says the specimen consisted of "ten consecutive vertebræ and their appendages," and this is the number of vertebræ figured on the plate. Nowhere is *D. articulatus* designated as a new species and the original description applies exactly to the figures there given.

Cope's ability to shift names is well known to those who are accustomed to deal with subjects treated by him, but usually such shifted names were detected, either by Cope or others. This appears not to be the case with *Dissorophus* and, so far as I can learn, the correction has never been made. *Dissorophus multicinctus* Cope is the only species of that genus which is valid and it is desirable that the synonymy of *D. articulatus* with the first described *D. multicinctus* should be established before the mistake goes further into the literature.

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CURRENT NOTES ON LAND FORMS

THE PENEPLAIN OF NORTH CENTRAL WISCONSIN

THE peneplain of north central Wisconsin has been recently described with rare skill by S. Weidman in a state survey report (Chap. XII., pp. 575–631, in "Geology of North Central Wisconsin," Bull. XVI., Wisc. Geol. and N. H. Surv., 1907). The teachers of the state and geographers in general will here find excellent account and illustration of the still undissected parts of the peneplain, of the well-defined, though small, monadnocks that rise above it, and of the valleys that have been eroded beneath it; they will find also a well-considered and lucid discussion of the origin of these features. The once continuous upland is ascribed with good reason to the destruction of ancient mountains of disordered and generally resistant rocks in an almost complete pre-Cambrian cycle of subaerial erosion. The submergence of the resulting peneplain, its burial beneath an unconformable cover of paleozoic strata, the elevation of the region with the resultant removal of the covering strata and resurrection of the buried peneplain, and the dissection of the peneplain by superposed rivers are all clearly set forth. The upland rises from 1,000 feet at its southern border to 1,500 feet at the northern part of the area. As the rivers are followed southward, there is a gradual transition from well-enclosed valleys, 200 or 300 feet deep, floored and sided with disordered rocks, through shallower valleys, floored with disordered rocks but sided with stratified rocks, to open valleys, floored and sided with stratified rocks. There is a corresponding passage from higher, more northern uplands of disordered rocks, through somewhat lower uplands, patched over with scattered remnants of the once more extensive cover of stratified rocks, to the lower ground of the still remaining, continuous stratified cover. All these features are so well presented that they may be accepted as standard accounts of typical physiographic features. If a hesitating geographer is still to be found, unconvinced of the desirability of replacing older empirical methods by newer explanatory methods in the description of land forms, let him read this essay.

The attention of others engaged upon physiographic reports for state surveys may well be directed not only to the general plan of this report, but particularly to four helpful block diagrams (pl. 68–71), which promptly and concisely set forth the essentials of the story to be told, so that its details may afterwards be apprehended in proper relation to the more general features. The chapters on glacial and alluvial deposits also contain geographical material. One of the very few points on which Weidman's form of statement might be changed to advantage is that concerning the adjustment of rivers. It is said: "Under normal conditions, streams . . . tend, not only to flow in nearly direct courses, but also to avoid the harder rocks, thus seeking to establish their courses upon the softer formations and to move along lines of least resistance" (p. 616). This might give the impression that the establishment of stream courses along belts of weak rocks is accomplished by the preexistent streams themselves, as an active, almost intentional process. The quoted phrase might be changed to read: "Streams of early origin are often led to avoid the harder rocks by the later development of subsequent

streams along belts of weaker rocks." It is not clear why the technical term, baselevel, should be printed as two words in a report which makes a single word of waterfall.

W. M. D.

DEFLECTION OF RIVERS BY THE EARTH'S ROTATION

The sufficiency of the earth's rotation to deflect rivers has now been debated many years. The deflective force is well understood to be independent of azimuth and to increase with the sine of the latitude, but to be so weak as to be of questionable value in spite of its persistence. Nevertheless, the observations of von Baer and others regarding Russian rivers, the well-marked asymmetry of the radial valleys on the great fan of Lannemezan in southwestern France, and the occasional instances of unsymmetrical valleys reported in different parts of this country by Kerr, Gilbert and others, have kept the matter in the mind of geographers. As to the Russian rivers, particularly the Volga, where a long-maintained right-handed tendency has resulted in a strong inequality of valley-side slopes, no efficient explanation in place of the deflective force of the earth's rotation has been offered. As to the radial valleys of the Lannemezan fan, L. A. Fabre has given good reasons for regarding their steeper right and less steep left sides as dependent on the westerly source from which their rains usually come; and as to the greatest of our own rivers, for which the detailed maps of the Mississippi river commission give unusually accurate quantitative measures of lateral erosion, the studies of I. Bowman, published in Science a few years ago, leave little doubt that the rotation of the earth, which would turn this south-flowing river westward, has less control than the prevailing winds, which brush it eastward.

A presumed effect of deflection upon river courses has been pointed out by certain Austrian geographers, who have noted that some of their larger rivers, especially the Danube, turn to the left in long curves, convex to the right, while passing across alluvial plains between notches in rock ridges; the left-handed turning of the river curves being the necessary result of the right-handed pressure of the river between its pairs of (relatively) fixed points. Had the original course of these rivers been direct, from notch to notch, the deflective force of the earth's rotation, even though quantitatively weak, would have been at least qualitatively appropriate to bring about the existing curved courses.

DEFLECTED RIVERS IN AUSTRALIA

Few examples of deflected rivers have been noted in the southern hemisphere; hence an especial interest attaches to some instances reported by T. G. Taylor in Australia ("A correlation of contour, climate and coal; a contribution to the physiography of New South Wales," *Proc. Linn. Soc. N. S. W.*, XXXI., 1906, 517–529). It is pointed out that several members of the Murray river system, on the inner plains west of the mountains back of Sydney, exhibit a persistent tendency to turn to the left, while sweeping around long curves convex to the right. It is urged that as the rivers flow for several hundred miles across a nearly level district where there are no rock outcrops to determine their courses, the earth's rotation should become a prime factor in guiding them.

It is with regret that we have to conclude that the explanation offered by Taylor for these left-curving rivers is not valid. There is no indication that the rivers are held in rock notches at the ends of their curves, and it is, moreover, evident that if the reason given for the Danube curves were applied to the Australian rivers, they ought to turn to the right in long curves convex to the left. The case would then be somewhat analogous to that of cyclonic winds, which being deflected from the barometric gradients by a right-handed force in the northern hemisphere, there curve to the left in spiral inflows to low pressure centers; or by a left-handed force in the southern hemisphere, there curve to the right. It is implied by Taylor that the Murray river branches were originally straight, presumably on lines now indicated by the tangential prolongation of their upper waters; hence the greatest amount of deflection should have been in the lower course of each curved branch; but

this does not appear to be a legitimate consequence of the earth's rotation. Moreover, Taylor goes on to say that the two rivers least deflected are the Murrumbidgee and the Murray, "which is what one would expect, since their course is practically at right angles to the meridians." But the deflective force being independent of azimuth, and these two rivers being farther from the equator than any other members of the Murray system, they are precisely the two that should show the greatest deflection. Finally, no adequate consideration is given to other possible controls of the river courses in question; yet in view of the fact that the left-hand curving of the rivers leads them toward the lower part of the trunk river, it may well be that their courses are essentially consequent upon the various processes that have in a general way given shape to the Murray basin. It does not, therefore, seem warranted to regard these Australian rivers as having been deflected by the earth's rotation.

W. M. D.

THE WORK OF OUR LARGER MUSEUMS AS SHOWN BY THEIR ANNUAL REPORTS

A NUMBER of museum reports, including those of our largest institutions, have appeared during the past summer, all somewhat belated, though any one acquainted with the work of museums can understand and excuse much of this delay. They comprise the reports of the United States National Museum, American Museum of Natural History, Field Museum of Natural History, Carnegie Museum, Museum of the Brooklyn Institute and the Public Museum of Milwaukee. These are the largest of our museums and it may be well to note what they are doing for the public.

The cramped and crowded condition of the present building of the United States National Museum precludes many changes in or additions to material on exhibition, but the accessions to the collections have been many and valuable. The most important among them were the collection of arms, numbering 569 pieces, deposited by the United States Cartridge Company, and the Schaus collection of Lepidoptera, comprising about 75,000 specimens. That research work has not flagged is shown by the list of papers published in the *Proceedings,* and the liberal policy of allowing others than members of the museum staff to study material or publish the results of their observations. The list includes many names and covers a great range of subjects.

As a forecast of future arrangements in connection with the new museum building, it is noted that this will contain the collections of archeology, ethnology, natural history and geology; that a portion of the Smithsonian building will be given over to art and that the present building will contain the technical collections.

As to art, the gifts of the Freer and Evans collections provide the opportunity for removing the stigma that the United States is the only large nation without a national gallery of art.

The report of the American Museum of Natural History is, as usual, somewhat brief and formal, though presenting a concise view of the year's work.

It seems to be taken for granted that museum reports will only be read by those directly concerned, and, acting on this assumption, little is done to make them interesting, though the illustrations probably appeal to the average man rather than the text.

Two prominent features of the year are the acquisition of a considerable number of skeletons of whales, the commencement of a life-sized reproduction of a sulphurbottom whale and the installation of a number of new and beautiful bird groups. Hitherto cetaceans have been but poorly represented in this museum and it is the evident intention to remedy this defect. The bird groups are an attempt to show certain phases of the bird life of North America in a more realistic and more beautiful manner than has hitherto been done. The methods employed are an adaptation and amplification of those in use, or suggested, and the results far in advance of those previously attained. Groups of animals may be treated from various standpoints, the one most commonly taken being that introduced by the British Museum, in which birds or other ani-