

severe freeze has on them remains to be seen. At the time of the first discovery it was just six weeks after a minimum temperature of about 16° F. in Tallahassee, which killed many cultivated woody plants to the ground; and it is possible that the leaves we first saw had all come out since that freeze.

The inhabitants within several miles of the place seem to be all negroes, and we have not yet heard that any of them know any name or use for *Grossularia echinella*, although according to Mr. Coville its fruit is sweet and juicy. *But we have not talked about it much locally, for fear of giving the impression that it is something valuable and thus causing a raid on it. Several specimens that have been transplanted to yards in Tallahassee are growing nicely.

TALLAHASSEE, FLORIDA.

FURTHER NOTES ON CALYPSO

HENRY MOUSLEY

I have found an Orchis:
 "What of that?" you say,
 T'is a proof that miracles
 Happen every day.

The above lines, I believe, are attributable to Mrs. Talbot Clifton, the authoress of "Pilgrims To The Isles of Penance," "Orchid gathering in the East", or as it was to have been called, "The Orchid Pilgrimage," and I have chosen them as being a somewhat appropriate heading to this further paper on the underground development of Calypso. In my first article on the subject—see the "Journal of the New York Botanical Garden" for February 1924—it seemed to me that I had covered the ground fairly well, but even after years of patient research, it is no surprise to the orchid hunter to find new wonders awaiting him, not only above, but below ground also. It is in the study of the latter phase more especially, that I am meeting with new

* SUPPLEMENTARY NOTE. Dr. Kurz visited the locality on June 2, 1924, a few days before leaving Florida for the summer, and found the gooseberries not quite ripe. But Mrs. Kurz gathered some of them, and the next morning made from them some jelly, which in both color and taste was very similar to apple jelly.

surprises, not exactly every day, but so frequently, as no doubt to justify my use of the above lines of Mrs. Talbot's, and the further recording of my experiences with *Calypso* during the year 1924.

As most people will no doubt remember, the month of May was anything but warm, in consequence of which, *Calypso* was somewhat behind time in making its appearance, and it was not until the 25th, that it could be said to be fully out, this being a week behind the average time for the past six years. On the 18th, I was fortunate in discovering a fourth station for the species, containing nine plants, and again on the 22nd, a fifth station of five plants, one of which was a lovely snow-white example. I have already referred to the fact, that if *Calypso* depended entirely upon its seeds for propagation, it would very soon become extinct, which fact was again forcibly brought to my notice, for out of fifty plants examined this season, three only bore capsules, one of which will be seen in our plate Fig. No. 1, the capsule bearing the persistent perianth, together with another capsule Fig. No. 1a, from one of the other two plants. These were found on August 2, and at that date had dehisced as can be seen. Figures Nos. 2 and 8, are interesting as showing the development of two new buds, one on each side of the old tuber, in place of the usual single one. This producing of two instead of the usual single bud, appears to be not uncommon, several examples having come under my notice, one of which has already been shown in my previous paper Fig. No. 3, and the other will be touched upon later as Fig. No. 10 in the present plate. We now come to Figures Nos. 3 and 4, probably the most interesting of the whole series, and kindly sent me by my friend Mr. L. M. Terrill of St. Lambert, Que., he not knowing at the time, what was hidden away in the earth surrounding these plants, which were intended I should transplant at Hatley. They came from near Metis, on the northern shore of the Gaspé Peninsula, and were collected on June 21, 1924, in somewhat dry coniferous woods. Now Irmisch, "Beiträge Zur Biologie und Morphologie der Orchideen," Leipzig, 1853, as I have previously mentioned has described the tuber as consisting of two internodes, or sometimes of only one, below the leaf, and this I have always found to be the case, until I examined the two plants in question, which clearly have three internodes de-

veloped. Moreover, in Fig. No. 3, which brings out this point more forcibly than Fig. No. 4, it will also be seen, that the old tuber (1923) is actually producing a bud similar to the tuber of 1924, such a thing I have never come across before, and I have examined some hundreds of tubers, which can be done in most cases—I am glad to say—without uprooting them. This bud it will further be seen, is developed on the basal or third internode, the tuber being of a round nature, whereas, the one for 1924, is somewhat slender and elongated. The more general rule, I think, is for the succeeding tubers to be similar in shape to the preceding ones, which is well exemplified in figures Nos. 5 and 10, more especially No. 10 and Figs. 3, 4 and 5 of plate No. 2, of my previous paper. In Fig. No. 6, we get another instance of a bud appearing on the old tuber. The cause of this phenomenon, I think, lies in the fact of the plant's habitat, somewhat dry coniferous woods, in place of the usually damp situations that *Calypto* favours. This is conducive to the preservation of the old tubers, which in some cases apparently, contain an amount of vitality in the second year sufficient to produce a bud, even if this bud never comes to maturity, which is questionable. In further reference to this matter of preservation, I might state, that I have photographs of two plants of *Liparis Loesellii*, found growing on very dry ground—which is unusual for this species—that show signs of four and five generations of tubers, still remaining, a thing almost impossible in the very wet situations I usually find the species, where signs of three generations are uncommon. Figs. Nos. 7, 9, 11 and 12, show the very early stages of the plant's existence, Fig. No. 9, having the coralloid palmate body or rhizome accompanying the tuber, as mentioned by Liboschitz and Trinius, in their "Flore des Environs de St. Petersbourg et de Moscov," 1818, p. 214, finer examples of which will be seen in my previous paper.

Fig. No. 12, is an interesting little plant, with its very small leaf and no doubt first flower bud in evidence Aug. 2, on which date the other three small plants were collected. Figure No. 10, has already been alluded to in connection with the tubers resembling one another so nearly, but it is a good example also, of how one might have been deceived on finding the plant in 1925, into imagining that it represented five generations, where-

as it would really only represent three. This plant was collected on June 21, but was first found on May 18, with two others closely appressed to it, thus forming a little bunch, which eventually bore four blooms, the largest number I have ever found close together at Hatley, the plants as a rule being distributed singly, over a somewhat wide area, in direct contrast to the conditions existing near Metis, where Mr. Terrill tells me he found as many as fifty blooms, in an area of about ten square feet. Baldwin in his "Orchids of New England," 1884, p. 50, speaks of Prof. Scribner, of Girard College, having once found in Maine, as many as fifty plants in bloom, in a space not a foot square.

We now come to the last figure of all, No. 13, depicting a plant growing in, and surrounded by a mass of white web-like, or lace-like fungus growth—mycelium—which threads through the earth and decaying wood—as can be seen—forming an alliance with the orchid, which has been termed luxury-symbiosis, an association that has been regarded as harmful to the orchid, but which in reality is exactly the opposite, so far as I have been able to judge. In connection with this most interesting phase of orchid life, I quote the following from a paper by Prof. Oakes Ames in the "Orchid Review," Aug. 1922, Entitled, "Observations on the Capacity of Orchids to Survive in the Struggle for Existence," viz., "Another peculiarity of the Orchids that inclines us to believe that decadence is not a purely hypothetical condition is their dependence on mycorrhiza. It has been claimed that the orchid seed, under natural conditions, is incapable of passing beyond the embryonic stage unless invaded by the hyphae of a mycorrhizal fungus. When the seeds are disseminated they lie dormant until association with the necessary fungus is established. Whether or not there are numerous exceptions to this peculiarity has little to do with the case from the point of view taken by those authors who would have us believe that the Orchids are on the decline as a biological group." In several recent issues of the "Orchid Review," there have been papers on this subject of luxury-symbiosis, experiments having been carried out by several growers—of hothouse plants—in which they have demonstrated that it is possible to rear seeds successfully without the aid of any fungus whatsoever, but in nature unadulterated, I have always found that where there is

an abundance of mycorrhizal fungus, there surely, will one find, not only a greater number, but larger, richer, and more hand-



some plants as a rule. Even the one in question, i.e. Fig. No. 13, bears out my contention in a minor way, for on the date it was gathered, Aug. 21, it was well ahead of most others, as regards

the development of the leaf and flower buds, more especially the latter. This experience seems to be in accord with that of Prof. Oakes Ames, judging from his paper, "The Mycorrhiza of *Goodyera Pubescens*," *Rhodora*, Vol. 24, March 1922, pp. 37-46, in which he refers to his studies of colonies of *Goodyera* (now *Epipactis*) *pubescens*, which colonies he says are the result of seeds falling near mature plants, where mycorrhizal fungi are generally most in evidence, and where they germinate readily. Seeds which drift away on air currents or are blown abroad by the wind and fall where there is no nidus of the necessary fungus, fail to germinate. Otherwise, how account for the colony forming tendency of the species and the peculiarities of distribution.

Before closing, it may not perhaps be out of place to mention, that in the latest book on Orchids, "Enumeration of the Orchids of United States and Canada," by Prof. Oakes Ames, April 23, 1924, it will be noticed that in the Key to the genera, *Calypso* is placed among the species that have a simple rhizome. Writing to me on the subject July 2, 1924, Prof. Oakes Ames says, "I think this is right for the ordinary run of specimens one finds. The coralloid character to which you have drawn attention seems to be rare. Your notes had not come to my attention in time to make a straddle." Whilst agreeing to this in the main, I might say, that my further studies of *Calypso* incline me to the belief that this coralloid character is not so rare as at first surmised, especially where the plants are found growing on dead logs, stumps, or small branches of trees which are in a state of decay, as I have previously pointed out in the "Journal of the New York Botanical Garden," vol. 25, 1924, p. 28. The photographs from which the plate has been made were taken by the Geological Survey at Ottawa, and I am again indebted to Dr. M. O. Malte for them.

HATLEY, QUEBEC.

AN ADDITIONAL *ANYCHIA* FROM PENNSYLVANIA.—In the early part of the past century Rafinesque described a half-dozen species of *Anychia*. Specimens of these species, distributed by Rafinesque himself, and now extant, show that they represent either *Anychia canadensis* or *A. dichotoma*. Recently specimens of a plant novelty have come to hand. They represent a species