

ference. Data as to habitat, depth, and water temperature are germane, because of their possible physiological effects on different representatives of a single species. All plants were freshly gathered, and in good condition, except as noted.

The data relating to *Valonia utricularis* show that in this species there is relatively little selective accumulation of potassium: this species stands at the bottom of the list in so far as selective permeability is concerned. Meyer³ regards his data as probably inaccurate, and this is almost surely the case with regard to the value for Na. All three analyses refer to plants from the same vicinity, and some seasonal differences are to be expected, as Camlong and Genevois have shown in the case of other marine algae.⁴

Plants usually referred to *V. macrophysa* Kütz have been collected for analysis from three stations: Naples, Bermuda and the Dry Tortugas Keys of Florida. The plants from the Golfo di Pozzuoli near Naples, where they grow at a depth of about 30 m, attached to tunicates, show less power of selective accumulation than do plants supposedly of the same species, which grow attached to rocks in shallow water in Bermuda and Florida. The former grew at a temperature which at the time of collection (January) was not far from 12°, while the latter were flourishing at a water temperature of about 28°. Some suggestion of a morphological difference is apparent, although Professor W. R. Taylor has been unable after careful study to find any certain difference. Yet in Florida the ratio of K to Na is about 5, while near Naples it is about 2.75. Other collections at Naples showed some variation from this figure, but the ratio of K to Na did not in any case exceed 3.17. The Bermuda plants resemble the Florida plants in all respects.

Are we here dealing with physiological variants, or with distinct valid species? If the habitats of the two types could be interchanged would their physico-chemical characteristics change too!

The plants classed in the table as *V. ventricosa* present a still more puzzling situation. The two samples from Tonga tentatively assigned to this species may very well in one of the two cases be *V. forbesii* J. G. Aghard. Morphological characters said to distinguish the two species are most unsatisfactory, and field identification was impossible. Professor W. A. Setchell has kindly examined specimens of the Makahaa collection, and tentatively assigns them to *V. ventricosa*. The habitat of the plants collected at Makahaa was like that of *V. ventricosa* in the Dry Tortugas of Florida: under coral rocks on sand in about one foot of water or less at low tide. The plants along the main shore reef of Tonga grew on and among other algae in considerably deeper water. Yet

the sap of these latter plants was like that of Florida specimens of *V. ventricosa*, while that of the former was much more like that of *V. macrophysa* Kütz from Florida and Bermuda.

These facts lead us to inquire whether physico-chemical characteristics which are quantitatively well defined may not be valuable aids to the systematist. In some cases it is possible that environmental factors alone have produced the chemical differences noted. Yet it hardly seems likely that this is ordinarily the true explanation, any more than that it is the true explanation of morphological differences. Further study may well make chemical analysis an indispensable tool for the systematist.

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