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Ralando for Rolando, and page 180 in the last line of has been omitted.

An important adjunct to the work is the well-chosen list of original papers which is given at the end of the outline for each general subject. While not intended to be exhaustive it is thoroughly representative and includes all that the student could possibly utilize to advantage at this stage of his development.

The volume as a whole is a meritorious contribution from a skillful teacher and is a welcome addition to the histological laboratory.

MICHAEL F. GUYER

*The Fauna of Mayfield's Cave.* By ARTHUR M. BANTA. Pp. 114, with plates, map of the cave, figures and tables. Published by the Carnegie Institution, Washington, D. C., September, 1907.

Mayfield's Cave is in Monroe County, Indiana, 4.5 miles northwest of Bloomington, the location of the Indiana University. It has often been visited, and its contents have been described in part by Bollman, Hay, Blatchley, Call, Eigenmann and others. What has been admirably done by Arthur M. Banta is to visit it on an average once a week during eight months in all, covering different seasons of the years, 1903, 1904 and 1905, using the strong, steady light of a carbide bicycle lamp, observing all phenomena, noting the temperature and air currents, and in particular collecting all varieties of animal life for detailed study with the facilities afforded by the laboratory of the university and the expert aid of C. H. Eigenmann. Contours for the cave map are by J. W. Beede, and the photographs are by E. R. Cummings. Full recognition of work done by others is made in the introduction, and in a bibliography mentioning more than 130 works and papers consulted.

Mayfield's Cave is only a fourth of a mile long, is from 6 to 20 feet wide, and is nowhere more than 12 feet high, while many passages are mere crawl-ways. The roof is usually flat and hard limestone, with small domes here and there. The floor is strewn with large and small fragments of stone, with patches of gravel or soil, and occasional banks

and mounds of earth. The excavation is in the Mitchell limestone of the upper Subcarboniferous. The entrance is in a low bluff at the head of a ravine once a part of the cave. There are sink-holes without and springs within, and in winter and spring a cave stream flows through, which ceases to flow in summer, leaving detached pools, parts of the channel remaining moist and other parts being quite dry. The temperature of the earth tends to counteract that of the air currents from without, bringing the average to about 11.9° C., equalling the mean temperature of the region.

Cavern fauna depend on an irregular food-supply and lead a precarious life. Flowing water brings in algæ, worms, insects, seeds and other material; mammals and human visitors leave various reminders; and fungus grows abundantly on decaying organic matter. Dry parts were poor collecting ground, while better results were had in moist localities. Most cave animals are scavengers. Some are strays, or accidental visitors; others visit voluntarily; while true cavernicola are classified as temporary, permanent and exclusive residents—the latter never found elsewhere. Banta also classifies them in their relation to daylight, twilight and darkness.

Sixty-six pages are devoted to detailed scientific descriptions of the fauna of Mayfield's Cave, under the heads of Mammalia, Pisces, Insecta, Myriopoda, Arachnida, Crustacea, Annelida, Mollusca and Turbellaria. Six pages are filled by comparative tables of species known to exist in Indiana caves as compared with those found in this single cave; the sum total being 138 species, 110 of which exist in Mayfield's Cave. This is certainly remarkable.

Of true cave fauna the most space is allotted to the blind fish (*Amblyopsis spelæus*, DeKay) concerning which curious experiments were made as to its habits, anatomy and its food as determined by inspecting the contents of the stomach. Two varieties of cave crawfish were found (*Cambarus pellucidus*, Packard, and *Cambarus pellucidus testii*, Hay); the distinction being the presence or the absence of spines. To the cave-

hunter these and other descriptions of strange and unusual forms of life are fascinating.

Several pages are occupied by general observations, with an interesting discussion of the origin of cave life. The latter is treated under three questions: (1) How did these animals get into the caves? (2) What was their condition when they entered? (3) How have they reached their present state? Answering these inquiries the author argues that cave animals originated from outside forms, being predetermined to such cave conditions as suited them; that, at first, they differed slightly from similar forms, but were better adapted than they for subterranean existence; and that they reached their present condition by gradual adjustment to environment, modified by cumulative variations due to heredity.

Taking the monograph as a whole, Mr. Banta is to be congratulated on having given a most commendable example of what can be done by an exhaustive study of a small cavern, and on having thus made a valuable contribution to scientific literature.

HORACE C. HOVEY

#### SCIENTIFIC JOURNALS AND ARTICLES

*Terrestrial Magnetism and Atmospheric Electricity* for March contains the following articles: "L'Observatoire Magnétique de Zika-wei," by J. de Moidrey; "Carnegie Institution Comparisons of Magnetic Standards during 1908," by J. A. Fleming and J. C. Pearson; "The Carnegie Institution Marine Collimating Compass," by W. J. Peters; "Some Problems in Radioactivity," by A. S. Eve; "Peculiar Magnetic Disturbances in December, 1908," by D. L. Hazard.

*The American Naturalist* for March contains the papers read at the Darwin Memorial Session of the Baltimore meeting of the Botanical Society of America, held December 29. These papers are: "Darwin as a Naturalist: Darwin's Work on Cross Pollination in Plants," by William Trelease; "Darwin's Influence upon Plant Geography and Ecology," by Frédéric C. Clements, and "Darwin's Work on Movement in Plants," by Herbert Maule Richards. In addition there is

"An Examination of Darwin's 'Origin of Species' in the Light of Recent Observations and Experiments," by Edwin Linton. Edward M. East discusses "The Distinction Between Development and Heredity in Inbreeding," and T. H. Morgan describes some results of "Breeding Experiments with Rats," the species being *Mus rattus*, *M. alexandrinus* and *M. decumanus*. Among the "Shorter Articles" is a note by Roy L. Moodie, stating that in parts of the Niobrara River the chub, *Semotilus*, has acquired the habit of feeding on the horn fly that infests cattle, follows up the cattle and captures flies by jumping and picking them from the animal's sides.

*Bird-Lore* for January-February contains articles on "The Hollow Tree," by Ernest T. Seton; "The Feud of the Crows and the Owl," by Frank M. Chapman; "Birds seen in Prospect Park, Brooklyn," by Kate P. and E. W. Victor; "Notes on Pacific Coast Shore Birds," by John T. Nichols, and the eighth and last paper on "The Migration of Flycatchers," by W. W. Cooke. The Ninth Christmas Bird Census gives the results of observations from a large number of localities and the "Report of Audubon Societies" records the painful fact that two Audubon wardens have been brutally murdered. This illustrates the character of some of the men engaged in "the feather business." It used to be said that each elephant tusk cost the lives of three men and we await statistics on aigrettes.

In the *American Museum Journal* for February Roy C. Andrews describes "A Summer with the Pacific Coast Whales," illustrated with some remarkable views from life. E. O. Hovey tells of "St. Pierre and Mt. Pelé in 1908," giving some illustrations showing how rapidly vegetation is springing up over the region devastated by the eruption of 1902. New exhibits have been arranged illustrating the industries of the California Indians, and it is noted that the museum has acquired the Waters collection of Fiji objects.

On February 28 a Brazilian tapir was born at the National Zoological Park, Washington, D. C., making the fifth of this species that