

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

WASHINGTON, D. C., June 27, 1889.

Sir William Dawson, Montreal, Canada.

My dear Sir:—

I am very much obliged to you for your kindness in examining and passing your judgment upon the obscure Nevada specimens. I have sent copies of your letter to Mr. Hague, Prof. Lesquereux, and Mr. Walcott. I hope you have returned the specimens at the expense of the U.S. National Museum, and I doubt not that they will arrive in due time and good condition.

I enclose the copy of my American Association Abstract requested in your last. I believe I sent you a photograph of the fossil, and I regret to say that I have no more at present. I shall be glad to receive any further light that your new material may shed upon this problem, as I am now preparing my Report upon the collection in which that organism occurred.

Very respectfully yours,

Lester F. Ward

dive on the left bank of the river and close to the water's edge, the specimens are smaller and more perfect, being embedded in a fine grained bluish clay shale. The fossil shows a large circular center 2-7cm. in diameter from which there proceed in radial arrangement in all directions a large number of single flexible stems varying in length and having a width of 2-3 mm. These horizontal, radiating stems are sometimes slightly sinuous, lying upon and often crossing one another. They exhibit for most of their length, beginning near their attachment to the center, a row of toothlike appendages on each side, which are about $\frac{1}{2}$ mm. in width at the base and about 1mm. apart, obliquely ovate in shape with obtuse tips and always projecting forward toward the distal end of the stem at an angle of 50°. Close examination with a high power reveals the presence of a continuous epidermal membrane composed of hexagonal cells connecting these projections. The stems are uniform in width and not marked by any longitudinal costa until within some 3cm. of the apex when they expand into an elongated elliptic blade, or head, terminating the stem. Through the center of each of these heads run two rows of what appear to be spore-cases, one on each side of the median line and separated from each other by a very narrow interval forming a continuous groove running longitudinally through the head. The supposed spore-cases are somewhat elongated transversely, and arranged in pairs, filling most of the surface of the head, but leaving a winged expansion at the central or widest portion. They average $1\frac{1}{2}$ mm. in length and $\frac{1}{2}$ mm. in thickness. Below the base of the head, where the teeth begin, they appear to cease, but in most cases a careful inspection reveals their presence in an obsolete and probably functionless form, and this is sometimes distinguishable for considerable distance down the stem where it assumes more the aspect of a series of articulations widening as the center is approached. The lateral teeth of the stems usually cease below the head, but cases occur in which they continue for some distance along the margins of the expanded lamina.

Considerable, but not as yet exhaustive, search has been made through the literature of paleontology to find the analogues and determine the affinities of this singular organism, as yet almost entirely without success, the forms figured under the names *Discophorites*, *Gyrophyllites* and *Tænidium*, perhaps having the greatest resemblance, but not close enough to indicate any relationship. Specimens have been shown and sent to a number of eminent paleobotanists and paleontologists, but none, so far as heard from, can give any idea of its nature. Its vegetable character having been questioned it has also been shown or sent to the best authorities on invertebrate zoology in this country and in Europe. Those who have thus far expressed an opinion have uniformly denied its relation to any known animal. It is remarkable that it is the botanists who have suggested its possible animal nature, the zoologists inclining to regard it as a plant.

Having collected and long studied the specimens, superintended their delineation, and compared them with a great number of forms both fossil and living, I may be permitted to advance in as few words as possible, the

theory which I provisionally hold as to the nature of this organism, as follows: I am disposed to regard it as a "comprehensive type" of vascular cryptogamic life, embodying some of the characters of several well known living types, viz., 1. The large tufted central base is suggestive of that of most species of Isoetes, and the long weak stems of certain of these species are observed to recline and lie prostrate in all directions around this center. 2. The double row of spore-cases at the apex of the stem agrees in all essential respects with that of *Ophioglossum*, and the elliptic expansion may be regarded as homologues of the larger blade-like fronds of that genus, which may easily be imagined to have the spores borne along its median line instead of on a special fruiting frond. 3. The prostrate sinuous habit is not widely unlike that of certain creeping species of *Lycopodium*, as, e. g., *L. annotinum*, and the toothlike appendages may be the reduced homologues of the scale-like leaves of that genus. 4. A still further approach is seen in *Selaginella* where the scales have become distichous and the stems flat and closely creeping. This parallel is well-nigh complete in those species, such as *S. Douglasii*, in which the spores are borne in terminal spikes, like those of most *Lycopodiums*, except that these are more or less flattened and two-ranked. 5. Finally, ignoring the appendicular organs of *Marsilia* we see in the fruit-bearing portion a further analogy to our fossil, the fruiting stems radiating from the thickened base and bearing the spores at their apex.¹

The fossil would thus represent a highly generalized type and may be phylogenetically related to all these more specialized modern forms with each of which it seems to possess some characters in common.

The paper was illustrated by lantern views of the original fossils and of carefully prepared drawings.

THE PALEONTOLOGIC HISTORY OF THE GENUS *PLATANUS*.² By Prof. LESTER F. WARD, U. S. Geological Survey, Washington, D. C.

[ABSTRACT.]

THE genus *Platanus* is one of those waning types, like *Ginkgo*, *Sequoia*, *Liriodendron*, etc., of which so much has been said of late, and though now constituting an entire order and containing only seven species, it is evidently the descendant of a large family embracing a number of genera, each with a fair representation of specific forms. Twenty extinct species of *Platanus* are now recorded from Tertiary and Cretaceous strata, which are, however, in most cases founded on the impressions of leaves. But in

¹ Since the date at which this paper was read communications have been received from the Marquis Saporta and from Dr. A. G. Nathorst, both of whom agree that the organism is probably a cryptogamic plant related to *Ophioglossum*.

² Published in full in the Proceedings of the United States National Museum, Washington, 1888, Vol. XI, pp. 39-42, pls. xvii-xxii.

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addition to these there is a large number of aberrant types resembling *Platanus* in many respects, though also resembling some other living genera, which have been variously referred to *Sassafras*, *Aralia*, *Liquidambar*, *Liriodendron* and to the supposed extinct genera *Araliopsis*, *Aspidiophyllum*, *Protophyllum* and *Credneria*.

The object of this paper was to point out the probable genetic relationship among all these extinct types and to show that they are the probable ancestors of the modern genus *Platanus*. Special emphasis was laid upon the significance of the basilar lobes of the form described by the author as *Platanus basilobata* from the Fort Union group, and upon the connection between this and similar appendages sometimes found on leaves of *P. occidentalis*, and of certain fossil species of *Platanus*, *Aralia*, and *Aspidiophyllum*. The supposed *Sassafras* leaves of the Dakota group were also discussed with a view to showing that they are also archaic platanoid types, and it was argued that the nervation of these leaves differs in some fundamental respects from that of the leaves of the only living species of that genus, the normal form of which was shown to be entire and not trilobate, as is commonly supposed.

Finally, it was contended that, inasmuch as five of the seven living and a large preponderance of the fossil species of *Platanus*, as well as most of the ancestral forms referred to, are American, and as the type is found in this country in very much older strata than in the Old World, it must be conceded that, notwithstanding the historic antiquity of the oriental plane tree in connection with the early development of the human race in Asia and Europe, nevertheless it is, paleontologically, an American tree, and had its origin in this country.

This paper was illustrated by lantern views of fifteen of the forms selected to exhibit the phylogenetic development of the genus.