the preglacial Maumee, the preglacial Sandusky and Huron, the Teays and the preglacial or interglacial Miami and Little Miami, separated by divides, the major one, including the upland in Logan County, being the controlling feature. The Harrisburg peneplane may be represented by the highest bed-rock elevations in Logan County, and the Worthington erosion surface has a wide extension throughout the area. Lower areas, probably representing the Parker Strath, occur along the buried valleys. Beneath these are the deep, gorge-like valleys which represent the Deep Stage.

In the near future the writer expects to publish the complete results in a paper dealing with numerous details which are treated in a general way here.

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AUTOTOMY IN A PEREGRINE EARTHWORM

NUMEROUS caudal fragments of an unidentified earthworm that had been collected in a living condition from a golf green were submitted, in early June, 1935, to the authors by F. W. Poos, of the Bureau of Entomology and Plant Quarantine, of the United States Department of Agriculture. These fragments averaged 13 mm in length and consisted of from 15 to 23 of the caudal segments. They were reported by a greenskeeper as causing numerous castings on a putting green near Catonsville, Md. This green was investigated by the writers on July 11, a very warm day that succeeded a period when daily temperatures had remained well above 90° F. Numerous earthworm castings, many of them still wet and fresh, were visible on the green. The greenskeeper maintained that these castings were due to fragmentary worms similar to those previously described. Upon removal of a 2-foot square section of sod, however, many active yellowish brown earthworms, 6 inches or more long, were revealed, as well as live fragments of the same. Specimens of these submitted to Dr. Frank Smith at Hillsdale, Mich., elicited the advice that this worm belonged to the genus *Pheretima,* was doubtless a peregrine species and should be sent to Professor R. E. Gates, of Rangoon, Burma, for specific identification. It was at first supposed that the fragmentation observed might represent a habit of reproduction by fission, but a recent excellent work on the earthworms,[1] cited by Dr. Smith, furnished an explanation in what is known as "autonomy," a recognized phenomenon with some earthworms. This consists of the voluntary severance, under certain irritational stimuli, of several segments of the tail, after which the original worm may survive, but the severed fragment, eventually, always dies. Professor Gates subsequently identified the worm as *Pheretima hupeiensis* (Michaelson) 1895, and stated that it had previously been reported twice from Washington, D. C., and once from Philadelphia. Otherwise it is known only from a limited portion of China and Japan. He agreed that the fragments sent him were all autotomized and that this action might have resulted from the previous application of a vermicide to their habitat. This deduction is doubtless correct, as it was learned that mercury, both as chloride and bichloride, had been applied in light dosage several times each year and that lead arsenate, at the rate of 5 pounds to 1,000 square feet of surface, was applied in 1932, and at the rate of 3 pounds each spring thereafter. This amount of poison is easily sufficient to destroy *Lumbricus terrestris* L. and similar species, but evidently served as a mere irritant for this exotic form.

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ANOPHELES (ANOPHELES) NEOMACULIPALPUS, CURRY, EXPERIMENTALLY INFECTED WITH MALARIA PLASMODIA

DURING the latter part of 1935, experiments were begun to determine the infectibility with malaria of certain previously unincriminated species of Anophelines which breed in the Panama Canal Zone and elsewhere in the American tropics. Since that time *A. punctimacula,* Dyar and Knab, a shade-breeding mosquito which is prevalent in Panama throughout the year, has been found naturally infected with malaria plasmodia,[1] and has been proved to be highly susceptible to laboratory infection[2] with both *P. vivax* and *P. falciparum.* These observations and the epidemiological data indicate that *A. punctimacula* is probably an important malaria vector, and that it may be responsible for a considerable part of the malaria infections contracted in unsanitated regions of the Canal Zone.

It is the purpose of this note to announce the experimental infection of another species, namely, *Anopheles (anopheles) neomaculipalpus,* Curry, with *P. vivax.* This mosquito breeds in small collections of sunlit water, being especially common in the hoof-prints and muck of cattle pastures. Further studies will be required to determine the comparative infectibility and the importance of *Anopheles neomaculipalpus.*

From a search of available literature it appears that these two species, *A. punctimacula* and *A. neomaculipalpus,* are the first members of the Arribalzagaia

[1] "The Oligochaeta," by J. Stephenson, Oxford, England, 1930, p. 639.

[1] J. S. Simmons, *Am. Jour. Trop. Med.,* 16: 2, 105, 1936.
[2] J. S. Simmons, SCIENCE, 83: 2150, 269, 1936.

group of Anophelines to be proved susceptible to experimental infection with malaria plasmodia.

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EROSION ON THE UPPER RIO GRANDE

IN view of the rapid developments in the field of watershed management, including the handling of lands to prevent destructive floods and accelerated erosion, it is desirable to briefly report outstanding results of a recent survey of the Upper Rio Grande watershed in New Mexico. The study was conducted by the U. S. Forest Service, which has been assigned primary responsibility for research relating to forest and range lands by the Secretary of Agriculture.

On 40 per cent. of the watershed in New Mexico above Elephant Butte Dam, deterioration of the natural vegetation has reached an extreme stage, and the lands are excessively eroded. On 35 per cent. of the area, the plant cover is in a medium stage of deterioration, and erosion is advanced. Evidences of accelerated erosion were found on parts of all the major vegetation-type areas, principally where utilization was uncontrolled.

The natural vegetation has deteriorated as the result of man's activities, principally overgrazing, timber cutting, fire and injudicious dry farming. As a result, accelerated erosion and silt-bearing floods are imperiling land resources and human welfare. Many settlers who formerly made a living by farming are being driven to depend more and more on the grazing of live stock. This has speeded up deterioration of the remaining forage resources and has unloosed a deluge of silt, which threatens to destroy irrigation agriculture in the Middle Rio Grande Valley and to displace the water storage capacity of Elephant Butte Reservoir within the century.

That surface run-off and soil erosion were controlled by natural vegetation for centuries is shown by the good condition of the ground surface of areas that still have protective cover. If land resources are to be preserved the lands must have a protective cover of vegetation. The vegetation on depleted lands must be restored by regulation of use and by artificial revegetation so as to rebuild watershed protective values.

A complete presentation of the results and their relation to land resources and human welfare will be published later this year.

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THE OCCURRENCE OF THE AMERICAN BISON IN ALABAMA AND FLORIDA

HORNADAY, in his monograph "The Extermination of the American Bison,"[1] calls attention to the lack of any records of the observation of the American Bison (*Bison Americanus*) in the state of Alabama, although it had been observed in Georgia and Mississippi. The discovery of authentic records of the occurrence of this animal in southern Alabama and adjacent Florida is of considerable interest.

I am indebted to Dr. C. E. Castañeda, of the Latin-American Library of the University of Texas, for transcripts of old Spanish documents relating to the expedition of Marcos Delgado from Apalachee to the Creek country in 1686. The expedition was sent out in an endeavor to discover the rumored colony of La Salle on the Gulf Coast and was perhaps the first penetration of this region since De Soto's time.

Delgado's description of the route of his outward journey is clear and permits quite close identification of his course. Writing of a portion of his path across the present Jackson County, Florida, in an area I identify as lying south of Russ Creek and northwest of Marianna, he says: "Y Caminando al norueste 2 leguas esta un barial que atolla que no lo podran pasar Cauallos en tiempo de aguas que alli Comencan a aber *Cibolas* q son un Genero de animales Como bacas."

And further writing of his passage across what I identify as the vicinity of the Little Choctawhatchee River, probably east of Beaver Creek in the westward extension of Houston County, Alabama, he says: "Caminando al norte Costeando Vn monte Grueso de Castanales Y aCevales Y laureles Y en medio tiene un Rio de 6 bracas de ancho Y dos bracas largas de hondo Y tiene el monte de travesia mas de un quarto de legua Y tiene muchas *Sibolas* Y osos."

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SCIENTIFIC BOOKS

EVOLUTION

Evolution. By A. FRANKLIN SHULL. McGraw-Hill Book Company, N. Y. 312 pp., 64 illustrations. 1936.

The Variation of Animals in Nature. By G. C. ROBSON and O. W. RICHARDS. Longmans, Green and Company, London, New York and Toronto. 425 pp. Two colored plates and 30 illustrations in the text. 1936.

THE topic of these books is fundamentally the same, although the first considers both plants and animals, the second only animals. The title of the second book

[1] Report, U. S. National Museum, 1887, p. 380.