

whole, the conclusion was favourable. Dr. M. C. Schuyten (Antwerp) gives some favourable evidence, so does Dr. H. Baur (Württemberg), who used Scheiner's experiment as a test of fatigue. The question of suicide at school elicited a very full and detailed paper from Dr. G. W. Chopin (St. Petersburg). It is obvious that national temperament, as well as school pressure, counts for much in the percentages. In Russia the suicide occurs three times as often in the middle schools for boys as among the general population of all ages. In the middle schools for girls the tendency to suicide is about three times weaker than at the gymnasium or real schools, and not more than in the general Russian population. No general solution is offered.

These papers are enough to indicate the large variety of material contained in these transactions. One general feature is obvious—personal hygiene distinctly predominates over environmental hygiene, although the latter is far from neglected. We have no space to note the papers on residential schools, school epidemics, administration questions, medical inspection, special schools, &c. The editors are to be congratulated on the practical nature of the volumes.

It is only right to direct attention to the elaborate address prepared by Prof. Griesbach on the relations between medicine and pedagogy; the tables are of great value.

PREHISTORIC POTTERY IN AMERICA.

THE Academy of Natural Sciences, Philadelphia, has issued as part of the thirteenth volume of its Proceedings another of its great monographs, finely illustrated with coloured and process plates, on a group of mounds in Arkansas and Mississippi, prepared by Mr.



Vessel of the "teapot" variety. Near Menard Mound. Height 6.25 inches.

C. B. Moore, who has made a speciality of this line of investigation. These mounds fall into three groups:—those of the Lower Arkansas, the Yazoo and Lower Sunflower Rivers, and those at Blum. A number of interments, many of which are of the "bunched" or contracted type, has been examined, and a large collection of objects, such as pottery, bone pins, shell and copper ornaments, has been made. Some bones showing marks of specific disease have been unearthed, but there is some doubt whether these belong to the pre-Columbian period, and the sites may have been used for interments after Europeans reached the country.

The most important examples are those of pottery, which, though inferior to specimens found in other sites, is still highly artistic, well baked, and carefully wrought. It consists of pots, bowls, and bottles, of the last the long-necked or carafe type being comparatively abundant. An interesting variety is the "teapot" class, a vessel with a more or less globular body, a circular opening at the top surrounded by a low neck, with a spout and small knob at opposite sides of the body. This class, for the United States at least, seems to be peculiar to the

Arkansas region. The pigments used are generally clays, white or tinted with iron oxides, of which careful analyses have been made by Dr. H. F. Keller. In decoration the scroll pattern is predominant; but in one very beautiful bottle the spaces in the yellow ware are defined on the body in white pigment, the interior being occupied by five-pointed stars and figures resembling an arrow-head, somewhat analogous to the copper pendants found at Moundville, the circular portions of which contain Swastikas or stars.

On the base of another vessel the Swastika reappears, and the same emblem is common on shells and stamped ware from the southern States. Prof. Holmes, in a contribution to this report, interprets this well-known symbol as a representation of the world, the division into four quarters being a convenient mode of marking the groups of guardian deities to whom it was necessary to make offerings or appeals. This explanation, however, hardly accounts for the symbol in other parts of the world. On the whole, these discoveries are of the highest value as opening up a comparatively novel chapter in the art development of prehistoric America, while the forms and schemes of ornamentation deserve the attention of designers in our day, who may find much interesting suggestion in the work of this early school of artistic pottery.

INHERITANCE IN SILKWORMS

IT is not surprising that animals which breed so fast and occupy so little room as silkworms should have afforded the material for the experimental investigation of heredity. The publication before us is the outcome of the third considerable series of breeding experiments with this moth. The first to appear was that of Coutagne ("Recherches experimentales sur l'Héredité chez les Vers a Soie"). This work was done without a knowledge of Mendel's observations, a fact which only increases the value of the work in the eyes of those who are not familiar with this author's other writings. The experiments, on the other hand, of Kametaro Toyama were carried out with the full knowledge of Mendelian principles, and were, indeed, set on foot with the object of testing them.

Mr. Kellogg's experiments were started a year later than Toyama's—in 1901. Mr. Toyama, who published his results before Mr. Kellogg, obtained results confirmatory of Mendelian hypotheses. But Mr. Kellogg does not find this to be the case with all his characters; in fact, he finds that the characters of the larvæ behave in Mendelian fashion in inheritance, whilst those of the cocoon exhibit considerable exceptions to this rule. The author suggests that the cause of this is that the cocoon characters have arisen by the selection of fluctuating variations, whilst those of the larvæ have arisen as discontinuous variations.

Mr. Kellogg's position with regard to the application of Mendelian principles to his results may be stated in his own words:—"Toyama finds the larval variation of colour-pattern and the cocoon differences of colour to follow Mendel's law. I do not. By the use of many repetition or check lots I find the larval characters to exhibit a great fidelity to Mendelian principles in their mode of inheritance, but with the cocoon colours I find exceptions so numerous, so varied, and so pronounced as to lead me to lay great stress on the potency or influence of individual or strain idiosyncrasies."

The chief criticism we are inclined to make is that far too little numerical evidence is given for the generalisations which are made. In an experiment in which nearly everything turns on the numerical proportion in which individuals with particular characters occur, we look for a far more detailed account of the results obtained. For example, Mr. Kellogg whets our appetite by telling of his experiments with a character of the egg, or rather of the female which lays it. Most races lay eggs which stick to the box in which they are laid, whilst some strains of the Bagdad race lay "non-adhesive" eggs. "The one race in my possession whose eggs are regularly (this regularity is not absolute) non-adhesive is the Bagdad

1 "Inheritance in Silkworms." By Vernon L. Kellogg. Leland Stanford Junior University Publications. University Series, No. 1. Pp. 89. (California: Stanford University, 1908.)

race. . . . Well, we want to know exactly how many have laid adhesive eggs. The author tells us that the egg-character is non-Mendelian, and that, though of course a character of the female, it is transmitted through the female. We want the details of the evidence on which this statement is based, in the form of a table preferably. In no case is the probable error of his results worked out.

THE OLDEST EUROPEAN SEDIMENTS.

MR. J. J. SEDERHOLM, director of the Geological Survey of Finland, has issued in English his "Explanatory Notes to accompany a Geological Sketch-map of Fenno-Scandia" (Helsingfors: Frenckellska Tryckeri-aktiebolaget, 1908). The beautifully coloured map of Norway, Sweden, and Finland (Prof. W. Ramsay's "Fenno-Scandia") that accompanies this memoir was originally issued in Bulletin No. 23 of the Commission géologique de Finlande. Photographs are given of critical rock-specimens, such as the conglomerates that mark uniformities between the Archaean systems in Finland, and the early pre-Cambrian (Bottnian) banded sediment of the shores of Näsijärvi. This rock indicates seasonal stratification, strangely like that of the adjacent Glacial clays of Pleistocene age.

Those who have seen the actual specimens, or, better still, the beds in the field, cannot deny the existence of an immense series of pre-Cambrian sediments in Fenno-Scandia. The gneisses, such as those of the Hangö islets, are by no means the oldest or fundamental rocks, but result from the intrusion of granite into various series and at various times. Some of the granites in the north of Finland appear to be post-Silurian, as in Scandinavia. Sederholm's admirable summary is, of course, written from a Finnish point of view, and some of the results may meet with criticism when applied to Scandinavia; but they deserve the keen attention of geologists in our own islands, where post-Silurian movements have masked much of the older sequence, but where patches of ungranitised pre-Cambrian sediments may remain amid metamorphic areas.

A visit to Finland healthily counteracts the tendency, still apparent in some quarters, towards bringing all our clearly stratified rocks somehow into the Palaeozoic era. Dr. A. Mickwitz has recently proposed (*Bulletin de l'Académie impériale des Sciences de St. Pétersbourg*, 1907, p. 699) to correlate the results of deep borings on the south side of the Gulf of Finland, in the hope of ascertaining the relations of the lower Cambrian strata of Russia to the pre-Cambrian beds that appear across the sea in Finland. Perhaps the areas still unexplored by the Finnish Survey may include some Palaeozoic strata. For the present, the "Jatulan" dolomites, sandstones, and true bedded anthracites are sufficiently fascinating. What forms of vegetable life in pre-Cambrian times furnished the bed of coal 7 feet thick in Olonetz?

G. A. J. C.

METEORIC SHOWER OF JANUARY.

THE Quadrantids, or Bōtids as they are sometimes called, the former constellation being modern, and not fully recognised, ought to reappear under favourable auspices on the nights of Saturday, January 2, and Sunday, January 3; but the shower is a very fugitive one, and its more abundant phase will probably be confined to a few hours on one of the nights mentioned.

These January meteors really form a very rich stream, and I believe that, next to the Perseids, Leonids, and Andromedids, they are entitled to take precedence as regards numbers; but the annual returns are seldom well observed in this country owing to cloudy weather, moonlight, and other causes. Moreover, the radiant is only at a satisfactory height for the plentiful display of its meteors just before sunrise. At 9 p.m. in the latitude of Greenwich the point of radiation is only fourteen degrees above the northern horizon. Observations are best made, therefore, in the early evening between 5 p.m. and 6 p.m., or during the few hours before sunrise.

The meteors are generally fairly bright, with long, rather swift flights and flaky trains. They are decidedly conspicuous objects, and easily identified from members

of the secondary showers of the epoch, which are not abundant or individually rich. This year the gibbous moon will slightly interfere with observations before midnight, but the morning hours, if atmospheric conditions allow, ought to provide a very suitable time for witnessing the spectacle.

W. F. DENNING.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE annual meeting of the Mathematical Association will be held on January 12, 1909, at King's College, London. Addresses will be delivered by Dr. H. T. Bovey, F.R.S., rector of the Imperial College of Science and Technology, on the mathematical preparation for students who propose to take up technical work; by Mr. Alfred Lodge, on the introduction of the idea of cross-ratio and homography, and its connection with involution; and by Prof. G. H. Bryan, F.R.S., on a proposal for the unknown digit.

THE annual meeting of the Geographical Association will be held on January 6, 1909, at the London School of Economics. In the morning, at 11.30, short papers on practical problems will be read. Mr. J. Fairgrieve will deal with the weather report and the teaching of geography, Dr. A. J. Herbertson will give hints on hanging and storing maps, and Mr. J. A. McMichael will give a demonstration of the method of making models by serial sections. In the afternoon, after a business meeting, the president, Mr. Douglas W. Freshfield, will deliver his address, Dr. H. R. Mill will lecture on the rainfall of the British Isles, and a lantern exhibition will be given of the set of views of the Dora Baltea, which has been prepared for the association by Mr. G. W. Palmer. The Geographical Association is, we are glad to find, continuing its excellent work in the direction of encouraging more scientific methods of teaching geography in schools. Monthly meetings for teachers and others are to be held on the last Friday evenings of January, February, and March next for the discussion of problems likely to assist teachers in their work, and in other ways the association is endeavouring to assist improved methods of geographical instruction. The honorary correspondence secretary, Mr. J. F. Unstead, 30 Greenholm Road, Eltham, is willing to give full particulars of the work of the association.

THE annual meeting of the recently formed American Federation of Teachers of the Mathematical and Natural Sciences was held at the Johns Hopkins University, Baltimore, on December 28 and 29. On the second day a joint meeting was held with the American Association for the Advancement of Science, at which numerous problems of science teaching were discussed. From Bulletin No. 1 of the federation, which has been received, we learn that seven associations have formally joined the federation. Fourteen others have the matter under consideration, and are expected to take action on it at their next meetings. Among pieces of work of obvious interest and importance which the federation proposes to undertake may be mentioned investigations and reports on such matters as the bibliography of science teaching and the history of science; the best means of publication for new material of interest to teachers of science; the best means of securing the most favourable conditions for science teaching, including a share in the shaping of college entrance requirements. It is important to notice that the articles of the federation provide, not for the formation of a new national society of teachers of mathematics and science, but for a collective representation of existing local societies in matters of broad general interest. Each local society, of which there are many in the United States, preserves its independent identity and methods of work. Already the federation has begun work by undertaking the compilation of a bibliography of the literature on the teaching of science and mathematics. The work is being done by cooperative effort, part having been assigned to each of the federated associations. A committee on bibliography has been appointed, with Prof. Richard E. Dodge, of Teachers' College, New York, as chairman. The list to be prepared is to "include books, articles in periodicals, scientific journals or association reports, including foreign contribu-