UNIVERSITY AND EDUCATIONAL NOTES

THE corner-stone of the new Eckhart Hall on the main quadrangle of the University of Chicago, which will house the laboratories of Professor A. A. Michelson and Professor Arthur H. Compton, was laid on July 12 by Bernard A. Eckhart, the donor of the building. Three generations of Eckharts assisted in the ceremony, the donor, his son, Percy B. Eckhart, an alumnus of the university, and his granddaughter, Marion West Eckhart, a junior. Professor Gilbert A. Bliss, acting head of the department of mathematics, which with the department of physics and astronomy will occupy the new structure, and Professor Henry Gordon Gale, dean of the graduate school of science, were among the speakers.

DR. PIERRE A. FISH, a member of the faculty of Cornell University since 1890, when he became an instructor in the department of physiology and neurology, has been appointed dean of the college of veterinary medicine, succeeding Dean Veranus A. Moore, who retires this year.

DR. JEAN R. OLIVER, professor of pathology in the Stanford University Medical School, San Francisco, has been appointed professor of pathology at the Long Island College Hospital, Brooklyn, to succeed Dr. Archibald Murray.

DR. CHARLES L. MIX has resigned as professor and head of the department of medicine, Loyola University School of Medicine, and has been appointed professor emeritus. He will be succeeded by Dr. Italo F. Volini.

AT the College of the City of Detroit, Dr. K. W. Folley, of Trinity College, and Dr. D. C. Morrow, of Northwestern University, have been appointed instructors in mathematics.

DR. W. GARSTANG, professor of zoology at the University of Leeds, England, has been appointed pro-vice-chancellor.

DR. LEWIS F. RICHARDSON, in charge of the department of physics of the Westminster Training College, London, has been appointed principal of Paisley Technical College.

M. L'ABBÉ BREUIL has been elected professor of prehistory in the Collège de France to succeed the late M. Théodor Reinach.

DISCUSSION

BABYLONIAN MATHEMATICS

WITHIN the past twelve years our knowledge of Egyptian and Babylonian mathematics has been considerably extended and it has been surmised that in the near future we may be even better acquainted with Babylonian than with Egyptian mathematics.

Among a number of documents which contribute to the body of known facts regarding Egyptian mathematics two are of outstanding importance: the Rhind mathematical papyrus of about 1650 B. C., a copy of an older document, and the Golenishchev mathematical papyrus dating from about 1850 B. C.; also, probably, a copy of a document dating back earlier, perhaps to 1900 or 2000 B. C.

Of the Rhind papyrus, which is in the British Museum, except for certain fragments in the New York Historical Society, a notable new edition was brought out in 1923 by Professor T. Eric Peet, of the University of Liverpool. A sumptuous two-volume edition by Chancellor Chace, of Brown University, is in the press. Peet's work has inspired many publications, of which the outstanding longer ones are Otto Neugebauer's in 1926 and O. Gillain's volume in 1927. As far back as 1894 it was generally known that Golenishchev, now professor of Egyptian philology at the Egyptian University in Cairo, had a mathematical papyrus, but it was not till Turaev's article in 1917 that we learned anything about this papyrus which had then become the property of the Museum of Fine Arts in Moscow. Tsinserling's article in 1925 gave us still more information. A reproduction of the papyrus with hieroglyphic transcription, German translations and commentary is about to be published by Professor V. V. Struve, of the Hermitage Museum of Leningrad. In 1917 we learned the very extraordinary fact that the Golenishchev mathematical papyrus seemed to prove that the Egyptian of 1850 B. C. knew the equivalent of the formula for the volume of the frustum of a square pyramid. Professor Struve discovered in 1928 that the papyrus contains another geometrical result of an even more extraordinary nature (in spite of what Turaev and Peet have stated to the contrary), indicating a stage of development of geometry among Egyptians undreamt of by scholars a score of years ago.

Until recently comparatively little has been known about Babylonian mathematics. One of the chief sources of information has been Hilprecht's "Mathematical, Metrological and Chronological Tablets of the Temple Library of Nippur," published by the University of Pennsylvania in 1906. He here describes fifty tablets dating from the period 1350 to 2200 B. C. C. J. Gadd's article in *Revue d'Assyrio-*

logie, 1922, discussing a large fragment in the British Museum, was an important addition to what was known of Babylonian geometry about 2000 B. C. Articles by Weidner, Zimmern and Ungnad in 1916 seem to have made further contributions to our knowledge in discussion of what purports to be an Akkadean tablet of the same period. This contains two approximations for the length of the diagonal of a right triangle in terms of the sides.

Since the publication by the British Museum in 1900 of part IX of its "Cuneiform Texts from Babylonian Tablets" (*i.e.,* CTIX), it has been known that two tablets 85194 and 85210 contained nearly fifty mathematical problems. Till recently, however, no one could translate and interpret them. It now appears that to Dr. Neugebauer, of Göttingen, author of a monograph "Zur Entstehung des Sexagesimalsystems" in the Göttingen *Abhandlungen* (1927), must be given the credit for notable achievement not only in this regard, but also in making illuminating comment on mathematical parts of Sumerian and Babylonian texts recently published by Carl Frank in *Schriften der Strassburger Wissenschaftlichen Gesellschaft in Heidelberg,* new series, Heft 9. Some of his results are to be found in the first issue of a new publication, *Quellen und Studien zur Geschichte der Mathematik,* of which Neugebauer, Julius Stenzel, of Kiel, Otto Toeplitz, of Bonn, are the editors. This publication is to be issued in two parts, *Abteilung A: Quellen; Abteilung B: Studien.* The first part of the *Studien,* published in Berlin last April, contains new information of great interest to the student of Babylonian mathematics. This information is to be found in two articles, one by Neugebauer, "Zur Geschichte der babylonischen Mathematik," pp. 67–80; and the second by Neugebauer and Struve, "Über die Geometrie des Kreises," pp. 81–92. The first article is mainly taken up with the discussion of some problems of Frank's monograph with certain references to CTIX. Various problems connected with figures which may be derived by lines drawn parallel to a side of a right-angled triangle are discussed. In this way we get a series of trapezia (using this term as employed by every country of the world except the United States). The Babylonians and Egyptians were perfectly familiar with the fact that the area of a trapezium, such as this, is one half the sum of the parallel sides times the distance between them. One of the extraordinary conclusions arrived at in this connection is that the Babylonians of about 2000 B. C. seem to have known what is equivalent to our well-known formula for the solution of a quadratic equation of a certain form.

The second paper, apart from consideration of matters of terminology, mainly elaborates various problems of CTIX. The interpretation of one passage regarding a circle of circumference 60 and diameter 20 leads to a value 3 for π, also familiar to readers of the Bible (I *Kings,* 7, 23; II *Chronicles,* 4, 2). With this value of π the expression for the area of a circle seems to have been correctly derived by what is equivalent to the formula one twelfth of the square of its circumference. Similarly for the volume of the frustum of a right circular cone from the equivalent of the formula, one half the sum of the areas of the bases times the distance between them. In the discussion of chords of a circle it seems to be definitely suggested that Babylonians were familiar not only with the Pythagorean theorem but also with the fact that the angle in a semicircle is a right angle.

Such results regarding mathematics of nearly four thousand years ago are surely very extraordinary. It has been announced that a complete discussion of the mathematical part of CTIX is to be given in a part of *Quellen.* Its publication must be awaited with the keenest interest.

In 1928 I was informed by a noted Assyriologist that there are other Babylonian tablets which, on first reading, seem to indicate that the problems have to do with finding three parts of a triangle when three other parts are given. This, and results referred to above, suggest that the surmise with which this note opens may indeed come true, namely that it may not be very long before we know more about Babylonian than about Egyptian mathematics.

RAYMOND CLARE ARCHIBALD
BROWN UNIVERSITY

BIOLOGICAL PUBLICATIONS IN AMERICA

IN his communication on "Biological Publication in America" in SCIENCE for March 8, your correspondent fails to take into account an important phase of the matter. One reason the biologists find publication both slow and difficult is that so many of them take up a lot of valuable space with most circumstantial accounts of work that often turns out to be but a slender contribution to our knowledge. Each feels it his duty to give a history of the project, a detailed account of his own methods and a list of all the works he has consulted.

Like other things, the cost of printing has advanced to unwarranted heights during recent years and the high mortality among biological publications that are not financed by outsiders is sufficient indication that the publishers of such journals are not getting rich.

If publishers had to depend on the average "research" paper to keep their subscription lists growing, there would soon be few biological journals in existence. Ask yourself how many of these published researches you read carefully if they are not in, or