SPIRANTHES AUTUMNALIS,

NEOTTIA SPIRALIS, or *Ladies' Tresses.*

BY L. LANE CLARKE.

SCARCELY perceptible to the careless eye is the modest beauty of this little orchid, the last of its family that will unfold for us this year the "Manuscript of God" concerning the orchis tribe.

Deeply interested as all intelligent readers must be in Darwin's delightful book, for the facts he has recorded, the study of the British orchids will henceforth be an ever-recurring recreation to the observant eye.

First, in the early spring, the purple orchis mascula, and last, in the autumn time, this little white Neottia will again and again recall the wonder with which we first learnt the mysterious fertilization of orchids.

Of the three thousand species Lindley has numbered, most varied and fantastic in form are the exotics; but scarcely less curious are the spider, the bee, the fly, and the butterfly orchids of our own woods and meadows, and a minute examination of those which haunt our path will surely be acceptable to the intelligent observer.

The Spiranthes autumnalis is now abundant in dry pastures; it is thickly dotted on the Malvern hills, on the light pastures of the Isle of Wight, and the meadows and cliffs of the Channel Islands.

The spiral cluster of small white flowers is so insignificant in appearance, that more than once I have heard the exclamation of—"*That* an orchid?" Even so—gather one, and come and see.

It will require a microscope to discern all its beauty; but a pocket lens will show us much, and we shall learn from this one specimen what it is quite necessary thoroughly to understand, before we can appreciate the discoveries of Darwin.

The flower spike (fig. 1) is given natural size. The other figures are all more or less magnified.

In the single flower (fig. 2) we observe the plan upon which all orchids are fashioned, the number *three* ruling the plant, however modified by the Creator, "for whose pleasure they are, and were created." Three sepals, three petals, three pistils, and twice three stamens. These are not discernible at first, because the large lower petal, or labellum, is so prominent, and two upper petals are joined together, and one of the sepals adheres to them so closely as to require particular attention.

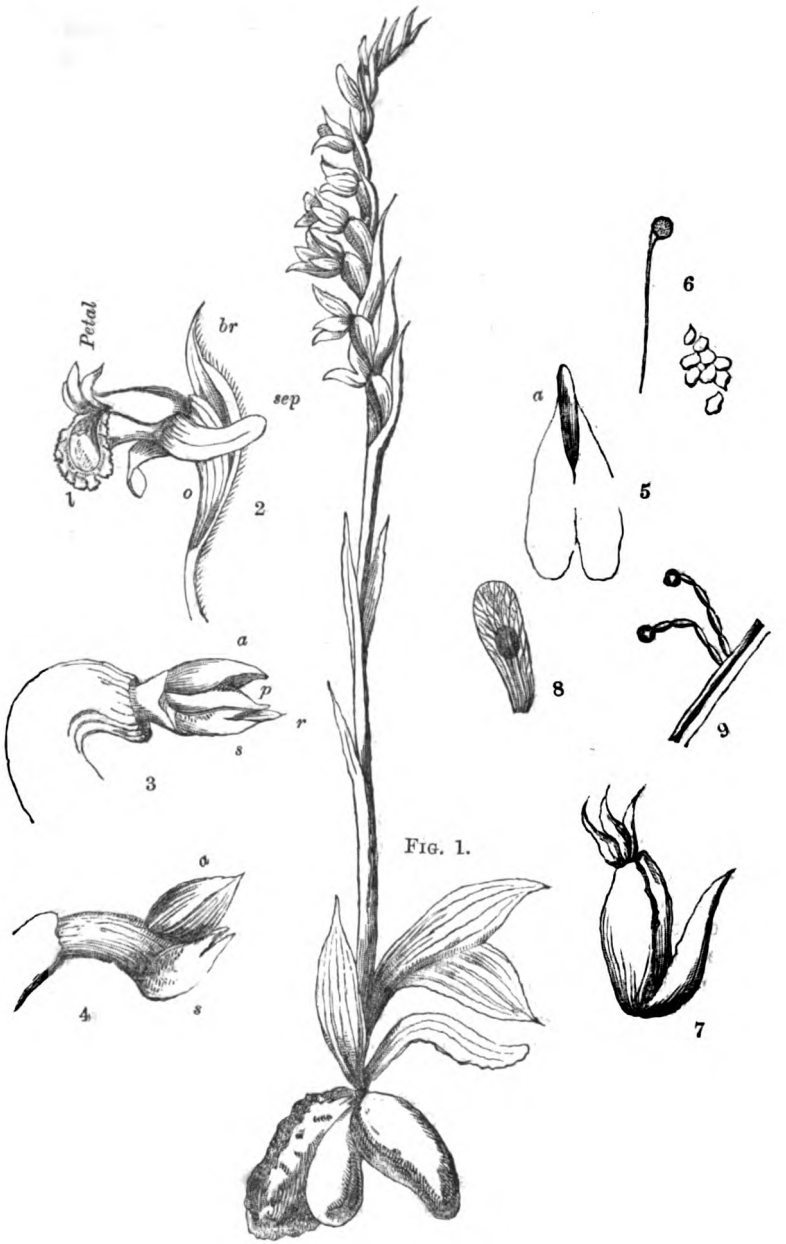

FIG. 1.

SPIRANTHES AUTUMNALIS.

Of the three pistils, one is modified into a rostellum or beak, *r*; the other two are confluent, and form a cup, the surface of which is the stigma. This stigmatic surface, *s*, like all other stigmas, becomes at a particular moment highly viscid, attracting and retaining the pollen grains, which throw their granular tubes down the loosened tissue, to fructify the ovules in the ovary beneath, *o*.

Six stamens, according to Lindley and Hooker, are discoverable in the perfect orchis; only one fertile anther is apparent in Spiranthes, which now demands close attention.

In examining a young Neottia with a pocket lens, and looking into the flower, we observe two pale yellow spots in the throat; these are the pollen masses or pollinia lying under the anther cell, *a*, and immediately over the stigma, *s*, attached to the rostellum, *r*, by a boat-shaped disk, in such a position as to render it highly improbable that the pollen grains of that flower can ever touch their own stigma. If a needle is passed into the flower, and this disk touched lightly, it will detach itself, and with it the whole pollinia, as in fig. 5.

This, on being pressed between thin glass under the microscope, will show the square or oblong pollen grains (fig. 6); or if applied to the stigmatic surface of an *older* flower, these bright golden grains will adhere to the glistening green cup, and be a beautiful object under a low power.

Some flowers, if stripped of sepals and petals, as in fig. 4, will show the anther cell empty, the stigma untouched, the flower unfructified—where, then, is the pollinia?

This is Darwin's discovery, that Spiranthes, like so many of its brethren, is indebted to insect visitors for the perfecting of its seed, depending also on the movement of its labellum, which at one period closes the throat, and protects the young stigma until its hour of maturity has arrived, then drops slowly down, opening its honey glands to invite the wandering bee, which bears upon its proboscis the pollinia previously extracted from a younger flower.

Resting on the sunny hills above Torquay, Darwin watched the intercourse between insect and flower. The little Neottia giving forth a sweet perfume to attract the living "winged things;" he saw the humble bee, as I have seen the hovering Syrphidæ and Tipulæ, and small Hymenoptera enter the flower cup; but these only entered one flower, and then flew away, I know not whither. Whereas he saw the bee always alight at the bottom of the spike, and, climbing up regularly, withdraw the pollinia from the upper and youngest flower, then fly to a next plant, rest for a moment on the labellum, which is moved aside, and whilst the insect sipped the nectar, the pollen mass was received by the expectant stigma. Then again mounting

the spike, as the long and flexible proboscis was thrust into the scarcely opened flower, it could not fail to touch the sensitive rostellum, and bear away the disk and its pollinia.

The experiment is easily tried, and you will find that once fertilized the stigma becomes dry, and will receive no more pollen. There is no waste in any of the works of God.

For more minute details of rostellum and disk, we must refer to Darwin's work, as the length of this paper is limited; but I wish to observe that a section of the ovary is well worth looking at, also the seeds, like pretty netted purses, which contain the germ of the future plant, fig. 8. A portion of the cuticle also, from any part of the stem or flower, will show jointed and glandular hairs, giving a crystallized appearance to the surface of these parts.

Fig. 7 is a mature ovary, with the withered sepals on its apex and the bract at its base.