

UNIVERSITY AND EDUCATIONAL NOTES

HARVARD UNIVERSITY has been appointed residuary legatee of the estate of the late Augustus Coe Gurney, a former member of the Paris bankers, Morgan, Harjes and Company, who died on July 5. It is reported that the share of Harvard University will amount to two million dollars.

At the University of Chicago, Dr. J. Harlen Bretz has been promoted to a full professorship of geology, and Dr. I. S. Falk, of hygiene and bacteriology; E. P. Lane, mathematics, and C. R. Moore, zoology, have been made associate professors.

DR. THOMAS A. STOREY, of New York University, who for ten years after his graduation served as director of the gymnasium of Stanford University, has been recalled to Stanford as professor of hygiene and physical education for men.

DR. DON M. GRISWOLD, who has been on a year's leave of absence from the University of Iowa, has resigned his position as state health commissioner of Iowa, effective on July 1, and will return to his post at the university. The governor has appointed Dr. Henry Albert, director of laboratories, University of Nevada, to succeed Dr. Griswold. Dr. Albert is a graduate of the University of Iowa, where for many years he was head of the department of bacteriology.

DR. J. KIMBALL YOUNG joined the faculty of the University of Wisconsin on July 1 as associate professor of economics.

At Western Reserve University, the following announcements were recently made regarding the department of biology: Dr. C. H. Otis has been given leave of absence for the coming year; Dr. J. P. Visscher has been appointed associate professor; Dr. Lloyd Ackerman has been appointed assistant dean, and Mr. J. M. Odiorne and Mr. R. C. Gilmore have been appointed instructors.

GEORGE PATCHIN has been appointed principal of the Sir John Cass Technical Institute, London, in succession to Dr. C. A. Keane, who has retired.

DISCUSSION

LOGARITHMS AND PRECISION

IN SCIENCE¹ Professor Karl Pearson is quoted as follows: "In a certain sense the day of logarithmic tables to 4, 5, 6 or 7 figures is past . . . What are

used and are often badly needed are logarithmic tables to 10, 15 or 20 figures." A couple of weeks later Professor Satterly, in SCIENCE, wrote under the heading, "How many Figures are Significant?": "The research worker trained without a course in this subject (theory of measurements), often wearies the patience of his readers with an absurd number of 'significant figures' in his numerical work."

In view of these statements it may be of service to consider the precision of measurements corresponding to different numbers of significant figures. Starting with one of the simplest cases, "good linear measurement" may be taken as requiring six digits, indicating a precision of one part in a million. With ten digits the population of the earth may be stated to the last individual, but since our knowledge of that number for a given date probably does not exceed seven significant digits, that marks an upper limit to the accuracy of the data of eugenics.

The volume of the earth to the nearest cubic yard requires only about twenty-one digits, while two more digits will express the distance to the Large Magellanic Cloud in feet; the latter number being also the approximate number of electrons in one gram of matter, quoting Dr. W. R. Whitney, of the General Electric Company.

In comparison with what is probably the longest string of significant digits ever computed, *viz.*, William Shank's value of π to 707 decimal places, the number of cubic centimeters in space-time of the Einstein Theory is relatively small, requiring much less than one hundred digits. But the radius of space-time and the number of electrons in a gram have the common property of being unknown beyond the first digit so are not accurate within ten per cent., thus illustrating the difference between results of observation and computation. For these observational results the humble slide rule, accurate to three digits, is much too refined for use, while measurements of any sort are relatively few where the ten place logarithm table is not far beyond the utmost attainable precision of the observers.

A few years ago a geometry teacher computing the length of tether of a donkey at the edge of a circular pond grazing over a given area gave the result to eighteen digits. Recently a reporter, learning of the discovery of a fifteen million year old lizard, announced that it was born in 14,998,074 B. C.

It is not an accident that decimal points are not mentioned above, since precision of measurement from the viewpoint of fractional precision is independent of size of the quantity measured, whether it be the radius of space-time or the distance between electrons within the atoms.

¹ Vol. LXI, No. 1568, p. 59.