

that the *L. longipes* of Bory was only a form of *L. saccharina*, Lin. Through the kindness of Mr. Collins I have been able to examine specimens of the alga from the Maine coast, and it seems to me that they belong to *L. saccharina*, in spite of the narrowness of the frond and the long stipe. The forms included under *L. saccharina* by American algologists do not with certainty all belong to that species, and it is possible that the broader northern forms belong rather to *L. maxima* (Gunner). But sufficient material has not yet been obtained at different seasons of the year to make the diagnosis certain. In this connection I may mention the Californian specimens at first distributed privately as *L. Andersonii*, but later recognized as the *Lessonia Sinclairii* of Harvey. This is apparently the *Laminaria Ruprechtiana* of Le Jolis (*l. c.*), of which he considers *Lam. saccharina*, var. *angustifolia*, Post and Rupr., *Illust. Alg.*, Tab. XI, *Lam. longipes*, J. Ag. Spec. Alg., and *Lessonia repens*, Rupr., *Alg. Ochot.*, to be synonyms. Since it was ascertained that the species called *L. Andersonii* was the same as *Lessonia Sinclairii* the manuscript name of *L. Andersonii* has been applied by Prof. Eaton and myself to a second species from the California coast which belongs to the digitate division of the genus and not to the section *Saccharinae*.

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§ 63. **Note on the Perforation of Flowers.**—In the vicinity of Ithaca, N. Y., the flowers of *Dicentra Canadensis* are all perforated, year after year, as described by a correspondent of the BULLETIN* some years ago. Last spring, after a tiresome watch, I succeeded in capturing the malefactor, which, in this case, proved to be one of our very common humble-bees (*Bombus Virginicus*, Oliv.†). The holes were cut in the manner described by the writer above referred to, the bee beginning at or near the bottom of the flower-cluster, and ascending when visiting the flowers normally. Flowers of the common blue violet, *Viola cucullata*, were not infrequently found with reniform holes cut in their spurs, but the author of the mischief was not detected.

The general impression seems to be that short-tongued humble-bees are responsible for most of the perforations like these, though the hive-bee has been shown to perforate flowers in a few instances, and it certainly is not above frequently using those made by its larger relatives.‡

So far as I know, other insects have never been charged with perforating flowers for their nectar, and Mr. Darwin says that "no insects except bees, with the single exception of wasps in the case of *Tritoma*, have sense enough, as far as I have observed, to profit by the holes already made."† Last year, while studying the flowers of *Ribes Cynosbati*, I noticed on one plant many which were perforated near the base with round holes about 1.5 mm. in diameter. After a while I succeeded in detecting a white-faced hornet (*Vespa maculata*, L.) in the act of cutting these holes with its mandibles, and thus ob-

*Vol. iii, p. 34. †Kindly identified by Mr. E. T. Cresson.

‡Cross and Self-Fertilization' (Amer. ed.), p. 427.

§ For other bees see Delfino: *Urb. Des. II.* 2, 114.
Comes; *Impallinazione*. 24. † My references.
These include *Xylocopa* etc.
For *Xylocopa* see Payson, 1882, p. 298 & p. 348.

taining the nectar surreptitiously. On three occasions, however, this insect was seen to visit the flowers normally, and it must be perfectly able to obtain the nectar from their mouth. The flowers of *Symphoricarpos racemosus* were also frequently found with similar perforations. This, as is well known, is a species largely fertilized by wasps; but, though I watched carefully, I could not catch any insect making or using the holes; and, in ascribing this also to the hornet, I am simply stating what appears most probable to me.

Ants, too, are sometimes guilty of a similar misdemeanor. The species known as *Formica fusca* has been repeatedly seen to gnaw through the fleshy calyx of *Ribes cynosbati*, at about the point where the flowers are perforated by the hornet. The openings made by the ant, however, are larger and more irregular than those described above, and not infrequently the insect, attracted by the sugar with which this part of the calyx is gorged, eats away large parts of the flower. A case of perforation of the corolla, solely for access to the nectar contained within, came to my notice in Brooklyn, N. Y., in Sept., 1880. The fine pubescence of the corolla of *Salvia splendens* appears to be quite efficient in preventing creeping insects from reaching the mouth of the flower. A small ant, the name of which I have not been able to obtain, finding itself almost unable to enter in any other way, and wanting the nectar, gnawed rather large, irregular holes through the corolla just at the end of the calyx,* through which it entered and feasted upon the sweets within. Large numbers of the flowers were perforated, and the ants were repeatedly seen to make and use these openings.

In addition to these, there is one other class of animals which occasionally rob flowers of their nectar through perforations which they make for that purpose, namely, birds, according to Darwin.† Prof. Beal has found the golden currant (*Ribes aureum*) perforated by orioles, and readers of *Nature* and *Science Gossip* will recall numerous notes on the piercing and tearing of flowers by sparrows. There are, however, cases in which birds that are adapted to fertilize flowers covet the sweets of some whose nectar they obtain more easily by perforating them than by working in the proper way. My friend, Prof. W. A. Henry, tells me that he has seen in Ohio numbers of flowers of the trumpet creeper (*Tecoma radicans*) perforated through calyx and corolla by birds, as he believes, and I should not be surprised if the misdemeanor were to be fixed upon the ruby-throated humming-bird.‡ Darwin† states that while long-beaked humming-birds visit the flowers of *Brugmansia* normally, some of the short-beaked species perforate them; and they frequently pierce the tubular flowers of *Tacsonia*.

From the facts stated, it appears that under some circumstances humble-bees, hive-bees, wasps, ants and birds perforate flowers in order to rob them of their nectar.##

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* American Naturalist, Apr., 1881, p. 297, Fig. 1.

† Cross and Self-Fertilization, p. 432.

‡ *Id.*, p. 371, note.

§ Cf. *Scrophularia*, Torr. Bull. Nov. 1881.

¶ Henry believes this done by woodpeckers cf. Moon?
in Proc. Boston Soc. for 1878. Strange saw it made by ants, B. Mag. 81.
as perforation of *Bulphurium* see So. Gossip, 1877, 249, p. 303.
2nd perforation of *Polygonatum* by a beetle