

this interesting alga. In the end of November the dried up clods of clay become brick-red in colour due to extensive cyst formation.

Protosiphon botryoides was collected by the present author from fields lying fallow in Hoshiarpore district of the Punjab in October 1929 and a reduced variety of it growing on walls was described by Iyengar from Madras. The interest of the present form lies in the peculiar type of budding seen in some of the specimens. Iyengar could not observe any budding in the samples he collected from Madras and he records as follows: "The budding of the green aerial portion, which Klebs recorded from the European specimens, was never observed in the Indian alga although hundreds of specimens were examined. Nor

The subaerial part of the alga is usually spherical and rhizoidal part unbranched (Fig. 1). However, in some specimens branching was seen in the rhizoidal part (Figs. 2 and 3). It was observed that in some specimens bud-like protuberances were seen arising on one side of the balloon-like subaerial part (Fig. 4). A further stage in budding was seen in some specimens in which the rhizoidal part was seen bearing two globular subaerial vesicles (Figs. 5 and 6). The parent is recognized by the greater diameter in some cases (Fig. 5), while in others it is difficult to distinguish between the parent and the bud, as both are almost of the same size (Fig. 6). Individuals thus budded off usually remain attached with the parent plant for some time (Fig. 7).

It may also be noted that during the vegetative phase of this alga, budding is an important means of reproduction, especially when it grows on heavily manured soil containing plenty of nutrient material. However, when the alga is found growing in fields which are usually not well manured, budding has quite an insignificant role in the life-cycle of the alga.

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A Note on the Algæ Collected by James A. Murray at Karachi

JAMES A. MURRAY has mentioned a few marine algæ collected by him from Manora and Clifton at Karachi in his book on the plants of Sind.¹ Murray being the earliest scientific explorer of these plants his collection is of some importance to the algologists in our country. Amongst other plants Murray has recorded the following species: *Porphyra vulgaris* Ag.; *Fucus vesiculosus* L.; *Fucus distichus* L.; *Fucus nodosus* L.; *Laminaria digitata* Lam.; *Laminaria bulbosa* Ag.; *Laminaria saccharina* Lam.; *Chordaria flagelliformis* Ag.; *Callithamnion plumula* Lyng.; *Callithamnion corymbosum* Ag.; *Chondrus crispus* Lyng. On scanning the whole list of algæ one is surprised to find that no one of his plants has been found by the recent investigators and

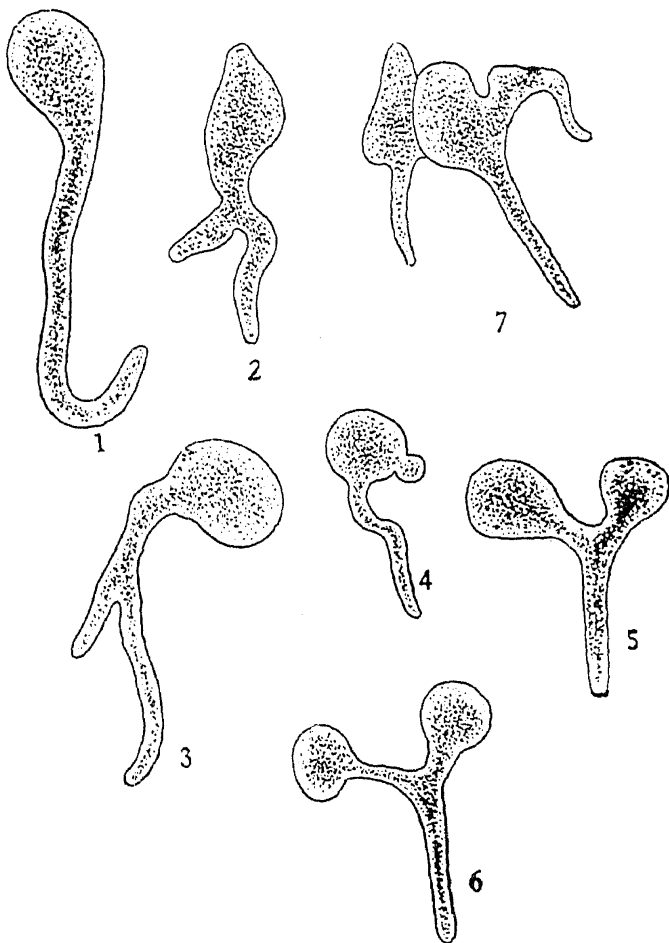


FIG. 1.—*Protosiphon botryoides* Klebs.

1. A typical plant. 2 and 3. Plants with branched rhizoidal parts. 4, 5, 6 and 7. Show different stages in budding. All $\times 120$.

was such budding ever seen in the variety growing on the walls described below." No budding was observed in the specimens collected from Hoshiarpore in 1929.

in fact, they are not known to occur on this side of the globe.

So far as the author is aware Murray's collection of algæ are found both at the British Museum and the Kew Herbarium. Dr. F. Borgensen² of Copenhagen was rather misled by Murray's collection found at the latter place. This at least has been made clear by him in the following words: "When I heard that the British Museum also possessed a large collection of J. A. Murray's Algæ from Karachi I was of course especially interested in finding out whether the northern species were found there too. This not being the case greatly increases my doubts as to whether they really live there." etc.

As some of the plants mentioned by Murray are of economic utility I visited Karachi in 1938 to find out for myself if the species were still available there. I was sorely disappointed in my search. At the same time I inquired at the Municipal Museum where Murray was a Curator, if some of his plants could be found there. There, I saw for the first time in this country, good many marine plants exhibited. They really were old but the date and the name of the collector were not on them and still more, the specimens were not what they were labelled to be. It is difficult to believe that all these plants mentioned could have existed in the locality only three score years before and now completely exterminated.

It is a loss to science that Murray's first collection is not preserved in this country so that it could now be revised like Forsskal's algæ mentioned in *Flora Ægyptico Arabica*. However, this note would serve its humble purpose if the Government and the Universities would learn better from the past and try to preserve all the original natural history specimens in this country as a national trust.

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¹ James A. Murray, *The Plants and Drugs of Sind*, Bombay, 1881, pp. 1-6.

² F. Borgensen, *A List of Marine Algæ from Bombay*, pp. 4-5, *Biologiske Meddelelser*, 1935, XII, 2, Kobenhavn.

Constitution of Sulphur Nitride

THE note on the above subject in the October issue of *Current Science* (p. 473), calls for a few comments. The term "resonance" must not be mistaken for alternate structures, as the authors of the above note seem to do. After quoting the idea of Arnold, Hugill, and Hutson that sulphur nitride has structure I *with* (italics mine) the corresponding resonance structures Ia and Ib, the authors proceed to pick out which is the correct formula! The dipole moment of S_4N_4 as measured indicates but the polarity of the superposed state of the molecule and not that of any component state.^{1, 2}

Apart from this, from a purely structural point of view, (1) it is wrong to say structure I will have $\mu = 0$, as on account of the possible free rotation about the single bonds, it will have quite an appreciable moment;³ (2) the moment of Ib may be due to similar reasons, the contribution of $>S=S$ being practically nil as it is a homopolar bond; (3) the formula, Ia, if redrawn with the normally accepted valency angles, will show that there are no re-entrant angles at S atoms.

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¹ C. K. Ingold, *Chemical Review*, 1934, 15, 225.

² M. A. G. Rau, *Proc. Ind. Acad. Sci.*, (A), 1936, 4, 687.

³ —, *Curr. Sci.*, 1934, 3, 145.

IN our note on the Constitution of Sulphur Nitride, when we assigned the structure (Ib) to S_4N_4 , we meant to say that (Ib) was the predominant structure of the three. Regarding the actual origin of the moment and the comments of Dr. Rau, full details will be published elsewhere.

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