elect: John L. Rice, New York; *Vice-president:* Robert D. Defries, Toronto; *Vice-president:* Charles Edward Finlay, Havana; *Vice-president:* Selskar Gunn, New York; *Treasurer:* Louis I. Dublin, New York; *Chairman of the Executive Board:* Abel Wolman, Baltimore; *Executive Secretary:* Reginald M. Atwater, New York. A Committee on Public Health in the National Defense was appointed with the following personnel: W. S. Leathers, chairman, Stanley H. Osborn, Huntington Williams and Abel Wolman. Among the resolutions passed was one emphasizing the necessity for maintaining civilian health as essential to national defense and pledging the united support of members to national defense and to the maintenance of health in a free people. The seventieth annual meeting will be held in Atlantic City, N. J., in October, 1941.

THE School of Mathematics of the Institute for Advanced Study each year allocates a small number of stipends to gifted young mathematicians and mathematical physicists to enable them to study and to do research work at Princeton. Candidates must have given evidence of ability in research comparable at least with that expected for the degree of doctor of philosophy. Blanks for application may be obtained from the School of Mathematics of the Institute, Fuld Hall, Princeton, N. J., and are returnable by February 1, 1941.

ANNOUNCEMENT has been made by the Finney-Howell Research Foundation, Inc., that applications for fellowships for next year must be filed in the office of the foundation, 1211 Cathedral Street, Baltimore, Md., by January 1. This foundation was provided for in the will of the late Dr. George Walker, of Baltimore, for the support of "research work into the cause or causes and the treatment of cancer." The will directed that the surplus income from the assets of the foundation together with the principal sum should be expended within a period of ten years to support a number of fellowships in cancer research, each with an annual stipend of two thousand dollars, "in such universities, laboratories and other institutions, wherever situated, as may be approved by the board of directors." Fellowships are awarded for the period of one year, with the possibility of renewal up to three years; when deemed wise by the board of directors, special grants of limited sums may be made to support the work carried on under a fellowship.

THE new session of the faculty of medical science of King's College, London, located until lately at Glasgow, opened at the medical school of the University of Birmingham on October 9.

DISCUSSION

MULTISENSUAL MATHEMATICAL TERMS

MATHEMATICS belongs to the many smaller, but now very active, scientific laboratories of the lexicographers. In a paper by H. Poincaré (1854–1912) read at the Fourth International Congress of Mathematicians, held at Rome, Italy, in 1908, it is asserted that mathematics is the art of giving the same name to different things. Hence the use of multisensual terms in mathematics is not exceptional even if it requires that the reader select meanings when he may not be in position to decide wisely. In very early times mathematics devloped in part a special language, as may be seen in the ancient Babylonian algebraic writings which have only recently been deciphered by O. Neugebauer and others. In one of the most influential medieval mathematical books called "Summa" (1494) its author, L. Pacioli, seriously asked the question whether it is not a contradiction to say that when we multiply by a number which is less than unity the product is less than the multiplicand, since the Bible uses the term "multiply" to mean increase.

In more recent times the mathematicians have greatly extended the use of the term "multiply" by not only multiplying by negative and complex numbers but also by multiplying where no numbers at all are involved, as in the case of group operations where the term is used simply to denote the combination of elements and is sometimes used interchangeably with adding. In the ancient mathematical literature the omission of a symbod of operation between two elements commonly implied addition, but since medieval times it more commonly implies multiplication. While multiplication at first implied only a special kind of addition, *viz.,* the case when the addends are equal to each other, it has assumed during the ages meanings which have little in common with this original meaning and the lexicographers would probably find it impossible to furnish a satisfactory explanation of these elementary extensions of meanings.

Among the many instances of mathematical terms which have become multisensual much more recently than the term multiplication we may mention the term group, which is one of the many simple English words whose mathematical meaning has become difficult and is now often misunderstood even by writers on mathematical subjects. As a technical term it was introduced by a young Frenchman, E. Galois (1811–1832), who was practically unknown at the time of his early death, but whose reputation has grown since then and is now one of the greatest among the comparatively small galaxy who became known solely on

account of their mathematical ideas whose fruitfulness was developed by their successors. At first this term had a very simple meaning, representing merely a set of distinct permutations which have the property that they include the product of every two of them and the square of every one. Surely this is not a difficult concept for the human race to acquire explicitly as late as the first half of the nineteenth century.

The difficulty among mathematicians began to exhibit itself when, about fifty years after this technical term was introduced, efforts were made to define it abstractly and to base an abstract theory on it. This theory became elegant and useful, but it created a kind of strait-jacket which seemed to interfere with the freedom of action which many mathematicians enjoy, and it naturally curbed productivity even if it did not create a barrier thereto. A central idea of this abstract theory is that the associative law must be obeyed when the elements of a group are combined. In neither of two recent large general dictionaries of the English language, *viz.*, Webster's "New International Dictionary" (1938) and the "New Standard Dictionary" (1938) is the associative law made a definite part of the definition of the mathematical term group, notwithstanding the fact that one could not construct by means of the definitions which they give an extensive and useful abstract theory of groups.

In a recent book entitled "Premières leçons sur la théorie générale des groupes" (1935) G. Bouligand asserted (page 5) that with each mathematical proposition there is associated hereafter a group composed of all the modifications leading from one case of exactitude to a new case of exactitude. This is perhaps the vaguest and most objectionable definition of the term group that has ever appeared in a text-book and exhibits how far this particular mathematical term has wandered during a century from its first simple definition. With various other sciences mathematics is creating a kind of Tower of Babel with too few common terms besides the Ph.D. degree. It should be emphasized that the multisensual terms are even more confusing than the multitude of terms since the former frequently make it necessary to select from an ever growing list of concepts which may vary widely, while dictionaries are more apt to clarify the latter.

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HOLLY DEFOLIATION PREVENTED BY a-NAPHTHALENEACETIC ACID[1]

a-NAPHTHALENEACETIC acid has received considerable attention since Gardner, Marth and Batjer[2] reported its value in preventing fruit drop in apples. Another use for this chemical that promises to be of value to holly growers has been found at the Oregon State Experiment Station. The defoliation of holly sprays and wreaths during shipment at Christmas time often results in large losses. Spraying or dipping holly in a-naphthaleneacetic acid previous to shipment offers a method to prevent this loss.

Previous work at the Oregon Experiment Station has shown that holly is defoliated either by the presence of ethylene gas or high humidity. In the present experiments the holly was subjected to both ethylene gas and high humidity, but some of the lots were previously sprayed with solutions of a-naphthaleneacetic acid, and others were sprayed with water. Branches of holly (*Ilex aquifolium*) were sprayed and then placed in jars with apples as the source of ethylene gas. Free water was present on the sides and bottom of the jars. In 48 hours the holly sprayed with water alone was completely defoliated. The leaves began to drop from holly sprayed with .001 per cent. of a-naphthaleneacetic acid in 48 hours, but defoliation was not completed for 144 hours. The holly treated with .005 per cent. did not begin to defoliate until after eight days, and complete defoliation occurred in ten days. The leaves were firmly attached on the holly sprayed with .01 per cent. a-naphthaleneacetic acid after fourteen days. Later this lot of holly turned black and decayed without shedding its leaves. The severity of this test is evidenced by the complete defoliation of the untreated lot of holly in 48 hours. Other sprayed and unsprayed lots of holly were packed in wet paper, and these were held at 75–85 degrees for one week. Defoliation had occurred on all unsprayed lots of holly, but those sprayed with .01 per cent. a-naphthaleneacetic acid had all their leaves firmly attached at the end of the experiment.

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ONCOMING REVERSAL OF THE HUMAN GROWTH TIDE

RECENT completion of a study of height, weight and menarchial records for over 65,000 freshmen, matriculating in four state universities in recent years, has shown that the reversal in the human growth tide hinted at in 1938[1] is now becoming more definite. The mean age for onset of the menses, which for many years had been coming progressively earlier with successive birth

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[1] Published as Technical Paper No. 355 with the approval of the Director, Oregon Agricultural Experiment Station. Contribution of the Departments of Botany and Horticulture.

[2] SCIENCE, n. s., 90: 2331, 208–209, 1939.

[1] C. A. Mills and L. B. Chenoweth, *Human Biol.*, 10: 547–554, 1938.