UNIVERSITY AND EDUCATIONAL NOTES

RENSSELAER POLYTECHNIC INSTITUTE receives $40,000, Princeton University $50,000, and Lafayette College $50,000 by the will of Calvin Pardee.

THE building of metallurgy at the Michigan College of Mines, Houghton, Michigan, was destroyed by fire on March 15, with loss estimated between $250,000 and $275,000. Valuable records were lost, including those of the United States Bureau of Mines, occupying offices in the building.

COURSES constituting the first two years of the four-year course in medicine at Rush Medical College are given at the University of Chicago and include work in zoology, anatomy, physiology, physiological chemistry and pharmacology, pathology, hygiene and bacteriology. For the summer quarter the regular faculty in these courses will be supplemented by men from other institutions, including Wade Wright Oliver, professor of bacteriology, Long Island College Hospital; William Barnard Sharp, professor of preventive medicine, University of Texas Medical School; William Alfred Starin, professor of bacteriology, Ohio State University, and Andrew Conway Ivy, assistant professor of physiology, Loyola University.

EUGENE J. RIGHTS, a graduate of Lehigh University who has been engaged in bridge construction, has been appointed professor of civil engineering at the University of Porto Rico.

DR. L. PLASENCIA has been appointed professor of biological chemistry in the University of Havana.

MR. M. B. R. SWANN has been elected to a fellowship at Gonville and Caius College, Cambridge, and appointed a lecturer in pathology.

DISCUSSION AND CORRESPONDENCE

WEATHERWAX ON MAIZE ENDOSPERM[1]

DR. WEATHERWAX has recently contributed a very interesting paper to *Genetics* entitled "A rare carbohydrate in waxy maize." It is written with that inimitable blending of the didactic and the dogmatic which approaches true perfection in all of the author's work.

Two ingenious ideas led to this paper. Presumably there would be no claim that these ideas are absolutely original; but at least they have not been utilized before to the full extent of their possibilities. The investigation consists of observing the color reaction when iodine dissolved in aqueous potassium iodide is applied to the endosperm of a variety of maize. In itself this is not new. It has been done frequently by various botanists, and even by geneticists. The novel idea, the idea which might be termed ingenious without misrepresentation, is to make a complete and well-rounded investigation out of this one experiment. The second adroit idea is to omit all the vulgar details of this test in order that there may be no hindrance, obstruction or inhibition which might prevent the fullest freedom in drawing the most general conclusions. This again has its prototype. Sir Isaac Newton is said to have made a single experiment with falling bodies, utilizing the apple as material; yet the plan, the scope, and the mode of carrying on his observation are unmentioned in the two great works to which it gave rise. Thus it will be seen that the author deserves high credit for eliminating all that is extraneous and leaving his work characterized by utmost simplicity.

But it is in the comments, conclusions and generalizations regarding genetics that Dr. Weatherwax's originality is most striking; though it must be confessed they have a generic resemblance to those of other morphologists who have invaded the field. His first conclusion is that since waxy maize gives a red color with the iodine solution, its endosperm is composed wholly of erythro-dextrin, a rare carbohydrate having the unique property of producing this color reaction. Generously, though perhaps unnecessarily, he cites as corroborating authority for these facts a paper by Meyer written in 1886. Doubtless because chemical literature is notoriously erroneous, he has been able to dispense with the relatively large literature on the subject, much of which has been brought together by Abder-

[1] Weatherwax, Paul. A rare carbohydrate in waxy maize. *Genetics*, 7, 568-572, 1923.

halden in the *Biochemisches Handlexicon*. It might be of a little historical interest, however, to note that Haas and Hill (*Chem. Plant Prod.*, p. 107), after commenting on the ill-defined mixture of substances known collectively as dextrins, quote Ost as disputing the existence of erythro-dextrin as a chemical entity because he has obtained the red reaction with iodine on an artificial mixture of achroo-dextrin and starch.

Our author is at his best, however, in scourging the careless, inefficient genetic work of the past. He says in one place: "Geneticists of the past quarter of a century have found in hybrids between sweet and starchy varieties of maize, material readily utilizable for illustrating Mendelian ratios. But in the majority of the experiments reported, the 3 to 1 ratio expected in the conventional F_2 generation (of endosperms) has been complicated by the occurrence of grains intermediate between sweet and starchy." In determining to use the word "majority," the hundreds of crosses reported by Emerson, East, Merle Coulter and others, where only 1 or 2 per cent. of the matings were thus complicated, were omitted. The reasons for the omission will probably be given in a later paper.

Geneticists will also await expectantly an explanation of the statement that "the usual recourse has been the citation of the possibility of reclassification, based upon the degree of expression of the characters concerned, or an interpretation based upon various observed or assumed conditions." Until our attention was drawn to the case, the method used by geneticists of classifying doubtful individuals by the common practice of growing them and finding out how they breed had seemed just and proper.

Again, Dr. Weatherwax shows his clairvoyance in regard to genetic work by pointing out how much fruitless investigation of the maize endosperm could have been avoided by paying attention to its chemical and physical nature. If this had been done, he says, the divergent views of Dr. Harper on the one hand, and geneticists on the other, would be brought closer together, and Dr. Jones's investigation of the heredity of "pseudo-starchy" endosperm might have had more conclusive results. And with telling effect, he deals a final blow with an apt and striking metaphor. He says: "The visual method of discriminating between endosperm textures by observing the outside of the grain is as crude as a color-blind man's attempt to describe the rainbow."

Numerous other genetic hypotheses, which the author did not see fit to mention, fall before this type of criticism. Dr. Morgan has been crossing and recrossing *Drosophila melanogaster* for the past fifteen years, and has built up a seemingly consistent, orderly and logical scheme of inheritance upon the results. But many persons have felt that this consistency, this orderliness, this apparent logic was perhaps a mere phantasy or mirage which would disappear when a particular dispelling agent was discovered. Is it not probable that Dr. Morgan's ignorance of the chemical constitution of the characters with which he is dealing has led him into a maze from which he can never extricate himself? Furthermore, it is unquestionably true that in Dr. Jones's researches on the heredity of "pseudo-starchy" endosperm, he was unable to state the exact chemical constitution of the characters with which he dealt. There seems no escape from the conclusion that the deficiency vitiates his work.

Geneticists were not interested in whether there was a difference of opinion between Jones and Harper. They were interested in the facts. And these facts seemed to prove that "pseudo-starchy" had a different heredity from "true" starchy and from "sweet" endosperm. They accepted his work as an advance in knowledge on this account, even though a simple interpretation of the heredity mechanism was impossible. How crude and unsophisticated such a view now appears!

The reviewer does not wish to put an interpretation on Dr. Weatherwax's statements which he himself did not intend, but there appears to be a mute accusation between the lines of his metaphor concerning the color-blind man. Do geneticists endeavor to camouflage their deficiencies to the public by appearing to be doing the things which Dr. Weatherwax says they do not do? We have been in several genetic laboratories where maize endosperm was being investigated. The workers were cutting sections said to be for microscopical study. They were treating their material with various

chemicals supposedly to try to gain an insight into the chemical composition of the material. Perhaps their silence on this matter, as contrasted with their relative multiloquence on the pedigree culture data, is indicative of a capacity to judge the comparative importance of the facts, rather than a crafty masking of inefficiency.

E. M. EAST

NEW OCCURRENCE OF THE BELT TERRANE IN MONTANA

No occurrence of the Belt Terrane in central Montana has been reported east of the Little Belt Mountains which were mapped in 1892-97 by Weed and Pirsson in Folio 56 of the United States Geological Survey.

Recently the writer has discovered over 100 feet of the top of the Belt Terrane in the Big Snowy Mountains. These mountains are about thirty miles long and are located east of the Little Belts, from which they are separated by a pass several miles broad called Judith Gap. The Big Snowies are the result of an anticlinal fold and contain no igneous rock, thus differing from all the rest of the outlying ranges in Montana. The summit of the uplift was reached at Half Moon Pass in the eastern part of the range, and the exposure of the Belt Terrane is on the south side of this pass in the canyon of Swimming Woman Creek.

The exposure of the Belt consists of dark gray, reddish and greenish shale or fissile slate. The rock is hard and highly fractured. Veinlets of iron stained quartz and calcite containing small amounts of gold and copper fill some of the fractures and joints in the strata. The Belt Terrane is exposed over an area of possibly two or three hundred acres. The Belt is overlain by more than 1,000 feet of Cambrian strata at the base of which is a quartzitic basal conglomerate. The walls of Swimming Woman Canyon are composed of the Cambrian and the hard Devonian and Mississippian limestones. There is an angular unconformity of a few degrees between the basal Cambrian quartzite and the Belt Terrane, but the Belt shows no evidence of extensive erosion. No fossils were seen in the Belt rocks.

The Big Snowy Mountains have never been mapped geologically, and the discovery of Belt strata in them extends the known area containing Algonkian strata forty miles farther east than hitherto reported.

O. W. FREEMAN

STOCKTON, CALIF.

THE SCALES OF THE FOSSIL FISH EOBRYCON

OWING to the remarkable distribution of the Characinid fishes in the neotropical and ethiopian regions and consequent questions as to their origin and migrations, any scrap of information concerning fossil forms is of value. In 1898 Dr. A. S. Woodward described and figured *Tetragonopterus avus* from the Tertiary of São Paulo, Brazil. He considered that it might belong to the subgenus *Hemibrycon*, which is now considered a quite distinct genus. However, in 1907 Jordan made it the type of a new genus *Eobrycon*. In 1920 Dr. Eigenmann sent me a specimen, lacking the head, for examination. I found that the scales were exactly those of *Salminus*, and I think the fish must be placed in that vicinity. In his very excellent work on the fishes of western South America, just published by the Carnegie Museum, Dr. Eigenmann, in accordance with most ichthyologists, neglects to use or refer to the finer characters of the scales. I venture to predict that the time will come when scale-characters will be considered more valuable for generic diagnosis among the Characidæ or Characinidæ than the presence of an adipose fin or the completeness of the lateral line. More valuable because more constant and characteristic of natural divisions.

T. D. A. COCKERELL

UNIVERSITY OF COLORADO
JANUARY 30, 1923

SCIENTIFIC BOOKS

LOFTFIELD ON STOMATA[1]

NOT since the appearance of Lloyd's "Physiology of Stomata" in 1908 has there appeared in America a book which has taken up the problems involved in the behavior of stomata on the broad and comprehensive scale, and as

[1] "The Behavior of Stomata." By J. V. G. Loftfield. Publication No. 314, Carnegie Institution of Washington. Pp. 104; 54 figures in text, 16 plates with 27 figures. Washington, D. C., 1921.