

a plant which I should not refer here. It is in some points more like *E. ageratoides*. Its foliage is light-green, the veins also whitish, the serratures of the leaf margin are small, and there is a sprinkling of almost scabrous hairs on both faces of the foliage; but the specimen seen by me is not in fruit, so that the character of the achenes can not be made out. It is a plant which should be investigated.

The only published description of an *Eupatorium* to which *E. boreale* is somewhat near to answering is that of Poirét's *E. Fraseri*. But that is to be a plant with a paniced inflorescence, the whole herb perfectly glabrous throughout; and its habitat is Carolina. There are other discrepancies also; but the outline and indentation of the leaf, as shown in La Marck's fig. 4 of Plate 672, suggests a possibility of identity between the two. Yet, upon such crude figures as this, nothing can, with anything approaching certainty, be established; and, after long hesitation, and careful study, I have thought it best to call attention to this northern plant under a new name, rather than to call it *E. Fraseri* with double or triple question marks.

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SOME OBSERVATIONS ON ORCHID FRAGRANCE.

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By no means the least of the factors entering into the great problem of cross-fertilization in flowers is the matter of fragrance or other odor serving as one means of attracting insects and securing their co-operation in the plant's struggle to perpetuate its kind. Singularly enough comparatively little scientific attention has been given to this important feature, investigations along the line of insect-pollination tending rather to the subject of interesting mechanical and chemical contrivances, to coloring, nectar-receptacles, honey-guides, etc.

It is not my purpose here to enter into any considerable discussion of the subject, but simply, by way of a suggestion, to note the results of careful observations upon our native orchids. The orchid, whose sole serious purpose in life seems to be self-perpetuation, presents unexcelled opportunities for the study of anything connected with cross-fertilization. We may reasonably expect it then to illustrate well the various facts of flower-fragrance and its relations to insects.

Of course we must bear in mind that in all probability odors imperceptible to the human sense of smell exist, which may possess for the small insect the very greatest attraction, and the tiny, unattractive *Microstylis* may be to the little gnat a perfect censer of fragrance; this probability does not, however, render valueless a classification of odors from the human standpoint.

Our natural, primary division would distinguish the distinctively agreeable from those not distinctively agreeable which we may term by way of contrast disagreeable. Laying aside individual eccentricities of like and dislike it will be readily seen that all odors will fall pretty definitely into the one or the other class. The disagreeable I would subdivide into the positively disagreeable, i. e., those of the carrion or other similar scent, the purpose being the attraction of flies by the suggestion of the presence of carrion, and the negatively disagreeable, i. e., those which may be called disagreeable from the lack of any agreeable quality, faint, oily, pungent smells, etc., probably attractive to some kind of insect, or possibly incidental or serving some other purpose. The agreeable I would similarly subdivide into those possessing the peculiar, distinctive flavor which we denominate perfume or true fragrance, and those characterized by a merely sweetish odor, one in no way distinct nor justifying the name perfume or fragrance, simply a suggestion of the presence of nectar.

The plants, particularly the roots, of all our terrestrial orchids possess a characteristic odor described by Mr. Baldwin (*Orchids of New England*) as "musky," which can hardly be called pleasing except for the associations which it always suggests, but which, as being also present in the flowers of certain species like *Habenaria orbiculata* habitually fertilized by night-moths, undoubtedly plays a part in the attraction of nocturnal insects.

Of the carrion odor and its relatives we have no examples in our orchids, though several tropical species display it in a very marked degree.

As negatively disagreeable I would mention *Cypripedium pubescens* whose "heavy, oily odor" noted by Burroughs is well known and furnishes an easy mark of distinction between it and the closely related *C. parviflorum*. One may sometimes detect an unpleasant, penetrating odor in *C. acaule*. Here belongs *Goodyera repens* var. *ophioides* which exhales a characteristic, pungent odor wholly different from that of *G. tessellata*.

Those orchids which are slightly sweet, but scarcely enough so to be termed fragrant in the ordinary sense, include *Cypripedium acaule* and *C. spectabile* with possibly *Orchis spectabilis*. I would insert also *Goodyera tessellata* in which a sweet, pleasant scent is readily noted. Another mark of this species, that I have not seen elsewhere mentioned, is a pinkish tinge almost invariably present in the flowers and sometimes of a very pronounced shade.

Naturally the greatest number of species belong to the fragrant division and it is interesting to observe the disagreements in the attempts of different botanists to describe them. I have already mentioned *Cypripedium parviflorum* whose peculiar, almost sickishly sweet fragrance distinguishes it from *C. pubescens*. Of the Habenarias *H. dilatata* claims our admiration for an unusually strong and very sweet, but characteristic fragrance, which would seem to indicate a wide difference between it and *H. hyperborea* which is scentless. Kraenzlin, however, in his recent great work on orchids (*Orchidacearum Genera et Species*) restores it to its old place as a variety of *H. hyperborea*. Baldwin complains because Gray referred to *H. psychodes* as "fragrant" and contradicts him with the statement that all the specimens which he had found had a rank smell. Kraenzlin describes them as "*suaveolentes*" and "*wohlriechend*." The truth of the matter I find from my own experience and from experiments with others is this: the odor, which resembles no other with which I am acquainted, at first always impresses one as rank, nauseating, disagreeable; to one persisting, however, it becomes very attractive, and the remembrance of it remains with one a long time. *Spiranthes Romanzoffiana* and *S. cernua* resemble each other in a very pronounced fragrance, though I have found apparent variations of the latter (RHODORA, I, 110) which were characterized along with other differences by an entire lack of fragrance. *Arethusa* and its relatives all exhale a very delicate violet fragrance. Baldwin takes exception to the statements of Chapman, Goodale and Burroughs that the *Arethusa* is fragrant, as also to those of the last-mentioned writer and Meehan concerning the fragrance of *Calopogon pulchellus*, though admitting that quality in *Pogonia ophioglossoides*. Thoreau on the other hand refers with the greatest disgust to the disagreeably "snaky" odor of the *Pogonia*.

I have found the following to be true of both the *Pogonia* and the *Calopogon*, and suppose that the case is the same with the *Arethusa*,

but have not had the same opportunity of examining fresh blossoms of the last. The early blooms of both *Pogonia* and *Calopogon* are fresh, clear and vivid in coloring, and possess very perceptible and very attractive perfumes, similar, but of slightly different flavors. A later visit to their homes shows them in much greater numbers, but lighter and faded in color, and with no sign of fragrance. This is true at the later date of even newly-opened blossoms. In the freshly-opened flowers of still another species which I have nowhere seen described as scented, *P. verticillata*, I find a very delicate fragrance faintly suggestive of the odor of *P. ophioglossoides*. The species of the greenhouse display similar characteristics, and will fall readily into the same classification.

These few fragmentary remarks touch upon a subject which to me seems of peculiar interest, and with which are connected some of the pleasantest recollections of many a collecting trip.

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NOTES ON THE FLORA OF WOODS HOLE, MASSACHUSETTS.

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THE following notes are based on observations made during August, 1895, July and August, 1899, and part of July and August, 1900, while the writer was engaged in biological work at the Laboratory of the United States Fish Commission. The village of Woods Hole is situated on a strip of ground between Vineyard Sound and Buzzards Bay, and, southwestward from the village, this is extended as a long and narrow tongue of land known as Penzance, and occupied by a few handsome summer residences, each surrounded by extensive lawns and more or less numerous flower-beds, the presence of which doubtless accounts for some of the interesting "escapes" noted below. These chance introductions seem to be confined chiefly to two widely separated spots, one on the Buzzards Bay side, the other on the Woods Hole side of Penzance.

Northward from Woods Hole the land broadens and becomes considerably diversified, containing some extensive woods, several ponds, and at least one cedar swamp. Since 1895 the increased popu-



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