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A SUPPOSED JELLYFISH FROM THE PRE-CAMBRIAN OF THE GRAND CANYON

By R. S. Bassler

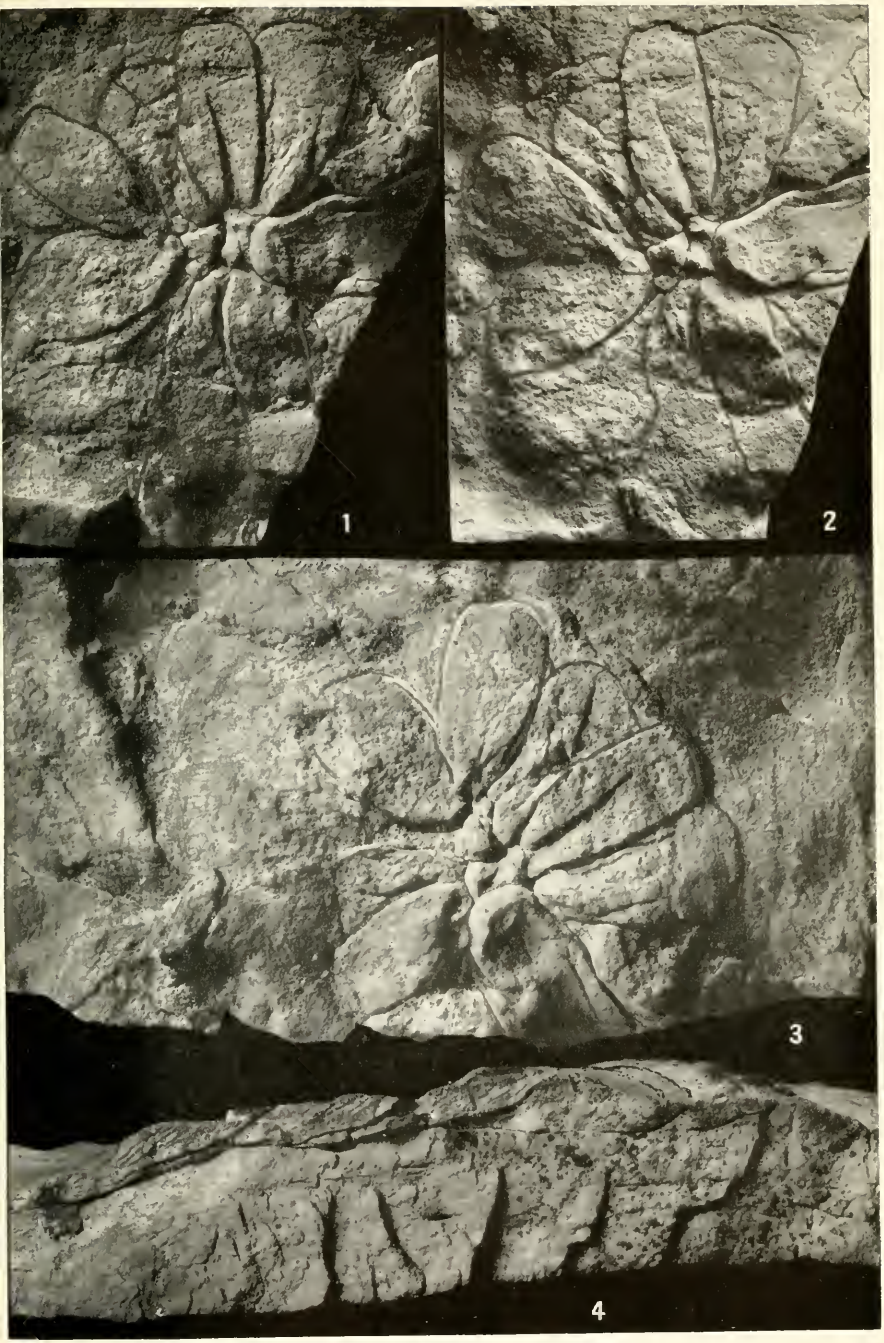
The search for fossils in pre-Cambrian rocks has always intrigued the geologist, but the comparatively few discoveries have led to almost as many controversial discussions, some of which are now classic in the literature. Pre-Cambrian fossils so interested the late Dr. Charles D. Walcott that he spent many months of his long, busy life in the discovery and interpretation of their remains. Shortly after his death, Mrs. Mary Vaux Walcott, in memory of her husband, established the Charles Doolittle Walcott medal and honorarium, to encourage further researches upon the paleontology of the earliest sedimentary rocks. The outcrops of the little metamorphosed pre-Cambrian strata in which fossils might be expected are usually in more or less inaccessible regions where collecting presents difficulties other than those of finding specimens. Besides, the few fossils found have led to the belief that these strata instead of being marine might have originated upon the ancient continents.

The paucity of marine fossils in pre-Cambrian rocks makes it impossible to solve the problem of their origin. However, there must have been valid reasons for their apparent absence, since life was necessary at this time to account for the great abundance in the succeeding Cambrian rocks. Prof. William Keith Brooks believed that these oldest organisms lived at the surface of the ocean and lacked hard parts because the weight of the skeleton would have been detrimental to them. Dr. Walcott thought the pre-Cambrian strata were fresh-water deposits in lakes of low calcium content located considerable distances inland. Prof. T. C. Chamberlin suggested that all organisms originated on the land and did not reach the sea until early Paleozoic times. Daly's theory was that the pre-

Cambrian marine organisms lacked calcareous parts because of insufficient calcium in the waters of that time. However, the great bodies of pre-Cambrian limestone and marbles would seem to preclude this idea. Prof. A. C. Lane considered the waters of the pre-Cambrian oceans to be so acid that calcareous skeletons could not be formed. Prof. Percy E. Raymond followed Brooks' theory with the modification that skeletons appeared when a sluggish mode of existence was adopted. And, lastly, it is quite possible that the metamorphism of the rocks since pre-Cambrian times would account for most of the apparent absence, but then many of the strata are scarcely metamorphosed at all. Professor Raymond has elaborated these various theories in his address as retiring president of the Paleontological Society in 1934.[1]

Although every object remotely resembling a fossil from the oldest strata of the Grand Canyon regions has been carefully collected and studied, so few have been accepted as real fossils that their number is almost negligible. These few have been classified as algae, sponges, and worm tracks, but there are students who deny that all these can be proved to be of organic origin. The discovery, therefore, of an imprint apparently of a jellyfish in the red sandstone of the Nankoweap middle group of the Grand Canyon series above the lavas forming the top of the Unkar lower group, by C. E. Van Gundy in 1935, and brought to the attention of scientists by Prof. Norman E. A. Hinds at the December 1937 annual meeting of the Carnegie Institution of Washington, is of great interest provided the specimen is correctly classified. Mr. Van Gundy[2] in 1936 published an abstract of the stratigraphy of the Nankoweap group and mentioned the occurrence of this medusa as suggesting a marine environment for the beds containing it. The subject was discussed by Professor Hinds in 1938,[3] and he noted that this jellyfish is the only authenticated animal fossil discovered in the Grand Canyon pre-Cambrian, all others strongly suggesting the inorganic markings found throughout this series. Professor Hinds further stated the specimen had been identified as probably a jellyfish by the present writer and that a detailed description of it would be published later. Then, Dr. J. C. Merriam, president of the Carnegie Institution, under whose leadership the Grand Canyon researches were undertaken, presented the specimen to the United States National Museum on the promise that it would be described. Since making this promise, the writer has become less certain of his first opinion as to the animal nature of the specimen, which was based upon its resemblance to *Brooksella* and

[1] Bull. Geol. Soc. Amer., vol. 46, No. 3, pp. 377–392, 1935.
[2] Proc. Geol. Soc. Amer., 1936, p. 304.
[3] Science, new ser., vol. 88, No. 2278, Aug. 26, 1938.



BROOKSELLA CANYONENSIS, NEW SPECIES.

1–3, Views of the type specimen, with light from various angles (fig. 2 coated with ammonium chloride); 4, edge of sandstone bed showing at least five overlapping layers, upon four of which the specimen rests. Natural size.

other medusalike Cambrian fossils and to the hardened, dried-up jellyfishes along the seashores today, but nevertheless he believes the facts favor this interpretation. In an issue of the Carnegie News Service, Dr. Hinds gave a popular account of the subject, entitled "An Early Chapter of Earth History".[1] Since then he has made special efforts to discover more material in the Grand Canyon section without any results. As it is very probable that there will be little opportunity for further search because of the expense involved in collecting in this very inaccessible area, he believes there should be no further delay in naming the form so that it can be quoted in definite terms.

The lobation of the single specimen is so similar to that in a jellyfish that it seems hardly possible it can be an accidental resemblance produced by inorganic markings. It is realized, of course, that a series of specimens should be discovered so that their variations or possible proof that they are simply markings can be verified. This specimen and photographs of it have been shown to various Washington and visiting paleontologists, who have varied in opinion from one pronouncing it undoubtedly a medusa to the opposite that it is positively inorganic. Dr. G. Stiasny, of the Riksmuseum at Leiden, Holland, the leading student of medusae, to whom the photographs were shown, reports that while the fossil looks in outline somewhat like a medusa, closer examination shows that it resembles neither the semaeostomatean or rhizostomatean medusae, the two great groups of these animals. He says the furrows do not represent radial canals, the pouches are not stomach pouches, and the two polygons in the center are certainly unknown. In addition, Dr. Stiasny believes that the jellyfishes described from the earliest rocks do not in most cases belong to this group of animals at all.

The illustrations of this supposed fossil have been prepared to show its structure as clearly as possible under varying aspects. The imprint is upon a slab of thin-bedded, fine-grained sandstone marked upon its upper surface by cross-bedding or overlapping ripple marks. Portions of these have been stained reddish brown with iron as is the imprint itself. Viewing the edge of the slab (pl. 64, fig. 4), one may see the minute sand grains piled up into ripplelike overlapping layers with the imprint crossing several of them. Exactly similar conditions may be noted today on the Atlantic shores, especially along Chesapeake Bay, where the jellyfishes when left stranded dry into slightly shriveled bodies but still retain their general shape, before being covered by the sand layers of succeeding waves. No detailed description of the lobes is advisable, since each observer might have a different interpretation, but it is evident that this specimen is a more

[1] Bull. Carnegie Inst., Washington, vol. 4, No. 23, Mar. 13, 1938.

or less regularly outlined object with the individual lobate areas radiating from a center unfortunately somewhat crushed. It is also true that there is considerable resemblance to the abundant supposed jellyfish from the Middle Cambrian of the Coosa Valley of Alabama, named *Brooksella alternata* by Walcott. This *Brooksella* occurs in limestone from which the uncrushed fossil forms have been freed by silicification and weathering. Polished sections of it show a series of canals, radiating from the center, but, as noted before, doubt has been thrown upon the identification of this fossil as a jellyfish. It may be an algal form, in which case the Grand Canyon specimen possibly had a similar origin and therefore would not have the same geological significance as if it had been a jellyfish. At any rate, it seems not unreasonable to apply a name to this imprint, fossil or inorganic.

Genus BROOKSELLA Walcott

BROOKSELLA CANYONENSIS, new species

PLATE 64

This new specific name is suggested for a supposed jellyfish represented by a single individual about 7 centimeters in its major diameter, impressed and compressed upon a slab of fine-grained sandstone and resting upon the edges of the laminations of several successive ripple marks. From the central portion of the disk, which is considerably crushed, the specimen continues into 8 to 10 somewhat uniformly arranged lobes of fairly equal size, all stained red with iron and more or less distinctly marked out by the lighter-colored sandstone. The lobes all show crushing along the midline; and the edge of the disk suggests a somewhat pentagonal form slightly elevated above the surrounding sandstone upon which it is impressed.

The above description may contain some wishful thinking, but the writer believes, although the specimen does have considerable superficial resemblance to *Brooksella*, that the best proof for it as an organism lies in the fact that this lobed structure is impressed upon a series of ripple marks which elsewhere on the slab appear as dark colored, rather evenly arranged layers. In other words, other parts of the slab with exactly the same arrangement of sand layers should show similar markings if the specimen were inorganic.

Occurrence.—Proterozoic (Algonkian) sandstones of the Nankoweap middle group above the lavas marking the top of the Unkar lower division of the Grand Canyon series, near the bottom of the Grand Canyon of the Colorado River, Ariz.

Holotype.—U.S.N.M. No. 99438.

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