ruptedly in progress from the end of the Paleozoic to the present time."

Having thus far taken the negative side on some of Mr. Winslow's propositions, I will now turn to the positive side of the argument in support of my own views.

Enough has been said to show my reasons for thinking that the initial courses of the drainage on the Paleozoic strata at the time of their first emergence are long since lost. Let me now consider the evidence of composite topography in the Ozark plateau, and the evidence that indicates an uplift between the production of the more gentle forms of the upland and the steeper slopes of the Osage valley and its fellows.

The Missouri reports frequently make mention of the relatively even surface of the upland country, and its contrast with the steep sides of the ravines in which the streams now flow. The upland is not level by any means, but has gentle swells and broad slopes, distinctly unlike the sharper slopes of the ravines. The process by which the present ravines are forming is not a direct continuation of the process by which the gentler slopes of the upland were formed. The former are incised in the latter; the latter have suffered little change during the excavation of the former. What, then, is the origin of the upland? It is not a constructional form; that is, it does not retain the form of strata deposited under water and simply uplifted into a land surface. It has manifestly been eroded, and thereby changed from its original constructional form. Under what conditions can a gently rolling surface be formed by erosion? Only as the penultimate result of long erosion, whereby the initial valleys have been deepened close to base-level and widened so as almost to consume the intervening hills; that is, the rolling upland must have gained an oldish topographic stage, when the erosive forces were acting with respect to a base-level different from that which now controls them, and with respect to which they are trenching deep valleys in the upland. The region must have stood lower when the wide rolling uplands were fashioned than it does now, when the upland is incised by steep-sided valleys. The change of elevation, by which the older cycle was closed and the present cycle was opened, was only long enough ago to allow the excavation of narrow valleys in rocks of moderate hardness; and hence, according to the time scale above indicated, this uplift was not longer ago than somewhere about late Tertiary time. The uplift revived the oldish streams that then flowed gently in wide open valleys, and the streams at once began their new task of cutting down their basins towards the new base-level. They have not yet done much in this new task.

It is only as a part of this new task that the Osage has cut down its meandering valley. Making all allowance for increase of meanders during the deepening of the present valley, the river must have possessed significant meanders when the down-cutting was begun. Such a conclusion is quite consistent with the conclusion of the preceding paragraph; for a meandering course is generally characteristic of an oldish river, such as the Osage was when it was flowing across the formerly lowland surface of what is now the upland. I am therefore constrained to think that more than one cycle of development must be postulated in explaining the course of the Osage through the Missouri plateau.

Regarding the relations of the meanders of the upper branches of the Osage on their open flood plains and those of the lower course of the main stream in its deep valley, I am not confident that the suggestion of my former article is correct. Mr. C. F. Marbut, lately of the Missouri Geological Survey, now a student in our Geological Department, and of whose topographical work Mr. Winslow made mention, tells me that the wide valleys of the upper Osage are confined to the weaker strata of the Coal measures; and that the narrower valley of the lower stream occurs in the harder lower Carboniferous and older Paleozoic rocks. This introduces a complication in the problem that cannot be safely solved at this distance from the field; but a review of the topographical maps with this fact in mind gives no reason for withdrawing from the conclusion that the region has been pretty well base-levelled before the existing valleys were cut in it.

Several points that Mr. Winslow makes regarding the