worn down in preglacial time to the great depth of the main valley. Moreover, as a rule, the fiord walls are not strongly ravined; they are generally rather smooth, as if they had been severely scoured. May it not therefore be supposed that the ravines are of late interglacial origin in rock structures that favor relatively rapid wearing; and that they have been eroded with respect to a valley floor which earlier glacial erosion had already deepened; while a minimum measure of the total glacial erosion is best given by the altitude of the large hanging valleys above the fiord bottoms, huge as the minimum may be?

THE ORIGIN OF MOELS.

'The Origin of Moels, and their Subsequent Dissection' (*Geogr. Journ.*, XVII., 1901, 63–69) is a discussion by Marr of the rounded mountains common in several parts of Great Britain, showing convex, dome-like tops and concave basal slopes, all covered with rock waste and vegetation, and not dissected by streams. Etymologically they are the Welsh equivalents of the 'balds' of our North Carolina mountains. Their form is ascribed to weathering under vegetation. The irregular forms into which a tableland is carved by streams would in time be subdued to moels, if weathering under a climate which favored the growth of a mantle of vegetation by which streams are excluded. In an arid or frigid climate, sharp peaks or ridges with even-sloping sides would, it is said, be developed, while running water would carve the well-known concave valley lines with steepening slope to their sources. The author goes on to show that if streams should gain a hold on a moel, either by climatic change destroying the plant mantle or by headward growth from the basal slopes, radial valleys would be carved by retrogressive erosion. Such valleys would in time reduce the intervening spurs into sharp ridges; notches would be worn in the narrowing ridges near the summit, where they are soonest consumed by the widening valley heads; and the peak of each ridge, just outside of the notch, would then be a 'tahoma,' as Russell has called such forms on Mt. Rainier (18th Ann. Rep. U. S. G. S., pt. II., 349). When one side of a mountain is exposed to rainy winds, while the other side is relatively dry, the convex moel slope may be paired with the concave stream slope, as in certain parts of the English lake district.

Soil-creeping might have been given more explicit consideration than it here receives; for both the convex upper summit and the concave basal slopes of a valleyless moel may be largely produced by the slow creeping of the waste cover, as well as or better than 'partly by the action of the wind, and partly by inconstant runnels of water.' It seems unadvisable to treat moels as exhibiting 'the ultimate outlines of mountains which have been shaped by denudation'; for the ultimate outlines are level to the eye, and even the penultimate outlines have but a faint relief as the moels fade away. It is questionable whether the attainment of a convex summit outline is impossible in arid and frigid deserts; more probably it is merely delayed till the reduction of the mountain to a moderate relief in a late stage of the cycle weakens the forces of waste transportation to essential equality with forces of waste supply; a graded waste cover may then be formed all over the surface, whose outline will exhibit no sharp forms, but only gentle undulations. These undulations may be too gentle to be classed with the strong moels of Wales, but they deserve consideration in the general study of land forms.

W. M. Davis.

THE PHYLOGENY OF THE TOOTHED WHALES.

A recent issue of the *Memoirs of the Royal Museum of Natural History of Belgium* is devoted to a paper by Dr. O. Abel on the 'Longirostrine Dolphins of Bolderien,' in which the author describes and figures in detail the skulls of two remarkable extinct dolphins, *Cyrtodelphis sulcatus* and *Eurhinodelphis cocheteuxi*. The memoir is, however, a great deal more than the description of these crania, valuable though this be, for nearly one-half of it is devoted to observations on the phylogeny of the Odontoceti. We have a discussion of the evidence furnished by the dentition in general, and that of the pre-maxillaries in particular, the dermal armor and the general characters of

the cranium. Following this is a diagram showing *Zeuglodon* at the bottom and *Ziphius* as the most highly modified genus at the top, other genera, recent and fossil, being indicated in their proper positions at either side. This portion of the work is replete with information and abounds in references to other papers. There are, however, two points to which it may be well to call attention: The first of these is the assumption that *Zeuglodon is* the ancestor of the toothed whales, the other is the assumption that *Zeuglodon* had a highly developed dermal armor, amounting in fact to a carapace. Both of these conclusions should for the present be held in abeyance, as neither is as yet proven. This may perhaps be modified somewhat by saying that under the term *Zeuglodon* are included two perfectly distinct genera, *Basilosaurus* and *Dorudon*, and that while it seems very improbable that the former left any descendants, the structure of the latter is much nearer that of modern whales and these may be descended from that genus. There is, however, a large undescribed cetacean, indicated by vertebræ in the U. S. National Museum, found in the Eocene of Alabama and a knowledge of this form may throw some light on the problem of the origin of modern toothed whales. As to the defensive armor of *Zeuglodon* it may be well to discuss this at length later; for the present it may be said that the fine material collected by Mr. Schuchert for the U. S. National Museum shows nothing more than a few dermal ossicles, about the size of one's fist, of a rounded shape and slightly keeled on one edge. Had there been any extensive dermal armor it seems likely that it would have been collected, or at least seen, by Mr. Schuchert.

F. A. L.

ANTHROPOLOGY AT THE UNIVERSITY OF CALIFORNIA.

A DEPARTMENT of anthropology has, as we have already noted, been established by the regents of the University of California. The work of this department, for the present, will be anthropological research and the formation of a museum. Mrs. Phoebe A. Hearst has for several years been collecting a large amount of valuable material from the several expeditions she has established, particularly in Egypt, in Peru and in California. These collections she gives to the University at Berkeley. The University has also a large collection from Alaska, presented by the Alaskan Commercial Company; and it is known that other collections are to become the property of the University when the museum is established. There are also now in the University many archeological specimens and human crania obtained from various parts of the state. For the storage and preservation of all this valuable material a temporary fire-proof building of brick and iron is to be erected at once. It is believed that this action will also be an incentive to the friends of the University to provide the funds for a museum building adequate for the proper exhibition of the collections in all departments.

As an encouragement to others and as an expression of her great interest in the new department, Mrs. Hearst, who is one of the regents and a most generous patron of the University, makes a gift of $50,000 a year for five years for anthropological research. This amount will be devoted to continuation of the work in Egypt and in South America and to securing Greek and Roman antiquities; also to a thorough research of the archeology and ethnology of California, with particular reference to investigations of the deposits from the supposed Pliocene gravels to recent times, with the object of discovering when man first appeared on the Pacific Coast; also to a study of the many Indian tribes of California, their languages, myths and customs. For this work several parties are already in the field.

At present there will be no regular courses in the department, but university lectures on special topics in anthropology will be given from time to time. The first of these lectures was delivered on September 20 by Professor F. W. Putnam, who was invited to outline the purpose and scope of the new department and the methods of anthropological research. This was followed by a lecture on the study of the Indians by Miss Alice C. Fletcher; and the third lecture is to be by Mrs. Zelia Nuttall on the picture-writing of the ancient Mexicans.

Dr. A. L. Kroeber and Mr. P. E. Goddard have been appointed respectively instructor