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ALGAE OF THE FLUME.

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ON September 4th of this year, the writer visited "The Flume" in the Franconia region of New Hampshire. The Flume is one of the well known objects of interest of the mountain region of the state, and many readers of RHODORA are doubtless well acquainted with it; but for the benefit of others it may be well to say that it is a narrow passage, perhaps averaging 15 or 20 feet wide, between perpendicular walls of rock, seeming almost of artificial construction, so straight are the walls, and so even the width. A mountain stream rushes down through it but there is a path all the way; sometimes on a shelf of rock, sometimes on planks fastened to the wall. The depth of the cut, for such it probably is, though cut by natural not by human agency, is so great that direct sunlight can seldom reach anything but the uppermost part, and the moisture trickling from above combines with spray from the stream to make an ideal region for algae.

Nearly everywhere the wall is covered with a dark reddish brown coating; specimens of this taken at different points showed that it was practically the same throughout, four species of algae being found in all the specimens, though varying in relative abundance. Every here and there on this coating were found masses of translucent gelatine, colorless, or pale greenish or yellowish; these also seemed to be of uniform character, seven species being found in each specimen examined, but in varying proportions. Both the brownish coating and the gelatine were more abundunt on the southwestern wall than on the northeastern, plainly on account of the smaller amount of light to which the former was exposed. The species composing the brown coating were *Gloeocapsa Magma* (Bréb.) Kütz., giv-

ing the reddish tint; *Stigonema minutum* (Ag.) Hass., *S. hormoides* (Kütz.) Born. & Flah., and *Scytonema ocellatum* (Dillw.) Thuret. *Stigonema hormoides* occurred also in the gelatine, but not the other three species just named; and besides the *Stigonema*, there were *Aphanothece microscopica* Näg., *Plectonema Nostocorum* Bornet, *Calothrix fusca* (Kütz.) Born. & Flah., *Gloeocystis rupestris* (Lyng.) Rab., *G. vesiculosa* Näg., and *Mesotaenium Braunii* DeBy.

Before the mouth of the Flume proper, the stream flows rapidly over a smooth, sloping rock, in the form of a thin sheet rather than a stream in the ordinary sense. All through this sheet were scattered tufts of a bright green filamentous alga which, on subsequent examination, seemed to be a species of *Zygnema*, with filaments 25–28 μ diameter. No fruit being found, specific determination was out of the question. Zygnemas are found in ponds and still waters generally, often forming large loose masses near the bottom where the water is not very deep. The present habitat is certainly an unusual one, and the smooth, unbranched filaments would seem little suited to holding on to the smooth rock.

As an adaptation there had been developed short rhizoidal projections, much in the same way as the *forma polyrhizum* of *Rhizoclonium riparium* (Roth) Harv. attaches itself to surf beaten rocks, while the *forma implexum*, with perfectly simple filaments, is at home in quiet bays, lagoons and ditches. It is curious to note that another marine *Rhizoclonium* of our coast, *R. tortuosum* Kütz., though without rhizoids, resists being swept away by the waves, by means of its densely crisped and twisted fronds, which entangle it with any algae with which it may come in contact.

Beside the species mentioned, there were found on the walls of the Flume, the thin black sheets of *Schizothrix Muelleri* Näg. and in quieter parts of the stream, *Phormidium Retzii* (Ag.) Gomont; on rocks just outside the Flume, *Stigonema mamillosum* Ag.

The only reference heretofore to the algae of this locality that the writer has been able to find, is by Prof. Farlow in Appalachia, Vol. III, p. 232, 1884; the conditions of his visit were unfavorable, and he reports only five species; *Synechococcus aeruginosus* Näg., *Nostoc rupestre* Kütz., *N. muscorum* Ag., *Stigonema ocellatum* (Dillw.) Thuret and *Trentepohlia aurea* (L.) Mart. It is interesting to note that none of these were observed at the present visit. This would seem to imply either that there was more variety at different places along

the wall than was detected by the writer; or that the species occurring here varied from one year to another. In either case, it is probable that a student spending some days here might considerably extend the list.

MALDEN, MASSACHUSETTS.

SCIRPUS VALIDUS AND ALLIES IN THE CHAMPLAIN VALLEY.

EZRA BRAINERD.

THE lucid account of *Scirpus validus* and its two allied species, presented in the April number of RHODORA by Mrs. Agnes Chase, has doubtless led many students of Botany to examine these plants in the field during the past season. The statement that *S. heterochaetus* had been found in New England only at Milton, Vermont, and the fact that *S. occidentalis* had not been seen from Vermont at all, were additional motives for the examination of the bulrushes, that were known to occur abundantly in Lake Champlain. The result of observations at many stations over a stretch of fifty miles is here given.

1. *S. validus* is extremely rare in the waters of the Lake. Only one small colony was seen in a sheltered bay, where it was growing in mucky sand on the border of a marsh. It is, however, abundant along sluggish streams and in small ponds back from the Lake. Its weak stems ill adapt it to withstand the waves of large bodies of water.

2. *S. occidentalis* is the prevailing species in Lake Champlain, covering hundreds of acres. Its strong, pliant stems enable it to grow even in exposed situations. It is found in water, one to three feet deep even in August. This and the matted interwoven condition of the rootstocks make it difficult to secure proper specimens. The plant begins to ripen seeds some six weeks later than does *S. validus*. The "Eastern form," with open panicles, is the usual one in Lake Champlain; but in one colony near Pelot's Bay, North Hero, the spikelets are in congested heads, as figured by Mrs. Chase in Plate 53, cc.