

## CORRELATION OF ILLINOIS COAL SEAMS WITH EUROPEAN HORIZONS

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A congress for the advancement of the studies in carboniferous stratigraphy was held in Heerlen, Holland, June 7-11, 1927, and the transactions of this congress, edited by W. J. Jongmans, were published a few months ago. I was invited to present a paper on the correlation of American and European coal seams at this congress, but declined, giving as reason that we are not yet quite ready to correlate American and European coal seams. This opinion was challenged by European paleobotanists and coal geologists, especially by W. Gothan of the Prussian Geological Survey in Berlin. I, therefore, communicated with Professor Gothan and sent him a collection of plant fossils from our coal No. 2 of Northern Illinois to see whether he could correlate the horizon of this coal with any coal horizon of western Europe. Professor Gothan informed me that the fossil plants of our coal No. 2 indicated the same horizons as can be found at Piesberg and Ibbenbüren of the Osnabrück district in Westphalia and also showed similarity with the flora of the layers of Saarbrücken in the Sarre district. This opinion was corroborated by Dr. Hans Bode, also of the Prussian Geological Survey, who had published a monograph on the flora of Ibbenbüren<sup>1</sup> and with whom I am also in correspondence about the subject. Dr. Bode intends to spend part of the coming year in Chicago studying my collections of the Pennsylvania formation of Illinois. I hope that our discussions will clear up a number of points concerning American and European coal correlations.

Besides having a representative collection of coal No. 2 fossils from Illinois on hand, Gothan and Bode used my paper on the Pennsylvanian flora of Illinois<sup>2</sup> for the comparison of their horizons with ours.

<sup>1</sup>H. Bode, Palaeobotanisch-stratigraphische Studien im Ibbenbürener Carbon, Abhandlungen der Preussischen Geologischen Landesanstalt Neue Folge, Heft 106, Berlin, 1927.

<sup>2</sup>A. C. Noé, Pennsylvanian Flora of Northern Illinois. Bulletin No. 52, State Geological Survey of Illinois, Urbana, 1925.

At the congress in Heerlen it was agreed to establish a new international nomenclature of the carboniferous formations of Europe. The lower carboniferous, which we call the Mississippian, is now uniformly called in Europe the Dinantien, and the upper carboniferous, our Pennsylvanian, is divided into three sections which are named, from bottom to top, Namurien, Westphalien, and Stephanien. The Westphalien is again sub-divided from bottom to top into the series A, B, and C, and the Stephanien is divided into a lower and upper series.

The horizons of Piesberg and Ibbenbüren in the Osnabrück basin of Westphalia, as well as the Flaming Coal and Fatty Coal of Saarbrücken in the Sarre district, belong to series C of the Westphalien. Our coal No. 2 would, therefore, be correlated with the uppermost Westphalien of Europe, and the Pennsylvanian formation of Illinois, above Coal No. 2, would fall into the Stephanien. The latter is the uppermost series of the carboniferous formation in Europe and lies directly under the Permian. Our Pottsville would, therefore, correspond to the Namurien and series A and B of the Westphalien in Europe.

It is of interest to note that, according to Hirmer<sup>3</sup>, all European coal ball horizons are below the Stephanien while ours are only in horizons corresponding to the European Stephanien. Also the coal ball floras of coal No. 5 of Harrisburg and of Grape Creek coal of Danville, Illinois, show a flora which is closely related to that of the Permian of Europe.

During a recent trip to Europe I had the opportunity to study the fossil plant collections of the British Museum in London and in some places in Westphalia and in the Donetz basin of Russia. My own observations agreed with those of Professor Gothan and Dr. Bode with regard to Westphalia. In the Donetz basin I had the opportunity to do extensive field work in the basin of the Khroustalskaya coal seam. Its flora corresponds to our No. 2 flora. The Khroustalskaya coal seam represents the uppermost Mouscovie of the Russian carboniferous, which in turn corresponds to Westphalien C of Western Europe.

The species which are common to the corresponding horizons of Westphalia, the Donetz Basin, and northern Illinois are:

<sup>3</sup> M. Hirmer, *Über Vorkommen und Verbreitung der Dolomitknollen und deren Flora*. *Compte Rendu, Congrès pour l'avancement des Etudes de Stratigraphie Carbonifère*, Liège, 1928.

*Calamites suckovi*  
*Annularia sphenophylloides*  
*Calamocladus equisetiformis*  
*Sphenophyllum emarginatum*  
*S. majus*  
*Alloiopteris* sp.  
*Palmatopteris furcata*  
*Mariopteris muricata*  
*Neuropteris rarinervis*  
*Cyclopteris orbicularis*  
*Linopteris neuropteroides*  
*Pecopteris vestita*  
*P. arborescens*  
*Alethopteris serlii*  
*Trigonocarpus*

It is to be hoped that before very long other fossil-bearing coal seams of Illinois will be correlated with European seams. The roofs of the following coal seams of Illinois contain excellent plant impressions which can be used for correlations:

Coal No. 1 of Rock Island  
Coal No. 2 of Colchester  
Coal No. 2 of Murphysboro  
Coal No. 5 of Harrisburg  
Coal No. 6 of Jackson County, Perry County, Franklin  
County and Williamson County  
Coal No. 6 of Danville (Grape Creek Coal)

Coal balls with distinct floras have also been found in sufficient quantities in Coal No. 7 of Danville and coal No. 13 of Calhoun Richland County.