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

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

## NEW AND INTERESTING DESMIDS FROM SOUTHEASTERN UNITED STATES.

ARTHUR M. SCOTT AND ROLF GRONBLAD.

Prior to 1940 not much was known about the desmid flora of southeastern United States, as compared with that of the northern and northeastern part of the country, where more work had been done. The State best represented was Florida, where something like 200 species had been reported, only a small fraction of the total subsequently found there. In the other southeastern States, particularly Louisiana, Mississippi and Alabama, only a few scattered records were available. A good account of the state of research on the entire group of freshwater algae in the southeastern region, together with a bibliography of 61 references, was given by Silva (1948).

In 1939 Scott started collecting desmids, at first in the neighborhood of New Orleans, and later the field of operations was extended through the southern parts of Louisiana, Mississippi, Alabama, and the whole State of Florida. Excursions were also made through the northern parts of the first three States, which proved to be far less productive of desmids owing to the different soil conditions and the more hilly topography. The region that has been more or less thoroughly explored consists of a belt across southern Louisiana just north of the saline coastal marshes, and another belt from 10 to 30 miles wide along the northern shore of the Gulf of Mexico in Mississippi, Alabama, and northwestern Florida. The belt seems to be interrupted to some extent in Alabama, where only a few good habitats have been found. A few collections have been made in the southeastern corners of Georgia and South Carolina, which seems to be a good region for desmids. Texas is not included in the southern group of States, and so far as observations have been made good desmid habitats are hard to find there. Some ecological remarks concerning the territory explored by Scott are contained in papers by Prescott (1942), Prescott & Scott (1942, 1943, 1945, 1952), Scott & Prescott (1949, 1952). A total of close to 800 collections was made, of which 510 were preserved, the remainder being discarded because they either contained no desmids or only species that were already well represented in previous

Farlow Herbarium of Harvard University.

Most of the collecting in the Gulf Coast region was done on one- or two-day automobile trips at weekends, the only time available from business affairs. A total of 12 trips to Florida was made, spending 4 or 5 days in the State each time. Nearly all of the north-south Florida highways have been traversed, as far south as Key West, together with most of the highways between the east and west coasts. Also many of the secondary roads have been travelled, since an effort was made to cover new ground at each visit so as to collect from as many different places as possible. After each of the last few collecting trips made in 1952 and 1953 it was noticed that the number of desmids obtained that had not previously been seen was noticeably declining in spite of the fact that new localities had been visited, and in 1954 the number of new acquisitions became so small that it did not justify further expenditure of time effort and money. It is believed, therefore, that not only has a representative collection of desmids from all parts of the described region been obtained, but also a large percentage of the total number of species existing there. Undoubtedly there are many more to be found, but that can best be done by someone who lives closer to the scene.

Because of the great distances that had to be travelled, collecting was necessarily confined to habitats within easy reach of the roads, and fortunately they are plentiful. In many places ditches with a few inches to a few feet of water and an abundance of aquatic vegetation run along one or both sides of the road for many miles; these are excellent desmid habitats and hundred of collections have been from them. In other places roads have been cut through vast swampy regions like the Everglades, the Big Cypress Swamp, and those in Madison and Taylor Counties in northern Florida. It is said that there are some 30,000 lakes in Florida; the smaller ones generally yield an abundance of desmids, while the largest ones seem to be quite poor, though towing with a plankton net might reveal species not found along the shores. The annual rainfall averages about 60 inches, with many torrential downpours, during one of which 13 inches of rain was recorded at New Orleans during a single 24-hour period. In the occasional droughts, which may last 6 weeks or longer, the shallower

and the dead remains of the aquatic vegetation. But after the first rains desmids quickly become abundant again.

Nearly all the collections are squeezings or strippings from many kinds of aquatic macrophytes, because this method has been found by experience to yield both a much larger number of desmids and a wider assortment of species than the plankton net. Comparatively few pH measurements were made, on those gatherings made within a few hours drive from New Orleans and which therefore could be brought back alive. Others made at greater distances had to be killed immediately with formalin, to prevent spoilage in the hot climate. It was considered that it would take too much time on these hurried automobile trips to make field measurements with three Lamotte colorimetric sets covering the range from pH 4.2 to 8.4, and a portable electric pH meter is too expensive for a private individual. From the measurements made it may be said in general that the pH of the waters collected from varied between about 5.6 to 7.0, occasionally up to 7.6 or 7.8. The lowest measured was 5.2, and the highest exceeded 8.4, the upper limit of the comparator used.

Concerning the general nature of the desmid flora in the region described it may be said that as regards the better known species the flora is more or less uniform over most of the area except the southern half of the Florida peninsula, and is similar to that of the Atlantic coastal plain. Of course each habitat has its own association of desmids, and in a future paper we expect to give complete lists of all desmids found in certain selected collections. Again there are a great many new or very rare species that have been found in only one or a very few localities. As examples may be mentioned Micrasterias mahabuleshwarensis var. surculifera and var. japonica, found only in the large swamp in Madison and Taylor counties in Florida; M. foliacea var. ornata, only in Lake Chicot, Louisiana; Euastrum longicolle, only from one habitat in Louisiana; and the curious Cosmarium fastigatum, only from a very small pond in 'coral rock' (really oolitic limestone) in the Everglades. It is rather strange that many of the species reported by Taylor from Newfoundland and by Irénée-Marie from Canada are found in the decidedly different climate and soil conditions around the Gulf of Mexico, where there are no igneous rocks at all.

as south of Tampa, there appears to be a distinct difference in the desmid flora, due to the absence or scarcity of some species, and the presence of others that are not found, or only rarely, in the northern part of the range. Examples are Microsterias alata, reported from Cuba and common in Brazil, southeast Asia and North Australia; M. abrupta also a Brazilian species; Euastrum hypochondrum from Venezuela, represented by fa. decoratum and fa. prominens; Desmidium curvatum from South America; and several of the new species and varieties described in the present paper. It is apparent that this difference in the desmid flora is caused by the increasingly hot climate, which becomes almost truly tropical in the southern tip of the peninsula, where such tropical fruits as pineapples, guavas, mangoes, avocados, ~~and~~ papayas and coconuts are grown.

From his material Scott has made about 3500 drawings with the camera lucida, ~~some~~ <sup>some</sup> of which have been published in the papers cited above. The remainder of the original drawings were sent to Grönblad, photocopies having been kept in New Orleans for reference and as a precaution. Also a complete set of samples of all collections was sent to Grönblad. Both authors, therefore, have examined the material independently at their respective homes, and the thoroughness with which this was done may be judged from the fact that Grönblad's search revealed only a very small number that had not been recorded by Scott. The drawings were gone over by both authors jointly, in a personal conference of three weeks, during a visit by Scott to Finland in the summer of 1955. Satisfactory determinations were made in all except a few cases, where the drawings were incomplete for one reason or another. These drawings were taken back to New Orleans and a further search made for additional specimens to get the necessary information. In some cases the search was successful and the required information obtained. In other instances no more specimens could be found, and these drawings have been disregarded and set aside until such time as the desmids may turn up again.

From the large mass of drawings ~~were~~ <sup>we</sup> have separated those depicting desmids that we believe to be new to science. They are presented herewith by themselves, in the belief that having all the novelties together in a single paper will be more useful than if they were scattered among several hundred other species. In some cases we have given illustrations of known forms to illustrate the differences between the old and the new. The number of new taxa is quite large, due of course to the fact that there

has been so little work done previously in the region. We wish to emphasize that we have made a serious effort to identify our specimens with previously described desmids, but in the numerous cases where there has been no possibility of doing so we have been obliged to make new species and varieties, though we are well aware that the large-scale manufacture of new names is neither useful nor desirable for the systematy. In some instances, however, we have thought it better to create new species rather than to increase the number of varieties in such overcrowded species as, for example, Xanthidium antilopaeum, Staurastrum gracile, St. paradoxum, etc.

In the descriptions all measurements are given in microns, and the following abbreviations are used: L = Length; W = Width; I = Width of isthmus; spr = sine processibus; cpr = cum processibus; ssp = sine spinibus; csp = cum spinibus.

The authors wish to thank Miss Toina Tikkanen for inking Scott's pencil drawings for the plates of illustrations, and Dr. Hannah Croasdale for assistance with the Latin diagnoses.

List of habitats mentioned in the text:

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The paper by Hermann Silva cited below gives a list of 61 papers on freshwater algae up to 1948, so they are not repeated here. The following were published after 1948, or are special works referred to in the text.

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Add any others that you consider necessary.