VI.—*On* Ammobroma, *a New Genus of Plants, allied to Corallophyllum and Pholisma.*

By John Torrey.

Read June 27th, 1864.

This singular plant was discovered in the year 1854 by the late Col. Andrew B. Gray, in his survey and explorations for ascertaining the practicability of constructing a southern railway to the Pacific. It was found in abundance on a range of sandhills near the head of the Gulf of California, and is not known to occur elsewhere.

A brief notice of the plant was given in a memoir by Prof. A. Gray, entitled *Plantæ Novæ Thurberianæ*, which was published in the fifth volume of the Memoirs of the American Academy of Arts and Sciences, in the year 1854. A full description was reserved for Col. Gray's complete narrative of his expedition. Various causes have hindered the publication of this work, and as it is now doubtful whether it will ever make its appearance, owing to the recent death of that gentleman, it seems proper that one of the most interesting of the scientific results of his labors should no longer be withheld.

The following are the characters of the new genus, taken from dried specimens presented to me by Mr. Gray, and from a drawing made from the living plant by Mr. C. Schuchard, who accompanied the expedition as draughtsman.

AMMOBROMA*, Torr.

Calyx deeply 10-parted; the divisions setaceous, plumose. Corolla monopetalous, tubular-funnelform, somewhat plicate; the border 6-lobed;

* From αμμος, sand, and βρωμος, food; in allusion to its place of growth, and the use made of the plant by a tribe of Indians.

lobes short and emarginate. Stamens 6-10, inserted above the middle of the tube of the corolla in a single series, included; filaments very short; anthers oblong, 2-celled; the cells opening longitudinally. Ovary oblate-globose, 15–20-celled; the cells arranged in a marginal circle around a thick central axis; style elongated, rather stout, straight, included; stigma sub-capitate, depressed in the centre, the margin crenate. Ovules single in each cell and fixed to the inner angle, at first nearly hemitropous, but becoming anatropous; the micropyle superior. Fruit (immature) depressed, the dehiscence apparently localicidal. Endocarp chartaceous, separating readily from the rest of the fruit, which is apparently somewhat fleshy. Plant herbaceous and fleshy, of a dull orange color, parasitical on the roots of an unknown shrub. Stem simple, scaly, almost entirely buried in the sand, the summit expanded into a shallow cyathiform head or receptacle, which is densely lined with small, pedicellate, purplish ebracteate flowers.

Ammobroma Sonoræ.

PLATE I.

Habitat.—State of Sonora, Northern Mexico, in the sandy desert near the head of the Gulf, on hills around Adair Bay.

Root consisting of thick tortuous fibres, dilated near the extremity, where they are attached to the plant from which the parasite draws its nourishment. Stem 2 to 4 feet long, and from three-fourths of an inch to an inch and a half in diameter, thicker below, and gradually tapering upwards, furnished with numerous lanceolate acute scales, which are appressed, except near the top and on the under side of the cup-like receptacle, where they are reflexed. This receptacle is about two inches in diameter, funnel-form inside, with the margin recurved, and the cavity and margin densely lined with flowers, which stand on short pedicels, which are longer in the centre flowers, so that the mass of flowers is nearly level or only slightly concave. The inflorescence appears to be centrifugal. Calyx 10-parted nearly to the base; the divisions very slender, purplish, clothed with spreading simple or bifid white hairs which appear torulose under a lens. Corolla about 4 lines long, nearly

the length of the calyx, purple and plicate towards the summit; the border 6-lobed, with the lobes erect and slightly emarginate. Stamens 5–10 (mostly about 8), inserted near the upper third of the corolla; the filaments very short, triangular-lanceolate, blue; anthers obtuse at each end. Pollen simple, obtusely, but distinctly triangular. Ovary orbicular and somewhat flattened, mostly about 20-celled, the cells marginal and surrounding a thick fleshy central axis. Style cylindrical, about two-thirds the length of the corolla; stigma capitate, somewhat lobed or crenulate. Ovules suspended on a short funiculus. Mature front not seen.

In a business Report of Col. Gray to the Texas Western Railroad Company, published at Cincinnati in 1856, is the following notice of the plant: "West of Tucson and Tubac, towards the Gulf of California, the country presents more the appearance of a barren waste or desert than any district I have seen. It is the country of the Papigo Indians, a peaceful and friendly tribe, extending down the Gulf coast, where they are mixed up somewhat with the Cocopas of the Colorado. From Sonoita I explored the Gulf shore near the mouth of Adair Bay. This bay is completely encircled by a range of sand-hills, reaching north-west to the Colorado river, and southward as far as the eye could discover. The "sables" are probably eighty or ninety miles in extent by five to ten broad. Notwithstanding it appears to be the most desolate and forlorn-looking spot for eighty miles around the head of the Gulf, the sand-hills looking like a terrible desert, nature seems even here, where no rain had fallen for eight months, to have provided for the sustenance of man one of the most nutritious and palatable vegetables. In this naked spot I found a band of Indians (Papigos) almost in a state of nudity, living on fish and crabs caught in the salt creeks and lagoons of the Gulf; and a sort of root, which was eaten after roasting upon hot coals or dried in the sun, and ground on a *metate* (curved stone) with mesquit beans, forming "Pinole." In the latter state it was not so palatable as ours made of parched wheat or corn; but the vegetable itself, when first

gathered and cooked, was very luscious, and resembled in taste the sweet potato (batatas), only far more delicate. It is very abundant in the hills; the whole plant, except the top, buried in the sand, apparently attached to some other root or substance."

There is not much probability that the Ammobroma can be cultivated, as it seems to be a true parasite; yet it is possible that it may be propagated by transplanting it along with the living roots to which it is attached.

The only known genera to which the Ammobroma is nearly allied are Corallophyllum of H. B. and Kth.* (or rather Lennoa of Llave and Lexarza†), and Pholisma of Nuttall. The former has been found only near the City of Mexico, and no botanist appears to have noticed it since the original descriptions of the plant were published, about forty years ago. It differs from the other two related genera in having a corymbosely branching cespitose stem, with the fleshy leaves (or rather scales) deeply and irregularly laciniate, and the stamens in a double series. The principal figure in the *Nov. Gen. et Spec. Plant.* does not clearly show the mode of inflorescence, but the flowers are described as being bracteate.

Pholisma‡ of Nuttall is as little known as the preceding genus, not having been found since that sagacious botanist discovered it near San Diego and Monterey in California, in the year 1835. It is very closely related to Ammobroma, but differs in its calyx being 6- (not 10-) parted, and in having its flowers in a dense oblong spike instead of lining a cyathiform receptacle.

As to the affinities of these plants there has been much uncertainty, owing to their great rarity and the incompleteness of our knowledge concerning them; the two longest known having been examined only by the botanists who first described them, and the character of the mature fruit and seed being still

* Nov. Gen. et Spec. Plant. 7, p. 276, t. 660 bis (1825).

† Nov. Veg. Mex. Desc. fasc. 1, p. 7 (1824), fide Pritz. Thesaur.

‡ Nutt. in Hook. Icon. t. 626.

undetermined. Kunth (l. c.) expressed no opinion as to the place of Corallophyllum in the Natural System, and he seems to suspect that the plant he examined was in an abnormal condition. It is left by him among his "*genera incertæ sedis.*" Endlicher also places it with "*genera dubiæ sedis.*"

Sir W. Hooker, who first described Pholisma, from Nuttall's specimen, and gave a good figure of the plant in his Icones Plantarum (l. c.), regards it as nearly related to Corallophyllum, and refers it to Orobanchaceæ, though he thinks it will yet form a distinct group near that order, but with a very different fruit. Walpers follows Hooker without comment. Lindley* places both genera, with a mark of doubt, at the end of Monotropaceæ, which they certainly resemble much more than they do Orobanchaceæ. Like the former they are parasitical on roots; and in the spiked inflorescence of Pholisma there is an approach to Hypopithys. Most of the genera of Monotropaceæ are gamopetalous, and in half of them the anthers open by longitudinal slits.† The pollen, also, is simple and spherical.

On the other hand, Corallodendron and Pholisma, as well as

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* Vegetable Kingdom, p. 452.

† Viz. In Pterospora, Allotropa, Torr. and Gray (in Bot. Wilkes's Expl. Exped. ined.), and Hemitomes, Gray, in Newberry's Bot. of Williamson, and Abbot's Pacif. Railroad Expl. An examination of good specimens of Hemitomes, collected in Washington Territory by George Gibbs, Esq., shows that the anthers are distinctly 2-celled; but they open and discharge their pollen even before the flower is expanded. The lines of dehiscence are near the connective. After opening, the broader portion of the cells is rolled backwards till each nearly meets its fellow, forming a large and spurious cell. A narrow portion of each proper cell is left. These also incline towards each other, so that another smaller, spurious, and apparently abortive cell is formed. Hence, after flowering the anther might easily be regarded as only one-celled by abortion. An examination of an unexpanded flower shows the true structure of the anther; and proves that in the withered state the spurious cells are at right angles to the normal ones. Hence the name Hemitomes is quite inapplicable, and I propose that it be changed to Newberrya, in honor of the first discoverer of the plant, who has distinguished himself by investigating the recent and fossil botany of the Western and Pacific States.