not only to the bibliographer, but to the working zoologist as well, that the reader forgets to be critical.

The "Students' and Librarians' Ready Index to Short Author-Titles on Vertebrate Zoology," which forms the second division of the book, aims to furnish the means of quickly finding the most important works on any subject in vertebrate zoology. To this end the authors, each with a word or two of catch title, are arranged chronologically under geographical headings.

By far the larger part (more than two thirds) of the book is devoted to "A Partially Annotated Catalogue of the Titles on Vertebrate Zoology in the Libraries of McGill University," and this forms the third section of the contents. In this catalogue the annotations include much information, such as obscure dates of publication and other items of value.

Of rare printed books the McGill University possesses so many that space does not avail to list them here. Of particular interest are the first edition (1680–1681) of Borelli's "De Motu Animalium"; the first edition (1570) of John Caius's "De Canibus Britannicis"; Scopoli's "Deliciae Florae et Faunae Insubricae"; and especially important for ornithologists, Blasius Merrem's "Beyträge zur Besondern Geschichte der Vögel gesammelt"; and the original editions of the two earliest (1544) bird books—Longolius's "Dialogus de Avibus," and Turner's "Avium Precipuarum."

There is also in the library a noteworthy collection of original manuscripts and unpublished drawings, some of the latter apparently unknown to the zoological world until unearthed for the McGill library by the activities of the indefatigable "compiler" of this published catalogue. Among the most interesting of these is the collection of 121 colored paintings of Indian birds executed early in the nineteenth century by Lady Elizabeth Gwillim. It now appears that she was the first ornithological artist to paint full-sized portraits of the very large birds, an honor heretofore always accorded to John James Audubon.

The present treatise catalogue makes evident that the several collections of zoological works contained in McGill University together comprise one of the most important scientific libraries in the western hemisphere, and zoologists owe Dr. Wood a debt of gratitude for making available a knowledge of these treasures.

HARRY C. OBERHOLSER

WASHINGTON, D. C.

SPHERICAL ASTRONOMY

Text-book on Spherical Astronomy. By W. M. SMART, ii + 414 pp. Cambridge University Press, 1931.

THIS book is an excellent text for a second course in astronomy in a liberal arts college, but it is not suitable as a text for a graduate course in spherical astronomy or as a reference book for the working astronomer. The wide range of topics treated, the inclusion of the recent developments in the subject, the excellent diagrams, the omission of troublesome details and the large number of problems enhance its value for the casual reader and for the elementary student. However, for one who desires a thorough treatment of the traditional problems of spherical astronomy, too large a part of the book is devoted to extraneous material, while many important details are omitted. For example, in chapter five about forty pages are devoted to a discussion of planetary motions. This adds to the completeness of the book from a pedagogical point of view, but the student of astronomy already has adequate treatments of this subject in the well-known book of Moulton and in that of Crawford. In the same class are portions of descriptive material normally treated in text-books of general astronomy, such as that of Russel, Dugan and Stewart: for example, parts of the discussion in paragraphs 25 and 84. Much of this space might well have been devoted to discussions of practical methods of computation, to critical examination of the formulae derived and to more thorough discussions of such topics as astronomical photography. Chapter one gives alternative proofs for the formulae of spherical trigonometry, but does not list them for convenient reference.

The most serious faults of the book are the lack of preciseness and the absence of references. As examples of the former we have on page 21 a discussion of "trigonometrical ratios for small angles" without mention of what is meant by "small," and on page 95, the statement that the error of a Shortt clock on any day "could be almost exactly predicted several months in advance." The redefinition of astronomical latitude, page 196, to mean geographical latitude is of a similar nature.

WALLACE J. ECKERT

COLUMBIA UNIVERSITY

REPORTS

ACTIVITIES OF THE ROCKEFELLER FOUNDATION

DURING 1932, The Rockefeller Foundation appropriated $11,577,064 for projects in the fields of the medical, social and natural sciences, the humanities and public health. A printed report on these activities has just been issued.

For public health work the foundation expended

during the year the sum of $2,539,057. It supported laboratories for yellow fever research in Lagos, Nigeria, Bahia, Brazil, and New York City; assisted the government of Brazil in an extensive program for the control of yellow fever; aided four states in the United States and the health administrations of 17 foreign governments in antimalaria work; conducted malaria studies in various parts of the world; assisted 10 foreign governments in antihookworm work, comprising laboratory and field programs; continued support for studies of tuberculosis, the common cold, undulant fever, yaws, schistosomiasis and typhoid fever; contributed toward the development of the central or local health services of 43 foreign governments; gave assistance to the central health administrations of 11 states and to the local health work of 164 counties in 22 states in the United States, and, finally, provided funds for the support of 225 international fellowships in public health.

The aim of the public health program is not merely to gain new knowledge of a limited number of diseases and public health problems, but by concrete demonstrations in the control of these maladies to fix attention upon problems of public health, to educate governments and to induce them to give increased attention to the fundamental health needs of mankind.

In recent years increased emphasis has been placed on careful correlation of studies of a disease in its environment with investigations in the laboratory. Through this procedure it becomes possible to make headway in the search for more effective and less expensive methods of disease control. Research is always conducted in cooperation with government health departments. When such research is successful the foundation aims to assist governments in preparing and trying out plans for the prevention of disease through application of the knowledge gained by research. More than 100 papers were published in the scientific press during 1932 and the early part of 1933, describing research work in public health problems carried out by members of the foundation staff or under foundation auspices.

High lights of the year in yellow fever work were the continued success of vaccination against yellow fever; the verification in the state of Espirito Santo, Brazil, of a mild epidemic of yellow fever occurring in the absence of *Aedes aegypti,* the usual mosquito carrier, and the clearing up of various moot points connected with the behavior of the virus in the mosquito and the usefulness of certain yellow fever laboratory tests.

In the field of the medical sciences, after 10 years of concentration on capital aid for buildings and on the endowment of certain medical schools, foundation emphasis during recent years has shifted to the support of specific research programs. In 1932 special attention was given to the field of psychiatry. The total amount appropriated for the medical sciences was $3,090,973.

The largest appropriation of the year in the medical sciences, $1,282,652, was made to McGill University, Montreal, Canada, for the establishment of a neurological institute. These funds provided for laboratory quarters and endowment for the departments of clinical neurology, neurosurgery, neurophysiology and neuropathology. In addition, many small appropriations were made in support of research projects in the field of neurology, elsewhere. Included among these were grants to the Kaiser Wilhelm Institute for Brain Research, at Berlin-Buch, Germany, and to the Institute for Psychiatric Research at Munich, for investigations of infections of the central nervous system; to the Institute of Physiology of the University of Bern, Switzerland, for research on the excitation processes in nerves, and to the London Hospital for training in neurosurgery.

Among other research projects in the medical sciences receiving support were studies of the physiology of the acoustic nerve at the Johns Hopkins University School of Medicine; studies of whooping cough at the Western Reserve Medical School; studies of virus diseases, especially of the nervous system, at Columbia University and at Washington University, St. Louis; biological research at the Radium Institute of the University of Paris, and investigations of the National Research Council Committee for Research in Problems of Sex. Funds were provided during 1932 for the support of 383 fellowships for the training of research workers in the medical sciences.

The main features of The Rockefeller Foundation's program in the natural sciences during 1932 were: aid to specific research projects, and support of a system of fellowships and travel grants. The work for which assistance was given during the year falls within the fields of paleontology, meteorology, astronomy, physics, chemistry and biology.

A grant was made to the International Commission for the Polar Year 1932–33 for the purchase of special equipment in connection with world-wide meteorological studies conducted by this commission. Aid was given to the California Institute of Technology for specific research projects in physics and chemistry. An appropriation was made to Harvard University for the furthering of chemical research in connection with the heat of organic reactions.

Aid was continued for studies which have been going on for some time at Chou K'ou Tien, near Peiping, China, where the remains of the prehistoric human being, *Sinanthropus pekinensis,* have been discovered. "Black earth" found in the cave from which

these remains were taken has been identified as charcoal. This carries with it inferences as to the use of fire by *Sinanthropus pekinensis*. A considerable number of quartz artifacts have been recovered. There can be no doubt that *Sinanthropus* was of truly human status. This maker of crude stone artifacts must have had hands differing in no essential respect from our own.

Among other institutions receiving aid were the Long Island Biological Association, the Zoological Station of Naples, the Perkins Observatory at Ohio Wesleyan University, the Institute of Inorganic Chemistry of the University of Göttingen, the Massachusetts Institute of Technology, the Palmer Physical Laboratory of Princeton University and Yenching University and Fukien Christian University in China.

Funds were provided for the support of 291 fellowships in the natural sciences.

The principal objective of The Rockefeller Foundation's program in the social sciences is the more effective analysis and better understanding of pressing social problems with a view to the improvement of the prevailing conditions of human life. The description of the year's work falls into two parts: a general program designed to promote certain interests in the social sciences as a whole, and a program of specific concentration in fields of special interest.

The general program includes four types of activity: the development of institutional (largely university) centers of advanced training and research; support of inclusive advisory and planning bodies, chief among which has been the Social Science Research Council in New York City; the provision of training and research fellowships, by which, in 1932, opportunity for advanced study was given through 56 fellowships administered by the Social Science Research Council and 167 fellowships under direct Rockefeller Foundation supervision; the maintenance of grants in aid and small projects, as well as certain larger undertakings of general interest such as the *Encyclopaedia of the Social Sciences* and *Social Science Abstracts*. All these types of activity were carried on abroad as well as in the United States.

The development of institutional centers of advanced training and research is regarded as the essential basis of the entire program. Nineteen institutions thus aided are listed in the annual report of the foundation. The research now recognized by university administrators as essential to progress in the social sciences is costly in terms of both time and money and has been greatly retarded by the economic depression. During 1932, new appropriations to centers of research included those given to the Universities of North Carolina and Texas, as well as to Stanford University and Harvard University.

In addition to the general program the foundation has supported social science research in three specific fields: (1) economic planning and control; (2) international relations; (3) social organization and procedure, with special reference to problems of community organization and planning.

Much physical illness, mental disorder, family disintegration, crime and political and social instability trace their origins to economic causes. In a time of depression, when millions of unemployed are unable to command the necessities of life, there is the incessant question as to why this distressing situation arises in a country where raw materials are plentiful, where technological equipment is of the best, and where workers are eager to apply their productive capacities. The foundation, although not itself a research agency in the social sciences, is impressed with the importance of research in this field. It therefore seeks to strengthen existing institutions which are collecting and appraising basic information and to assist in advancing particular studies which deal with problems of economic stabilization. For several years it has given support to various studies and organizations concerned with research in this field.

During 1932, substantial new grants were made by the foundation to a number of investigative organizations including Harvard University and the Universities of Pennsylvania and Minnesota. Smaller gifts were made to several foreign institutes of research. A large number of institutions were given support in carrying out programs in international relations and in community organization and planning. The total amount appropriated in 1932 for work in the social sciences was $2,622,567.

In the humanities the program of The Rockefeller Foundation during 1932 was directed toward the support of general research and advanced training of personnel and toward the promotion of projects having international significance. The centers of research and training aided included the Oriental Institute of the University of Chicago; the School of Oriental Studies, London Institution, University of London, and Yale University.

Grants in aid of specific research problems included support to the Institute of Archeological Research at the University of Michigan, which has been carrying on valuable excavations at the site of the ancient city of Karanis in Egypt; aid to the Prussian State Library in connection with a Union Catalogue, and aid toward important lexicographical work carried on by five learned societies of Germany and Austria centering at Munich, Germany.

Small sums were granted in support of definite projects of humanistic research carried out by mature scholars. The amount appropriated in 1932 was used

mainly for awards to foreign scholars. With funds contributed to the American Council of Learned Societies there have been provided 40 fellowships in the humanities. Seventeen of these were granted during 1932. All the awards were post-doctoral fellowships intended to provide opportunity for further training and experience in humanistic research. In addition a grant was made to the American School of Classical Studies at Athens, for fellowships in archeology, in connection with the excavation of the Athenian Agora.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE PURIFICATION OF MERCURY BY AN ELECTROLYTIC METHOD

IN addition to the many uses to which mercury is put in chemical and physical laboratories, it is becoming increasingly important in biological work as a confining and transferring agent for aqueous solutions and gas mixtures. After exposure to rubber tubing, stopcock grease and solutions of organic matter like blood, mercury acquires impurities, so that when it is shaken with water, large quantities of dirt, consisting of organic matter and mercury compounds, are liberated. Since large quantities of mercury are often needed at one time, a rapid and convenient method for cleaning it is desirable. After extensive experimentation with a variety of procedures, we have found the following method to be most satisfactory in combining effectiveness and convenience. The apparatus is inexpensive and easily prepared and the purification of 500 cc of mercury can be completed in one and one half hours.

In general the procedure is to make the mercury the positive pole of a 110 volt direct current, first in the presence of 10 per cent. H_2SO_4, then in the presence of 5 per cent. NaCl, and finally to make the mercury negative in the presence of 10 per cent. H_2SO_4, and to remove by filtration the scum which forms on the mercury during each of these steps.

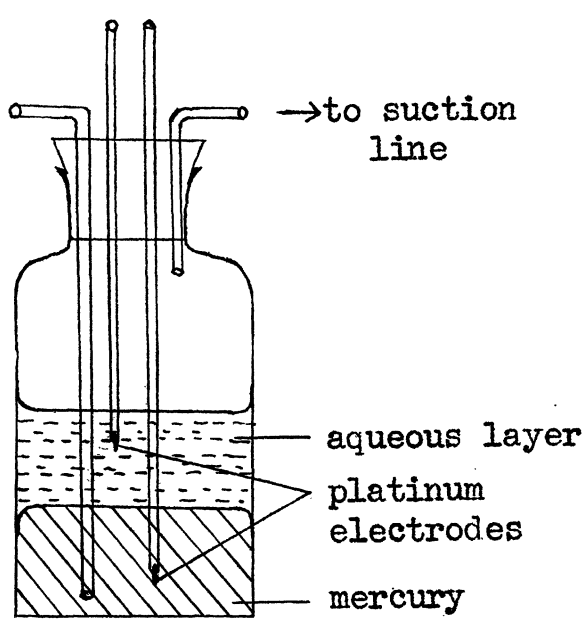

FIG. 1

APPARATUS

The apparatus consists of a wide-mouth bottle with capacity about four times the volume of the mercury to be purified, fitted with a stopper containing two glass tubes with platinum electrodes sealed in the ends, and containing also inlet and outlet tubes for air, the former reaching the bottom of the bottle, the latter ending close under the stopper. Platinum wires 0.5 mm diameter and protruding about 10 mm from the end of the glass serve well as electrodes. An ordinary water suction pump causes a stream of air to pass through the bottle, which not only agitates the mercury vigorously but also prevents the accumulation of explosive mixture of hydrogen and oxygen arising from the electrolysis. The electrodes are arranged so that they can be connected to the 110 volt direct current outlets with sufficient resistance in series, by means of a hot plate or lamps, to give a current of about 3 amperes.

PROCEDURE

One volume of mercury[1] is placed in the bottle with an equal volume of 10 per cent. H_2SO_4. The stopper with electrodes and glass tubes is inserted and air is bubbled through the mercury. The circuit is completed in such a way that the mercury is the positive pole and the electrode in the H_2SO_4 layer is then the negative pole. The electrolysis is carried on for fifteen minutes, during which time a gray precipitate forms in the acid layer. The circuit is broken and then the suction line is disconnected.

The mercury is now washed with alkali in the following manner. Tap water is run into the bottle to remove most of the acid, after which the mercury is poured into a bottle just large enough to contain it so that the water and acid are almost completely removed. The mercury is then poured into a larger bottle containing about one fifth volume N NaOH, and the aqueous phase becomes dark. The mercury and NaOH are poured back and forth between two

[1] We have found it impractical to purify more than 500 cc of mercury at one time because the great weight makes manipulation inconvenient.