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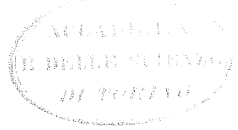
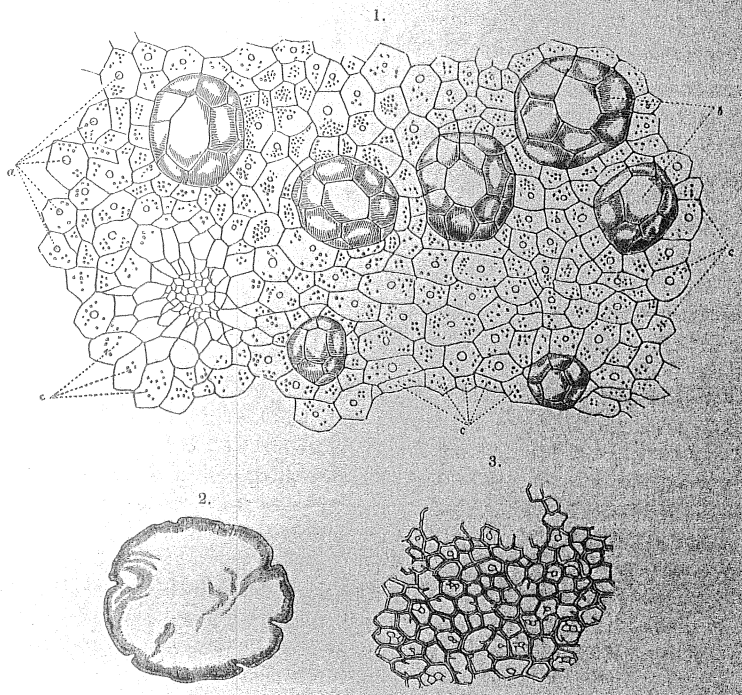




EXPLANATION OF THE FIGURES.

Fig. 1. A section, highly magnified, of a fragment of the root of *Satyrium pallidum*. *a. a. a.* Cytoblasts. *b. b.* Nodules of Bassorine. *c. c. c.* Granules of starch.

2. A cell, which once contained Bassorine, emptied of its contents by caustic potash, and pressed flat. The circumference is irregularly cracked by the pressure that has been employed.

3. A view of the cellular structure of the nodules, seen after being charred, and examined with a microscope magnifying 480 diameters.

All these figures were drawn with a camera lucida.

XXV. *On the* Heliamphora nutans, *a new Pitcher-plant from British Guiana.*

By GEORGE BENTHAM, *Esq., F.L.S.*

Read February 4, 1840.

AMONGST a number of new and handsome plants collected by Mr. Schomburgk on the mountain of Roraima, on the borders of British Guiana, one of the most curious is a species of Pitcher-plant, which he found growing in a marshy savannah, at an elevation of about six thousand feet above the level of the sea. As this plant is a new form in a very distinct natural Order, the *Sarraceniaceæ*, hitherto consisting of but one genus, and only six species, I have thought that the following short account of it might not be uninteresting to the Linnean Society.

Like the true *Sarraceniæ*, this is an herbaceous plant, with fibrous roots and radical leaves, of which the petiole forms a long hollow tube or pitcher, open at the top, and the lamina a small concave lid, which does not, however, as in *Nepenthes*, close over the pitcher. The parallel veins of the pitcher, with transverse reticulations, and the thick texture and reticulate venation of the lid, are the same in *Heliamphora* as in *Sarracenia*.

A curious disparity in the texture of the reflexed hairs of the inner surface of the pitcher has been pointed out to me by Dr. Lindley, and I observe precisely the same structure in *Sarracenia purpurea*. The hairs which densely close the mouth of the pitcher are thick, conical, and striated, without any of the ordinary appearances of secreting hairs, although this part of the leaf is said, in *Sarracenia* at least, to be generally covered with a saccharine exudation. At the bottom of the pitcher, and below the smooth shining part (the same in *Heliamphora* as in *Sarracenia*), the scattered hairs, smaller than those of the throat, but still reflexed, have all the appearance of ordinary secreting hairs. They arise from a small tubercle, and appear to be composed of a single

cell, forming a hollow tube, in which in the dried state there appears to be more or less of congealed matter, probably fluid when fresh. These secreting hairs are somewhat conical in *Heliamphora*, very long and slender, but with the same structure in *Sarracenia purpurea*.

Notwithstanding several memoirs which have been already published on the *Sarraceniæ*, it does not appear that any course of observation and experiment on the living plant has ever been closely and carefully followed up with a view to ascertaining the precise nature and functions of the abovementioned very distinct portions of these singular pitchers. They are constantly observed with more or less of an aqueous fluid in them, which is generally supposed to be chiefly, if not entirely, water derived from rains and dews, a circumstance not at all borne out by the structure as it appears in the dried state. The lower portion is evidently contrived to produce copious secretions; the central apparently smooth portion, often covered with an infinity of minute glands, appears destined to some important function in the economy of the leaf, and the form of the opening appears but ill contrived for the mere purpose of collecting rains and dews. One effect of the singular clothing of the orifice is known to be the retaining such insects as may venture within it, and some have even gone so far as, on that account, to consider these plants as carnivorous; but surely, if killing the insects were the main object of this apparatus, it would meet with better success than the imprisoning some half a dozen flies or beetles during the whole season the leaf lasts. It were therefore much to be wished, that American botanists, who have opportunities of observing these plants under those circumstances which are natural to them, would carefully ascertain the state of the different parts of the pitcher, the nature and amount of any secretions, and any other phenomena that may take place at different times of the day and of the season, at various ages of the plant, and under various states of the atmosphere, which alone can enable us to found any conjectures on its physiological functions.

The scape of *Heliamphora*, instead of being one-flowered, as in *Sarracenia*, bears a loose raceme of from two to six nodding flowers, borne on short pedicels, each pedicel springing from the axilla of a concave bract, similar in venation to the pitcher part of the leaves. There is no trace of any bracteolæ on the pedicel.

The floral organs differ chiefly from those of *Sarracenia* in the great reduction in the number of parts. Instead of three distinct series of floral envelopes (three external bracts, five sepals and five petals), *Heliamphora* has but four, five, or (as observed by Mr. Schomburgk) six leaflets altogether, of which the external are somewhat thicker and more herbaceous than the more internal ones, though all are to a certain degree petaloid and coloured. Where there are four or five, the æstivation and position is the same as those of the sepals of *Sarracenia*, but they are more imbricate, each leaflet overlapping more or less the next opposite one on one side, even at their insertion. I have not seen any flowers with more than five leaflets, and I therefore do not know the position of the sixth.

The stamens are indefinite, and placed as in *Sarracenia*; there were twenty-one in the flower-bud I opened; from twenty-seven to thirty-two in most flowers, according to Mr. Schomburgk. The anthers are versatile, turned inwards in the bud, and the cells open longitudinally.

The ovary differs from *Sarracenia* in being three-celled only, instead of five-celled; in other respects, the number, arrangement, and structure of the ovules agree perfectly with *Sarracenia*. The style is erect and cylindrical, but is truncate, and minutely ciliated at the apex, with an obscurely three-lobed stigmatic surface, without any tendency to the remarkable foliaceous expansion of the stigma of *Sarracenia*.

I have not seen the capsule of *Heliamphora*, but Mr. Schomburgk describes it as "three-celled, three-valved, with numerous seeds." A few ripe seeds communicated to me by him are rather larger than in *Sarracenia flava* and *psittacina*, the only two species of which I have the fruit*: the testa is brown, less tuberculated than in *Sarracenia*, but expanded into a membranous wing surrounding the seed. The albumen and embryo are the same in both genera.

From this sketch it will be seen that all the essentials of arrangement and insertion of the floral organs, and of the conformation of the ovary and seed, are as in *Sarracenia*, and place this new plant in the same Order; the differences in the number of parts cannot here have any other than a generic im-

* The seeds of *Sarracenia* are described as "minute," a vague term, scarcely applicable in this case, as in both the above-quoted species they are full one line long, and obovoid.

portance, as it is evident from their variableness and want of symmetry that they are reductions from a normal type.

As to the general affinities of the Order, this genus, a less complete one than *Sarracenia* itself, does not appear to furnish any further elucidations, excepting in as far as it proves that neither the symmetry of the floral envelopes, nor the foliaceous stigma of *Sarracenia*, are of importance. The inflorescence, the only character more developed in *Heliamphora*, is not different from that of *Papaveraceæ*, to which order, as well as to *Nymphæaceæ*, some affinities have been already indicated by various botanists, from both of which Orders, however, the placentation essentially removes the *Sarraceniaceæ*.

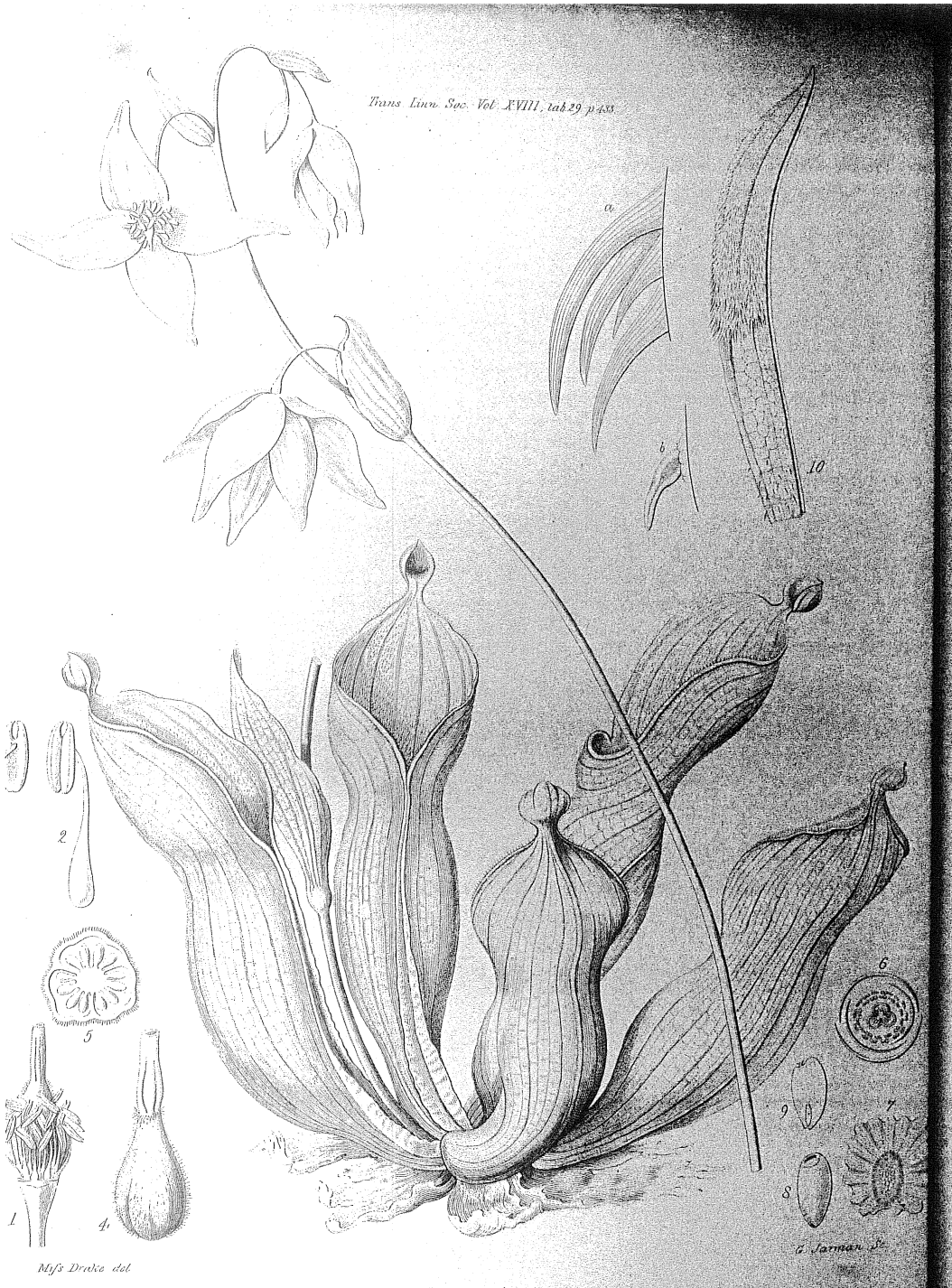
I now proceed to give the technical character of the *Heliamphora nutans*, of which I have derived the generic name from ἕλος, a marsh, and ἀμφορεύς, a pitcher.

HELIAMPHORA.

Ordo SARRACENIACEARUM.

Char. Gen. Perigonii foliola 4, 5, (vel. 6?) hypogyna, libera, æstivatione valdè imbricata, subpetaloidea. *Stamina* numero indefinita, hypogyna. *Antheræ* oblongo-lineares, versatiles, biloculares, loculis appositis longitudinalitèr dehiscentibus. *Ovarium* triloculare, ovulis numerosis anatropis pluriserialitèr placentæ axili affixis. *Stylus* simplex, apice truncatus. *Stigma* parvum, obscurè trilobum, minutè ciliatum. "*Capsula* triloculares, trivalvis, polysperma." (Schomb.) *Semina* obovata, compressa, testa fusca laxiuscula, vix rugosa, in alam fusco-membranaceam semen cingentem expansa. *Embryo* parvus, teres, rectus prope basin albuminis copiosi, radicula juxta hilum, cotyledonibus parvis.

Sp. *H. nutans*. *Herba* perennis, uliginosa. *Folia* radicalia; petiolus tubuloso-amphoræformis, basi attenuatus, dein inflatus, sub ore parùm contractus, ore obliquè margine subrevoluto, parallelè plurinervis et transversim reticulato-venosus, extùs glaber et latere interno alis duabus angustis longitudinalitèr auctus, intùs apice densissimè pilis reflexis striatis nitentibus vestitus, medio glaberrimus, basi pilis simplicibus excretoriis reflexis sparsis asperrimus. *Lamina* parva, orbiculata, concavo-cucullata, crassiuscula, reticulata, glabra. *Scapus* erectus, (1—2-pedalis,) apice simplicitèr



racemosus, glaber. *Pedicelli* alterni, glabri, solitarii ad axillam bracteæ ovatæ complicatæ acuminatæ paralleli-venosæ glabræ. Prope basin scapi folium nonnunquàm adest forma inter illas foliorum radicalium et bractearum ferè media, nempè basi bracteis simile supra medium marginibus connatis subamphoræ-forme. *Flores* nutantes, albi, v. pallidè rosei. *Perigonii* foliola expansa, ovato-lanceolata, acuminata, glabra, 15-16 lin. longa. *Stamina* glabra, filamentis basi crassioribus. *Ovarium* ovoideum, pubescens. *Stylus* glaber.

EXPLANATION OF TAB. XXIX.

Heliamphora nutans.

Fig. 1. The flower, with the perigon removed, showing the stamens.
2. A single stamen, front view.
3. The same, back view.
4. Style and ovary.
5. Transverse section of the ovary.
6. Diagram of the arrangement of the floral parts.
7. Seed.
8. The same, with the testa removed.
9. Longitudinal section of the same.
10. Portion of a young petiole, showing the inner surface of the natural size. *a*. Hairs of the orifice, highly magnified. *b*. Hairs of the bottom of the pitcher, magnified to the same degree.

Nos. 1. to 9. are all more or less magnified.