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CARBONIFEROUS FORMATIONS OF THE OZARK REGION.

BY CHARLES R. KEYES.

The term Ozark, as now generally understood, applies to all the broad dome-shaped and mountaineous area, lying in southern Missouri and northern Arkansas chiefly, and extending from the Red to the Missouri river, and from the Mississippi to the Neosho. In this sense the name is used in the present connection. For a long time the Ozark uplift remained a region about which less was known geologically, than perhaps any other part of the North American continent. Of recent years, however, so many new facts have been obtained concerning the formations of the northern part of the area that a very complete and satisfactory classification of the deposits for the whole of that region is now capable of being made out. This is particularly the case with those strata known to be of Carboniferous age.

In the southern part of the region, in Arkansas, little comparison was made with the sections of other regions, and consequently an entirely distinct grouping of the beds was adopted, one that was only in a very general way comparable to that in the north. Although much work had been done in the state mentioned, no satisfactory parallelism of the formations of the two districts was brought out. Within the past two years, however, direct comparisons have shown clearly that the geological sections of the Carboniferous formations of the entire Ozark region are essentially the same. The importance of this determination over so large a region is obvious.

The formations, which may be regarded as typically developed in Missouri, are fully described in the recent reports of the Missouri geological survey, and while no further reference need be made to them in this place they will be tabulated later. As already intimated, there has been in Arkansas an entirely

new set of names applied to the formations, with only vague attempts to indicate their equivalents elsewhere. About the only formation that was correlated with any degree of certainty with the northern section was the Boone chert, which was thought to represent, in part at least, the Burlington limestone. A short time ago* the typical Kaskaskia limestone was recognized in northwestern Arkansas, and indications of the St. Louis division near by in Missouri. Farther eastward, on the branches of White river, in the last named state, the Kinderhook had been determined; so that all four subdivisions of the Mississippian series were at last recognized for this district as clearly as these formations had been farther north. In addition, the productive coal measures (Des Moines series) were found to be present. The relations of these divisions to those of the Arkansas geologists farther south was thus easily determined.

Up to the beginning of the present year the only part of the Ozark region in which the Carboniferous formations remained uncorrelated with the typical sections was in northeastern Arkansas, in the Batesville district. Within the past few months Weller† has announced the results of his work here. He has brought forth abundant evidence to show that the formations in the vicinity of Batesville are capable of the same subdivision and are as clearly defined as in the more typical locality along the Mississippi river. His correlation of the Arkansas formations are given in the table.

Thus the exact parallelism of the Lower Carboniferous (Mississippian) formations around the whole of the Ozark dome may be regarded as established as essentially similar. Why this is so, and why it should be expected, will be referred to more specifically in another place.

In Arkansas the Carboniferous above the Mississippian series has also remained without any exact determination as to position in the general section of the Continental Interior, but in a broad way it has been thought to be equivalent to the combined upper and lower coal measures of Missouri and Kansas, or about what has been more recently called the Des Moines and Missourian series. The alleged enormous thickness of the coal measures of the southern Ozarks—1,000‡ to 2,400§ feet has

*American Geologist, Vol. XVI, p. 86, 1885.

†Trans. New York Acad. Sci., Vol. XVI, p. 251, 1897.

‡Winslow: Bul. Geol. Soc., America, Vol. II, p. 225, 1891.

§Branner: Am. Jour. Sci. (4), Vol. II, p. 235, 1896.

probably led to a misinterpretation of the real conditions that prevailed during the period of their deposition. The purely paleontological evidence, though somewhat meager, set forth by Smith,* was intended by him to strengthen the view stated above, that the Arkansas coal measures are the representatives of the commonly recognized upper and lower divisions of the Mississippi basin, taken together. However, a careful consideration of the fossils noticed and a comparison with those of other districts appear rather to indicate that, in Arkansas, only the lower coal measures, or Des Moines series, is really present. This is also in accordance with the results of various other lines of investigation in the Ozark region. The correlation of the Arkansas coal measures, with its great thickness, and the Des Moines series of Missouri and Kansas, with a thickness of only one-fourth of the first named, is fully explained elsewhere. In a word, the shore-line during the latter part of the Mississippian epoch was approximately along the present axis of the Ozark uplift. North of that line erosion of the land was taking place, now indicated by the great unconformity of the base of the coal measures throughout the greater part of the Mississippi basin. South of the line, shore deposits were being laid down on a slowly sinking coast, within that district, no secession of sedimentation.

The Missourian series may, therefore, be regarded as not being represented in any part of the Ozark dome, unless possibly in some parts of Indian territory, where the Ouchita range extends westward.

The following is, then, a summary of the Carboniferous formations of the Ozarks and of their local equivalents:

*Proc. American Philos. Soc., Vol XXXV, pp. 213-235, 1896.

CORRELATION OF CARBONIFEROUS FORMATIONS OF THE OZARKS.

GENERAL SECTION.		EASTERN MISSOURI.	NORTHEASTERN ARKANSAS <i>Weller.</i>	SOUTHWEST MISSOURI AND KANSAS.	NORTHWEST ARKANSAS <i>Branner et al.</i>
Mo.	Bethany.	Absent.	Absent.	Absent.	
Des Moines.	Pleasanton.	Absent.	Absent	Pleasanton sh.	Pleasanton?
	Henrietta.	Absent.	Absent.	Henrietta li.	} Kessler li. — shales
	Cherokee.	Cherokee sh.	Absent	Cherokee sh.	
Mississippian.	Kaskaskia...	{ "Ohester" sh. Kaskaskia li. Aux Vases ss.	{ Barton Gr. Batesville ss.	Kaskaskia li.	{ Pentremital li. Archimedes li. Marshall sh.
	St. Louis. ...	{ Ste. Genevieve li. St. Louis li	{ Spring Creek li.	Absent? St. Louis sh?	Batesville ss Fayetteville sh.
	Augusta.	{ Warsaw sh. Keokuk li. Burlington li.	{ Boone chert.	{ Keokuk li. Burlington li	{ Boone chert.
	Kinderhook.	Chouteau li.	St. Joe marbl.e. Sycamore ss	Chouteau li.	St. Joe li.

SOME GEOLOGICAL FORMATIONS OF THE CAP-AUGRES UPLIFT.

BY CHARLES R. KEYES.

Cap au Gres is a name that was given by the early French voyageurs to a prominent sandstone headland rising from the east side of the Mississippi river a dozen miles above the mouth of the Illinois. The point is of special interest geologically on account of having, side by side, beds of the earliest and latest Paleozoic. The sandstone is Cambrian in age and the contiguous limestone middle Carboniferous. The cliff marks the position of the most profound dislocation, or fault, known in the Mississippi valley. Near the line of the slip the horizontal strata are abruptly bent upward at high angles, as much as 80 degrees, immediately against the fault plane. (See plates I and II). Hence it is that within the very short horizontal distance of less than a mile the greater part of the entire Paleozoic section of the region is well displayed.