THE CHARACEAE, 1951

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The Characeae is a family of algae of world-wide distribution and common occurrence. The group includes some 292 recognized species divided into six or seven genera, namely, Chara, Nitella, Tolypella, Lychnothamnus, Lamprothamnium, Nitellopsis and possibly the recently described Protocarha. It is considered by a number of students (e.g., Migula, 1890; Pascher, 1925; Groves, J. and Bullock-Webster, 1920; Zaneveld, 1940) as comprising an assemblage of organisms sufficiently unique to merit the status of a separate division, the Charophyta. Smith (1938, 1950) includes it among the Chlorophyta as a class, Charophyceae, coordinate with the other green algae which comprise the class Chlorophyceae. Fritsch (1935) treated it as an order, Charales, giving his reasons for this disposition, and later (1944) rephrased even more clearly his basis of opinion for not considering the group a distinct division. The Characeae do exhibit a few characteristics not found among other green algae, but the majority of the characteristics would indicate alignment with the greens, as suggested by the latter two writers.

Members of the Characeae frequently present the appearance of a feathery equisetum when seen growing in several feet of water. Their relatively large size, as well as general appearance, might easily mislead the casual observer to consider them as higher plants, such as Myriophyllum or Utricularia. The species of this group display a wide range of variation in superficial aspects, such as size of thallus, relative size of different vegetative structures, and habit of growth. The mature plants range in size from tiny species two or three centimeters high to robust examples five or six

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feet long; and from forms with compact heads to those loose and flexible in make-up. The basic morphological characteristics underlying these variations are much more uniform than might be suspected, and there is a common structural pattern throughout the group. Marked morphological differences are few, and these have become accepted as genus and tribe characters. It is an assemblage of algae which is unique and closely knit, yet it displays no apparent close relationship to other known cryptogams.

From an evolutionary point of view, the existence of such a closely knit group of organisms, relatively isolated morphologically from other forms, at once raises interesting problems of their lines of descent and stimulates interpretations that can be placed on their existing peculiarities. Although not yet conclusive, the concurrence of a number of structural peculiarities tends to indicate that there seems to be little evidence against and more evidence for assuming an origin in or a mutual origin with the Chaetophorales. Among these peculiarities are a few that might be noted, such as the alternate nodes and internodes (cf. Draparnaldiopsis), cortication, and in particular certain aspects of the sex organs which have been discussed to a certain extent by Goebel (1930) and to a greater extent by Wood (unpublished paper, AAAS, 1947). A report of this paper is in preparation.

Interest in these organisms has been largely academic, since their economic value is neither great nor spectacular. Zaneveld (1940) summarized nine types of uses for which these plants have more or less economic importance, namely, fish culture, water purification, food for aquatic animals as well as farm stock, fertilizer, polishes, mud baths, therapeutic value, sugar clarification and insect control. A few notes with respect to certain of these possible uses may be worth adding to Zaneveld's earlier analysis. Concerning their value as water-clarifying agents and use in wildlife management, the report by Crocker (1948) of the plight of North Bay and Back Bay, Virginia, is particularly interesting. The damage to these valuable hunting and fishing areas as a result of removing locks and widening channels into the bay was critical. Aquatic seed plants were practically eliminated, and waterfowl left the region followed by the sportsmen. The Boyce Thompson Institution, after considered study, recommended replacing the locks. This recommendation involved the prediction that Chara and Nitella