

HISTORY OF SCIENCE

Chairman: R. E. GIRTON, Purdue University

C. L. Porter, Purdue University, was elected chairman for 1953

ABSTRACTS

Scientific contributions made by Indiana's colleges and universities, 1870-1950. STEPHEN S. VISHER, Indiana University.—During 1870-1950, most of the scientific research done in Indiana was done by members of the faculties of its higher educational institutions. Nearly all of these institutions contributed significantly at some period. Most of them also produced alumni who became notable scientists.

In Indiana Scientists are brief biographical sketches of about 4,000 scientists born in Indiana, graduated there, or employed at least briefly there. The sketch indicates something as to the special interests of the scientist, where he worked, and the recognitions received.

For nearly all of the Indiana colleges and universities, a historical summary is given of the institution's contributions to science, listing the former and some present faculty members who contributed conspicuously, and the more distinguished alumni. For several, the dates of the inauguration of certain scientific curricula are given.

During the first two or three of the eight decades under discussion, Hanover, Wabash, Indiana, DePauw and Rose Polytechnic ranked especially high. In recent decades, Purdue, Notre Dame and Butler have become prominent, while some of those who ranked high in the early decades have declined relatively. Other phases of the history of science in Indiana given in this volume are summaries for each of several sciences of their development in Indiana, and listings by institutions of the presidents of the Indiana Academy of Science, and other especially distinguished scientists.

Some theories of origins. JAMES F. MACKELL, Indiana State Teachers' College.—There is probably no scientific field better adapted to a study of the history of science than the field of Cosmogony. Ever since man has been able to record his history there have been attempts to speculate on the origin of the Universe and upon his own place in that Universe. Many years ago the German philosopher Kant and the French mathematician Laplace proposed the well known Nebular Hypothesis. Later two American scientists, Chamberlin and Moulton, University of Chicago, proposed a radically different idea known as the Planetesimal Hypothesis. In recent years there seems to be a tendency to revert to an hypothesis somewhat similar to that of Kant and Laplace but based upon recent developments in the field of nuclear physics. Thus it appears that a study

of the history of the development of these ideas is pertinent in an attempt to solve the riddle of nature and the Universe.

A century of the American Pharmaceutical Association, 1852-1952. CHARLES O. LEE, Purdue University.—A brief account of the circumstances which led to the organization of the American Pharmaceutical Association, how it has functioned through the years, some of its accomplishments, its place as a national association, and its centenary program in Philadelphia, August 17-23, 1952.

Review of attempts to define THE scientific method. WARREN E. HOWLAND, Purdue University.—It is one thing to use a scientific method; it is quite another to attempt to put the essence of the procedure into words so as to characterize THE scientific method,—if there is ONE. Perhaps there never was a time since men have been men when methods properly called scientific have not been used for the solution of problems. But only recently—so it seems to this writer—have satisfactory verbal descriptions or definitions appeared. Some of the contributions to this enterprise of Pascal, Des Cartes, John Locke, J. A. Thompson, Jevons (of Jevons' Logic), Graham Wallas, John Dewey and several others will be referred to in this brief paper in the attempt to formulate a statement which embodies a pattern or list of steps in the thinking process which are characteristic of nearly all, if not all, of the planned and successful methods for solving problems.

Rafinesque and the taxonomy of Indiana vascular plants. RAY C. FRIESNER.—The paper presents a summary of Rafinesque's work dealing with the taxonomy of Indiana plants. Of the 1,210 names proposed by him Gray's Manual, 8th ed., lists only 33 as valid names. Of the 654 species and varieties to which Rafinesque gave names, 285 were given two or more names each by him. One specific case to be cited is *Prunella vulgaris*. He had given this plant 18 different names. Only 2,73 per cent of the names he proposed are now in use. [This abstract has been prepared by John E. Potzger and the entire paper will appear in the Butler Botanical Studies.]

A short history of fungus antibiosis and its industrial, medical and economic significance. CHARLES L. PORTER, Purdue University.—A review is given of the observations made by laboratory and field workers concerning the common incidence of mixed cultures and the phenomena associated with such cultures. The various types of microbiotic associations are discussed, as well as the practical applications either suggested or in current use that are made of such associations.

The Domestication of Bumblebees. B. ELWOOD MONTGOMERY, Purdue University.—Both Carl Vogt and Ernst Haeckel expressed the opinion that the English nation owed its power and wealth largely to bumblebees. This opinion was based on the following logic. One of the important foundations of the wealth of England is found in cattle which feed principally on red clover. In the absence of bumblebees this plant produces little or no seed in most localities.

Darwin appears to have been the first to point out the importance of bumblebees in the pollination of red clover in 1859. The matter of red

clover requiring bumblebees for pollination was the center of a bitter dispute for many years. However, the importance of bumblebees was established beyond a doubt in the years following 1885. In that year bumblebees were introduced into New Zealand where no red clover had been produced previously, even when honeybees were placed in the fields. Within five years yields of 500 to 600 pounds of seed per acre were obtained regularly.

Little work has been done on the domestication, or even the management of bumblebees, although they are close relatives of the honeybee, an animal which has been living in close association with man, if not under actual domestication, longer than any other animal except the dog.

The first attempt to establish bumblebee colonies in artificial domiciles was made by Hoffer at Graz in 1882. Nest establishment was started but complete colonies were not obtained. Advances were made with European species by Lindhard (1912) and Sladen (1912). Establishment of nests by American species in cages or artificial domiciles was obtained by Frison in Illinois (1918, 1927) and Plath at Boston (1934).

Hasselrot (1952) in Sweden has recently described a method of starting nests in cages, after which the domiciles are placed in the field and opened so that the queens continue the development of the colonies in the natural manner but under management.

During the past two years the author has developed domiciles and methods by which colonies have been carried through all stages of the life cycle in confinement. Colonies have been used, either in cages, or in open domiciles, for experimental work on alfalfa, red clover, mint and tomatoes.

Thirty-four years of science at Ball State Teachers College. O. B. CHRISTY and R. H. COOPER, Ball State Teachers College.—This paper is an account of the work of some of the staff members and former students of the Science Department of Ball State Teachers College at Muncie, Indiana. Included especially are those on the staff and those in other positions at this time who have contributed noticeably to the teaching profession and to science research. In the brief accounts are notations of the work of some alumni who have added to the knowledge and accomplishments in the field of science.

Recent developments in science in Soviet Russia. ALLAN B. BURDICK, Purdue University.—The background and personnel involved in the demise of genetics teaching and research in Soviet Russia is reviewed. An attempt is made to evaluate the basis for the ensuing controversy by drawing on recent pertinent experimental findings. The impact of the genetics controversy on other branches of Soviet science is traced through a series of recent reports. The evidence indicates that the present situation in Soviet science is the result of a different philosophical basis of science.

A dominant force in our world and its significance for democracy. ZYLPHA HURLBURT, Anderson College.—It is evident to every thinking observer that there are two opposing ideologies in our world, viz., democracy and totalitarianism. Regardless, science plays a dynamic role in shaping human lives and influencing state and world progress. Without

science, living would be reduced to a status of crudity. Could we survive?

We profit by accumulative findings of science. Philosophies have been altered by science; major concepts of power revised; future changes are inevitable.

A changing economic order may mean advance or retrogression. Science itself is neither good nor evil. Can it help us, now? Survival depends upon a continuance of scientific endeavor. Science is universal. What of planning and controls in scientific research?

Science, like all truth-seeking activities of man, requires a free environment, free from fear, petty arbitrariness and tyranny.