problems in methods of instruction. Most schools of medicine in the United States are located in regions where there are few if any examples of the important parasitic diseases, and hence clerkship or ward teaching is not possible. An alternative is a series of lectures or "dry clinics," supplemented by lantern slides and charts. This latter method is obviously deficient, since a thorough knowledge of a disease is rarely acquired without the study of patients. When a hospital patient is not available for study, the best substitute is the presentation of a case at a clinicopathological conference. In this exercise, if the case is treated as an unknown, it is possible to discuss the differential diagnosis and treatment in much the same way as in ward teaching. There is the added advantage that the pathologic changes can be presented at the conclusion of the clinical discussion.

At the Washington University School of Medicine an attempt has been made to develop the clinicopathological method of teaching tropical medicine. Representative gross specimens of specific cases, together with a full abstract of the clinical record, have been borrowed from other laboratories. The abstract is mimeographed and given to the staff and students two days in advance of the conference to allow ample time for study. At the conference the clinical record is briefly reviewed, and a senior clinician then discusses the differential diagnosis and treatment. Specific points are brought out by questions directed to members of the attending staff, each of whom has previously read the abstract and formulated an opinion. Finally the gross and microscopic observations and a summary are presented by the pathologist.

Since January 1, cases of leprosy, amebic dysentery, yellow fever and schistosomiasis have been presented in clinicopathological conferences to members of the third and fourth year classes of the medical school. The reaction of both the staff and the students has been sufficiently favorable to suggest that clinicopathological conferences may serve as a valuable method of teaching tropical medicine in medical schools of the United States.

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THE ELGIN BOTANIC GARDEN

THE question "Who Established the Elgin Botanic Garden?" which Dr. C. Stuart Gager puts as a title for his able article in SCIENCE, November 13, 1942, has arisen largely because certain reviewers of "Dr. Bard of Hyde Park" have implied that more credit should be given to Samuel Bard than to David Hosack.

It is fairly stated in my biography of Dr. Bard that his medical partner, Dr. Hosack, who was 27 years his junior, conceived the idea of the Elgin Garden in 1795 (p. 188). It was some six years later that Dr. Hosack purchased land for this botanic garden in what is now the midtown section of Manhattan, but in another six years he found the financial burden of maintaining the garden was too much for him to continue, and therefore in 1807 he offered the land for sale (p. 233).

At this point Samuel Bard came forward publicly and privately with the plea that the State Legislature should purchase the garden from Hosack and so established it for posterity (pp. 243, 244). Even after this was accomplished in 1810 the maintenance of the garden was still a dilemma. The College of Physicians and Surgeons with Bard as president and Hosack as professor undertook to carry on the garden until in 1816 the land where now rises the Rockefeller Centre was ceded to Columbia College. Thus in spite of Hosack's creation and Bard's sponsoring this ambitious adventure came to an end in 1819 so that the answer to the question seems to be that no one succeeded in establishing the Elgin Garden.

Another experimental garden which had its first inception in plans laid out by Samuel Bard in 1746 (pp. 80, 81, 83) for his great-grandfather's estate on the Hudson River called Hyde Park, still continues, however, as a monument of the botanical effort of Bard and Hosack. This estate was purchased by David Hosack after the venerable Dr. Bard's death and has received expert care from subsequent owners to the present day. It is now part of the National Parks Service and is known to many as the setting for the Vanderbilt Mansion National Historic Site at Hyde Park. After the war it is planned to make this eighteenth century garden a center for those interested in the science of botany.

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SCIENTIFIC BOOKS

NICHOLAS COPERNICUS

Nicholas Copernicus, 1543–1943. By STEPHEN P. MIZWA. The Kosciuszko Foundation. 88 pp. 20 illus. 1 map. 1943. $2.00.

REGARDLESS of these tragic and turbulent times, the spirit of humanism and culture endures. This philosophy of life may not always be able to express itself, yet we have had many evidences these past centuries that civilization does survive where culture and learning prevail. One form of this evidence is truly ex-

pressed by the Polish organization, "The Kosciuszko Foundation of New York."

The richness and fullness of life seems to increase with every advancement in the philosophy of pure science, art and literature. It is to those who have caused these advances that we in succeeding generations wish to pay tribute and to commemorate their works. These two years—1942 and 1943—are indeed epoch-making in recording the anniversaries of some of these great prophets. To name a few, we have Galileo (1564–1642) in physics; Newton (1643–1727) in mathematics and astronomy; Halley (1656–1742) in astronomy and meteorology; Lavoisier (1743–1794) in chemistry; Koch (1843–1910) in medicine, and Copernicus (1473–1543) in astronomy. There are various forms of commemoration, but usually these take place on some given date, such as birth or death. With Copernicus, however, we have the unusual experience of commemorating the first appearance of his great work, "De Revolutionibus Orbium Coelestium," 1543, which announced to the world, at his death-bed, the true order of the solar system, and from thence we found ourselves completely reorientated in the universe. Philosophically speaking, this influenced our minds to the extent that an intellectual revolution took place.

This beautiful brochure, prepared by Dr. Mizwa, is small in physical appearance, but incredibly rich in learning and humanistic philosophy. The material contained therein brings vividly to mind the life and work of the founder of modern science and observational astronomy. The greatness of Copernicus does not rest alone upon his clear formulation, through laboriously long series of observations of the movements of the planets in respect to the sun, but in reality he laid the foundation for the whole realm of modern celestial mechanics. Kepler, Newton, LaPlace, Gauss, Newcomb and a host of others followed in his footsteps.

Copernicus came from an old Silesian family, born in 1473, in Torun, Poland, during the period this section was Germanic. At the outset, one is thoroughly awakened to the large amount of historical and bibliographical work necessarily involved in bringing to us this new picture of Copernicus's life. His manifold interests and activities, as given here, reveal what a full life, both secular and spiritual, he lived. The contents of this book is divided into four parts. Part I and Part II contain the salient features of his life, as well as the early concepts of our solar system. The doctrine of the Ptolemaic geocentric system, which prevailed for over 1,500 years, was finally supplanted by Copernicus's heliocentric system. This is followed by an account of Copernicus, the economist, which is indeed a new phase of the astronomer's life, not generally known. The principal activities during this period were in the formulation of the law of bad money with scientific precision, not evident in any of his predecessors. Newton faced the same problem for the British Crown in 1695–96. The third phase of this part treats upon Copernicus as a churchman, statesman and soldier, it being virtually a biographical sketch. This is followed by a section giving a brief account of the slow recognition of the new truth concerning the cosmic order.

In view of the scholarly research work manifested in this small book, we are here given, once and for all, the assurance that Copernicus was born a Pole, and not a German. Irrespective of political ties, blood ancestry has proven this to be true. He was the most inveterate enemy of the so-called "Knights of the Teutonic Order," then headed by Albert Hohenzollern, 1490–1568.

Part II, the Sarmaticus Astronomus (Sarmatia being the ancient name for Poland) consists of miscellaneous phases of the life of Copernicus, and the origin and meaning of the name, as well as some aspects of the territorial complex of Prussian Poland and the Corridor. Why the Poles are proud of Copernicus is because the whole civilized world claims him as its own.

Special attention should be called to the footnote references and bibliographical suggestions and comments. This to the reviewer's mind always makes a complete treatise. The last two parts relate to program suggestions, bearing particularly upon the quadricentennial celebration, and upon the educational reconstruction of Poland in the name of Copernicus.

Very few books are so well balanced in their selection of historical illustrations, such as portraits, statues, title-page facsimiles, etc., together with a rare print of his birthplace and the death scene of Copernicus. This last shows him dimly able to behold the first copy of his great work.

The art of the old world seems to have been transplanted to the American continent in the frontispiece. Seldom does one find such exquisite medieval art as is revealed in this beautiful example. The intricacies of the design and the brilliantly contrasting colors are here so vividly reproduced. The symbolism represents Copernicus as a churchman and a scholar—more specifically as an astronomer. The chain and cap are academic symbols. In the left hand he holds a device which illustrates one of his astronomical principles of planetary motion. In the upper right-hand corner is the coat-of-arms of the University of Kraków. But one must see it in order to fully appreciate the numerous details. This design was contributed by a refugee Polish artist, Arthur Szyk, perhaps the great-

est living miniaturist working in the technique of illuminated medieval manuscripts.

It is interesting to note that "De Revolutionibus Orbium Coelestium" is the rarest book in scientific literature to-day. The Union Catalogue of the Library of Congress records ten known copies of the first edition, Nürnberg, 1543, eleven known copies of the second edition, Basle, 1566, and six copies of the third edition, Amsterdam, 1617, in the United States and Canada.

FREDERICK E. BRASCH
THE LIBRARY OF CONGRESS

THE ELECTRON MICROSCOPE

The Electron Microscope. By E. F. BURTON and W. H. KOHL. 233 pages. New York: Reinhold Publishing Corporation. 1942. $3.85.

THIS book attempts the ambitious problem of taking a reader with infinitesimal knowledge of physics through the steps necessary to understand the electron microscope. There are, therefore, of necessity many inequalities of difficulty. However, the authors have succeeded as well as might be expected in this difficult task.

The first six chapters take the reader through some of the most elementary rudiments of optics, and the cartoon method of illustration is used freely with the objects and images depicted by cats, giraffes, etc., and where wave motion is explained by the picture of a child upsetting a pile of books. It is not to be expected that the reader who needs these devices will get a very clear comprehension of the "dual theory of light and of the electron" as propounded in Chapters 8 and 9; and the attempt to explain the motions of electrons in electromagnetic fields will probably be comprehensible to an appreciable degree only to those for whom the elementary parts are unnecessary. In this connection, the present reviewer feels that the statement on page 111 may lead the elementary student to believe that electrons starting with zero velocity continue to follow the lines of force. This they would strictly do only when moving with short mean free path as ions in a gas.

In spite of the foregoing unavoidable difficulties of presentation, the latter part of the book gives a very readable account of the potentialities of the electron microscope and of the essentials involved in its operation. The section dealing with the power of the microscope to reveal emission characteristics of thermionic emitters of various kinds will be of interest to many research physicists.

The book gives a clear picture of the orders of magnitude in relation to the various possibilities realizable with the electron microscope; and it will probably be of the greatest use to those who have no previous acquaintance with the microscope but are, nevertheless, beyond the stage for which the more elementary explanations would be necessary.

The implication on page 108 that a vessel containing millions of molecules represents a poor vacuum is probably a pure oversight, for, of course, a vacuum of 10^{-8} mm still contains about 3×10^8 molecules per cc.

RADIOACTIVITY

Kuenstliche Radioaktivitaet. By KURT DIEBNER and EBERHARD GRASSMAN. xi + 87. Leipzig: S. Hirzel. 1939.

THIS book seems to be a valuable compilation of data in the field to which it refers. It is of attractive form, and the material is well arranged. It will suffice to summarize its essential contents as follows, in which the reviewer has translated the titles from the original German:

Part 1: Induced Radioactivity by α-rays; Induced Radioactivity by Protons; Induced Radioactivity by Deuterons; Induced Radioactivity by Neutrons; Induced Radioactivity by Gamma-Rays.

Part 2: Tabular Presentation of all Stable, Natural and Induced Radioactive Isotopes with the most Important Data.

Part 3: Summary of all Stable, Natural and Induced Radioactive Isotopes, and the Transmutation Processes in Graphical Representation.

It is worth while calling special attention to the comprehensive chart contained in graph 3.

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NATURAL COLORING MATTERS

The Chemistry of Natural Coloring Matters. The Constitutions, Properties and Biological Relations of the Important Natural Pigments. By FRITZ MAYER, Ph.D. Translated and revised by A. H. COOK, Ph.D. American Chemical Society, Monograph Series, No. 89. 6¼ × 9¼ in. 354 pp. Bound in dark blue cloth. New York: Reinhold Publishing Corporation. $10.00. 1943.

THE book is divided into five chapters, each one of which has numerous references to the literature in the form of paginal footnotes. These chapters are: (1) Carotenoids (Polyene Pigments) (82 pp., 443 refs.); (2) Diaroylmethane Compounds (3 pp., 17 refs.); (3) Carbocyclic Compounds (59 pp., 240 refs.); (4) Compounds Containing Oxygen Heterocycles (108 pp., 512 refs.), and (5) Compounds containing Nitrogen Heterocycles (70 pp., 274 refs.). These chapters are followed by a brief General Bibliography, an Author Index and a Subject Index. The subject is presented compactly, access to further details being obtainable through the footnote references.

Paper, type, printing and binding are all excellent,