contain a closely reasoned philosophical argument, but naïvely assumes that there can be only one logical explanation of the facts presented, and consequently the case becomes stronger in proportion to the data accumulated. This is of course the attitude of the modern evolutionist, only his explanation is not quite the same. The wonders of adaptation, the community of general structure in series of animals, the facts of paleontology, all are brought forward as evidence of intelligent design. If two pictures or statues show points of resemblance we do not say that they are derived one from the other, but we may suspect that they were created by the same hand. Just so Dr. Pettigrew, and having got thus far, the very difficulties in the way of the creation hypothesis appear to lend it support. For example, take any remarkable case of adaptation; the naturalist may show that a particular species is able to flourish at a particular time and place, because of a multitude of circumstances, *all* of which are more or less essential to its prosperity. It would not be sufficient merely to create the animal, it must be exactly so, at exactly such a place, with all the other characters in the play doing their proper parts. Quite impossible! you say. On the contrary, it is such a marvelous thing that it *proves* the action not merely of intelligence, but of the highest conceivable kind! The trouble is, that it not only requires the highest conceivable intelligence, but a still higher and wholly *inconceivable* sort. It transcends physics and metaphysics, and lands us in the field of metapsychics. In other words, the "explanation" is no explanation at all, and serves merely to shelve the question of origin and sequence. The author, at the end of each discussion, turns around to his audience and asks, like the conjurer, who can explain the trick except in his way; but also like the conjurer, he refrains from telling us precisely what that way is. There is no reason to suppose that this ardent supporter of "creation" had or pretended to have the least idea of the nature of the process.

Although our criticism is adverse, we must confess to a certain sympathy with the author. Evolution is not a key to unlock every door of mystery. We who are concerned daily with the mechanics of life need to be reminded from time to time that there are more dimensions of reality than those in which we quarry. It is not for us to claim that we really understand, in any complete sense, how this world of ours came to be what it is. As scientific men, however, we are bound to reject mere dummy explanations of things, mere words which embody no rational thought; and by the same token, we must hold fast to those facts and theories which seem to be best verified by experience. The theory of organic evolution, full of difficulties as it is, has some substance, some genuine pragmatic ability; that of creation, as held by Dr. Pettigrew, is but a shadow of a shadow. To our posterity five hundred years hence it will doubtless seem that we were groping in the dark; but let it be at least said of us, that we groped to the best of our ability. T. D. A. Cockerell

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This volume of contributions from the scientific staff of the American Museum of Natural History appears less interesting than its predecessor, though it attains a generous size of 430 pages, and contains twenty-nine articles from the pens of seventeen contributors. The articles of discussional and narrative value are fewer in number, and the volume is more confined to systematic studies.

Perhaps, from the point of view of general utility and interest, Mr. A. Hermann's demonstration of "Modern Laboratory Methods in Vertebrate Paleontology" most quickly attracts attention. The article can not be impugned on the score of paucity of detail. It makes indeed an excellent manual of direction for all museums of vertebrate fossils, and commands deference from the place its author holds among preparators. It is also in a measure, and quite frankly, a history of progress.

The papers on fossil vertebrates open with an article on the genus *Ancodon* by Dr. Mat-

thew. It announces the discovery of this pig-like genus in the Miocene of North America (hitherto confined to the Eocene and Oligocene), and, in an interesting paragraph, sums up the present views of the author as to its evolutionary history:

> On present evidence we must regard the genus as of Old World origin, probably not African, possibly European, but, considering the relative advancement and geological position of the European and African species, more probably of Asiatic origin.

Dr. Matthew contributes (in collaboration with Harold J. Cook) another paper on "A Pliocene Fauna from Western Nebraska," of which the remarkable features are thus summarized; the separation of fifty species allied to those of the Upper Miocene, but differing (1) in the presence of more advanced species or mutations, (2) Pleistocene or modern genera not hitherto reported from the Tertiary, (3) abundance of three-toed horses resembling the pleistocene *Equus* and *Hippidion,* (4) the remains of gigantic camels of the genus *Pliauchenia.*

Professor Osborn furnishes a paper on "New Carnivorous Mammals from the Fayum Oligocene of Egypt," in continuation of his previous studies on this fauna. The new genus *Metasinopa* is diagnosed from "a nearly complete lower jaw from the upper beds."

Dr. L. Hussakof discusses further the vexed question of the systematic relationship of American Arthrodires, and deposes Eastman's genus *Protitanichthys.* Roy L. Moodie, of the University of Kansas, contributes a paper on "New or Little Known Forms of Carboniferous Amphibia in the American Museum Collections."

Nine articles of varying interest in mammalogy are contributed by L. S. Quackenbush, John T. Nichols, Dr. Allen, Roy C. Andrews and Dr. Elliot. The most extended of these is an account by Dr. Quackenbush of the "Alaskan Mammoth Expeditions in 1907 and 1908." A feature of Mr. Andrews's paper is the photographic reproductions of whales, "sounding," the "slick," inspiration, "lob-tailing," thrashing, diving and spouting.

Mr. Bentenmüller adds five articles, with plates, to his previous papers upon gall-insects. Professor Cockerell discusses the "Fossil Insects of Florissant, Colo."; James A. G. Rehn contributes a long paper (31 text figures) upon the "Orthoptera of Sumatra"; Professor Wheeler is represented by an article upon the "Ants of Formosa and the Philippines," and Aaron L. Treadwell has a note upon an external parasite of eunicidian worms, taken in the Bahamas.

Two remaining papers have considerable value, one by Walter Granger, on the "Faunal Horizons of the Washakie Formations of Southern Wyoming," and some suggestive paragraphs by Dr. W. J. Sinclair on the "Washakie or Volcanic Ash Formation." The summary of the latter comprises a number of informing statements which deserve entire transcription:

> The Bridger rocks are rhyolitic tuffs containing glassy sanidine while the Washakie rocks are andesitic with soda-lime feldspar. From the absence of agglomerates and the fine-grained character of much of the ash it seems probable that it was transported mainly by the wind, and as the prevailing winds are at present from the west and had probably the same direction in Tertiary time, the centers of eruption should be located somewhere in the west or southwest. The absence of agglomerates does not favor the idea of local contemporaneous vents discharging rhyolitic and andesitic ash respectively and the great thickness and uniform petrographic character of each formation is opposed to the conception of rapid variation in the chemical composition of the ash at a single center of eruption. Assuming contemporaneous deposition from two centers of eruption it seems probable, in view of the comparatively short distance separating the areas occupied by the two formations (about fifty miles) that some intermixture of the two types of ash should be found, but the conspicuous absence of plagioclase feldspar from all the Bridger tuffs, and its presence in all those of the Washakie shows that this has not occurred. The lithologic evidence, therefore, does not favor the idea of contemporaneity for any part of the Bridger or Washakie.

Professor Osborn in 1881 upon faunistic evidence had indicated their probable separation.

L. P. GRATACAP