UNIVERSITY AND EDUCATIONAL NOTES

BEQUESTS amounting to about $700,000 to Princeton University, the University of Pennsylvania, the Presbyterian Hospital and Bryn Mawr Presbyterian Church are made in the will of Harold A. Freeman, a business man of Philadelphia.

A GIFT of $500,000 has been made to the Hill School in Pottstown, Pennsylvania, by Mrs. Alexander Hamilton Rice for a general science building as a memorial to her son, Harry Elkins Widener. In addition to the usual scientific facilities, the building will provide small private laboratories for the use of gifted students.

DR. A. G. BLACK, associate professor of agricultural economics at the University of Minnesota, will become head of the department of agricultural economics at the Iowa State College at Ames on July 1.

DR. E. G. CONDRA, head of the conservation and survey division of the University of Nebraska, has been appointed dean.

A. O. HICKSON, of Brown University, and E. R. C. Miler, of Rice Institute, have been elected assistant professors of mathematics at Duke University, effective September, 1929.

THE full Board of Curators of the University of Missouri on April 7 upheld the dismissal of Dr. Harmon O. DeGraff, assistant professor of sociology, for his part in the circulation of a sex questionnaire among students. It granted reinstatement to Dr. Max F. Meyer, professor of psychology, who, however, was ordered suspended for one year.

DISCUSSION

CRITERIA OF HYBRIDITY

CRITICISMS of certain phases of genetical research have from time to time been made in this journal and elsewhere on the ground that the material is "abnormal" or of hybrid nature. Leaving aside for the moment any wider considerations, it may be of interest to examine the value of the criteria of hybridity upon which the critics base their arguments.

Sterility, once thought to be a very good criterion of hybridity, is now admittedly a difficult one, owing to the possibility of confusion with incompatibility which in certain cases causes "self-sterility" and failure of matings between individuals genetically identical in respect of the incompatibility factors.

The more recently invoked criteria of hybridity are irregularities in the maturation division, or meiosis, and pollen sterility of plants. The former has been especially invoked by Professor Jeffrey against *Drosophila melanogaster* (SCIENCE, 62 (1592): 3–5, 1925; and *ibid.*, 68 (1758): 233–235, 1928). Profesor Jeffrey first stresses the difference between the body-cell and the germ-cell divisions in hybrids. This difference, interesting as it is from the cytologist's point of view, is surely irrelevant when the issue is the determination of hybridity. With few exceptions the body-cell divisions are regular regardless of the "purity" or hybridity of the organism or of the character of its germ-cell divisions. A feature common to both hybrids or abnormal forms and to pure species can scarcely be of value as a criterion for distinguishing between them.

Irregularity of the maturation divisions is very frequently associated with a hybrid condition, but again it can not be accepted as a satisfactory criterion of hybridity. First, hybridization between distinct species may give offspring with regular maturation divisions, even though the hybrids are in some cases sterile; and secondly, irregularity of the maturation divisions can be brought about by agencies other than hybridization. A few instances may be cited in illustration of these points.

The cross *Primula floribunda* × *P. verticillata* produces the form known as *P. kewensis*. The immediate offspring of the cross are sterile diploid plants having the same chromosome number as each of the parents, *viz.*, eighteen, and they have apparently normal maturation divisions. In the fertile, practically true-breeding form of *P. kewensis*, which has arisen from the doubling of the chromosome number, the maturation divisions are relatively regular, though slightly less so than in the sterile diploid form (Digby, *Ann. Bot.*, 26: 357–388, 1912; and Newton and Pellew, *Jour. Genetics*, 20: 405–469, 1929). In passing, one may note the bearing of this case upon the relative importance of the parts played by hybridization and chromosome irregularity in the production of new forms. Hybridization directly produces the type form *P. kewensis*, chromosome doubling renders it fertile, and the occasional irregularities of the maturation divisions produce variant forms.

A number of animal species hybrids which have regular maturation divisions are also known. One recent and interesting example of these is the hybrid between *Metopsilus* (*Chaerocampa*) *porcellus* and *Chaerocampa elpenor* described by Federley (*Hereditas*, 9: 391–404).

Some personal cytological observations on aberrant tomatoes produced by my colleague, Mr. M. B. Crane, may serve to illustrate the point that abnormality of the maturation divisions may be produced by agencies other than hybridization. Normal tomato plants, having the diploid chromosome number twenty-four, were cut back and from the subsequently formed callus surface adventitious shoots arose, which mostly