Five Outstanding New Books

THE STRUCTURE OF METALS. Crystallographic Methods, Principles, and Data
By Charles S. Barrett, Associate Professor of Metallurgical Engineering, Carnegie Institute of Technology. Metallurgy and Metallurgical Engineering Series. 563 pages, 6 x 9. $6.00
A new text and reference book that gives special attention to recent advances in the field. Covers structures, properties, theories of metals and alloys, and the crystallographic techniques of physical metallurgy. Also contains extensive reviews (with bibliographies) of branches of the field of special interest at this time, particularly those for which adequate reviews are not readily available in other books in English.

THE PHYSICS OF METALS
By Frederick Seitz, Professor of Physics and Department Head, Carnegie Institute of Technology. Metallurgy and Metallurgical Engineering Series. 330 pages, 6 x 9. $4.00
An entirely nonmathematical treatment of the developments of the physics of metals that have taken place in the past 15 years. The topics treated include the structure of metals, factors determining the stability of alloys, the theory of plasticity of metals, diffusion in metals, the theory of iron-carbon alloys, the electron theory of solids and its applications to cohesion, magnetism, and conductivity.

FUNDAMENTALS OF OPTICAL ENGINEERING
By Donald H. Jacobs, Associate Physicist, National Bureau of Standards, Washington, D.C. 458 pages, 6 x 9. $5.00
Offers a comprehensive introduction to the methods and principles of optical design. After outlining the fundamentals of optics, the author gives an analytical description of the functioning and design of representative military optical instruments. In the next section the basic principles of the mechanical design of optical instruments are stated. The book concludes with an introduction to optical design that will enable the student to design aplanatic objectives and eyepieces.

HEAT AND THERMODYNAMICS. New second edition
By Mark W. Zemansky, Associate Professor of Physics, College of the City of New York. 386 pages, 6 x 9. $4.00
Presents the fundamental concepts and laws of thermodynamics, together with a discussion of the technique of applying these principles to specific problems. The second edition includes treatments of convection, entropy and nonequilibrium states, second order phase transitions, superconductivity, heat capacity of reacting gas mixtures, LeChatelier’s principle, etc. Many new problems have been added.

AN INTRODUCTION TO WEATHER AND CLIMATE. New second edition
By Glenn T. Trewartha, Professor of Geography, University of Wisconsin. McGraw-Hill Series in Geography. 535 pages, 6 x 9. $4.00
A leading textbook in its field. Brings the student the latest research information on climatic regions and climatic types, describing their characteristics, explaining the origin of these types and regions, and showing how climatic controls acting upon climatic elements produce the various types and varieties of weather and climate.

Send for copies on approval

McGRAW-HILL BOOK COMPANY, INC.
CENTENNIAL OF THE ROTHAMSTED EXPERIMENTAL STATION

One hundred years old this year, the famous Rothamsted Experimental Station at Harpenden, England, is now celebrating its centennial in spite of the war. It is reputed to be the oldest agricultural research institution in the world. The founder of the research station, Sir John Bennet Lawes, remained its active director until his death in 1900. Sir Joseph Henry Gilbert, a chemist, was associated with him during these 57 years. He died in 1901.

When the station was established chemistry was thought to be the only science that seemed to bear on agriculture. For that reason first emphasis was placed on chemical problems having to do largely with the feeding of plant life, and out of it came the creation of what were then called artificial fertilizers.

To carry out the work of making satisfactory artificial fertilizers, and to test the compounds and mixtures made, experimental plots were established and the new fertilizers tried on various crops. The famous wheat plots on Broadbalk carried this year their hundredth consecutive crop of wheat. Other plots have carried other consecutive crops for many years.

The chemistry of farm animal feeding also received early attention at Rothamsted. Animals were fed special diets over specified periods, were then slaughtered, and their body contents analyzed chemically. This early work established the basis for all the later qualitative studies of animal nutrition.

Rothamsted's work to-day includes all branches of scientific agriculture. Its main objective is still the objective set by its founder. As stated by the British Council, "This purpose of gaining knowledge, of developing a subject that experts can use and of providing basic information for teachers, farmers, inventors and all interested, has always been uppermost at Rothamsted."

Sir John Lawes started the Rothamsted station on his own inherited estate. He used his lands even before creating the research center for farm demonstration work. Whether or not the idea of this work and the establishment of a scientific station originated with him is not certain. Others had proposed similar undertakings at an earlier date. Antoine Laurent Lavoisier, the great eighteenth-century French scientist, who was born just a hundred years previous to the establishment of Rothamsted, started a model farm in 1778, and in 1785, while secretary of the French Committee on Agriculture, he recommended the establishment of agricultural experiment stations.

In the United States the first agricultural experiment station with state support was the Connecticut station, established in 1875. By 1887 there were eighteen stations, although some had only meager support. In that year Congress passed the far-reaching Hatch Act, which gave Federal financial assistance for experiment stations connected with all the land-grant state agricultural colleges established under the well-known Land Grant Act of 1862.

MAPS OF THE U. S. GEOLOGICAL SURVEY

Many strategic areas in America are being adequately mapped for the first time, using methods three to five times as fast as pro-war methods, William Emory Wrather, director of the U. S. Geological Survey, reported recently to Secretary of the Interior Harold L. Ickes.

Less than half of the United States has been comprehensively plotted, Mr. Wrather disclosed, despite the 167 years of our national existence. Much of the area requiring additional mapping lies in the central and western states. But there are also regions along the coast which have not been mapped to show the actual shape and elevation of land surface, streams and drainage, the location and extent of cities and towns, roads, dams, forests, boundary lines and other culture.

"In certain strategic areas along the coastline," Mr. Wrather reported, "military requirements have resulted in a 60 per cent. increase over last year in the square mileage of mapping produced monthly by the topographic branch of the Survey." Of 228 areas in which mapping was completed last year, 166 were required by the military.

Improved stereoscopic plotting of aerial photographs, called photogrammetry, is only about a third as expensive and much faster than former methods when used under favorable conditions. In effect the procedure brings the terrain right into the laboratory. To get a three-dimensional view, the operator views plates of aerial photograph negatives through an optical system which is basically like the stereoscope through which the older generation once peered for natural-depth scenic views as a parlor pastime.

By moving a small plotting device, called a tracing table, over the map sheet, the operator then makes a pencil drawing of the culture, drainage and contours. A photographic copy of the drawing is then taken to the field for checking features that could not be identified on the photographs and to secure names to be lettered on the map.

Post-war uses, as well as military service, is foreseen for the maps, since they are valuable in planning and executing flood control, river and harbor improvements, power and irrigation projects, highway location and construction, forest administration, erosion control, drainage enterprises and mineral and soil surveys.

STAR IN THE CONSTELLATION OF LIBRA

The shell of a star in the constellation of Libra, which is not now visible in our evening sky, is composed of many intensely hot layers, each rotating at its own speed.

A layer of nickel in a gaseous state is on the outside of 48 Librae, and titanium and probably manganese, are in the deeper strata, Dr. Otto Struve, director of Yerkes Observatory, reports in the Astrophysical Journal for July.
WILEY BOOKS
in MATHEMATICS
for your V-12 and AST courses

A FIRST YEAR OF COLLEGE MATHEMATICS
By HENRY J. MILES, Associate in Mathematics, University of Illinois.
607 pages; 191 illus.; 5½ by 8½; $3.00

CALCULUS
By EDWARD S. SMITH, Professor of Mathematics, MEYER SALKOVER, Associate Professor of Mathematics, and HOWARD K. JUSTICE, Professor of Mathematics; all at the University of Cincinnati.
558 pages; 6 by 9; $3.25

ANALYTIC GEOMETRY
By EDWARD S. SMITH, MEYER SALKOVER, and HOWARD K. JUSTICE.
298 pages; 255 illus.; 6 by 9; $2.50

COLLEGE ALGEBRA
By H. P. PETTIT, Professor and Head of the Department of Mathematics, and P. LUTEYN, Assistant Professor of Mathematics, College of Engineering; both at Marquette University.
Second Edition: 247 pages; 28 illus.; 5½ by 8½; $1.90

COLLEGE ALGEBRA
By LOUIS J. BOUSE, Assistant Professor of Mathematics, University of Michigan.
Second Edition: 462 pages; 22 illus.; 5½ by 8; $2.25

CALCULUS
By FREDERIC H. MILLER, Associate Professor of Mathematics, The Cooper Union School of Engineering.
419 pages; 118 illus.; 6 by 9; $3.00

CALCULUS
By HENRY B. PHILLIPS, Head of the Mathematics Department, Massachusetts Institute of Technology.
353 pages; 162 illus.; 5 by 7½; $3.00

TRIGONOMETRY
By HOWARD K. HUGHES, Associate Professor of Mathematics, and GLEN T. MILLER, Assistant Professor of Mathematics; both at Purdue University.
With tables: 268 pages; 95 illus.; 5½ by 8½; $2.00
Without tables: 189 pages; 95 illus.; 5½ by 8½; $1.50

PLANE TRIGONOMETRY WITH TABLES
By HARVEY A. SIMMONS, Associate Professor of Mathematics, Northwestern University, and GREENVILLE D. GORE, Chairman, Department of Mathematics and Engineering Science, Central Y.M.C.A. College.
282 pages; 133 illus.; 5½ by 8½; $2.00

DIFFERENTIAL EQUATIONS
By HARRY W. REDDICK, Professor of Mathematics, The Cooper Union School of Engineering.
245 pages; 5½ by 8½; $2.50

DIFFERENTIAL EQUATIONS
By HENRY B. PHILLIPS.
Third Edition: 125 pages; 5½ by 7½; $1.75

JOHN WILEY & SONS, Inc., 440-4th Ave., New York 16, N. Y.
The outermost layers of the shell rotate slowly, while the inside layers revolve much more rapidly, according to the estimate of Dr. Struve. The layers within the shell seem to be slightly expanding at certain times, and contracting at others, adding to the complexity of the action of the stratified shell.

"The star 48 Librae presents a notable paradox," according to Dr. Struve. It combines many of the characteristics of a supergiant and a main-sequence star. The star lying beneath these thin whirling metallic layers seems to be a relatively well-behaved main-sequence B-type star. At present the shell is fairly transparent in the ordinary photographic region of the spectrum, but is essentially opaque toward the violet end.

The spectrum of the star has undergone a distinct change in recent years, reflecting changes within the star itself. During the last ten or twenty years a strong metallic absorption spectrum has developed, showing that the light from the hot center of the star was shining through an increasing number of metallic gases with temperature lower than that of the inner source of light.

The spectrum of 48 Librae is believed to denote a shell in many ways resembling the shell of Pleione as observed in 1940.

THE TREATMENT OF IMPETIGO

From a combination of Indian dislike of bandages and medical skill has come a twenty-four-hour conquest of one of the most persistent of skin infections, impetigo contagiosa.

The new treatment consists of placing on the sores a jelly consisting of 25 per cent. sulfadiazine in methyl cellulose. This mixture forms a water-soluble plastic coating over the lesions and obviates the need of bandages. The sulfa drug is effective in healing the surface sores caused by the impetigo bacteria and seldom is more than one application necessary.

Dr. and Mrs. M. Pijano, together with F. Worman, working at the U. S. Indian Service Nutrition Laboratory and the University of New Mexico, developed the treatment. The research was reported through Southwestern Medicine. Since the work was done, Dr. Pijano has been commissioned a lieutenant in the Navy and is on the research staff at the Naval Medical Research Center, Bethesda, Md.

Treatment of impetigo afflicting Indian patients was found by Dr. Pijano to be particularly difficult because they consider bandages over skin sores somewhat of a disgrace. The patients tore off the dressings once they were out of sight of the doctor.

A search was begun for a method of treatment that did not require bandages. It resulted in the sulfadiazine-methocel dressing. Earlier researches showed that sulfonamide ointments or microcrystals gave striking results, while sulfa drugs in methyl cellulose had been used successfully in treating burns. The new impetigo treatment was developed from both techniques. Controlled tests on a hundred Spanish-American school children showed the effectiveness of the treatment.

ITEMS

The Pacific coast of Guatemala probably received a moderate shaking from an earthquake on September 23 that seismological reports, interpreted by the U. S. Coast and Geodetic Survey, locate in the Pacific Ocean near 15 degrees north latitude and 92 degrees west longitude. The seismological stations reporting included St. Louis University, Georgetown University, Spring Hill College, Spring Hill, Ala., and Coast and Geodetic Survey stations at Tucson, Ariz., and San Juan, Puerto Rico.

The worst infantile paralysis year since 1931, with new cases still occurring throughout the nation at a weekly rate of 1,000 or more, would have taken a much higher toll if the nation had not fortunately been well prepared with money and equipment for fighting the disease. Credit for this life-saving preparedness is given to local chapters of the National Foundation for Infantile Paralysis by the foundation’s president, Basil O’Connor. Mr. O’Connor has recently made a transcontinental trip in which he visited some of the stricken areas, including California and Chicago, where the outbreaks have been particularly serious. "Americans helping other Americans with money given freely" during the public celebrations of President Roosevelt’s birthday last January 30, Mr. O’Connor said, is what made it possible for communities to have on hand both equipment and trained personnel for immediate action when the epidemic struck.

All refiners of 100-octane aviation gasoline may take advantage of a new method of manufacturing that will speed up the production of this essential high-test fuel for warplanes. This process has been developed by the Universal Oil Products Company, of Chicago, who have announced that it will be released to any refiner interested as a contribution to the war effort. The process consists in converting pentane into isopentane, both of these compounds being contained in the base stock from which gasoline is made. Isopentane is an essential component of 100-octane gasoline, but the amount of it in natural gasoline is not sufficient to make aviation gas, so what is called an isomerizing process is necessary to increase the amount by converting some of the normal pentane in the gasoline into isopentane. The process recently discovered does this efficiently and economically, it is claimed, and is reported to be simple, continuous in operation and easily controlled.

The production of agar on the Pacific Coast and careful use of the quantities available have given America enough agar for the essential bacteriological media needed in medical laboratories. This jelly-like substance made from seaweed was a Japanese product before the war, but agar of bacteriological grade is now being successfully extracted from seaweed of our Pacific Coast. A WPB limitation order prevents the use of the limited supply for industrial, food or therapeutic purposes. Agar industry on the Atlantic Coast is getting underway, but so far its product is not suitable for bacteriological use.
Two New Books

Cummins and Midlo
Finger Prints, Palms and Soles:
An Introduction to Dermatoglyphics

149 Illus.
309 Pages
$4.00
(1943)

This outstanding new book, written by university teachers of anatomy presents an up-to-date study of dermatoglyphics in which is incorporated considerable new material of practical importance. Besides its use in personal identification, the subject is of value in studying differential trends among races, between the sexes and among constitutional types. It also elucidates various morphological principles including bodily symmetry. Some traits of the dermatoglyphics are heritable, hence they are useful in recognizing types of twins and have promise of application in cases of questioned paternity. For those of a biological turn, especially anatomists, physical anthropologists, physicians interested in constitution, geneticists and zoologists, the book provides valuable data on a much neglected aspect of human biology. The text is arranged in three parts. I: Historical background and general orientation of the field. II: Methods and description. III: Fundamental biological phases of dermatoglyphics. By Harold Cummins and Charles Midlo, Tulane University School of Medicine.

Hector, Lein and Scouten
Electronic Physics

289 Illus.
Most in Color
355 Pages
$3.75
(1943)

In this new text, which presents a well integrated, modern study of electronic physics, all electrical phenomena are studied from the electron-proton point of view. Even magnetism is described in terms of moving electric charges. Ordinary light, wireless and x-rays are shown to be closely related and to be various aspects of electrical phenomena. Photoelectricity and electron tubes are presented as a unified part of the entire subject. The electrical nature of atoms of all elements is constantly used in the explanations thus enabling the student to follow promptly the phenomena of radioactivity and modern transmutation presented in the closing chapters of the book. Each chapter is introduced by a brief preview of its contents and purposes. The principal ideas are listed and the central thought is summarized at the end of each chapter. Problems are presented in graded groups. The illustrations in color are outstanding. By L. Grant Hector, National Union Radio Corporation; Herbert S. Lein, University of Buffalo; and Clifford E. Scouten, University of Buffalo.

THE BLAKISTON COMPANY, Philadelphia 5, Pa.
MICRO KJELDAHL DIGESTING APPARATUS

With improved type fume duct of Pyrex glass and with metal shield to protect the flames from drafts

KJELDAHL DIGESTING APPARATUS, MICRO, A.H.T. Co. Specification, for gas heating. Suitable also for semi-microanalysis as it takes Kjeldahl flasks 10 ml, 30 ml or 100 capacity, the latter if finished without rim at neck as listed below under 5442-B.

Consisting of a six-burner heating shelf with transite top and a fume duct of Pyrex glass. Heating shelf is made of cast brass with baked-on aluminum finish, with metal shield behind the burner manifold to protect the flames from drafts. Top is 18¾ inches long × 8½ inches wide × ¾ inch thick, with six tapered burner openings, 1-9/16 inches diameter at top × 1 inch diameter at bottom, 3 inches from center to center. Burners are regulated by individual needle valves conveniently located in front of each burner.

The fume duct is of heavy wall Pyrex glass, 516 mm long × 51 mm inside diameter, with six openings each 22 mm diameter for insertion of flask necks. The fume duct is provided with a central outlet and is sloped toward the center to facilitate drainage in use and to assure equal suction at both ends, as suggested by Eugene W. Schoeffel, while with the American Medical Association Laboratories, Chicago, Ill. The fume duct is held in position by means of two adjustable, slotted aluminum clamps with spiral springs for variation in tension.

7498. Kjeldahl Digesting Apparatus, Micro, A.H.T. Co. Specification, as above described, for use with artificial or mixed gases up to 600 B.T.U. Complete with Pyrex glass fume duct and six concave discs of Chromel wire gauze to fit burner openings, but without flasks or rubber connections

7499. Fume Duct, only, of Pyrex glass

5442. Flasks, Micro-Kjeldahl, Pyrex brand glass, with round bottom and long neck; for use with above Micro Digesting Apparatus. Size 10 ml is without taper or rim, and 30 ml is without taper but with rim at neck.

<table>
<thead>
<tr>
<th>Capacity, ml</th>
<th>Each</th>
<th>10% discount in original package containing 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>.32</td>
<td>.35</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5442-B. Ditto, 100 ml capacity, with straight neck with out rim; to fit into fume duct of above Micro Digesting Apparatus.

| Each | .30 |


| Each | .45 |

10% discount in package containing 72.

ARTHUR H. THOMAS COMPANY
RETAIL—WHOLESALE—EXPORT
LABORATORY APPARATUS AND REAGENTS
WEST WASHINGTON SQUARE
PHILADELPHIA 5, U. S. A.
Cable Address, BALANCE, Philadelphia
For Research...Analysis...Education

Purity and uniformity, indispensible qualities in chemicals intended for use in these exacting fields, are the basis of the rigid specifications for Eastman Organic Chemicals. Control of these essential properties is attained by laboratory production and actual testing of each individual batch before it is accepted for stock.

Eastman Organic Chemicals, which now total more than 3400, comprise the world’s largest group of organic compounds for research, analysis, and education. All of the items are supplied in the quantities most convenient and economical for their particular applications. . . . Eastman Kodak Company, Chemical Sales Division, Rochester, N. Y.

DETERMINING VITAMIN C
(Ascorbic Acid)
The new LaMotte Outfit employs 2-6 Dichlorophenol Indophenol in handy tablet form, two prepared color standards covering the high and low values, together with necessary pipettes and reagents. This test is designed for the quick and efficient analysis of Vitamin C in fasting blood of patients, within the wide range of 0.5 mg. to 1.8 mg. per 100 cc.
A larger outfit is available which combines blood and urine tests and can be used on other materials such as vegetables and fruits.
Information on request.
LaMotte Chemical Products Co.
Dept. "H" Towson 4, Baltimore, Md.

The Microbe's Challenge
FREDERICK EBERSON, PH.D., M.D.

For the scientist it presents a permanent record of progress made in bacteriology during very recent years in preventive medicine. For the student it illustrates the procedure by which great discoveries of science are made.
Price $3.50 vii + 344 Pages
THE JAQUES CATTELL PRESS
Lancaster, Pennsylvania

SPRAGUE - DAWLEY, INC.
Pioneers in development of the standard laboratory rat

Madison, Wisconsin
Modern Methods call for Accurate pH and Redox Control

It is no longer enough merely to determine a material as "acid" or "alkaline." In almost every industrial or laboratory process very small differences of degree in pH or Redox make big differences in quality and time. In today's war production and tomorrow's competition, accurate measurement of this vital factor is an essential.

Wide range of use. The Coleman Model 3D pH Electrometer is a sensitive, accurate laboratory instrument whose rugged construction extends its use throughout the entire industrial field. It is equipped with the sturdy Coleman Glass Electrode; a Temperature Compensator, providing automatic instrument correction to sample temperature; and a Redox Electrode for measuring oxidation reduction potentials.

Accurate, direct readings. Both pH and millivolt scales are provided, their accuracy insured by true standard cell calibration. The pH scale reads from 0-13 pH, easily readable to .02 pH; the millivolt scale from 1-1300 mv. is readable to 2 mv.

The Coleman Model 3D pH Electrometer comes complete with Sealed Glass and Reference Electrodes, Redox Electrode, Buffer Solution, Tubes, Batteries, etc., ready to use. $235.00

Chicago Apparatus Company
1735 NORTH ASHLAND AVENUE • CHICAGO 22, ILLINOIS
"WRATTEN LIGHT FILTERS"

A Book of Data on Wratten Filters

There are more than 100 filters in the series of Wratten light filters. They are designed for use in general monochrome and color still photography, cinematography, and special scientific fields—including astronomy, photometry, spectroscopy.

Each Wratten Filter is made to meet a rigid standard, and is supplied in the form most convenient for its application.

The purpose of the book, *Wratten Light Filters*, is to facilitate selection of filters by providing complete spectrophotometric data concerning them.

The 88-page Sixteenth Edition of this publication gives transmission curves and tables for all filters, as well as notes on the use of filters for special purposes. It is available at dealers in photographic supplies.

EASTMAN KODAK COMPANY
Research Laboratories
Rochester, N. Y.

---

Here's What Goes into Purina's LABORATORY CHOWS

Here at Purina, quality control has been put on a mass-production basis. 24 scientific laboratories, each equipped to do a particular job, see that the right research and ingredients go into every bag of feed for laboratory animals. Ask your Purina dealer, or write Purina Mills, St. Louis 2, Mo.

AIR-CONDITIONED TRACE ELEMENT LABORATORY

BLOOD CHEMISTRY LABORATORY  ION INTERCHANGE COLUMNS  CAROTENE ASSAY INSTRUMENT
Medicine meets the War's Challenge

The entire medical profession has been mobilized to serve the war's needs without a breakdown in medical service for the nation as a whole. More than 50,000 physicians are devoting their skills to the Army, the Navy, the United States Public Health Service, civilian defense, industry and other occupations related to the war effort.

Millions of dollars are being expended in research for the advancement of medical science; nearly a thousand of the country's leading medical scientists have been organized into committees to standardize and maintain at the highest possible level medical service for our soldiers and sailors—with the result that thousands of lives are being saved and mortality reduced to a minimum never achieved in any previous war.

With microscopes, microtomes, haemacytometers and other optical instruments, Spencer is making its contribution to this achievement.

Spencer LENS COMPANY
BUFFALO, NEW YORK
SCIENTIFIC INSTRUMENT DIVISION OF AMERICAN OPTICAL COMPANY