANT ONLY IS DIFFERENT FROM THE TYPICAL STAURASTRUM ELLIPTICUM W. WEST IN ITS CONSIDERABLY SMALLER SIZE. IT IS SO MUCH SMALLER THAN THE OTHER DESCRIBED FORMS AND VARIETIES THAT I CONSIDER ITS SEPARATION AS A DISTINCT FORMA IS JUSTIFIED.

SUGGESTED NAME FOR THE NEW FORMA: STAURASTRUM ELLIPTICUM W. WEST F. MINUS.

STAURASTRUM FURCATUM (EHR.) BRÉB.

MÉM. SOC. SCI. NAT. CHERBOURG [CHERBOURG]. 4: 136. 1856.

(PL. XVII, FIGS. 18-19)

CELLS ABOUT AS LONG AS BROAD OR A LITTLE BROADER, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS ACUTE AND OPEN; SEMICELLS SUBELLIPTICAL OR SUBGLOBOSE, DORSAL AND VENTRAL MARGINS ALMOST EQUALLY CONVEX, LATERAL ANGLES TERMINATING IN A SHORT, STOUT, NEARLY HORIZONTAL SPINE, WITH BIFID APICES, THE 2 TEETH LYING IN THE SAME VERTICAL PLANE, DORSAL MARGIN WITH 2 SHORT BIFID PROCESSES, WHICH ARE NEARLY ERECT; APICAL VIEW OF CELL 3-ANGULAR,

ANGLES SCARCELY PRODUCED, ENDING IN A SPINE, SIDES STRAIGHT OR VERY SLIGHTLY CONCAVE, WITH 2 SHORT BIFID PROCESSES PROJECTING FROM EACH LATERAL MARGIN; CELL WALL COLORLESS, SMOOTH OR VERY MINUTELY PUNCTATE.

LENGTH OF CELL, INCLUDING THE SPINES 22.1u; BREADTH, INCLUDING THE SPINES 27.2u; BREADTH OF ISTHMUS 6.8u.

ZYGOSPORE GLOBOSE, WITH NUMEROUS SPINES BIFID AT THE APEX.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

STAUSTRUM HYSTRIX RALFS VAR. POLYSPINUM BÖRGES.

VIDENSK. MEDDR. DANSK NATURH. FÖREN. KBH. [KJØBENHAVN]. 1890:

949, T. 4, FIG. 43. 1890.

(PL. XVII, FIG. 22)

CELLS ABOUT AS LONG AS BROAD OR VERY SLIGHTLY BROADER, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS ACUTE AND OPEN; SEMI-CELLS ELLIPTIC-OB LONG, DORSAL MARGIN NEARLY STRAIGHT, ANGLES VERY BLUNTLY ROUNDED, FURNISHED WITH VERY SHORT SPINES; APICAL VIEW OF CELL USUALLY 3-ANGULAR, RARELY 4-ANGULAR, LATERAL MARGINS CON-

CAVE, ANGLES ROUNDED, SPINES CONFINED TO THE REGION OF THE ANGLES; CELL WALL COLORLESS, SMOOTH.

LENGTH OF CELL, NOT INCLUDING THE SPINES 27.2u; BREADTH NOT INCLUDING THE SPINES 23.8u; BREADTH OF ISTHMUS 11.9u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BØRGENSEN 1890).

STAURASTRUM MUTICUM BRÉB.

LINNAEA [GENÈVE]. SER. 1, 14: 228. 1840.

(PL. XVII, FIG. 1)

CELLS ABOUT AS LONG AS BROAD OR A LITTLE LONGER, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE-ANGLED; SEMI-CELLS USUALLY ELLIPTIC, BUT OFTEN SUBSEMICIRCULAR OR EVEN SUBRENIFORM; APICAL VIEW OF CELL 3-ANGULAR OR 4-ANGULAR, WITH BROADLY ROUNDED ANGLES AND CONCAVE SIDES; CELL WALL COLORLESS, SMOOTH.

LENGTH OF CELL 23.8u; BREADTH 17.0u; BREADTH OF ISTHMUS 8.5u.

ZYGOSPORE GLOBOSE, FURNISHED WITH STOUT SPINES WHICH ARE 2-FURCATE AT THE APEX.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-RASSUNUNGA (BORGE 1918); MINAS GERAIS: LAGOA SANTA (WILLE 1884, WARMING 1892); MATO GROSSO: CORUMBÁ (BORGE 1903), PORTO DO CAMPO, SEPOTUBA (BORGE 1903); PARÁ: SANTARÉM (GRÖNBLAD 1945).

STAURASTRUM OCTANGULARE GRÖNBL.

ACTA SOC. SCI. FENN. [HELSINGFORSIAE]. SER. NOV. B, 11 (6): 28,

T. 12, FIG. 240. 1945.

(PL. XVII, FIGS. 16-17)

CELLS ABOUT AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE ANGLED; SEMICELLS SUBELLIPTICAL, LATERAL ANGLES PRODUCED INTO 2 SHORT, STOUT, BIFID PROCESSES, APICAL MARGIN ALMOST STRAIGHT, WITH AN UPPER SERIES OF SINGLE PROCESSES, SIMILAR OF PERHAPS SLIGHTLY SHORTER THAN THOSE OF THE LOWER SERIES, WHICH PROJECT VERTICALLY ABOVE AND BETWEEN THOSE OF THE LATERAL ANGLES; APICAL VIEW OF CELL 8-ANGULAR, LATERAL MARGINS CONCAVE, ANGLES DIVIDED BY A SOMEWHAT DEEP MEDIAN INCISION INTO 2 SHORT, STOUT, BIFID PROCESSES, AND A THIRD ONE, SIMI-

LAR BUT SINGLE, LOCATED ABOVE AND BETWEEN THE FIRST TWO; CELL WALL COLORLESS AND SMOOTH.

LENGTH OF CELL, INCLUDING THE SPINES 25.5-39.1u; BREADTH INCLUDING THE SPINES 30.6-34.0u; BREADTH OF ISTHMUS 11.9-13.6u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN AND SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52, 57).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945).

STAURASTRUM POLYMORPHUM BRÉB.

RALFS BRIT. DESM. [LONDON]. 135, T. 22, FIG. 9, T. 34,
FIG. 6. 1848.

(PL. XIX, FIG. 1)

CELLS ABOUT AS LONG AS BROAD OR UP TO $1\frac{1}{4}$ TIMES LONGER THAN BROAD, INCLUDING THE PROCESSES, SLIGHT BUT CONSPICUOUSLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE-ANGLED; SEMI-CELLS VARIABLE IN FORM, SUBELLIPTICAL, SUBFUSIFORM OR EVEN SUBCUNEATE, VENTRAL MARGIN USUALLY MORE STRONGLY CONVEX THAN THE DORSAL, ANGLES ATTENUATING TO FORM SHORT STOUT PROCESSES, HORIZONTAL OR VERY SLIGHTLY INCURVED, TIPPED WITH 3-5 MINUTE SPINES

AND PROVIDED WITH 3 OR 4 SERIES OF MINUTE DENTICULATIONS; APICAL VIEW OF CELL USUALLY 3-6 (-&)-ANGULAR, THE 2 SEMICELLS OF THE SAME INDIVIDUAL OFTEN DIFFERING IN THE NUMBER OF PROCESSES, LATERAL MARGINS VERY SLIGHTLY CONCAVE; CELL WALL COLORLESS, GRANULATE AT THE BASE OF THE PROCESSES, CENTRE OF APEX SMOOTH.

LENGTH OF CELL 27.2u; BREADTH, INCLUDING THE PROCESSES 28.9u; BREADTH OF ISTHMUS 8.5u.

ZYGOSPORE SPHERICAL OR SOMEWHAT ANGULAR, WITH STOUT PROCESSES USUALLY BRANCHED AT THE APEX.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: MINAS GERAIS: LAGOA SANTA (NORDSTEDT 1870, WARMING 1892).

STAUSTRUM POLYMORPHUM BRÉB. VAR. NOV.

(PL. XIX, FIGS. 2-3)

CELLS SMALLER THAN THE TYPE; SEMICELLS WITH ONE RING OF MINUTE DENTICULATIONS JUST ABOVE THE ISTHMUS AND ANOTHER ONE AT THE APEX, 5 VERY SHORT STOUT PROCESSES, HORIZONTALLY DISPOSED, TIPPED WITH 5 MINUTE SPINES AND PROVIDED WITH ONLY ONE SERIES OF

DENTICULATIONS.

LENGTH OF CELL 22.1μ ; BREADTH, INCLUDING THE PROCESSES 20.4μ ; BREADTH OF ISTHMUS 6.8μ .

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

THIS VARIETY CAN BE DISTINGUISHED, AT ONCE, BY HAVING A RING OF MINUTE DENTICULATIONS JUST ABOVE THE ISTHMUS IN EACH SEMICELL AND ANOTHER ONE AT THE APEX, AND THE ANGLES OF THE SEMICELLS TERMINATING IN SHORT, HORIZONTALLY DISPOSED PROCESSES.

SUGGESTED NAME FOR THE NEW VARIETY: STAURASTRUM POLYMORPHUM BRÉB. VAR. ITIRAPINENSIS.

STAURASTRUM SP. NOV.

(PL. XVII, FIG. 8)

CELLS ABOUT $1\frac{1}{3}$ TIMES AS LONG AS BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS NARROWLY LINEAR AND SLIGHTLY DILATED AT THE APEX; SEMICELLS TRAPEZOID, LATERAL MARGINS SLIGHTLY RETUSE, APICAL MARGIN STRAIGHT TO VERY SLIGHTLY CONVEX; APICAL

VIEW OF CELL 3- OR 4-ANGULAR, SIDES SLIGHTLY CONCAVE, WITH BROADLY ROUNDED ANGLES; CELL WALL COLORLESS, VERY COARSELY GRANULATE.

LENGTH OF CELL 35.7u; BREADTH 25.5u; BREADTH OF ISTHMUS 13.6u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE MARGINS OF A CLEAN FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 66).

I HAVE NOT BEEN ABLE TO FIND ANY OTHER SPECIES TO WHICH THIS PLANT COULD BE REFERRED.

SUGGESTED NAME FOR THE NEW SPECIES: STAURASTRUM PRES-
COTTII. THIS PLANT WILL BE NAMED IN HONOR TO DR. GERALD WEBBER
PRESCOTT, PROFESSOR OF BOTANY AT MICHIGAN STATE UNIVERSITY, EAST
LANSING, MICHIGAN, UNDER WHOSE GUIDANCE THIS STUDY WAS DONE.

STAURASTRUM PUNCTULATUM BRÉB.

RALFS BRIT. DESM. [LONDON]. 133, T. 22, FIG. 1. 1848.

(PL. XVII, FIG. 4)

CELLS A LITTLE LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS ACUTE AND OPEN; SEMICELLS SUBELLIPTIC TO SUBRHOMBOIDAL-ELLIPTIC, DORSAL AND VENTRAL MARGINS ABOUT EQUALLY

CONVEX, ANGLES SOMEWHAT ACUTELY ROUNDED; APICAL VIEW OF CELL 3-ANGULAR, RARELY 4-ANGULAR AND VERY RARELY 5-ANGULAR, SIDES SLIGHTLY RETUSE, ANGLES ACUTELY ROUNDED, THE ONES OF ONE SEMICELL OFTEN PARTIALLY OR ENTIRELY ALTERNATING WITH THOSE OF THE OTHER; CELL WALL COLORLESS, UNIFORMLY GRANULATE, GRANULES IN REGULAR SERIES AROUND THE ANGLES.

LENGTH OF CELL 23.8-27.2u; BREADTH 17.0-22.1u; BREADTH OF ISTHMUS 6.8-9.4u.

ZYGOSPORE GLOBOSE, FURNISHED WITH RATHER STOUT SPINES, WHICH ARE DOUBLY FURCATE AT THE APEX AND ARISING FROM A BROADLY MAMILLATE BASE.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 33); INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 45).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-RASSUNUNGA (BORGE 1918); RIO BRANCO: SERRA DA LUA (FÖRSTER 1963); RIO DE JANEIRO: RIO D'OURO (WILLE 1884); RIO GRANDE DO SUL: PORTO ALEGRE (BORGE 1903).

STAURASTRUM PUNCTULATUM BRÉB. VAR. SUBDILATATUM FÖRST.

REVUE ALGOL. [PARIS]. SER. NOV., 1 (1): 86, T. 6, FIG. 9, T. 9,
FIG. 19. 1963.

(PL. XVII, FIGS. 5-7)

SEMICELLS SOMEWHAT TRAPEZOIDAL, DORSAL MARGIN SLIGHTLY
CONVEX, ANGLES ROUNDED, LATERAL MARGINS VERY SLIGHTLY CONCAVE;
APICAL VIEW OF CELL 3-ANGULAR, SIDES SLIGHTLY RETUSE, ANGLES AC-
UTELY-ROUNDED; CELL WALL COLORLESS, SMOOTH JUST ABOVE THE ISTH-
MUS.

LENGTH OF CELL 20.4-22.1U; BREADTH 17.0-19.6U; BREADTH
OF ISTHMUS 8.5U.

ZYGOSPORE UNKNOWN.

HAB. - IN THE OVERFLOW CHANNEL OF A DAMP AT 'FAZENDA
GERIZA', CAETÉ, MINAS GERAIS (C.E.M.B. 31).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: RIO BRANCO: SER-
RA DO MAR (FÖRSTER 1963).

THE PLANTS COLLECTED BY FÖRSTER (1963) FROM 'SERRA DA
LUA', RIO BRANCO, ARE A LITTLE GREATER THAN THE PRESENT MATER-
IAL FROM CAETÉ, MINAS GERAIS.

STAURASTRUM PUNCTULATUM BRÉB. VAR. SUBDILATATUM FÖRST.

DIFFERS FROM THE TYPICAL VARIETY IN ITS NEARLY TRAPEZOIDAL OUT-

LINE OF THE CELLS. IT CAN ALSO BE DISTINGUISHED FROM STAURASTRUM PUNCTULATUM BRÉB. VAR. SUBPRODUCTUM WEST & WEST, ITS CLOSELY ALLIED, IN HAVING THE DORSAL MARGIN OF ITS SEMICELLS NOT SO CONVEX AND THE LATERAL MARGINS OF THE APICAL VIEW SLIGHTLY RETUSE.

STAURASTRUM QUADRANGULARE BRÉB.

RALFS BRIT. DESM. [LONDON]. 128, T. 22, FIG. 7, T. 34,
FIG. 11. 1848.

(PL. XVII, FIGS. 11-12)

CELLS ABOUT AS LONG AS BROAD, FAIRLY DEEP CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE-ANGLED; SEMICELLS SOMEWHAT SUBRECTANGULAR, DORSAL MARGIN STRAIGHT OR SLIGHTLY CONVEX, LATERAL MARGINS STRAIGHT OR SLIGHTLY CONCAVE, ANGLES PROVIDED TYPICALLY WITH 4 SPINES EACH, ONE PAIR TOWARD THE APEX AND ANOTHER AT THE BASE, SPINES CONICAL AND DIVERGING, AT TIMES ONE OR OTHER OF THEM DUPLICATED OR WANTING; APICAL VIEW OF CELL USUALLY 4-ANGULAR, RARELY 3- OR 5-ANGULAR, SIDES STRAIGHT OR SLIGHTLY RETUSE, ANGLES BROAD AND NORMALLY BEARING 2 SUPERIMPOSED PAIRS OF SPINES; CELL WALL COLORLESS AND SMOOTH.

LENGTH OF CELL 18.7u; BREADTH, INCLUDING THE SPINES 22.1u; BREADTH OF ISTHMUS 8.5u.

ZYGOSPORE UNKNOWN.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52); PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAMPINAS (BORGE 1918); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: CACHOEIRA (BORGE 1903).

STAURASTRUM QUADRANGULARE BRÉB. VAR. LONGISPINUM BÖRGES.

VIDENSK. MEDDR. DANSK NATURH. FOREN. KBH. [KJØBENHAVN]. 1890:

954, T. 5, FIG. 55. 1890.

(PL. XVII, FIG. 13)

ANGLES OF SEMICELLS PROVIDED WITH 3 LONG AND DELICATE SPINES EACH, USUALLY ONE PAIR TO THE APEX AND A SINGLE ONE AT THE BASE; APICAL VIEW OF CELL 3-ANGULAR, SIDES STRAIGHT OR ALMOST SO, ANGLES FURNISHED WITH 3 SPINES, 2 OF THEM IN AN UPPER LEVEL AND THE THIRD ONE BELLOW AND BETWEEN THE FIRST TWO.

LENGTH OF CELL, NOT INCLUDING THE SPINES 20.4_u; BREADTH NOT INCLUDING THE SPINES 17.0_u; BREADTH OF ISTHMUS 10.2_u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890): PIRASSUNUNGA, SÃO PAULO (BORGE 1918); MATO GROSSO: PORTO DO CAMPO (BORGE 1925).

THIS VARIETY IS WELL-CHARACTERIZED BY ITS MUCH LONGER AND DELICATE SPINES AT THE ANGLES OF THE SEMICELLS.

STAURASTRUM QUADRANGULARE BRÉB. VAR. NOV.

(PL. XVII, FIGS. 14-15)

SEMICELLS NEARLY RECTANGULAR, DORSAL MARGIN MODERATELY CONVEX, LATERAL MARGINS STRAIGHT AND PARALLEL, UPPER ANGLES PROVIDED WITH ONE PAIR OF SHORT STOUT SPINES, LOWER ANGLES WITH A SINGLE SPINE, SPINES DIVERGING AND WITH A RATHER MAMILLATE BASE.

LENGTH OF CELL 18.7-19.6 μ ; BREADTH, NOT INCLUDING THE SPINES 17.0-18.0 μ ; BREADTH OF ISTHMUS 11.9 μ .

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN

HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

THIS NEW VARIETY IS NEARLY ALLIED TO STAURASTRUM QUADRANGULARE BRÉB. VAR. CONTECTUM (TURN.) GRÖNBL., BUT NEED NEVER BE CONFUSED WITH THAT VARIETY, DIFFERING IN THE NUMBER, ARRANGEMENT AND SHAPE OF ITS SPINES.

SUGGESTED NAME FOR THE NEW VARIETY: STAURASTRUM QUADRANGULARE BRÉB. VAR. SANPAULENSIS.

STAURASTRUM ROTULA NORDST.

VIDENSK. MEDDR. DANSK NATURH. FOREN. KBH. [KJØBENHAVN]. 1869

(14-15): 227, T. 4, FIG. 38. 1870.

(PL. XVIII, FIG. 4)

CELLS ABOUT $1 \frac{1}{4}$ - $1 \frac{1}{3}$ TIMES BROADER THAN LONG, INCLUDING THE PROCESSES, MODERATELY CONSTRICTED IN THE MIDDLE, SINUS USUALLY ACUTE-ANGLED AND WIDELY OPEN; SEMICELLS NEARLY 6-ANGULAR, UPPER ANGLES PRODUCED TO FORM LONG SLENDER PROCESSES, USUALLY PARALLEL, SOMETIMES SLIGHTLY INCURVED, GRADUALLY TAPERING FROM BASE TO APEX, WITH 2-4 SERIES OF DENTICULATIONS, TIPPED WITH 3 OR 4 MINUTE SPINES; APICAL VIEW OF CELL 7-9-RADIATE, PROCESSES LONG, WITH DENTICULATIONS SOMEWHAT STRONGER TOWARD THE

BASE OF THE PROCESS, APEX OF SEMICELL WITH A LARGE CONICAL NODULE NEAR THE BASE OF EACH PROCESS; CELL WALL COLORLESS, SMOOTH OR SOMETIMES WITH THE APEX MINUTELY PUNCTATE.

LENGTH OF CELL 45.9 μ ; BREADTH, INCLUDING THE PROCESSES 59.5 μ ; BREADTH OF ISTHMUS 10.2 μ .

ZYGOSPORE, ACCORDING TO WHELDEN (1943), SPHERICAL AND ADORNED WITH MANY STRAIGHT AND/OR SLIGHTLY CURVED SPINES, WHICH ARE USUALLY SIMPLE OR SOMETIMES TIPPED WITH 2 OR RARELY 3 CURVED TEETH.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESSEN 1890): PIRASSUNUNGA, RIO CLARO, SÃO CARLOS (BORGE 1918), SÃO PAULO (WITTRICK & NORDSTEDT 1883, BORGE 1918), SERRA DA BOCAINA (BORGE 1918); MINAS GERAIS: CAPIVARI (NORDSTEDT 1877), LAGOA SANTA (NORDSTEDT 1870, WILLE 1884, WARMING 1892); GOIÁS: CONCEIÇÃO (FÖRSTER 1964); MATO GROSSO: PORTO DO CAMPO (BORGE 1925); PARÁ: SANTARÉM (GRÖNBLAD 1945).

STAURASTRUM TOHOPEKALIGENSE WOLLE F. MINUS (TURN.) SCOTT & PRESCH. HYDROBIOL. [DEN HAAG]. 17 (1-2): 114, T. 48, FIGS. 4-6. 1961.

(PL. XVII, FIG. 23)

CELLS ABOUT $1\frac{1}{2}$ TIMES AS LONG AS BROAD, WITHOUT THE PROCESSES, MODERATELY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE OR NEARLY RECTANGULAR; SEMICELLS BROADLY OVAL OR SUBGLOBOSE, LATERAL ANGLES PRODUCED TO FORM SOMEWHAT LONG BLENDER PROCESSES USUALLY WITH 2-FURCATE SPREADING APICES, OFTEN WITH 2 OTHER SIMILAR PROCESSES BETWEEN EACH PAIR OF ANGULAR PROCESSES, WITH A FURTHER DORSAL SERIES OF PROCESSES, 2 OF WHICH PROJECT BETWEEN EACH PAIR OF CONSECUTIVE ANGLES; APICAL VIEW OF CELL 3-ANGULAR, SIDES STRAIGHT OR VERY SLIGHTLY CONVEX, ANGLES PRODUCED INTO BLENDER PROCESSES, WITH A PAIR OF DORSAL PROCESSES PROJECTING FROM EACH LATERAL MARGIN, AND FREQUENTLY WITH A PAIR OF PROCESSES ALSO ON THE SAME PLANE AS THE ANGULAR PROCESSES, BENEATH THE DORSAL SERIES; CELL WALL SMOOTH, COLORLESS.

LENGTH OF CELL, NOT INCLUDING THE PROCESSES 28.9μ ;
BREADTH, NOT INCLUDING THE PROCESSES 18.7μ ; BREADTH OF ISTHMUS 13.6μ .

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

STAUROSTRUM TRIFIDUM NORDST. VAR. GLABRUM LAGERH. F. TORTUM

BØRGES.

VIDENSK. MEDDR. DANSK NATURH. FOREN. KBH. [KJØBENHAVN]. 1890:

954, T. 5, FIG. 56. 1890.

(PL. XVII, FIGS. 20-21)

CELLS ABOUT AS LONG AS BROAD, WITH THE SPINES, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE-ANGLED; SEMI-CELLS ELLIPTICAL TO SUBTRIANGULAR, DORSAL AND VENTRAL MARGINS ABOUT EQUALLY CONVEX, ANGLES PROVIDED WITH 3 SPINES USUALLY DIRECTED TO THE OTHER SEMICELL, 2 OF THEM IN AN UPPER LEVEL AND THE THIRD ONE BENEATH AND BETWEEN THE OTHER TWO; APICAL VIEW OF CELL 3-ANGULAR, SIDES USUALLY CONCAVE NEAR ONE ANGLE AND SLIGHTLY CONVEX NEAR THE OTHER, ANGLES BROAD, SLIGHTLY INCURVED, FURNISHED WITH 3 SPINES, 2 OF THEM IN AN UPPER ANGLE AND SOMEWHAT WIDELY SEPARATED BY A DEEP CONCAVE INCISION, THE THIRD SPINE BENEATH AND BETWEEN THE 2 FIRST ONES; CELL WALL SMOOTH, COLORLESS.

LENGTH OF CELL 30.6u; BREADTH, INCLUDING THE SPINES 32.3u; BREADTH OF ISTHMUS 13.6u.

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN AN ARTIFICIAL POND BEHIND THE GREEN HOUSES, AT THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 92).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BØRGESEN 1890); MATO GROSSO: CORUMBÁ (BORGE 1903).

STAURASTRUM TURGESCENS DE NOT.

DESM. ITAL. [GENOVA]. 51, T. 4, FIG. 43. 1867.

(PL. XVII, FIG. 3)

CELLS A LITTLE LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS OPEN AND ACUTE-ANGLED; SEMICELLS ELLIPTICAL; APICAL VIEW OF CELL 3-ANGULAR OR VERY RARELY 4-ANGULAR, SIDES CONCAVE, ANGLES BROADLY ROUNDED; CELL WALL COLORLESS AND VERY FINELY AND IRREGULARLY PUNCTATE.

LENGTH OF CELL 28.9 μ ; BREADTH 23.8 μ ; BREADTH OF ISTHMUS 11.9 μ .

ZYGOSPORE COMPRESSED AND SMOOTH; IN THE BROAD VIEW CIRCULAR AND WITH 9-12 MARGINAL UNDULATIONS; IN THE NARROW VIEW OBLONG-ELLIPTIC.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM AND MARGINS OF A VERY CLEAN AND FAST CREEK BETWEEN KM. 221 AND 222 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 59).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: NEW TO BRAZIL.

STAURASTRUM TURGESCENS DE NOT. IS PROBABLY MOST NEARLY

RELATED TO STAURASTRUM ALTERNANS BRÉB. AND STAURASTRUM PUNCTULATUM BRÉB.. IT DIFFERS, HOWEVER, FROM BOTH SPECIES IN HAVING NEARLY PERFECTLY ELLIPTICAL SEMICELLS AND IN THE COMPRESSED SHAPE OF ITS ZYGOSPORES.

COSMOCLADIUM DE BRÉBISSE, 1856.

COSMOCLADIUM PUSILLUM HILSE

JBER. SCHLES. GES. VATERL. KULT. [BRESLAU]. 1865: 117. 1866.

(PL. XIX, FIGS. 5-7)

CELLS ABOUT AS LONG AS BROAD OR UP TO $1\frac{1}{2}$ TIMES LONGER THAN BROAD, DEEPLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR; SEMICELLS OBLONG-ELLIPTIC OR SOMEWHAT TRAPEZIFORM, BASAL ANGLES SUBRECTANGULAR AND ROUNDED, LATERAL MARGINS CONVEX, APICAL MARGIN SOMEWHAT FLATTENED OR BROADLY TRUNCATE; LATERAL VIEW OF SEMICELL SUBCIRCULAR; APICAL VIEW ELLIPTIC; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS AXILE, EACH WITH A SINGLE CENTRAL PYRENOID. COLONIES FREE-FLOATING, USUALLY SMALL, VERY SELDOM WITH MORE THAN 4 CELLS, RARELY OR NEVER BRANCHED; CELLS USUALLY WITH THEIR BROAD SURFACE PERPENDICULAR TO THE DIRECTION OF THE CONNECTING GELATINOUS THREADS; MUCILAGINOUS ENVELOPE, WHEN PRESENT, VERY THIN AND SCARCELY VISIBLE.

LENGTH OF CELL 8.6-12.4 μ ; BREADTH 5.0-8.6 μ ; BREADTH OF ISTHMUS 1.8-3.0 μ ; THICKNESS OF CELL 4.0-4.3 μ .

ZYGOSPORE UNKNOWN.

HAB. - PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: THIS IS THE FIRST RECORD FOR THE GENUS TO BRAZIL.

SPONDYLOSIUM DE BRÉBISSE, 1844.

SPONDYLOSIUM DESMIDIIFORME (BORGE) G. S. WEST

J. BOT., LOND. [LONDON]. 42: 286, PL. 464, FIGS. 11, 12 (13?), 1904.

(PL. XIX, FIG. 8)

CELLS ABOUT 3 OR 4 TIMES LONGER THAN BROAD, SLIGHT BUT CONSPICUOUSLY CONSTRICTED IN THE MIDDLE, SINUS SUBRECTANGULAR; SEMICELLS ELONGATE-ELLIPTICAL, APICAL MARGINS BROAD AND TRUNCATE, ADJOINED IN ALMOST THE FULL EXTENSION OF THEIR APICES TO FORM LONG FILAMENTOUS COLONIES; LATERAL VIEW OF CELLS SUBQUADRANGULAR; APICAL VIEW OF CELL NEARLY ELLIPTICAL, WITH A SOMEWHAT ROUNDED MAMILLA-LIKE PROTUBERANCE AT EACH POLE; CELL WALL COLOR-

LESS AND SMOOTH; CHLOROPLASTS AXILE; FILAMENTS TWISTED, ENCLOSED IN A GELATINOUS SHEATH.

LENGTH OF CELL 10.2-11.0 μ ; BREADTH 25.5-28.9 μ ; BREADTH OF ISTHMUS 20.4 μ .

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH A FLOATING MASS OF SPIROGYRA SP. AND ZYGNEMA SP. IN A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 48); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: BAHIA: LENÇÕES ORANGE, MINAS DE CONTAS (FÖRSTER 1964); PARÁ: NEAR QUATIPURU (SIOLI 1960); RIO GRANDE DO SUL: CRUZ ALTA (BORGE 1903).

HYALOTHECA EHRENBER, 1840

HYALOTHECA INDICA TURN.

K. SV. VET.-AKAD. HANDL. [HANDLINGAR]. 25 (5): 152, T. 22,

FIG. 17. 1893.

(PL. XIX, FIG. 11)

CELLS A LITTLE LONGER THAN BROAD, SOMEWHAT BARREL-SHAPED WITH A SLIGHT AND SOMETIMES ACUTE MEDIAN CONSTRICTION, APICAL MARGINS BROAD AND TRUNCATE; APICAL VIEW OF CELL CIRCULAR; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS AXILE, EACH WITH A CENTRAL PYRENOID; FILAMENTS ENCLOSED IN A GELATINOUS SHEATH.

LENGTH OF CELL 17.0-18.7u; BREADTH 13.6u; BREADTH OF ISTHMUS 11.9u.

ZYGOSPORE UNKNOWN.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOATING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46); IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: GOIÁS: FORMOSO (PRESCOTT 1957).

THIS SPECIES RESEMBLES HYALOTHECA DISSILIENS (SMITH) BRÉB. VAR. HIANS WOLLE, BUT IT IS DISTINGUISHED BY ITS RELATIVELY BROADER APICES OF THE CELLS, THE FILAMENTS NOT BEING SO CONSPICUOUSLY EXCAVATED AT THE JOINTS. HYALOTHECA INDICA TURN. COULD ALSO BE CONFUSED WITH HYALOTHECA DISSILIENS (SMITH) BRÉB. VAR. TATRICA RAC., FROM WHICH IT IS DISTINCT BY THE SMALLER SIZE OF

ITS CELLS, AND BY THE DIFFERENT FORM OF ITS MEDIAN CONSTRICTION.

DESMIDIUM C. A. AGARDH, 1824

DESMIDIUM BAILEYI (RALFS) NORDST.

ACTA UNIV. LUND. [LUND] 16: 4. 1880.

(PL. XX, FIG. 3)

CELLS ABOUT AS LONG AS BROAD, CONSTRICTION WHEN PRESENT REDUCED TO A FAINT UNDULATION; SEMICELLS RECTANGULAR OR ALMOST SO, LATERAL MARGINS PARALLEL OR VERY SLIGHTLY RETUSE, APEX WITH A BROAD DEEP SEMIELLIPTIC DEPRESSION THAT GIVES THE APPEARANCE OF SHORT ERECT PROJECTIONS AT EITHER LATERAL MARGIN; SPACES BETWEEN THE CELLS OF CONSIDERABLE SIZE, ELLIPTIC TO SUBRECTANGULAR; APICAL VIEW OF CELL 3- OR 4-ANGULAR WITH SLIGHTLY CONVEX MARGINS AND ROUNDED ANGLES; CELL WALL SMOOTH, COLORLESS; CHLOROPLASTS AXILE, 3- OR 4-LOBED, EACH LOBE WITH A PYRENOID; FILAMENTS STRAIGHT AND NOT INCLOSED IN A GELATINOUS SHEATH.

LENGTH OF CELL 22.1u; BREADTH 22.1u.

ZYGOSPORE SPHERICAL AND SMOOTH.

HAB. - PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 93).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BØRGESEN 1890): SÃO PAULO (WITTROCK & NORDSTEDT 1883); PARÁ: SANTARÉM (GRÖNBLAD 1945).

DESMIDIUM CYLINDRICUM GREV.

SCOT. CRYPT. FL. [EDINBURGH]. 5: 293. 1827.

(PL. XX, FIG. 1)

CELLS ABOUT 2 - 2 $\frac{4}{5}$ TIMES BROADER THAN LONG, SLIGHTLY CONSTRICTED IN THE MIDDLE, SINUS LINEAR; SEMICELLS VERY SHORT, PYRAMIDATE-TRUNCATE, BASAL ANGLES ACUTELY-ROUNDED, LATERAL MARGINS GENTLY 2-UNDULATE, APICAL MARGIN BROAD AND TRUNCATE; APICAL VIEW OF SEMICELL ELLIPTIC WITH A SOMEWHAT ROUNDED MAMILLA-LIKE PROTUBERANCE AT EACH POLE; CELL WALL COLORLESS AND SMOOTH; CHLOROPLASTS AXILE, USUALLY WITH 4-8 MASSIVE RADIATING LOBES, IN EACH OF WHICH IS A PYRENOID; FILAMENTS TWISTED, USUALLY INCLOSED IN A GELATINOUS SHEATH AND WITH A THICKENED PROTRUDING RIM BETWEEN EACH PAIR OF CELLS.

LENGTH OF CELL 18.7-27.2u; BREADTH 54.4-78.0u; BREADTH OF ISTHMUS 49.3-60.0u.

ZYGOSPORE LARGE AND SMOOTH, GLOBOSE OR SUBGLOBOSE, FORMED AFTER THE DISSOCIATION OF THE FILAMENT INTO INDIVIDUAL CELLS, AND USUALLY CONTAINED IN ONE OF THE CONJUGATING CELLS, THE OTHER

REMAINING ATTACHED.

HAB. - INTERMINGLED WITH FLOATING FILAMENTS OF SPIROGYRA SP. AND ZYGNEMA SP. IN A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 48); PLANKTONIC IN SOME PERMANENT POOLS AT THE ENTRANCE OF THE SÃO PAULO BOTANICAL GARDEN, SÃO PAULO (C.E.M.B. 95); IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: CAMPINAS (BORGE 1918), ITAPURA (LEMMERMANN 1915), LEME (WITTRICK & NORDSTEDT 1880), SÃO PAULO (BORGE 1918, BICUDO & BICUDO 1962); GOIÁS: NEAR PEIXE (PRESCOTT 1957); MATO GROSSO: BANDEIRA (BORGE 1903), CORUMBÁ (BORGE 1925), CUIABÁ (BORGE 1903), SÃO LUÍS DE CÁCERES (BORGE 1925); RIO GRANDE DO SUL (KLEEREKOPER 1955): CACHOEIRA, CRUZ ALTA, PORTO ALEGRE (BORGE 1903).

ONE OF THE MOST PECULIAR AND IMPORTANT FACTS ABOUT DESMIDIUM CYLINDRICUM GREV. IS THAT ITS ZYGOSPORE IS FORMED WITHIN ONE OF THE CONJUGATING CELLS. THIS IS THE ONLY KNOWN DESMID IN WHICH THE REPRODUCTION IS NORMALLY OF SUCH A HIGH TYPE THAT THE CONJUGATING CELLS CAN BE DEFINITELY RECOGNIZED AS MALE AND FEMALE GAMETANGIA, ALTHOUGH THE SAME CONDITION IS KNOWN TO OCCUR OCCASIONALLY AS AN ABNORMALITY IN HYALOTHECA DISSILIENS (SMITH) BRÉB.

DESMIDIUM GRACILICEPS (NORDST.) LAHERH.

ÖFVERS. K. VETENSKÅKAD. FÖRH. [STOCKHOLM]. 42 (7): 228, T. 27,

FIG. 3. 1886.

(PL. XIX, FIG. 12)

CELLS ABOUT AS LONG AS BROAD, SLIGHTLY CONSTRICTED IN THE MIDDLE, SINUS SHALLOW AND LINEAR; SEMICELLS SHORTLY PYRAMIDATE-TRUNCATE, BASAL ANGLES SUBRECTANGULAR, LATERAL MARGINS 2-UNDULATE, APICAL MARGIN TRUNCATE; APICAL VIEW OF CELL ELLIPTIC, WITH A ROUNDED MAMILLARY PROTUBERANCE AT EACH POLE; CELL WALL COLORLESS AND SMOOTH; CHLOROPLASTS AXILE, 6-8-LOBED, WITH A SINGLE CENTRAL PYRENOID; FILAMENTS TWISTED, USUALLY NOT INCLOSED IN A GELATINOUS SHEATH, WITH A THICKENED PROTRUDING RIM BETWEEN EACH PAIR OF CELLS.

LENGTH OF CELL 22.1u; BREADTH 22.1u; BREADTH OF ISTHMUS 19.0u.

ZYGOSPORE SUBRECTANGULAR, PROVIDED WITH A NUMBER OF SHORT STOUT NODULES AT THE 2 OPPOSITE ENDS ONLY, SMOOTH IN THE MIDDLE PART.

HAB. - IN GELATINOUS MASSES ATTACHED TO THE BOTTOM OF A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 52).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO (BÖRGESEN 1890): BELÉM, PIRASSUNUNGA, SÃO PAULO (BORGE 1918); BAHIA: LENÇÕES ORANGE, MINAS DE CONTAS (FÖRSTER 1964); MATO GROSSO: COXIPÓ (BORGE 1903), NEAR THE XINGU RIVER HEADWATERS (SCHMIDLE 1901); PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO GRANDE DO SUL: PORTO ALEGRE (BORGE 1903).

DESMIDIUM QUADRATUM NORDST.

ACTA UNIV. LUND. [LUND]. 2: 49, T. 1, FIG. 24. 1873.

(PL. XX, FIG. 2)

CELLS ABOUT $1 \frac{1}{4}$ - $1 \frac{2}{5}$ TIMES BROADER THAN LONG, SLIGHTLY CONSTRICTED IN THE MIDDLE, SINUS SHALLOW AND LINEAR; SEMICELLS SHORT, PYRAMIDATE-TRUNCATE, BASAL ANGLES ACUTELY-ROUNDED, LATERAL MARGINS SOMEWHAT 2-UNDULATE, APICAL MARGIN RATHER BROAD AND TRUNCATE; APICAL VIEW OF SEMICELL SUBCIRCULAR, WITH 2 OPPOSITE MAMILLAE; CELL WALL COLORLESS, SMOOTH OR SOMETIMES WITH A SINGLE ROW OF GRANULES AT A CERTAIN DISTANCE FROM THE APEX OF EACH SEMICELL; CHLOROPLASTS AXILE, WITH A CENTRAL PYRENOID AND 6 OR 7 RADIATING PLATES; FILAMENTS TWISTED, SOMETIMES ENCLOSED IN A GELATINOUS SHEATH.

LENGTH OF CELL 34.0μ ; BREADTH 47.6μ ; BREADTH OF ISTHMUS 40.8μ .

ZYGOSPORE GLOBOSE OR SUBGLOBOSE, WITH A THICK SMOOTH WALL.

HAB. - IN TEMPORARY POOLS AT THE MARGINS OF THE PINHEIROS RIVER, SÃO PAULO (SP 7441).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945).

THE PRESENT PLANTS ARE GREATER THAN THE USUAL LIMITS GIVEN FOR THIS SPECIES. HOWEVER, GRÖNBLAD (1945) REPORTS SPECIMENS FROM 'FAZENDA TAPERINHA', PARÁ, WHICH ARE VERY CLOSE TO THOSE FROM THE STATE OF SÃO PAULO IN WHAT MEASUREMENTS ARE CONCERNED.

DESMIDIUM SWARTZII C. A. AGARDH VAR. QUADRANGULATUM (RALFS) ROY

ANN. SCOT. NAT. HIST. [EDINBURGH]. 2: 9. 1894.

(PL. XX, FIG. 4)

CELLS ABOUT $2\frac{1}{2}$ - 4 TIMES BROADER THAN LONGER, SLIGHTLY CONSTRICTED IN THE MIDDLE, SINUS SHALLOW AND LINEAR; SEMI-CELLS SOMEWHAT PYRAMIDATE-TRUNCATE, BASAL ANGLES SUBRECTANGULAR AND ROUNDED, LATERAL MARGINS 2-UNDULATE, APICAL MARGIN BROAD AND TRUNCATE; APICAL VIEW OF CELL QUADRANGULAR, WITH SOMEWHAT RETUSE MARGINS AND ROUNDED ANGLES; CELL WALL COLORLESS AND SMOOTH;

CHLOROPLASTS AXILE, 4-LOBED, EACH LOBE WITH A PYRENOID; FILAMENTS TWISTED, USUALLY DESTITUTE OF A CONSPICUOUS GELATINOUS SHEATH.

LENGTH OF CELL 18.7u; BREADTH 74.8u; BREADTH OF ISTHMUS 56.1u.

ZYGOSPORE ELLIPTIC, INNER LAYER OF WALL TAWNY.

HAB. - NEAR THE CITY OF PIRASSUNUNGA, AT LAGEADO, SÃO PAULO - THE EXACT PLACE NOT SPECIFIED (SP 7452).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: PARÁ: SANTARÉM (GRÖNBLAD 1945); RIO DE JANEIRO (BORGE 1899).

THIS VARIETY DIFFERS FROM THE TYPICAL IN ITS QUADRANGULAR APICAL VIEW OF THE CELLS, AND ITS RELATIVELY GREATER BREADTH IN FRONT VIEW.

BAMBUSINA KÖTZING, 1845.

BAMBUSINA BREBISSEANII (RALFS) CLEVE

ÖFVERS. K. VETENSKAKAD. FÖRH. [STOCKHOLM]. 1863 (10): 496. 1864.

(PL. XIX, FIG. 9)

FILAMENTS TWISTING, FORMED OR SOMEWHAT BARREL-SHAPED CELLS; SEMICELLS WITH A SMALL BASAL SWELLING, LATERAL MARGINS SLIGHTLY CONCAVE EXCEPT FOR THE BROAD RIM AT THE BASE, AND A

SLIGHTLY MEDIAN CONSTRICTION; APEX BROAD AND TRUNCATE; CELL WALL WITH A VERY DELICATE LONGITUDINAL STRIATION AT THE BASE OF SEMICELLS; APICAL VIEW CIRCULAR, WITH 2 OPPOSITE MAMILLAE; CHLOROPLASTS AXILE, WITH 6 RADIATING LAMELLAE AND A SINGLE CENTRAL PYRENOID.

LENGTH OF CELL 30.6-37.5 μ ; BREADTH 22.1-22.8 μ ; BREADTH OF ISTHMUS 20.2 μ .

ZYGOSPORE OVAL AND SMOOTH.

HAB. - INTERMINGLED WITH FILAMENTS OF OEDOGONIUM SP., BULBOCHAETE SP. AND SPIROGYRA SP. FLOATING ON A CREEK NEAR PIRASSUNUNGA, SÃO PAULO (SP 7447).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: BAHIA: LENÇÕES O-RANGE, MINAS DE CONTAS (FÖRSTER 1964); GOIÁS: NEAR PEIXE (PRESCOTT 1957); PARÁ: SANTARÉM (GRÖNBLAD 1945).

BAMBUSINA BREBISSEONII (RALFS) CLEVE VAR. GRACILESCENS NORDST.

WITTRO. & NORDST. ALG. EXSIC. [LUNDAE]. 8: No. 367. 1880.

(PL. XIX, FIG. 10)

DIFFERS FROM THE TYPICAL FORM ONLY IN THE RELATIVELY SMALLER BREADTH OF THE CELLS.

LENGTH OF CELL 22.1 μ ; BREADTH 15.3 μ ; BREADTH OF ISTHMUS 13.6 μ .

ZYGOSPORE SUBQUADRATE (RECTANGULAR) IN OUTLINE AND WITH
ROUNDED ANGLES.

HAB. - INTERMINGLED WITH FILAMENTS OF ZYGNEMA SP. FLOAT-
ING ON A CLEAN SLOW-FLOWING STREAM BETWEEN KM. 216 AND 217 ON THE
SÃO PAULO-BROTAS ROAD, ITIRAPINA, SÃO PAULO (C.E.M.B. 46).

BRAZILIAN GEOGRAPHICAL DISTRIBUTION: SÃO PAULO: PI-
RASSUNUNGA (WITTROCK & NORDSTEDT 1880); MINAS GERAIS: CALDAS
(WILLE 1884); PARÁ: SANTARÉM (GRÖNBLAD 1945).

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S U M M A R Y

THE PRESENT THESIS IS A CONTRIBUTION TO THE KNOWLEDGE OF THE DESMIDS (CHLOROPHYCEAE) OF THE STATE OF SÃO PAULO, BRAZIL, INCLUDING A FEW FROM 2 LOCALITIES IN THE NEIGHBOUR STATE OF MINAS GERAIS.

THE STUDY OF THESE FRESH-WATER ALGAE HAS BEEN NEGLECTED BY THE BRAZILIAN BOTANISTS. BORGE, IN 1918, MADE THE ONLY MORE EXTENSIVE STUDY ON THE DESMIDS OF THE STATE OF SÃO PAULO, WHILE SEVERAL OTHER PERSONS HAVE REPORTED SPECIES FROM THIS AREA. NO OTHER FORMAL STUDY, HOWEVER, HAS EVER BEEN MADE ON THE TAXONOMY AND DISTRIBUTION OF THIS GROUP OF ALGAE OF THE AREA COVERED BY THIS INVESTIGATION. THE CHIEF OBJECTIVES OF THIS STUDY HAVE BEEN, THEN, THE COLLECTION AND IDENTIFICATION OF THE DESMIDS OF

THE STATE OF SÃO PAULO.

IN ORDER TO CARRY OUT THE MAJOR OBJECTIVES OF THIS STUDY, REPRESENTATIVE ALGAL SAMPLES WERE PERSONALLY COLLECTED FROM VARIOUS CITIES IN THE STATE OF SÃO PAULO, AND INCLUDED SOME MR. ILVANY FERRAZ MARQUES VÁLIO HAS COLLECTED DURING HIS EXCURSIONS TO THE STATE OF MINAS GERAIS.

THE SAMPLES WERE CAREFULLY SCRUTINIZED IN THE LABORATORY AND EACH SPECIES, VARIETY OR FORMA OF DESMID OBSERVED WAS RECORDED. FROM THE 50 COLLECTIONS AT MY DISPOSAL I HAVE BEEN ABLE TO RECORD 95 SPECIES, 66 VARIETIES, AND 16 NAMED FORMAE, A TOTAL OF 177 TAXA OF WHICH 20, OR APPROXIMATELY 11.3 PER CENT, I HAVE CONSIDERED AS NEW TO SCIENCE.

FOR EACH MATERIAL A DESCRIPTION, THE MOST COMPLETE POSSIBLE, THE NECESSARY MEASUREMENTS FOR IDENTIFICATIONAL PURPOSES, AND THE RESPECTIVE BRAZILIAN GEOGRAPHICAL DISTRIBUTION IS GIVEN. 18 PLATES OF SELECTED DRAWINGS MADE BY USE OF THE CAMERA LUCIDA AND 2 MAPS SUPPLEMENT THE WRITTEN TEXT.

AFTER PRESENTING A LIST OF THE PLANTS I HAVE RECORDED FROM THE AREA, SOME INTERESTING BIOGEOGRAPHICAL OBSERVATIONS CAN BE MADE: 1) A PREVALENCE OF SPECIES OF COSMARIVM AND CLOSTERIVM OVER THE OTHER GENERA; 2) AN EXTREMELY HIGH NUMBER OF THE MOST COMMON COSMOPOLITAN FORMS; 3) THE PRESENCE OF A TROPICAL AMERICAN ENDEMIC GROUP RELATIVELY DISCRETE; 4) THE RELATIVE ABSENCE

OF THE GREATER FORMS OF MICRASTERIAS AND EUASTRUM, AND OF THE FILAMENTOUS FORMS; 5) THE EXISTENCE OF A PANTROPICAL RESIDUAL GROUP WHICH IS SOMEWHAT MUCH REDUCED.

THE DESMID FLORA OF THE REGION I HAVE STUDIED HAS MANY INTERESTING SIMILARITIES WITH THE DESMID FLORA OF THE REGION KRIEGER CALLED INDO-MALAYAN-NORTH AUSTRALIAN. ABOUT 27 PER CENT OF THE TOTAL TAXA PRESENTLY LISTED FOR THE STATE OF SÃO PAULO AND THE 2 LOCALITIES IN THE STATE OF MINAS GERAIS, ARE ALSO KNOWN TO OCCUR IN THE INDO-MALAYAN-NORTH AUSTRALIAN AREA. STAU-
RASTRUM TOHOPEKALIGENSE WOLLE F. MINUS (TURN.) SCOTT & PRESC. IS AN ORIENTAL AND BRAZILIAN FORM; THIS IS ALSO TRUE FOR PLEURO-
TAENIUM OVATUM NORDST..

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R E S U M O

A PRESENTE TESE É UMA CONTRIBUIÇÃO AO CONHECIMENTO DAS DESMÍDIAS (CHLOROPHYCEAE) DO ESTADO DE SÃO PAULO, BRASIL, INCLUINDO-SE ALGUMAS POUCAS COLETADAS EM 2 LOCALIDADES NO ESTADO VIZINHO DE MINAS GERAIS.

O ESTUDO DESSAS ALGAS DE ÁGUA DOCE, NO BRASIL, ESTÁ PRÁTICAMENTE POR SER FEITO. BORGE, EM 1918, PUBLICOU O ÚNICO TRABALHO MAIS INTENSIVO SOBRE AS DESMÍDIAS DO ESTADO DE SÃO PAULO, APESAR DE VÁRIOS OUTROS AUTÔRES HAVEREM MENCIONADO GÊNEROS, ESPÉCIES, VARIEDADES E MESMO FORMAS PARA ESSA ÁREA, TANTO EM DATAS ANTERIORES COMO POSTERIORES ÀQUELA MENCIONADA. PORÉM, NENHUM OUTRO ESTUDO MAIS SISTEMATIZADO FOI FEITO SOBRE A TAXONOMIA E DISTRIBUIÇÃO DESSE GRUPO DE ALGAS PARA A ÁREA COBERTA NESTE TRABALHO. ASSIM, OS PRINCIPAIS OBJETIVOS DÊSTE ESTUDO SÃO A CO-

LETA E A IDENTIFICAÇÃO DAS DESMÍDIAS DO ESTADO DE SÃO PAULO.

DE MODO A SATISFAZER OS OBJETIVOS DÊSTE ESTUDO, FORAM COLETADAS VÁRIAS AMOSTRAS DE ÁGUA EM DIVERSOS PONTOS DO ESTADO DE SÃO PAULO, INCLUINDO-SE ALGUMAS OUTRAS QUE O SR. IVANY FERRAZ MARQUES VÁLIO COLETOU DURANTE SUAS EXCURSÕES AO ESTADO DE MINAS GERAIS.

ESSAS AMOSTRAS FORAM CUIDADOSAMENTE EXAMINADAS EM LABORATÓRIO E CADA ESPÉCIE, VARIEDADE OU FORMA DE DESMÍDIA OBSERVADA FOI DOCUMENTADA. DAS 50 COLEÇÕES AO MEU DISPOR FORAM INVENTARIADAS 95 ESPÉCIES, 66 VARIEDADES E 16 FORMAS, NUM TOTAL DE 177 TAXA DIFERENTES E DOS QUAIS 20, OU APROXIMADAMENTE 11,3%, FORAM CONSIDERADAS NOVAS PARA A CIÊNCIA.

CADA MATERIAL IDENTIFICADO FOI DESCRITO EM SEUS MÍNIMOS DETALHES MORFOLÓGICOS, FORNECENDO-SE AINDA AS MEDIDAS NECESSÁRIAS PARA SUA PRECISA IDENTIFICAÇÃO SISTEMÁTICA, BEM COMO A RESPECTIVA DISTRIBUIÇÃO GEOGRÁFICA EM TERRITÓRIO BRASILEIRO. 18 PRANCHAS COM DESENHOS SELECIONADOS E FEITOS COM O AUXÍLIO DE CÂMERA LÚCIDA, ALÉM DE 2 MAPAS, COMPLEMENTAM O TEXTO.

APÓS EXAMINADA A LISTA DAS PLANTAS IDENTIFICADAS PARA A ÁREA ESTUDADA, ALGUMAS OBSERVAÇÕES BIOGEOGRÁFICAS INTERESSANTES PODEM SER TIRADAS: 1) O PREDOMÍNIO MARCADO DAS ESPÉCIES DE COSMARIUM E CLOSTERIUM SÔBRE AQUELAS DOS DEMAIS GÊNEROS; 2) O NÚMERO EXTREMAMENTE ELEVADO DAS FORMAS COSMOPOLITAS BANAIS; 3) A PRESENÇA DE UM GRUPO ENDÊMICO TROPICAL AMERICANO RELATIVAMENTE

DISCRETO; 4) A RELATIVA AUSÊNCIA DAS FORMAS MAIORES DE MICRASTERIAS E EUASTRUM BEM COMO DAS FORMAS FILAMENTOSAS; E, 5) A EXISTÊNCIA DE UM GRUPO RESIDUAL PANTROPICAL RELATIVAMENTE REDUZIDO.

A FLORA DESMIDIOLÓGICA DA REGIÃO ORA ESTUDADA TEN MUITA SEMELHANÇA COM AQUELA DA REGIÃO DENOMINADA POR KRIEGER INDO-MALÁSICA-NORTE AUSTRALIANA. CÊRCA DE 27% DOS TAXA PRESENTEMENTE MENCIONADOS PARA O ESTADO DE SÃO PAULO E PARA AS 2 LOCALIDADES NO ESTADO DE MINAS GERAIS, JÁ SÃO CONHECIDAS PARA A REGIÃO INDO-MALÁSICA-NORTE AUSTRALIANA. STAUROSTRUM TOHOPEKALIGENSE WOLLE F. MINUS (TURN.) SCOTT & PRESC., POR EXEMPLO, É CONSIDERADA UMA FORMA ORIENTAL E BRASILEIRA; O MESMO É VÁLIDO PARA PLEUROTAENIUM OVATUM NORDST..

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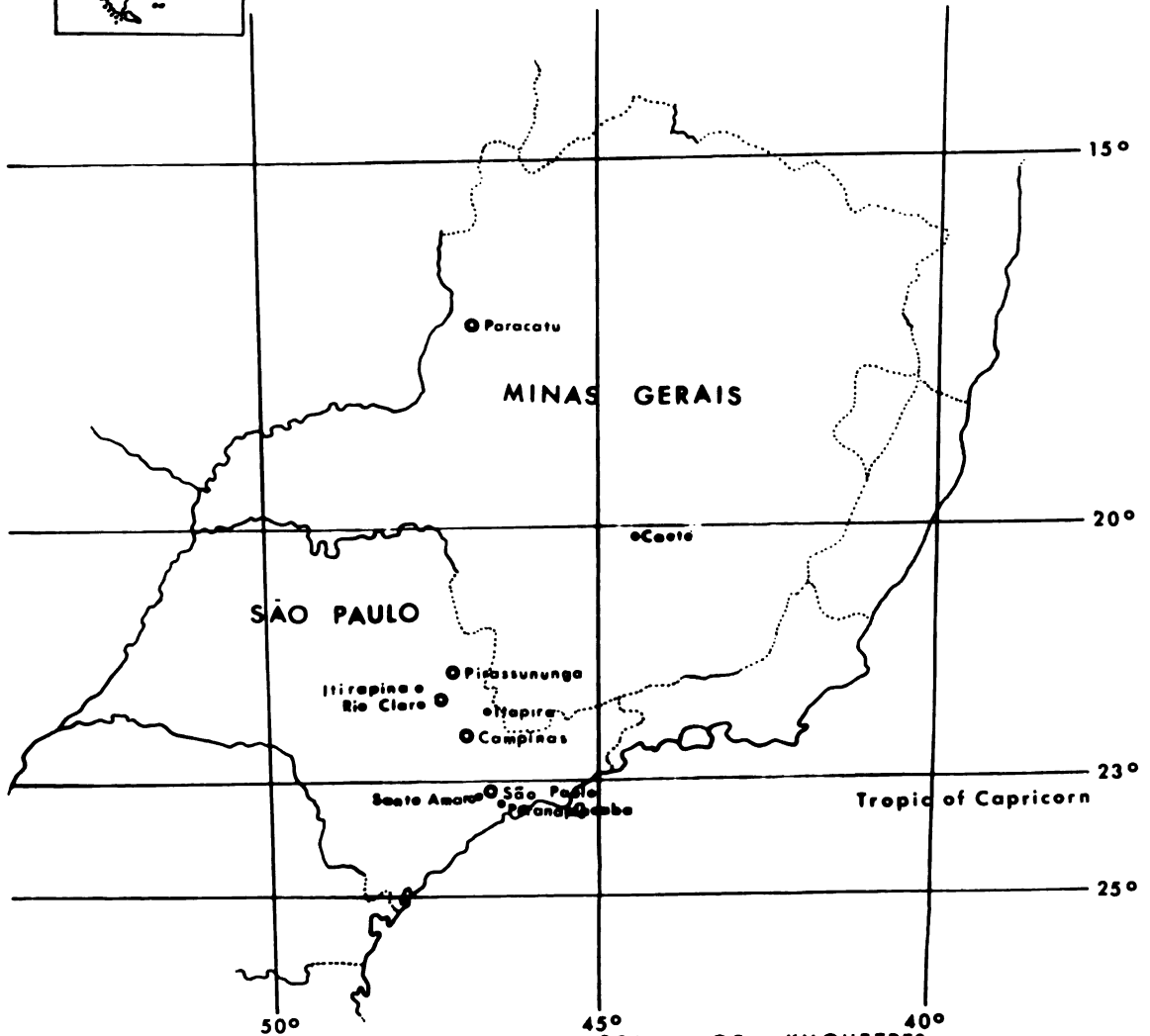
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PLATE I

LOCALITIES WHERE ALGAE HAVE BEEN COLLECTED (WITHIN THE
SCOPE OF THIS PAPER).



45° 40°
SCALE OF KILOMETRES

0 100 200 300 400 500
SCALE OF MILES

0 100 200 300 400 500

PLATE II

STATE OF SÃO PAULO: GEOLOGICAL MAP.

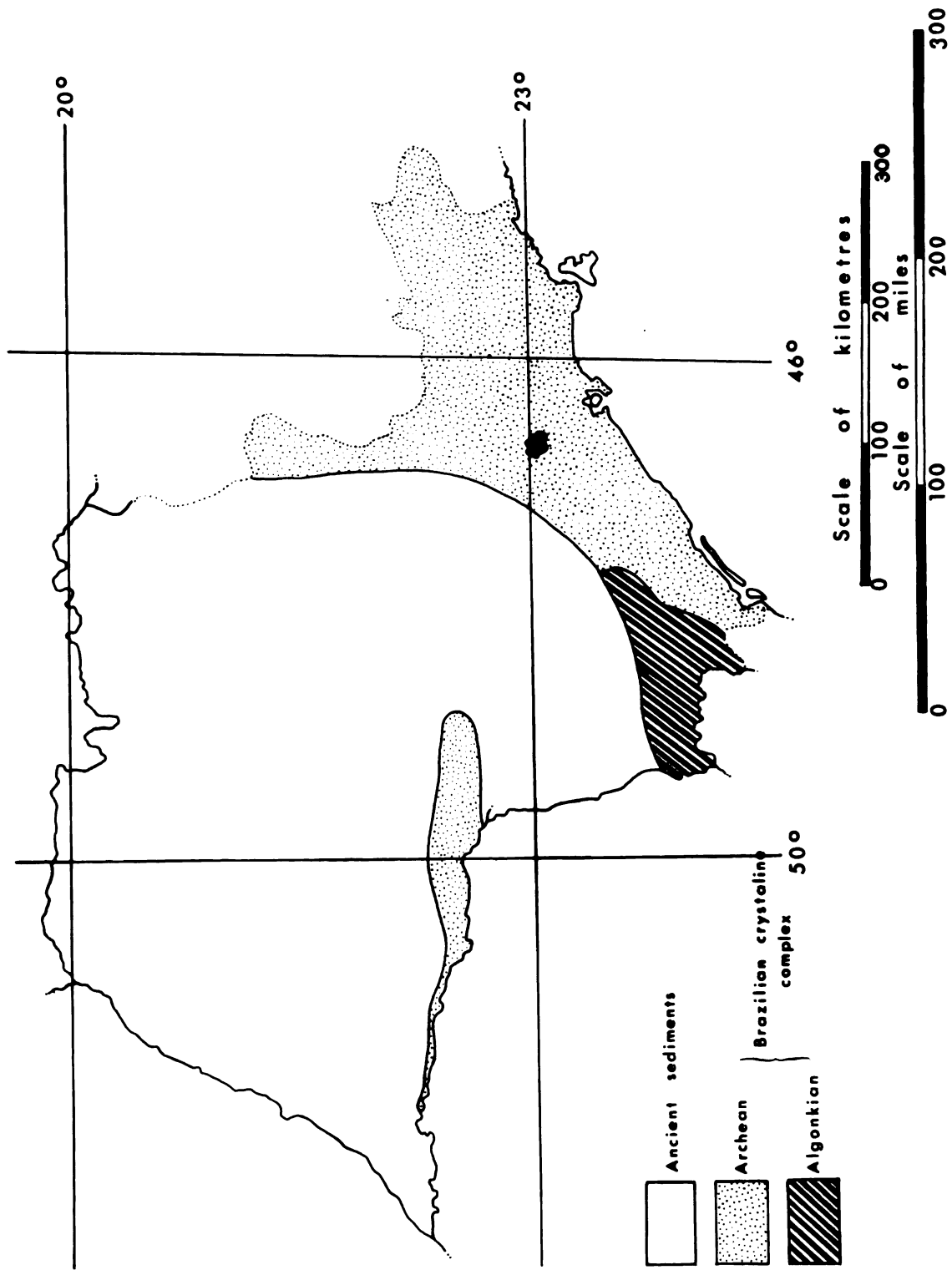


PLATE III

FIGS.	PAGE
1-2. <u>CYLINDROCYSTIS BREBISSEI</u> MENEGH.	14.
3. <u>CYLINDROCYSTIS BREBISSEI</u> MENEGH. VAR. <u>MINOR</u> WEST & WEST	15.
4. <u>SPIROTAENIA OBSCURA</u> RALFS	13.
5. <u>MESOTAENIUM DE GREYI</u> TURN. VAR. <u>BREVE</u> W. WEST	10.
6. <u>MESOTAENIUM ENDLICHERIANUM</u> NÄG.	11.
7. <u>MESOTAENIUM MIRIFICUM</u> ARCH.	13.
8. <u>MESOTAENIUM MACROCOCCUM</u> (KÜTZ.) ROY & BISS.	11.
9. <u>MESOTAENIUM MACROCOCCUM</u> (KÜTZ.) ROY & BISS. VAR. <u>MI-</u> <u>CROCOCCUM</u> (KÜTZ.) WEST & WEST	12.
10. <u>ROYA OBTUSA</u> (BRÉB.) WEST & WEST	17.
11-12. <u>NETRIUM DIGITUS</u> (EHR.) ITZ. & ROTHE VAR. <u>LAMELLOSUM</u> (BRÉB.) GRONBL. 12, APEX OF SEMICELL	18.
13. <u>NETRIUM INTERRUPTUM</u> (BRÉB.) LÜTK. VAR. <u>MINOR</u> (BORGE) KR.	20.
14. <u>NETRIUM DIGITUS</u> (EHR.) ITZ. & ROTHE VAR. <u>NÄGELII</u> (BRÉB.) KR.	19.

PLATE IV

FIGS.	PAGE
1-4. <u>CYLINDROCYSTIS CRASSA</u> DE BARY VAR. <u>ITIRAPINENSIS</u> , VAR. NOV. 1, 2, MACROSCOPIC ASPECT OF THE COLONIES; 3, ENLARGED PORTION OF A FILAMENT; 4, DETAIL OF A CELL	16.
5. <u>GONATOZYGON BREBISSEI</u> DE BARY VAR. <u>MINIMUM</u> WEST & WEST	21.
6-7. <u>GONATOZYGON MONOTAENIUM</u> DE BARY. 7, APEX OF SEMI- CELL	22.
8. <u>PENIUM CYLINDRUS</u> (EHR.) BRÉB.	23.
9-10. <u>PENIUM MARGARITACEUM</u> (EHR.) BRÉB.	24.
11. <u>PENIUM MARGARITACEUM</u> (EHR.) BRÉB. F. <u>GLABRA</u> MESS. ..	25.
12. <u>PENIUM SILVAE NIGRAE</u> RAB. F. <u>MINOR</u> BOUR. & MANG. ...	26.
13. <u>PENIUM SILVAE NIGRAE</u> RAB. VAR. <u>PARALLELUM</u> KR. F. <u>MI-</u> <u>NUS</u> , F. NOV.	26.

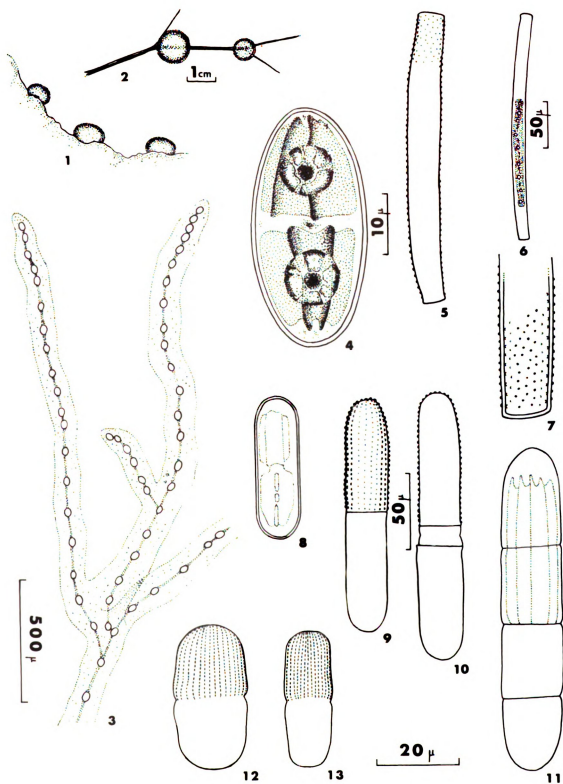
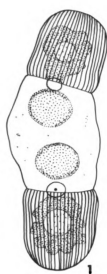
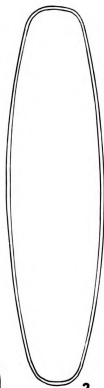


PLATE V

FIGS.	PAGE
1. <u>PENIUM</u> <u>SILVAE NIGRAE</u> RAB. F. <u>MINOR</u> BOUR. & MANG., VEGETATIVE DIVISION	26.
2. <u>CLOSTERIUM</u> <u>LIBELLULA</u> FOCKE VAR. <u>INTERMEDIUM</u> (ROY & BISSE.) G. S. WEST	41.
3. <u>CLOSTERIUM</u> <u>NAVICULA</u> (BRÉB.) LÜTK.	45.
4. <u>CLOSTERIUM</u> <u>TUMIDUM</u> JOHNS.	53.
5. <u>CLOSTERIUM</u> <u>CORNU</u> EHR.	30.
6-7. <u>CLOSTERIUM</u> <u>INFRACTUM</u> MESS. VAR. <u>SANPAULENSIS</u> , VAR. NOV.	37.
8. <u>CLOSTERIUM</u> <u>VENUS</u> KÜTZ. VAR. <u>INCURVUM</u> (BRÉB.) KR. ...	59.
9. <u>CLOSTERIUM</u> <u>MONILIFERUM</u> (BORY) EHR.	44.
10. <u>CLOSTERIUM</u> <u>PARVULUM</u> NAG.	46.
11-12. <u>CLOSTERIUM</u> <u>DIANAE</u> EHR. 12, APEX OF SEMICELL	33.
13-14. <u>CLOSTERIUM</u> <u>ABRUPTUM</u> W. WEST 14, APEX OF SEMICELL ..	27.



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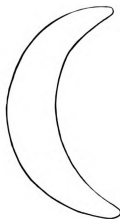
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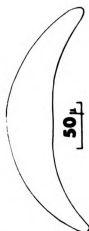
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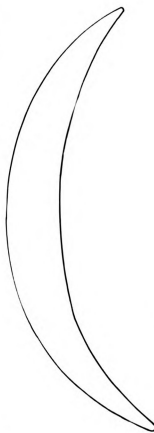
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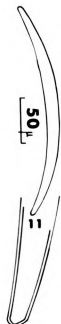
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PLATE VI

FIGS.	PAGE
1. <u>CLOSTERIUM</u> <u>DIANAE</u> EHR. VAR. <u>ARCUATUM</u> (BRÉB.) RAB. ..	34.
2. <u>CLOSTERIUM</u> <u>ACEROSUM</u> (SCHR.) EHR.	28.
3-4. <u>CLOSTERIUM</u> <u>PRITCHARDIANUM</u> ARCH. VAR. <u>MAXIMUM</u> NORDST.	
4, APEX OF SEMICELL	49.
5-6. <u>CLOSTERIUM</u> <u>DIDYMOTOCUM</u> RALFS VAR. <u>MINUS</u> WEST & WEST	
6, APEX OF SEMICELL	35.
7-8. <u>CLOSTERIUM</u> <u>TURGIDUM</u> EHR. 8, APEX OF SEMICELL	54.
9-10. <u>CLOSTERIUM</u> <u>LATERALE</u> NORDST. 10, APEX OF SEMICELL ..	39.
11-12. <u>CLOSTERIUM</u> <u>ULNA</u> FOCKE 12, APEX OF SEMICELL	56.
13-14. <u>CLOSTERIUM</u> <u>LATERALE</u> NORDST. 14, APEX OF SEMICELL ..	39.

PLATE VII

FIGS.	PAGE
1-2. <u>CLOSTERIUM GRACILE</u> BRÉB.	35.
3-4. <u>CLOSTERIUM RALFSII</u> BRÉB. 4, APEX OF SEMICELL	50.
5. <u>CLOSTERIUM KÜTZINGII</u> BRÉB. VAR. <u>LAEVE</u> (RAC.) KR. ...	38.
6. <u>CLOSTERIUM ROSTRATUM</u> EHR.	51.
7. <u>CLOSTERIUM SETACEUM</u> EHR.	52.
8-9. <u>CLOSTERIUM COSTATUM</u> CORDA 9, APEX OF SEMICELL	31.
10. <u>CLOSTERIUM CYNTHIA</u> DE NOT.	32.
11. <u>CLOSTERIUM PORRECTUM</u> NORDST. VAR. <u>ANGUSTATUM</u> WEST & WEST	48.
12-13. <u>CLOSTERIUM LÖFGRENII</u> BORGE 13, APEX OF SEMICELL ...	42.
14. <u>PLEUROTAENIUM MINUTUM</u> (RALFS) DELP. VAR. <u>MINUS</u> (RAC.) KR.	61.
15-17. <u>PLEUROTAENIUM TRABECULA</u> (EHR.) NAG. 16, APEX OF SEMICELL; 17, BASE OF SEMICELL	65.

PLATE VIII

FIGS.		PAGE
1-2.	<u>PLEUROTAENIUM TRABECULA</u> (EHR.) NAG. VAR. <u>RECTUM</u> (DELP.) WEST & WEST	65.
3-4.	<u>PLEUROTAENIUM EHRENBEGII</u> (BRÉB.) DE BARY. 4, APEX OF SEMICELL	60.
5-6.	<u>PLEUROTAENIUM WALLICHIANUM</u> (TURN.) KR. F. <u>ELONGATUM</u> , F. NOV. 6, APEX OF SEMICELL	67.
7-8.	<u>PLEUROTAENIUM TRUNCATUM</u> (BRÉB.) NAG. 8, APEX OF SEMICELL	66.
9-10.	<u>PLEUROTAENIUM OVATUM</u> NORDST.	62.
11.	<u>PLEUROTAENIUM OVATUM</u> NORDST. VAR. <u>TUMIDUM</u> (MASK.) G. S. WEST	63.

PLATE IX

FIGS.	PAGE
1. <u>TETMEMORUS GRANULATUS</u> (BRÉB.) RALFS	70.
2. <u>TETMEMORUS BREBISSENI</u> (MENEGH.) RALFS VAR. <u>MINOR</u> DE BARY	68.
3. <u>EUASTRUM BRASILIENSE</u> BORGE	77.
4. <u>EUASTRUM BRASILIENSE</u> BORGE VAR. <u>MINUS</u> G. S. WEST ...	78.
5. <u>EUASTRUM BRASILIENSE</u> BORGE VAR. <u>SIMPLICIUS</u> BORGE ...	79.
6. <u>EUASTRUM ANSATUM</u> EHR. VAR. <u>CONCAVUM</u> KR.	73.
7. <u>EUASTRUM SUBLOBATUM</u> BRÉB.	91.
8. <u>EUASTRUM SUBLOBATUM</u> BRÉB. F. <u>ELONGATUM</u> , F. NOV.	92.
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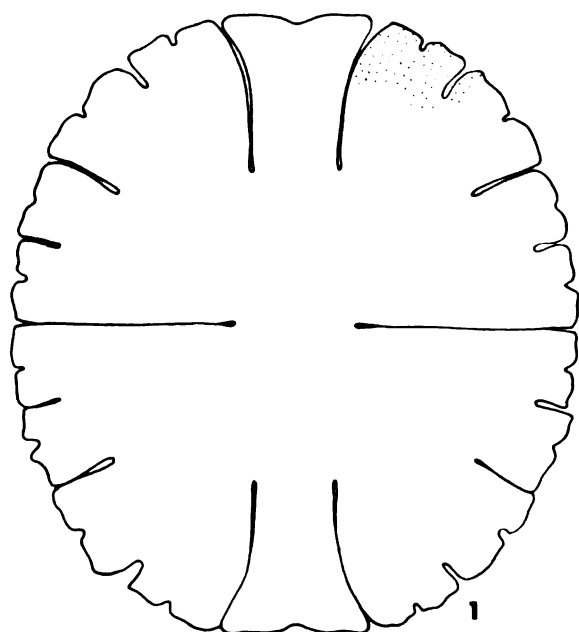
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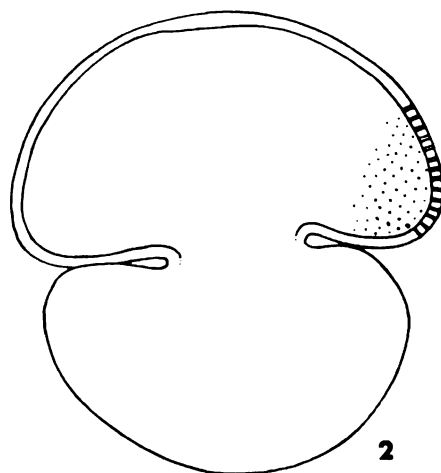
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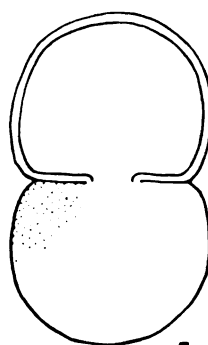
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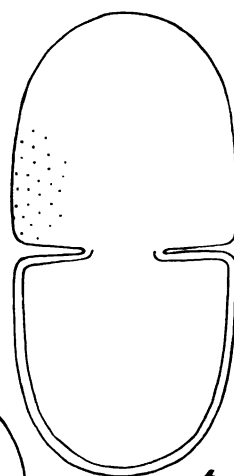
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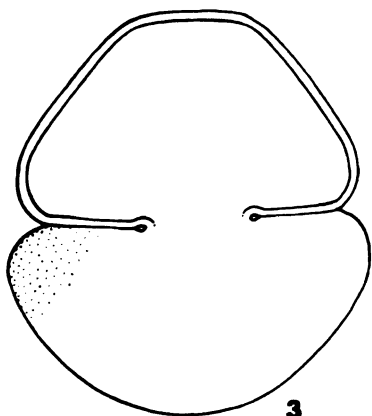
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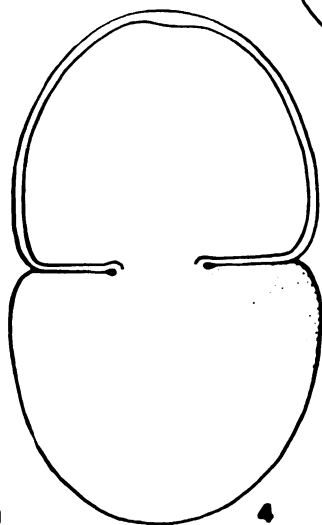


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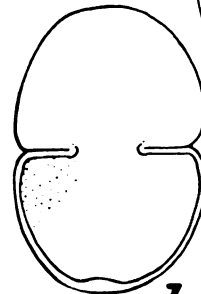


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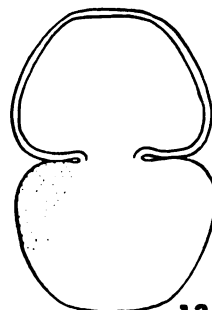
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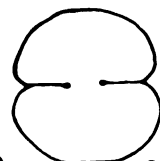
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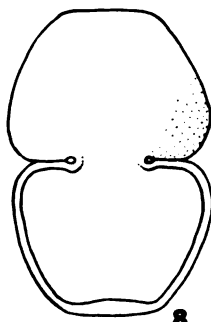
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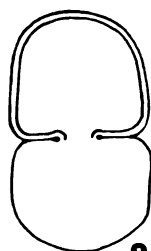
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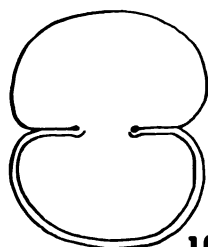
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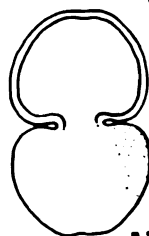
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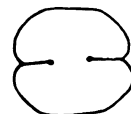
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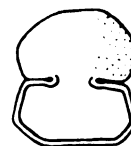
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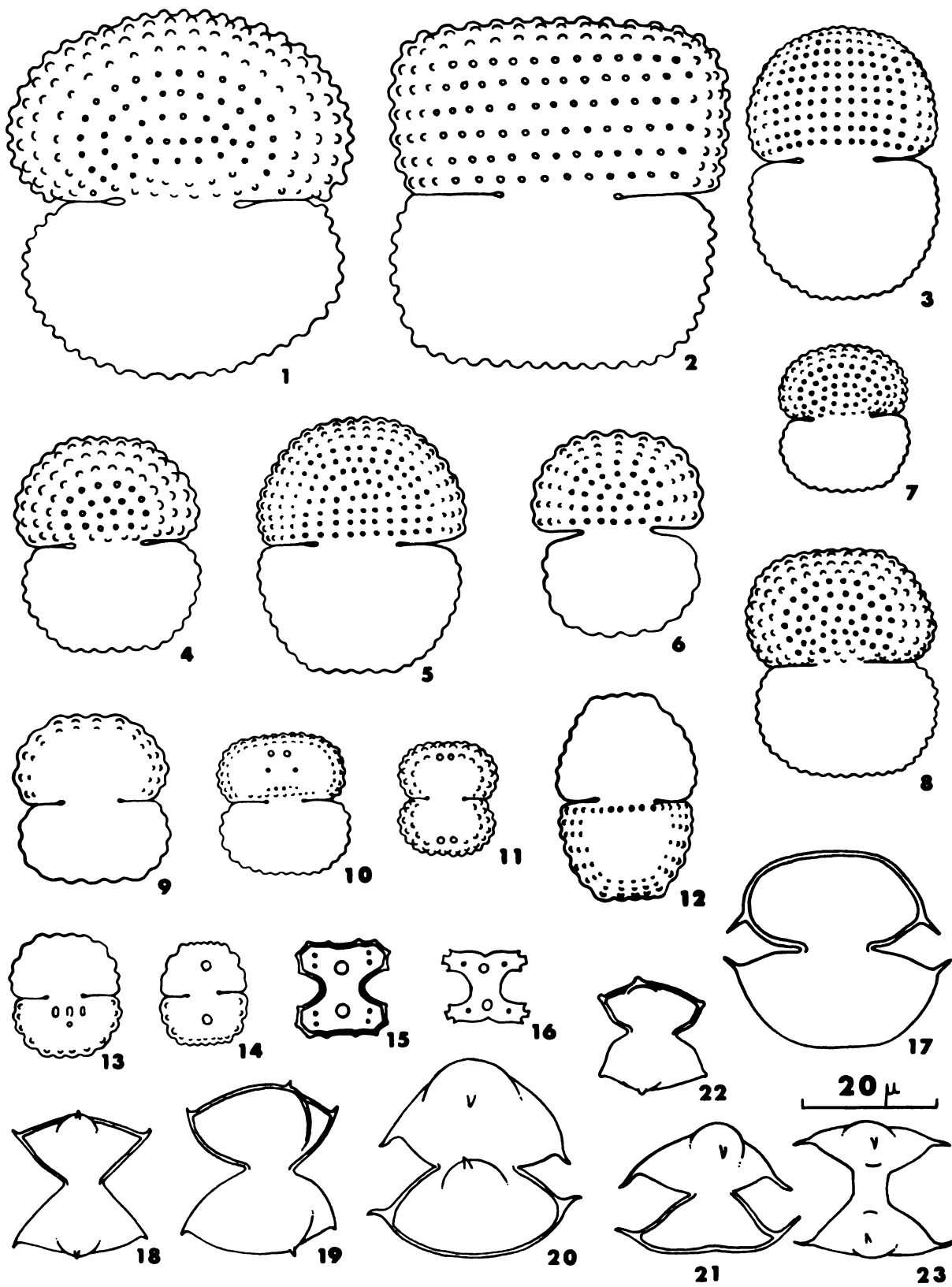


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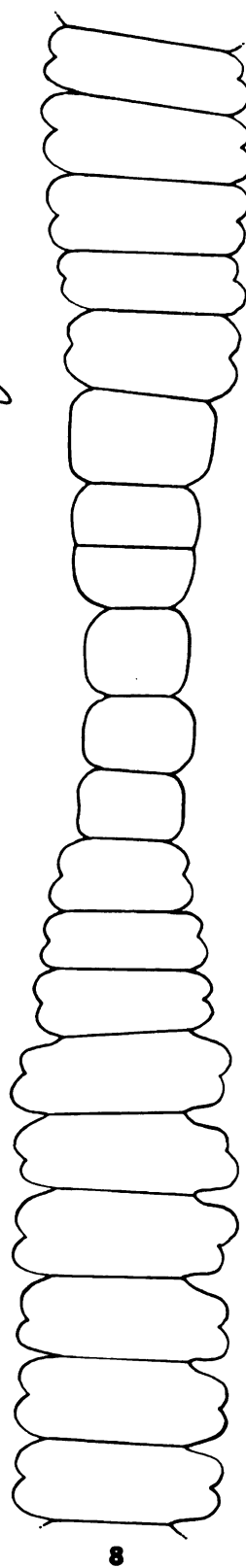
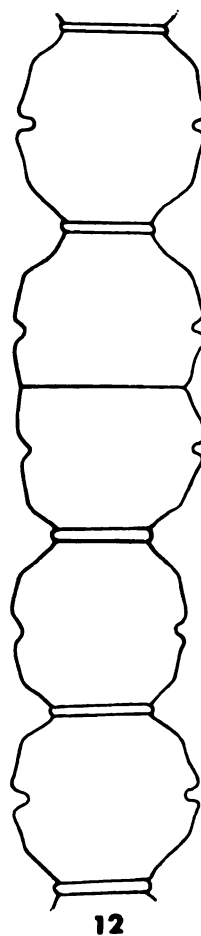
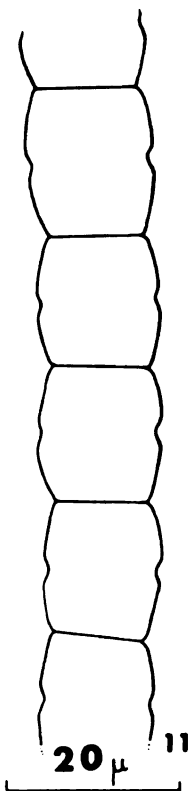
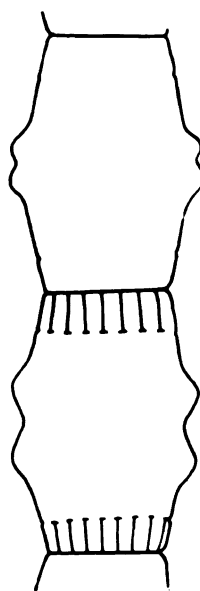
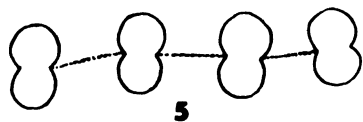
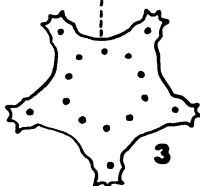
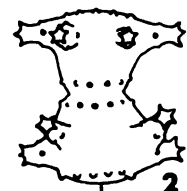
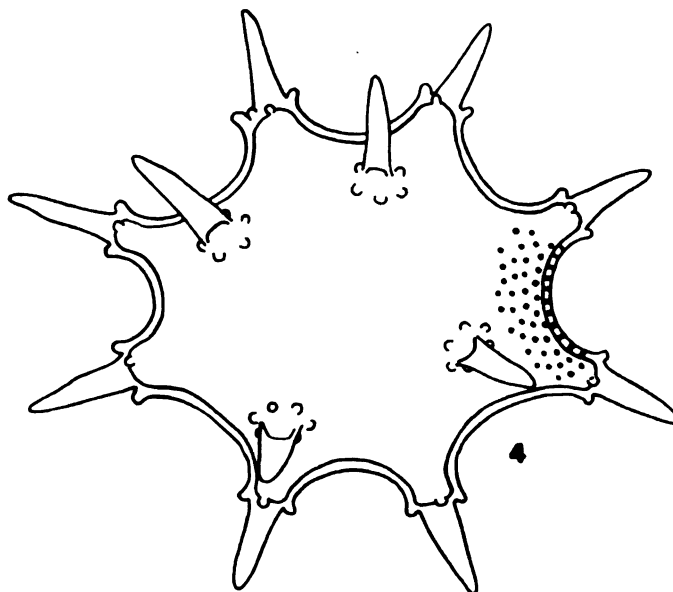
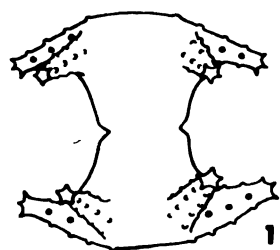


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