vibration which is reflected in the body. . . . The Greeks and Romans also knew of the power of words in this respect."

The music of any people is more than their melodies. It preserves many beliefs and customs that would otherwise be lost. In this lies the field of cooperation between the study of primitive music and other branches of ethnology.

FRANCES DENSMORE

RED WING, MINNESOTA

A METHOD OF ESTIMATING POST-GLACIAL TIME

AMONG the problems met in the study of the Post-Pleistocene is one concerning the time period involved. The solution of the problem is important in many ways. Geologists are more keenly aware of the events which have occurred in this period than in any other. Hence close estimates of the length of time involved will contribute to a more accurate geological conception of the absolute rapidity of various physiographic processes.

Several estimates of the length of post-glacial time are commonly known. Taylor,[1] following Lyell, Spencer and others, estimated the period occupied on the recession of Niagara Falls. DeGeer[2] reached his conclusions from his studies of varied clays. Other estimates have been based on the erosion of the pedestals beneath erratics and on the comparative weathering of drift materials of different ages. The variation in these estimates emphasizes the importance of additional methods of calculating the Post-Pleistocene time interval.

At Yellow Springs, Ohio, there is located a chalybeate spring which has built at its point of issuance in the Cedarville (Niagaran) limestone a large mound of ferriferous travertine which extends some hundred yards into the Yellow Springs Creek valley. The valley lies nearly north and south and is located within the most extended moraines of the Wisconsin glaciation; not, however, within the terminal moraines of the last Wisconsin invasion. The ice moved from a northwesterly direction; the deposit is located on the east side of the valley—hence, it is reasonable to suppose that any preglacial deposit would have been removed by ice abrasion. The erosion by the enlarged streams from the melting ice, one of which occupied the valley, undoubtedly aided in eliminating previous and contemporaneous travertine deposits.

[1] Taylor, F. B., Niagara Falls Folio, United States Geological Survey Folio, No. 190, 1913.

[2] DeGeer, Gerard, "A geochronology of the last 12,000 years," Cong. Int. Geol. Compte Rendu, XI, 1910, pp. 241–253, 1912.

Theoretically, the volume of the present deposit divided by the rate of accumulation should yield the length of time of accumulation as a quotient. The method, as will be readily recognized, involves several complex factors, chief of which are variations in spring flow and in amount of solid material deposited, each influenced in turn by rainfall, temperature and variations in the subsurface spring channels.

Accurate observations extended over a considerable period of rainfall, spring flow, air and water temperatures, together with studies of the differences in quantity of solids in solution at different points within the area of deposition, should provide a basis for a reasonable estimate of the present rate of deposition. A careful collection of the encrusted vegetation should provide an index of climatic variation, which in turn influenced the rate of deposition in the past.

A detailed instrumental survey of the bedrock structure has already revealed the presence of a small flexure, or possibly a fault, which undoubtedly explains the location of the spring and leads also to the conclusion that the spring has been relatively permanent.

The first estimates of the age of the Yellow Spring travertine mound must be regarded as purely tentative. The figures obtained, namely 20,000 to 30,000 years, are intermediate between those given by Taylor and DeGeer. Since trustworthy results of the study of the spring deposit must await the passing of some months, and possibly years, of observation it seemed worth while to publish this method of estimating post-glacial time. It is undoubtedly applicable to many similar travertine deposits. The study of a number of them, in various situations relative to morainal deposits, should contribute materially to the knowledge of the length of the Recent epoch.

A. C. SWINNERTON

ANTIOCH COLLEGE,
YELLOW SPRINGS, OHIO

LUMINESCENCE IN SPONGES

CASES of luminescence in sponges have several times been recorded. Noll (*Zool. Anz.*, 1879, p. 402) described luminescent larvae of *Reniera*, which had been reared in a table aquarium. The light was manifested upon a slight mechanical disturbance in the water of the aquarium. He states that the light is produced by a luminous fluid accumulated in the body of the larva, but the observation is too crude to be of much value. Since the aquarium had contained several other animal organisms, such as annelids, crabs, etc., and at the same time, it is quite doubtful if the luminous larvae really belong to the sponge. Pagenstecher (*Allg. Zool.*, Bd. 4, 1881, p. 14) and Peron

(s. *Mongold,* 1910, p. 245) also described luminosity in sponges. Dahlgren (*J. Franklin Inst.,* 1916, p. 243) examined luminous sponges at Naples and proved that the worms and protozoa living in their canals were the actual source of the light. The matter is, however, different in *Grantia* sp. as observed by Harvey (*Biol. Bull.,* 1921, p. 286) at Friday Harbor. According to this author the sponge produces a good luminescence in the dark and gives a luminous slime when squeezed. The organisms living in its canals are not luminous. Harvey is of the opinion that the light of this species of sponge is an autogenous luminescence. Thus, there is uncertainty and diversity of statement as to the fact and the probable source of the luminosity in sponges, and we lack careful observation and study affording either positive or negative evidence on the subject.

In the evening of August 25, 1919, the writer, while engaged in examining the dredgings from the bottom of the Sagami Sea at a depth of about one thousand meters, observed a large specimen of *Crateromorpha meyeri* Gray to be brightly luminous. The whole body of the sponge glowed for several hours after being brought into a dark room. The luminescence consisted of a thousand spots of a blue light resembling the stars in the sky. On dipping the sponge into fresh water the light shone particularly brightly, but at the same time the luminous spots were observed to be transferred from the body of the sponge into the surrounding medium. Each spot proved to be a small annelid belonging to the family *Alciopinae.* More closely examined, the sponge itself showed numerous individuals of this same annelid filling the entire canal system. After the annelids were entirely removed the sponge gave no more light, while the removed organisms themselves glowed momentarily on stimulation. The light of *Crateromorpha* is apparently a secondary luminescence.

Whether or not other luminous sponges are analogous to this is an open question, but it is a usual feature that annelids and other small organisms live in their canals. I am inclined to believe that sponges do not produce autogenous luminescence.

Yô K. OKADA

PARIS, FRANCE

THE FAMILY CLIONIDAE

THE name Clionidae was adopted by Topsent in 1887 for a family of sponges which bore into the shells of molluscs. The type genus was *Cliona* of Grant. However, the name Clionidae (Gray, 1840) has long been in general use for a family of Pteropod molluscs, with *Clione* Pallas as the type genus. The sponge family may be called Thoosidæ, from *Thoosa* Hancock, the next oldest genus.

T. D. A. COCKERELL

SCIENTIFIC BOOKS

SOME NEW BOOKS ON GENETICS

Genetics in Plant and Animal Improvement. By D. F. JONES. viii + 568 pp., 229 figures. John Wiley & Sons, N. Y. Price $4.00. 1925.

Principles of Genetics, an Elementary Text with Problems. By E. W. SINNOTT and L. C. DUNN. xviii + 431 pp., 140 figures. McGraw-Hill Book Co., N. Y. Price $3.50. 1925.

Animal Genetics, an Introduction to the Science of Animal Breeding. By F. A. E. CREW. xx + 420 pp., 67 figures. Oliver and Boyd, Edinburgh. Price 15/— 1925.

THREE new text-books on genetics have recently been published. There was no dearth of texts before. Apart from the pioneer and standard books by Bateson and Punnett in England, followed by those of Lock, Doncaster and Darbishire and the German texts by Baur, Goldschmidt and Johannsen, there had been published in America alone books by Babcock and Clausen, Castle, Conklin, Coulter, Morgan and Walter, besides several texts dealing primarily with eugenics. It would seem to be a bold author who would seek to extend the list. Yet at the present time genetics is of such general interest in biology that a variety of treatments of the subject is required to meet all needs, and our knowledge of genetics has been increasing so rapidly that no text remains up-to-date unless it is frequently revised or rewritten. In this state of affairs a fresh and original treatment of the topic is welcome and any new contribution to the only-partly-solved problem of how successfully to teach genetics is thrice welcome.

Jones has produced one of the best text-books on genetics that has yet appeared. He approaches the subject from the viewpoint of one interested in the increase of the world's food supply consisting of plant and animal products. He recognizes that the area available for agriculture is already largely occupied and can not be extended much further. It is therefore incumbent on the farmer to utilize to its fullest capacity the agricultural land now available. This can be done in part by better methods of farming and by improved machinery. It is possible also to discover or produce better varieties of cultivated plants and of domestic animals than those now in use. This last can be done best by an intelligent use of the principles of genetics. Those principles Jones proceeds to develop in an orderly way, beginning with the simplest case of Mendelian heredity and proceeding by gradual steps to more complicated and debatable cases, not however giving the reader occasion to doubt for a moment the complete adequacy of Mendelism to explain all cases. One wishes at times that Jones were less of a "fundamentalist" in his devotion to Mendelism; perhaps a dash of scepticism as to some