IX.—*On an Archæan Plant from the White Crystalline Limestone of Sussex County, N. J.*

BY N. L. BRITTON.

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The abundance of graphite in certain Archæan limestones, and notably in those referred to the Laurentian system, has often been cited as an indication of the existence of plant-life at that remote period, and indeed, has seemed to the writer and others attributable to no other source, although this view has not found ready acceptance in the minds of many geologists. The mineral generally occurs in these limestones in the form of scattered separated flakes or small masses, often somewhat crystalline in outline, thus affording neither information regarding the nature of the plant from which it has been derived, nor certainty that it is in reality of vegetable origin. Through a fortunate discovery made last September by Mr. J. I. Northrop and myself, I am able to submit evidence that in one belt of Archæan limestone in the Highlands of New Jersey, the graphite has been derived from a plant, and proof that vegetable life existed in that epoch.

There are two known limestone belts in the New Jersey Highlands. The one is in the eastern part of the area, extending in isolated outcrops from Mendham, Morris County, northeast through Passaic County to Ringwood, and in New York through Orange County to the Hudson. This contains some graphite, but is especially characterized by serpentine and other magnesian minerals. The other has its southwestern exposures in Warren County, extends through Sussex County, and is also known for a considerable distance in Orange County, New York.

Perhaps its most marked feature is its mineralization at certain points with manganese, zinc and lead,—the great mines of Ogdenburg and Franklin Furnace being enclosed by the limestone. While its northeastern portion is mainly a broad continuous outcrop, it is greatly broken to the southwest, forming by faulting, as we suppose, detached areas of limited size, occurring in the most unexpected positions.

One of these little areas furnishes the specimens to which attention is here directed. The plant-remains appear as black bands on the rock, consisting of very thin films of graphite; in some the thickness reaches about 0.5 mm., but it is generally less. The average width of the bands is about 3 mm., and the greatest continuous length observed about 6 cm., though it is apparent that when entire they were much longer. In many parts of the rock these are matted together to form broad, black patches, which are in reality thin carbon strata. The bands and films lie parallel with the bedding of the limestone. No cellular structure has thus far been detected.

As this is undoubtedly the most ancient plant yet discovered, I should suggest for it the generic name *ARCHÆOPHYTON*; and to acknowledge in an imperfect manner my obligation to one to whom I am indebted for encouragement and counsel in study and investigation, and at the same time to associate with this interesting plant the name of one foremost in American Palæobotany, I would denominate the plant *ARCHÆOPHYTON NEWBERRYANUM*.

While the imperfect nature of the fossil forbids any definite statement as to its botanical affinity, we may, perhaps, assume its relation to the algæ.

The general aspect of the specimens is well shown in the accompanying figure (Plate VII.).