way his appreciation of the work of the association and the honour done him in electing him the president for the year, and he thought he could do this by offering to defray the cost of the die of a suitable medal for the purpose suggested by Mr. Lowden. On the proposal of Mr. Innes, seconded by Dr. Juritz, it was resolved to accept this offer with many thanks, and to name the awards the "Gould-Adams" medals.

The Bloemfontein Museum deserves an article to itself; the members of the association were shown over the collections, and from cupboard and cranny objects of the utmost value were unearthed, including meteorites, stone and iron ones, Karroo fossils, early printed books, engravings, manuscripts, Bushmen implements, and a complete quagga skin. The collections urgently need proper accommodation, and it is hoped that the visit of the association brought home to the authorities some realisation of what a valuable asset for the town they had in their museum.

Dr. R. T. A. Innes was elected honorary secretary for the Transvaal and Free State, and Dr. C. F. Juritz for Cape Colony and Rhodesia, Dr. R. T. Lehfeldt honorary treasurer.

At the close of the meeting forty-five members left for a train and wagon trip to Basutoland, the railway authorities having placed a special train at the disposal of the association.

AMERICAN CAVE VERTEBRATES.[1]

PROF. EIGENMANN has brought together in an attractive and copiously illustrated quarto volume the results of his investigations on the cave fauna of America, upon which he has been engaged for many years. He points out that each cave is a separate environmental unit requiring special consideration, but all share to a greater or less extent certain common features, viz. the reduction or total absence of light and the relative constancy of other physical conditions, such as temperature.

The blind cave vertebrates form a very mixed faunistic group, derived from a variety of epigean ancestors. It appears, however, that "a certain predisposition in habit and structure must be present to enable a species to dispense with light and to live in caves." No mammals appear to have become especially adapted for permanent cave life, though, of course, many spend a large part of their lives in such situations. They may be "twilight animals," but they still have normal eyes. The same is the case with birds, and there are also no cave reptiles, which is remarkable when we consider that many snakes and lizards are blind, and burrow underground.

It is amongst the amphibia and fishes that true cave vertebrates are to be found. Two of the North American salamanders, of the genus Spelerpes, which habitually live in caves, still possess what appear to be normal eyes, while two others, of the genera Typhlotriton and Typhlomolge, have their eyes quite degenerate, resembling in this respect the European Proteus. The Amblyopsidæ are the typical North American cave fishes. "All the members of this family, eight in number, have degenerate eyes; five have mere vestiges; six permanently live in caves; one is known only from a spring, and another from open streams." More remarkable is the fact that in Cuba two sightless fishes, Stygicola and Lucifuga, belonging to a marine family many of which are blind, have become adapted to the fresh waters of caves.

[1] "Cave Vertebrates of America. A Study in Degenerative Evolution." By Prof. Carl H. Eigenmann. Pp. ix+241. (Washington: Carnegie Institution, 1909.)

Space forbids us to follow the author in his detailed and interesting discussion of the origin of the cave fauna. We may note, however, that he seems inclined to regard blindness as an antecedent rather than as a consequence of cave life, for it is only animals which are already accustomed to find their food by the sense of touch or smell which could ever establish themselves in complete darkness. In Amblyopsis, and other blind fishes, great numbers of special tactile organs are developed, especially about the head, and these serve for ascertaining, by disturbances in the water, the whereabouts of prey.

In the case of the loss of colour, however which is such a general character of animals living in perpetual darkness, it is different, and Prof. Eigenmann regards this character as due in the first place to the direct influence of the environment upon the individual. To quote his own words, "The bleached condition of animals living in the dark, an individual environmental adaptation, is transmissible, and finally becomes hereditarily fixed." This conclusion is based upon the fact that in Amblyopsis the bleaching takes place even when the young are reared in the light. "Natural selection cannot have affected the coloration of the cave forms, for it can be of no consequence whether a cave species is white or black. It could only affect the coloration indirectly in one of two ways: first, as a matter of economy, but since the *individual* is in part bleached by the direct effect of the darkness, there is no reason why natural selection should come into play at all in reducing the pigment as a matter of economy; second, Romanes has supposed that the colour disappeared through the selection of correlated structures, a supposition he found scarcely conceivable when the variety of animals showing the bleached condition was considered." It appears to us that these conclusions are of great interest and importance, and that Prof. Eigenmann has made out a strong case for the inheritance of acquired characters in this instance. In the case of Proteus it appears that the bleached condition has not yet become hereditarily established, for this animal becomes darker when exposed to the light. Possibly, after all, the inheritance or non-inheritance of acquired characters is largely a question of time, or, perhaps better, of the number of successive generations which have responded ontogenetically to the particular stimulus which evokes the character in question.

A great part of the volume is devoted to the consideration of the structural changes which accompany the degeneration of the eyes, and the author has given us a large amount of very valuable information on this difficult subject, including a detailed account of the development of the eye of Amblyopsis. From many points of view this interesting work will well repay a careful perusal. ARTHUR DENDY.

THE PRESERVATION OF NATURAL MONUMENTS IN GERMANY.[1]

THE German Government has been, for the last two years, organising a national system for the preservation of the natural monuments of the country. During the last year the scheme has developed in comprehensiveness, and has produced gratifying results. There are now forty local committees, and at the end of last year the first Congress for *Naturdenkmalpflege* in Prussia was held at Berlin. A considerable number of valuable reports has been issued; the present volume, edited by the energetic Government Commissioner for the Care of Natural Monuments, Prof. Conwentz, contains a report of the con-

[1] "Beiträge zur Naturdenkmalpflege." By Prof. H. Conwentz. Heft 3. Pp. 157–296. (Berlin: Gebrüder Borntraeger, 1909.) Price 2 marks.