Morris and Company presented $7,000 for research in the department of pharmacology. The department of psychology received from anonymous donors the sum of $4,000 for a salary.

ACCORDING to *The British Medical Journal*, Professor H. C. Souja-Aranjo, member of the Brazilian Academy of Medicine and vice-president of the International Leprosy Commission, has founded two prizes at the academy, each of the value of $2,000—namely, the Kadrowsky Prize for the best work on the bacteriology of leprosy, and the Lieras Acosta Prize for the best work on the immunology of leprosy.

THE trustees of Western Reserve University and of the Brush Foundation have entered into an agreement by which the work on human growth, development and sex initiated by the late Dr. T. Wingate Todd for the Brush Foundation and other foundations as well as future studies sponsored by the Brush Foundation will be conducted through the School of Medicine. Dr. William W. Greulich, research associate in anatomy and physical anthropology at Yale University School of Medicine, has been appointed director of the foundation and professor of physical anthropology and anatomy in the department of anatomy in the medical school.

AT the third International Congress of Neurology held at Copenhagen from August 21 to 25, which was attended by about five hundred neurologists from all countries, it was decided that the next congress should be held in Paris in 1942 or 1943.

THE autumn meeting of the American Society of Agricultural Engineers will be held from December 4 to 8 at the Stevens Hotel, Chicago, under the presidency of K. J. T. Ekblaw.

THE annual dinner of the New York Academy of Sciences and affiliated societies will be given on Wednesday, December 13, at the Hotel Astor at 7:00 P.M.

MORE than sixty professional psychologists and psychiatrists from eastern Massachusetts recently attended a discussion meeting at the President's House, Tufts College, as guests of the following psychologists and psychiatrists connected with the college: Douglas A. Thom, professor of psychiatry; Abraham Myerson, professor of neurology; A. Warren Stearns, professor of psychiatry; Herbert Barry, lecturer in psychology; Leonard Carmichael, president of the college; John L. Kennedy, assistant professor of psychology; Leonard C. Mead, instructor in psychology; Edwin A. Shaw, professor of education; John P. Tilton, assistant professor of education; Nils Y. Wessell, assistant professor of psychology; and Robert A. Young, instructor in education. Among those who spoke briefly on the topic of the relationship between psychiatry and psychology were: C. Macfie Campbell, professor of psychiatry at the Harvard Medical School; Truman Lee Kelley, professor in the Graduate School of Education at Harvard; Edwin G. Boring, professor of psychology at Harvard; Gordon Allport, professor of psychology at Harvard; Ross A. McFarland, of the Fatigue Laboratory of the Harvard Business School; Edna Heidbreder, professor of psychology at Wellesley College; David Shakow, clinical psychologist at the Worcester State Hospital; Vernon Jones, head of the department of psychology at Clark University; Hudson Hoagland, head of the department of biology at Clark University; and E. Stanley Abbott, psychiatrist and psychologist of Boston.

DISCUSSION

A DOZEN MATHEMATICAL ERRORS IN THE "ENCYCLOPAEDIA BRITANNICA"

IN the preface to the "Encyclopaedia Britannica" (1938) it is stated that "three thousand five hundred scholars, scientists, experts, and men of affairs" cooperated in the production of this work. It is to be expected that some errors appear in a work which had so many contributors and which covers such a wide field of knowledge, notwithstanding the emphasis on accuracy and the great claims made along this line. Some of these errors relate to details which interest only the specialists, but there are others which are of wider interest and affect adversely the users of this highly respected and widely distributed work of reference. The latter include the fundamental laws known as the associative law and the commutative law of mathematics. Contrary to common usage these appear in the plural in the articles devoted thereto in the encyclopedia in question. While this is somewhat striking it is not the worst feature thereof, even if it is at first disconcerting.

Under the entry "associative laws," for instance, it is stated that they are "two laws relating to numbers, one with respect to addition and the other with respect to multiplication." The same sentence appears under the entry "commutative laws." In fact, there is only one law in each of the two cited cases. It is the same law when it is used in addition as when it is used in the multiplication of numbers, and it has a large number of other applications. For instance, in the second edition of Webster's "New International Dicitonary" under the entry "associative law," it is said to be a fundamental law of group theory when the elements

are combined, but these elements are usually not numbers, as is now commonly known.

The groups whose elements obey the commutative law when they are combined are known as Abelian groups, and under the entry of "groups" in this encyclopedia it is stated (volume 10, page 914) that a set of independent generators of such a group can be so selected that their orders are powers of distinct prime numbers. This is clearly only possible in the special case when the Abelian group is a cyclic group. Among the other errors which appear under the same entry is the assertion that the group of the cube is the same as the group of the regular tetrahedron, while the latter group contains only one half as many elements as the former, and is a subgroup of the former. The regular solids have received considerable attention in mathematics since the times of the ancient Greeks, and hence it may be assumed that their groups of movements are of general interest.

Under the entry "algebra" in this encyclopedia it is stated that "the earliest known treatise containing problems which would at present be called algebraic is the Ahmes Papyrus (also called, from the name of its former owner, the Rhind Papyrus) now in the British Museum and written 1700–1600 B.C. It is now known that the work along the line of algebra by the ancient Sumerians and the ancient Babylonians is more advanced and probably older than that of the ancient Egyptians. On the following page it is said that the biquadratic equation was solved by Ferrari (1540). As Ferrari was born in 1522 he would have been only about eighteen years old when he first solved this equation. The solution was first published in the *Ars Magna* by H. Cardan in 1545, and there is no evidence to support the statement that Ferrari had obtained it long before the time of its publication and at such an early age as about eighteen years.

Several very elementary errors appear under the entry "arithmetic." On page 356 of volume 2 there appears the following statement: "The fact that twelve is scientifically a more convenient radix than ten (having its half, third and fourth easily expressible), seems to have led to the use of eleven and twelve instead of oneteen and twoteen, after which the denary scale was followed." Since eleven means etymologically one left and twelve means two left, these terms relate to the base ten and have no connection with the base twelve. On the same page it is stated that "the distinction between *abstract numbers,* like 4, and *concrete numbers,* like 4 ft., is an inheritance that serves no important purpose." On the contrary, the concept of abstract mathematics is of fundamental importance and it appears in the earliest extant mathematical developments. The early appearance of abstract mathematics is one of the primary facts of history.

Under the entry "Euler, Leonard" it is said that a complete edition of his works was begun in 1926. As a matter of fact, the first volume of this edition was published in 1911 and edited by H. Weber. As this was an international undertaking which was greatly delayed by the World War, the given date is somewhat striking, especially in view of the publicity given to the vast project of publishing Euler's complete works after several failures along this line. Under the entry "Descartes, René" it is stated in volume 7, page 252, that his lines of reference were preferable at right angles to one another. On the contrary, both he and Fermat commonly used lines of reference which are not at right angles to one another. Unfortunately, it is stated in many other places that the lines of reference used by Descartes were preferably at right angles to each other, and hence this error deserves emphasis. In view of the fact that Descartes's Collected Works are widely available this error can easily be verified.

Under the entry "coordinates" it is stated in volume 6, page 391, that the polar coordinates are attributed to Gregorio Fontana (1725–1803). In fact, these coordinates were used much earlier by Jakob Bernoulli (1694) but were not widely used before the appearance of the *Introductio* by L. Euler. On page 75 of volume 15 there appears the following sentence: "The number of mathematical societies, clubs, and circles organized since the early one at Hamburg in 1690 is exceedingly large, but the number of mathematical periodicals since the seventeenth century is very much larger." Since no one knows the number of mathematical organizations which were formed since 1690 it is misleading to imply the contrary. Many of these organizations lasted only a short time and did not publish any of their discussions. In fact, the number of mathematical periodicals since the seventeenth century is not definitely known.

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A REMARKABLE EXAMPLE OF POLAR MIRAGE

IN midsummer of the present year those on board the schooner *Effie M. Morrissey,* while midway between the tip of South Greenland and Iceland, were favored by a remarkable example of superior or polar mirage. Captain Robert A. Bartlett, master of the *Morrissey,* who has reported the occurrence to me with a view to its publication in SCIENCE, has during an experience of more than forty years in the Arctic seen many polar mirages, but, as he says, none so remarkable as this and certainly none so well checked for position and distance.

On July 17, the schooner was from its noon observation in sunshine found to be in latitude 63° 38′ N and longitude 33° 42′ W. The ship's three chronometers