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FOSSIL PLANTS FROM THE WICHITA OR PERMIAN BEDS OF TEXAS.

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In the spring of the present year, Mr. E. T. Dumble, state geologist of Texas, sent me for examination a small collection of fossil plants from the Wichita beds of that state.

These plants were discovered and collected by Mr. W. F. Cummins, assistant on the Texas survey. They occur in the Wichita beds along with invertebrate remains which Dr. C. A. White has assigned to a Permain age, and vertebrate remains which Professor Cope asserts are of the same age. I was therefore quite anxious to know what answer the plants might give to the question of supposed geological equivalency between the Wichita series of deposits and those at the summit of the Carboniferous column in southwestern Pennsylvania and West Virginia and in southern Ohio, where the invertebrate and reptilian remains are absent, or at least not yet discovered, though plant remains are abundant.

These West Virginia beds above the horizon of the Waynesburg coal had long ago (1878) been referred to the Permian by Professor Wm. M. Fontaine and myself,* upon the evidence of the fossil plants found therein; but as the correctness of this reference had been questioned, or at least not generally recognized by American geologists, the opportunity to compare this flora with that of a locality containing a Permian fauna, through the kindness of Mr. Dumble, was heartily welcomed.

After such cursory examination as I could give the plants when first received, I saw at a glance that they were either identical with, or very near relatives of, our West Virginia plants from the beds above the Waynesburg coal, and so wrote Mr. Dumble at the time. But to be certain of the matter, I sent the plants to Professor Wm. M. Fontaine, the distinguished paleobotanist at the university of Virginia, who at my request examined the collection and sent me the following list of identifiable species:

* PP, Pennsylvania Second Geological Survey.

Sphenophyllum latifolium, F. & W.
" *filiculme*, Lx.
Annularia, near *radiata*, Brt.
Walchia, sp.?
Odontopteris nervosa, F. &. W.
Callipteris conferta, Brt.
Callipteridium oblongifolium, F. & W.
" *dawsonianum*, F. & W.
" *grandifolium*, F. & W.
" *unitum*, F. & W.
Pecopteris lanceolata, F. & W.
" *platynervis*, F. & W.
" *latifolia*, F. & W.
" *imbricata*, F. & W.
" *tenuinervis*, F. & W.
" *scoimperiana*, F. & W.
" *rotundifolia*, F. & W.
" *candolleana*, F. & W.
Goniopteris oblonga, F. & W.

A few other new or indeterminable forms were present, one badly preserved specimen resembling *Lepidodendron*.

Professor Fontaine appends the following remarks concerning the geological horizon of the plants in question:

"I am decidedly of the opinion that this Texas flora is essentially the same with the flora described by us in report PP of the second geological survey of Pennsylvania. The *Walchia* is the only important determinable plant not present in the flora of West Virginia and Pennsylvania."

This conclusion of Professor Fontaine exactly confirms my own as given in Bulletin 65, United States Geological Survey, page 42, before I had seen the plants in question.

It follows from the evidence of this list of plants, as well as from general stratigraphic facts, that the age of these uppermost rocks of the Carboniferous system in West Virginia, southwestern Pennsylvania and southern Ohio, or the Dunkard Creek series,* as I have termed these deposits above the horizon of the Waynesburg coal, is the same as that of the Wichita beds of Texas; and if the latter be referable to the Permian on the basis of their reptilian and invertebrate remains, then geologists can no longer refuse to recognize the Permian age of the Dunkard Creek series, since, as shown by the list given above, every determinable plant sent me from the Wichita Series except one (*Walchia*) has been found in the Dunkard Creek beds.

The plants of this list were collected by Mr. Cummins from the upper portion of the Wichita at the head of Godwins creek, Baylor county, Texas, and from three miles west of Antelope, Texas.

*Bulletin 65, U. S. Geol. Survey, 1891, p. 20.