scientific activities of our freedom-loving countries would help to consolidate and widen our contacts. With this view in mind, we are in a position to despatch articles by Soviet scientists to American scientific journals.

Best New Year greetings to our American colleagues, wishing the American people success in hastening the defeat of Hitler's bands.

(Signed)

NIKOLAI DERZHAVIN,
President, Soviet Scientists Anti-fascist Committee
SERGEI PILIPCHUK,
Secretary

SCIENTIFIC BOOKS

THE "PIROTECHNIA" OF BIRINGUCCIO

The Pirotechnia of Vannoccio Biringuccio. Translated from the Italian with an introduction and notes by CYRIL STANLEY SMITH and MARTHA TEACH GNUDI. Publication sponsored by the Seeley W. Mudd Memorial Fund. xxviii + 476 pp. 92 illustrations. $7\frac{1}{2} \times 10\frac{1}{2}$ inches. New York: The American Institute of Mining and Metallurgical Engineers, 1942.

THE present century has witnessed an awakening of interest in several classic metallurgical treatises, as is indicated by the appearance of English translations of four important works of the sixteenth, seventeenth and eighteenth centuries. The first of these was the publication in 1912 by Herbert C. and Lou H. Hoover of their splendid translation of the first 1555 Latin edition of the "De Re Metallica" of Georgius Agricola. The second of these works was the translation in 1913 of "El Arte de los Metales" of Alvaro Alonso Barba by R. E. Douglass and E. P. Mathewson from the Spanish edition of 1640. The third of this group of treatises was the publication in mimeograph form in 1938 by the British Non-Ferrous Metals Research Association of the long-neglected translation by Arthur H. Searle of Emanuel Swedenborg's "Regnum Subterraneum, sive Minerale de Cupro et Orichalco" from the first Latin edition of 1734. The present English translation of the "Pirotechnia" of Biringuccio from the first Italian edition of 1540 is the fourth and latest member of this series of important historic metallurgical publications.

In the Introduction to the present edition of the "Pirotechnia" Dr. Gnudi gives first a two-page sketch of Biringuccio, who was born at Siena in 1480 and after a most adventurous life as a smelter and worker in metals died in 1538 or 1539. Dr. Smith then follows with a most interesting thirteen-page discussion of "The Background of the Pirotechnia and its Place in Metallurgical Literature" and of "The Editions of the Pirotechnia." The present edition, he remarks, "is the result of collaboration of two individuals whose chief fields of activity have been, respectively, in Italian literature and in metallurgy." Dr. Gnudi concludes the Introduction with two pages of remarks upon some of the problems encountered in making her translation.

The general scope of Biringuccio's "Pirotechnia" (by which was meant not so much pyrotechnics as pyrotechny in the broader sense of the use of fire in the mechanic arts) is indicated by the following brief synopsis of the ten books of the translation:

Book 1. Ores of gold, silver, copper, lead, tin, iron and making steel and brass.
Book 2. Ores of quicksilver, sulphur, antimony, vitriol, alum, arsenic and other so-called semiminerals.
Book 3. Assaying and preparing ores for smelting.
Book 4. Separation of gold from silver.
Book 5. Alloys of gold, silver, copper, lead and tin.
Book 6. Art of casting guns and objects of bronze such as bells.
Book 7. Methods of melting metals.
Book 8. Special methods of casting and moulding.
Book 9. Arts of alchemy, distilling, minting, metal working, extracting, etc. and of making wire, metallic mirrors, crucibles, pottery, lime and bricks.
Book 10. Manufacture of saltpeter, gunpowder, mines, bombs, etc. and fireworks for purposes of war and festivals.

To the ninety-nine strictly technical chapters, which make up the ten books of his Art of Fire, Biringuccio, for the sake of full measure, has added a final curious allegorical one hundredth chapter on the fire of love; "it consumes without leaving ashes, it is more powerful than all other fires, its smith is the great son of Venus, and its instruments, in place of glowing melting furnaces, bellows, hammers, and anvils, . . . are naught but quarrels, jealousies, fears and many other great and annoying agencies."

In addition to the flashes of wit and humor that appear here and in other pages of Biringuccio, the reader is impressed not only by the up-to-dateness of some of his descriptions of processes but also by the sagacity and common sense with which in an age of superstition he disposes of those who trust in divining rods, or in other magical devices, for locating mineral deposits, in the efficacy of which there are even now some believers. As for those who sought to produce precious metals by transmutation Biringuccio re-

marks: "I tell and advise you that I believe the best thing to do is to turn to the natural gold and silver that is extracted from ores rather than that of alchemy, which I believe not only does not exist but also, in truth, has never been seen by anyone, although many claim to have seen it." Similarly without arguing the matter he dismisses those who proclaimed the possibility of artificially creating human, or animal, or vegetable life by simply stating: "I cannot forbear saying that I do not believe them."

The present scholarly work of Drs. Smith and Gnudi will be all the more appreciated by both student and book collector for the reproduction of the title page of the first 1540 edition (interesting for its marginal engravings of apparatus) and for the eighty-four 2×4 inch reproductions of the original wood cuts of equipment and processes. In Appendix A are eight additional reproductions of drawings from Agricola and other authors to illustrate several of Biringuccio's descriptions. Appendix B gives an explanation of the weights and measures used by Biringuccio. Appendix C contains a list of the editions of the Pirotechnia. Appendix D is a bibliography of important metallurgical works with mention of English translations when such are known. An index of ten pages is also provided.

The typographic work of this edition, by Carl Purington Rollins at the printing office of the Yale University Press, is of the highest quality. As for the edition itself the reviewer can only repeat what Harvey S. Mudd, of the Seeley W. Mudd Memorial Fund Committee, has stated in his Foreword.

> Biringuccio's work is a classic and in its translation Dr. Smith and Dr. Gnudi have brought to bear the high degree of scholarship that it deserves. Dr. Gnudi made the translation at Dr. Smith's request and it was then refined "in the fire" of his scientific knowledge of the subject. The result is a book which the Institute is proud to place before its members and which the Memorial Fund Committee considers it a privilege to publish.

The book is one which should be read, and if possible owned, by all metallurgists and chemical technologists as well as by all students of the history of metallurgical arts.

C. A. BROWNE

CHEMISTRY

Introductory Chemistry for the Laboratory. By ALFRED BENJAMIN GARRETT, LAURENCE QUILL and FRANK HENRY VERHOEK. 239 pp. Ginn and Company. 1942. $1.60.

THIS manual contains 61 exercises, each of which will require two to four hours for performance and answering questions. The exercises are grouped into 14 units of related experiments, such as the gases of the air (Unit No. 1), acids (No. 3), the chlorine family (No. 6), compounds of sulfur, nitrogen, carbon (Nos. 9, 10, 11). An excellent unit is No. 12, raw materials for the inorganic chemical industries, which includes formation of useful compounds from natural carbonates, chlorides, sulfates, silicates and phosphates. Unit No. 13, metallurgy and reactions of some common metals, contains a few such interesting projects but consists mostly of test-tube reactions of metal salt solutions. Unit No. 14 consists of interesting applications of chemical principles—to water hardness, blueprinting, alloys, colloids, milk, butter, vinegar, baking powder, etc.

There is a wide choice of topics and ample opportunity for rearrangement for use with any text. There are a few quantitative experiments; this reviewer would prefer more. Appendixes I, II and III deal with fundamental techniques, weighing and elementary glass working, and since they are used immediately might well have been made into preliminary experiments. Most of the test-tube reactions are carried out on a semi-micro scale. An incongruity appears in the description of the "brown ring" test (p. 113) where five drops of nitrate and ferrous solutions are mixed in a small test-tube and five drops of concentrated sulfuric acid added; the accompanying diagram shows the acid being poured from a large wide-mouthed bottle.

The book is paper-bound, with the sheets perforated and punched for reassembling with rings. Each sheet has a blank for the student's name, and blanks are provided for answers to all questions. The printing is good, and there are few errors.

Semimicro Laboratory Exercises in General Chemistry. By J. AUSTIN BURROWS, PAUL ARTHUR and OTTO M. SMITH. xiii + 328 pp. The Macmillan Company. 1942. $2.50.

THIS laboratory manual is exceptionally well written, and the care, experience and interest of the authors in the student's progress are evident throughout. It introduces real semi-micro procedures from the start, with adequate directions, but does not hesitate to use small-scale macro-methods when this seems advisable. The saving in materials and time should be considerable, and the advantage of collecting 12 ml vials of dangerous or obnoxious gases instead of larger amounts is obvious. The experiments are thoroughly workable and most students should be stimulated by the careful but not at all difficult technique required.

The reviewer can do no better than to quote from the preface: "Balance has been maintained between descriptive experiments, quantitative experiments, experiments illustrating . . . laws and principles, and experiments illustrating applications of chemistry."