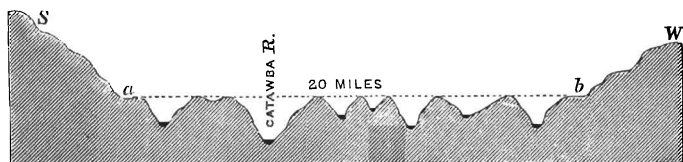


ART. XXVI.—*Origin of some new points in the Topography of North Carolina*; by W. C. KERR, State-geologist of North Carolina.

ALTHOUGH all the ordinary indications of glaciation are wanting in North Carolina, even in the higher plateaus of the western mountainous region, as ascertained and announced more than ten years ago, yet, singularly enough, long after I had ceased to look for evidences of glacial action, I have arrived, by two entirely independent lines of investigation, at the conclusion, unexpected and unsought, that glaciation has occurred here on a large scale, and at two different periods. Moreover, the evidences of the existence and action of glaciers is totally different from the commonly recognized marks and results of glacial action.

I have elsewhere described briefly one of these classes of phenomena, and shall discuss them more at length very soon; of the other I give here some outlines, sufficient to indicate the character of the evidence and to direct the attention of observers to similar phenomena elsewhere.

The accompanying diagram represents the facts better than any description can do. It is an ideal cross section of the hydrographic basin of the Catawba River, which takes its rise in numerous tributaries along the flanks of the Blue Ridge, and after gathering up a multitude of these, traverses the Piedmont, or cismontane plateau (of an elevation of 1,000 to 1,500 feet),



Ideal section of the Catawba River basin, between S., South Mountains, and W., Warrior Mountains.

in a wide basin or trough, flanked by two ranges of mountains, which rise on either hand to an additional elevation of a thousand feet and upward. The direction of the axis of this trough and of the bordering ranges is 60° to 70° east of north, which is about coincident with the strike of the rocks.

These rocks are Archæan—hornblendic and feldspathic gneisses, and micaceous and hydro-micaceous schists, of varying hardness and durability. The river and its several affluents have dug their channels along the softer and more yielding strata, and have left the tougher and more resisting masses in ridges and low spurs, knobs and domes, which rise above the beds of the intervening streams, from a hundred to three, four and five hundred feet. But the singular and significant fact, as indicated in the diagram, is, that to one standing at *a*, for example, a bench on the flanks of the mountains to the south, or at *b*, of the mountains to the north of the basin, and looking across, all the intervening ridges, knobs and hills *rise to the same level eye-line*, which might be represented by a water-line, so level does it seem from side to side; and one imagines that he is scanning a broad level valley, flat as a prairie. It is only at this particular elevation, about 1,400 feet in the meridian of Morganton,—less as you go east, more as you approach the Blue Ridge, with a very gradual ascent,—that the observation is practicable. A few feet lower you see nothing but the next ridges and hills on either hand; a little higher on the flanks of the mountains, above the line *a b*, nothing strikes the eye but a chopping sea of low mountain spurs

and knobs and hills and peaks, stretching away in confused and disorderly succession into the foot hills of the opposite bounding range. I had crossed this valley many times and in many directions, and ascended these mountain chains and measured most of their summits, mapping out in detail their intricate topography for half a dozen years, before this remarkable fact caught my eye. And it was not until the observation had been repeated from different points in the Catawba basin, and the same phenomenon had been observed on a grander scale in the great transmontane valley, the hydrographic basin of the French Broad,—a plateau of nearly a thousand feet greater elevation and of correspondingly greater breadth,—that the full significance of it began to appear.

In the summer of 1877, I stood on one of the foot-hills of the Black Mountains, near the head waters of Ivy River, within the horizon which cuts the level tops of the ridges and knobs and mountain spurs of this rugged and cañon-gashed valley-plateau. During the same summer, ascending the slope of the South Mountains, from a jutting spur, I happened to catch the summit level of the Catawba plateau, at a point which gave the whole sweep of it in length as well as breadth; it stretching westward thirty miles, to the foot of the Blue Ridge, and twice that distance eastward, until the last ridges of the Piedmont became merged into the western margin of the Midland plateau. One readily imagines the valley to have been an arm of the sea during some ancient period of subsidence, and these numerous hill-tops rising as islands to the surface, like the thousands of atolls in the Pacific; and the grand generalization of Darwin came into mind. But no subsidence or action of water seemed adequate to meet the conditions of this problem; nothing, it appeared to me, could explain it except the presence of a great glacier, which in some ancient time had moved down the valley and left the surface nearly level, and then, the subsequent action of meteoric agencies through long ages, channeling out of the plateau thus made the present rugged topography, leaving only this faint trace of its former extent. Nor does any other solution yet occur. The reasonableness of this hypothesis will appear, if it is considered what would be the consequence of the movement of such a glacier over the present surface of the valley for a few thousand years.

As to the time of this supposed glaciation, we note that the opinion seems to be gaining among geologists that there have been several, perhaps many, glacial periods, whether Croll's theory be accepted or not. And there is some ground for the view which introduces the Triassic period with an epoch of extensive glaciation, and the phenomena in question may be

connected with the rapid accumulation of the basal deposits of that formation. Or it may hereafter be ascertained, by a more minute study of the Appalachian regions of the middle latitudes, that glaciers established themselves at the higher levels in the earlier times of the Glacial period, but did not recur during the second accession of cold, while the more extensive and long-continued Diluvial denudations and erosions may have sufficed to remove the debris, striæ and other indications of earlier glacial action.

Raleigh, N. C., Dec. 24, 1880.