undertake properly controlled spinning tests for the agricultural departments and will be able to interpret the results and arrange later for full-scale mill-trials before new cottons are brought into general cultivation.

THE introduction of the metric system in the Soviet Union, says the *Commercial and Industrial Gazette* of Moscow, is proceeding rapidly. By the beginning of July next year the Gosmeter will have completed the inauguration of the metric system in all branches of national industry, including the retail selling apparatus in the provinces of Moscow, Leningrad and Nizhni-Novgorod.

UNIVERSITY AND EDUCATIONAL NOTES

MEMBERS of the Board of Trustees of the University of Chicago have given the sum of $1,670,800 toward the $17,500,000 development fund which the university is seeking for the endowment of instruction and research and the erection of new buildings. It is also announced that Professor and Mrs. Frank R. Lillie have given to the university $60,000 for the erection of a building to be used for experimental zoology.

A GIFT of $7,500 has been made to the general fund of Union College, Schenectady, by Charles Coffin, former chairman of the board of the General Electric Company.

LAFAYETTE COLLEGE will receive the residue of the estate of David B. Simpson, of New York. The amount has not been made known.

DR. JOSHUA C. HUBBARD, of the Boston City Hospital, has been appointed professor of clinical surgery at the Harvard Medical School to fill the position made vacant by the resignation of Dr. Frank H. Lahey.

AT Bryn Mawr College, Professor Charlotte A. Scott has retired; she is succeeded as head of the department of mathematics by Professor Anna J. Pell. Dr. D. V. Widder has been appointed associate in mathematics.

A. E. MURNEEK, graduate student at the University of Wisconsin, has been appointed assistant professor of horticulture at the University of Missouri College of Agriculture. Mr. Murneek will finish his work for the Ph.D. degree about February 1.

DR. ROBERT L. PENDLETON, director of agriculture in Gwalior State, India, has been appointed professor of soil technology at the University of the Philippines,

and in charge of the work in soils in the department of agronomy.

GRENVILLE B. FROST has resigned from the research department of the American Cyanamid Company, New York, to become lecturer in physical chemistry at Queen's University, Ontario.

DR. W. H. WOOD, lecturer in the University of Manchester, has been appointed to the Derby chair of anatomy in the university.

DISCUSSION AND CORRESPONDENCE

THE NUMBER OF BROTHERS AND SISTERS OF SELECTED INDIVIDUALS

SAYS Galton in his "Hereditary Genius" as quoted by Cattell ("American Men of Science," 1921, p. 804): "I also have found the (adult) families to consist on the average of not less than 2½ sons and 2½ daughters each. Consequently, each judge has on the average 1½ brothers and 2½ sisters." Cattell points out that this conclusion, obvious as it may appear at first sight, is really incorrect, since, with numerical equality of the sexes, boys should have, on the average, no more sisters than brothers. Rietz has recently (SCIENCE, LX, p. 46, July 11, 1924), given a mathematical generalization of the situation.

The phenomenon is due to the fact that more than one propositus may be picked from a single family, with the result that in ordinary statistical treatment of data some brothers and sisters are counted more than once. It is this point that Galton seems to have overlooked. For example, in his average family of 2½ sons and 2½ daughters it is apparent, if we designate the sons as A, B, and $\frac{C}{2}$ that A has 1½ brothers, 2½ sisters, and that B also has 1½ brothers, 2½ sisters, while $\frac{C}{2}$ has 2 brothers, 2½ sisters; a statistical total of 5 brothers, 7½ sisters. This might seem to be ½ brother too many according to Galton or 2½ too few, according to Cattell. But what the computation really shows—apart from illustrating the method—is that it is not always possible to treat an average as if it were an array. When, however, account is taken of the laws of chance and the frequency of families with various sex ratios, it can be shown, as Cattell and Rietz have done, that if the data are treated in the way indicated, a boy should have, *on the average,* just as many brothers as sisters.

But since even Galton seems to have been somewhat careless about this matter, it may not be out of place to call attention to another caution that should be borne in mind when dealing with this sort of data. When special groups are considered, the numerical

relations which Cattell has pointed out may be artificially altered by a combination of the ordinary methods of collecting data with a differential sex incidence of the trait under investigation. Judges are prevailingly men rather than women, and it is only when adequate care is taken in the method of selecting those to be investigated that one may expect the data to show an equality in the number of their brothers and sisters. The point involved may be brought out by means of a simple paradigm. Let us imagine a population with numerical equality of the sexes, and a calling in which half the men but none of the women attain a certain distinction. The tabulation, in which B stands for brother, S for sister and ′ for distinction, shows the distributions for families of three. The first column indicates a random distribution in the whole population. The second column shows the families in which there is at least one member of distinction.

1 B′ B′ B′	1 B′ B′ B′	3 B′ B′ B′
3 B′ B′ B	3 B′ B′ B	6 B′ B′ B
3 B′ B B	3 B′ B B	3 B′ B B
1 B B B		
6 B′ B′ S	6 B′ B′ S	12 B′ B′ S
12 B′ B S	12 B′ B S	12 B′ B S
6 B B S		
12 B′ S S	12 B′ S S	12 B′ S S
12 B S S		
8 S S S		

ber of distinction. This is the material which would be utilized if the investigator could obtain all the desired data. But it generally happens that only a selected portion of it is available and, when such is the case, families with two or three distinguished individuals are two or three times as likely to be located as those with only one. The third column shows the consequent probable distribution of family records if the data are collected in the usual way. The proportion of the sexes in the three groups is interesting. In the first column the sex ratio is 100 and each boy, distinguished or otherwise, has, on an average, as many brothers as sisters. In the second column the sex ratio is 164; boys as a group have an excess of brothers, but those of distinction have only as many brothers as sisters. In the third column, which probably most nearly represents the usual character of available data, the sex ratio is 200 and boys of distinction have 7 brothers to 5 sisters. The difference would be still greater if there were a hereditary factor also involved.

Obviously, such an extreme case as this hypothetical one is not likely to be met, but similar cases of less degree do occur, as the writer can testify from his own experience. The purpose of this note is simply to call attention to the existence of certain factors which, when combined as they frequently are,

may affect the important relation pointed out by Cattell and Rietz.

Stanford University,　　　　　　　C. H. Danforth
California

ENERGY VALUES OF FEEDS FOR CATTLE

The net energy conception of Armsby, having been unanimously indorsed by the American Society of Animal Production, may fairly be considered a promising basis for research in nutrition. In this connection a remarkable bit of confirmatory evidence will be of general interest.

The writer and others have reported a rather extensive series of experiments with cattle at the University of Missouri. These included live weight maintenance trials and slaughter experiments. In reviewing this work in a forthcoming monograph of the American Chemical Society the writer has calculated the maintenance costs of the 27 beef cattle used from the feed consumption in the feed lot and energy values obtained in some of Dr. Armsby's calorimeter experiments. In some of these experiments a few of the Missouri cattle were fed the Missouri ration and the metabolizable and net energy in the ration were determined. Using these figures, the average maintenance cost of the 27 cattle is shown to be 6.09 therms of net energy per 1,000 pounds per day. From calorimeter experiments Armsby had derived a value of 6 therms. Such an agreement in maintenance costs, in spite of widely varying quantities of feed and relative activity of the animals, supports the validity of the net energy conception.

The writer has previously reported results with two beef steers showing that the percentage of the metabolizable energy consumed above maintenance which was recovered in the flesh and other body substance gained by beef cattle was practically identical with the percentage of net energy in the feeds. One steer showed a recovery of 53.4 per cent. of the metabolizable energy above maintenance while another recovered 52.5 per cent. According to the method of Armsby this ration contained metabolizable energy which was 55 per cent. available or net.

Taken together these two pieces of evidence are a striking confirmation of the net energy conception.

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THE TEACHING OF EVOLUTION

In the New York *Times* of October 20, there is published a deliverance from Mr. Julian Huxley, of Oxford, in which he appears to me to have indulged in the light occupation of jumping to conclusions in a manner not characteristic of his illustrious grandfather, and to have made some rather sweeping state-