Just Published
the second volume of
an important two-volume text

INTRODUCTION TO
ELECTRICITY AND OPTICS

By Nathaniel H. Frank, Massachusetts Institute of Technology. 406 pages, 6 x 9. $3.50

This important new textbook, together with the author's Introduction to Mechanics and Heat, the second edition of which was published a year ago, constitutes a two-volume text in physics for the introductory technical course.

Introduction to Electricity and Optics gives a logical exposition of the fundamental principles, emphasizing field theory and the elementary application of these principles to circuits and to the electrical, magnetic, and optical properties of matter. The treatment is quantitative throughout and modern atomic ideas are stressed along with the more classical modes of presentation. The approach is new. The first half of the book develops systematically the fundamental laws of the electric and magnetic field for empty space, utilizing only the properties of conductors. The electrical and magnetic properties of matter are deferred to the second half of the book, where the discussion, based essentially on the electron theory of matter, develops the laws of dielectric and magnetic media. A study of electromagnetic waves in dielectrics leads smoothly to the subject of optics. Here, although the emphasis is largely on physical optics, more attention is given to geometrical optics than is customary in the average first course.

INTRODUCTION TO
MECHANICS AND HEAT

New second edition. 384 pages, 6 x 9. $3.00

The chief aim of this text is to develop a logical, unified treatment dealing with the topics of mechanics, acoustics, and heat, so that the elementary student may learn to appreciate and to utilize fundamental and general methods of attack on problems in all branches of physics. Features of the book are the treatment of kinematics of linear motion, the chapter on plane dynamics, the treatment of potential energy, and the chapter on static elasticity.

Send for copies on approval
THE MOBILIZATION OF SCIENCE

America's research power, as important as a national defense measure as the actual army, air force and navy, is being surveyed quietly for possible mobilization of science, as a national resource or in any emergency.

For the past few months a staff of specialists with headquarters in the building of the National Academy of Sciences in Washington has been marshalling facts and figures about just where in this nation new scientific knowledge is being sought. Leading scientists of wide acquaintance in their circles are hard at work making detailed reports and evaluations so that Uncle Sam, in peace or war, may know just where to turn when he has a puzzling scientific question to ask.

Government bureaus and university research centers, as well as industrial laboratories, are being tapped freely to produce a real census of American scientific effort. The survey was requested by the government and it is being made with federal funds, although the actual conduct of the survey is in the hands of a committee of the National Research Council, which is itself a part of the National Academy of Sciences.

Broader than a mere military preparedness measure, this research survey obviously will be of increasing usefulness as preparedness efforts are intensified.

Even if the United States escapes the actual blight of war, there are many problems of a constructive nature to which science and research can make a major contribution.

Major emergencies in the past, beginning with the Civil War or the War Between the States, brought a marshalling of science in aid of the national effort. The National Academy of Sciences was established by the Congress partly as a war measure when Lincoln was president. Out of the World War came the National Research Council, perpetuated when peace came as a national clearing house for science. When in 1933 an economic emergency arose, President Roosevelt formed a Science Advisory Board to advise the government. The National Resources Planning Board under the New Deal has given major attention to science and research. All these agencies would be expected to participate in any further mobilization of science as a part of the preparedness program.—Watson Davis.

THE NATIONAL HEALTH
(Copyright, 1940, by Science Service)


The present threat of war does not lessen the need for enactment of a national health program. This is clear from the report of Colonel Lloyd B. Magruder, U. S. A., recruiting officer of the second corps area, that 32 per cent. of the young men volunteering for Army service in May had to be rejected as physically unfit and that 60 per cent. of those volunteering from urban centers will have to be rejected for health and other reasons.

Tanks and guns and planes can not defend a nation by themselves. Men are also needed, men whose strength has not been sapped by "hidden hunger," whose hearts have not been crippled by rheumatic fever in childhood, whose lungs have not been damaged by tuberculosis. A program for the health of the nation is part of a program for its defense. The cost of such a program, as presented by Mr. de Kruif, will save money in the long run by cutting the nation's bill for hospitalization of the mentally sick, the tuberculous, the crippled and for support of their families. Enough might even be saved to pay for part of the cost of the defense program now under way.

In war or peace, however, we need also to protect the first of those rights with the weapons of the specialist: toxoid to defend life against diphtheria, sulfapyridine and serum to defend life against pneumonia, the surgeon's knife and x-rays and radium to defend life against cancer, vitamins to defend life against the "hidden hunger" of starvation. To guarantee these rights to every American, we must push our program for national health.

The program Mr. de Kruif presents is not likely to meet with opposition from the American Medical Association. It was drawn up by five Michigan physicians, three of them, Dr. Henry A. Luce, Dr. Thomas K. Gruber and Dr. L. G. Christian, members of the House of Delegates of the association, and the other two, Dr. Henry R. Carstens and Dr. A. S. Brunk, officials of the Michigan State Medical Society. All the features of a health program for which the American Medical Association has fought, maintenance of the doctor-patient relation, lack of regimentation of doctors, provision for high quality of medical care, administration by a federal Department of Health, are provided in this national health program. It has the approval of Dr. Thomas Parran, Surgeon-General of the U. S. Public Health Service.

It may even be the means for a burying of the hatchet between the government and the American Medical Association. This is strongly hinted in the section of the book describing the attitude of Supreme Court Justice Frank Murphy when, as attorney general in charge of the government's suit against the American Medical Association for violation of the Sherman Act, he was presented with the program and in turn helped to arrange for its presentation to President Roosevelt.—Jane Stafford.

THE WORLD PRODUCTION OF TIN
(Copyright, 1940, by Science Service)

That the United States has purchased 6,724 tons of tin since last November to build up a reserve stock pile of this strategic material, is shown by a survey of U. S. Treasury Department Procurement Division orders.

Despite the total of over 13,000,000 pounds at about 50 cents a pound valued at $6,500,000, the reserve is believed to be only about a tenth of the total needed reserve of the nation. Army officials are reluctant to discuss exactly what tonnage of tin the nation would like to have for potential war reserves, but some years ago the National
Find the Solutions to Your Perplexing Problems in These NEW Mosby Books

**Introduction to BIOCHEMISTRY**

The new Second Edition of this well-known text begins with a detailed account of the elements found in living organisms, and continues with discussion of the inorganic and organic compounds associated with life.

For the Second Edition the text matter has been revised, reset, and enlarged by the addition of chapters on Colloids, Biological Pigments, Tissue Respiration, and the Internal Environment. There are many new diagrams, summaries, and descriptions of original tests and analytical methods.


**Horsley-Bigger OPERATIVE SURGERY**

The Fifth Edition of this popular book has been thoroughly revised, enlarged, and brought up to date with 180 pages of entirely new text material and 183 illustrations, which describe and illustrate the newest in operative procedures.

Among the new features presented are the following: A new chapter on PERITONITIS; an amplified section on APPENDICITIS; Clute's incision for exposing the diaphragm, the terminal esophagus and the cardiac end of the stomach; Dodson's modification of Coffey's operation for transplantation of the ureters; and the new technic for nailing intracapsular fractures of the hip.

By J. SHELTON HORSLEY and ISAAC A. BIGGER. Fifth Ed. Two Volumes. 1652 pages, 1391 illustrations. Price, $18.00

• See These and Other Valuable Mosby Publications at the New York Meeting of the American Medical Association — June 10–14, 1940 — Booth No. 230

---

**1940 SYNOPSIS BOOKS**

**Synopsis of OBSTETRICS**

Litzenberg's "Synopsis of Obstetrics" is the crystallization of the author's wide experience in the field of obstetrics, together with the general consensus drawn from historical and current medical literature.

By JENNINGS C. LITZENBERG. 394 pages, 157 illustrations, 5 in color. Price, $4.50

**Synopsis of PRINCIPLES OF SURGERY**

In this new text the basic sciences are correlated with the fundamental principles of surgery. The body of the book considers surgical diseases while footnotes contain the correlated facts, physiology and experimental data.

By JACOB K. BERMAN. 400 pages, illustrated. Price, about $5.00

**Synopsis of OPERATIVE SURGERY**

Here is a volume on operative surgery which presents in brief, easily-referred-to form the surgical technique of each part and organ of the human body to the last detail. Coverage is complete and to the point, and the illustrations are graphic.

By H. E. MOBLEY. 375 pages, 399 illustrations, 39 in color. Price, $4.50

---

The C. V. Mosby Company
3525 Pine Blvd., St. Louis, Mo.

Gentlemen: Send me the following book(s):


Dr.

Address

6-7-40
Resources Board fixed 60,000 tons as a minimum wartime reserve.

Last year the Straits Settlements produced nearly 31 per cent. of all the virgin tin in the world while Netherlands India produced 17 per cent. It is a significant comment on world production that the American purchases since November of last year have been virtually all from the Orient. Minor contracts have been awarded for Bolivian tin. Bolivia produces 15 per cent. of the world output, not in the form of pure tin but as tin concentrates which run from 70 per cent. to 80 per cent. tin content. This concentrate has to be further refined; an operation carried out mainly, in the past, in England and in the Netherlands. It is understood that two tin smelters are contemplated in the area of New York harbor to take over the smelting of Bolivian tin.

Tin has long been on the strategic minerals list of the United States, for American production has amounted to only about 90 tons a year, over a five-year average. The nation's requirements, on the other hand, run to nearly 100,000 tons yearly, of which about 75,000 tons must be virgin metal. The remainder consists of secondary tin obtained from scrap which collects in tin-can factories and from "junk" alloys which contain tin.

Prize tin region of the world is of course the East Indian colonies of England and the Netherlands. In this region the tin ore is cassiterite, or tin oxide, which runs as high as 78.6 per cent. tin. Mining is a simple operation by dredges, of which more than 100 are available. In addition anywhere from 50,000 to 100,000 Chinese laborers work at tin mining, according to the world demand.

**THE EARTHQUAKE ANALYZER**

Most persons, when an earthquake is once over, have no desire to repeat it, but the seismologists, who study such tremors scientifically, often want a return performance, so as to study the movements that took place. This, in effect, can be done with the new earthquake analyzer developed by Professor Arthur C. Ruge, of the Massachusetts Institute of Technology. It was described recently before the meeting in Cincinnati of the eastern section of the Seismological Society of America at Xavier University.

In many places, especially California, where earthquakes are likely to occur, "strong motion" earthquake recorders have been placed in strategic locations. The ordinary seismographs, which respond to tremors thousands of miles away, are so delicate that they can not record the effects of a local quake. The strong motion instrument lies dormant until one happens in its vicinity, then it goes into action. Dr. Ruge now has available for study such records of about 40 earthquakes, including the disastrous one at Long Beach, California, in 1933, which killed 120 persons and caused damage to the extent of $50,000,000.

With the earthquake analyzer, the wavy lines in the record are scanned by an electric eye, and are transformed into a series of electric impulses. These are fed into a galvanometer, which has a swinging mirror, adjusted to vibrate with the same characteristics as any desired building or other structure. Thus, the swaying of such a building may be measured by recording, on a moving strip of photographic paper, a spot of light reflected by the mirror. The characteristics of the swinging mirror are changed with another photo cell, or "electric eye," and can be adjusted by turning the control dials.

Professor Ruge expressed the opinion that the device will find other applications, such as analyzing rainfall or sun-spot records, or for solving difficult vibrational problems of the mechanical engineer.

**HIGH OCTANE GASOLINE**

Gasoline of high octane rating, the advantages of which have been widely advertised, is no cure-all for the ills of motor car performance, according to C. H. Van Hartesveldt and H. W. Field, of the Atlantic Refining Company, who spoke before members of the Division of Refining of the American Petroleum Institute, meeting at Fort Worth, Texas.

"When high-octane-number gasoline is used in a car which does not knock on the lower-octane material, no improvement in performance results," they stated, "and when a car that knocks is fueled with a high-octane gasoline, the knock is reduced, but no additional power or gasoline mileage is obtained unless the knock was extremely loud. For power loss the knock must be so loud that no motorist with normal hearing, driving such a car, would fail to take the car to a repair shop. These things have been known for some time, but they deserve more emphasis than they are getting in present-day advertising."

Messrs. Hartesveldt and Field urged that gasoline quality be measured by performance in cars rather than laboratory tests, which means that technical difficulties make it impossible to expect the success of recent legislative efforts to fix gasoline quality. They declared that "an increased cost of $5 a year for a motor vehicle, if used to pay for mechanical adjustments and tune-up of the engine, would result in greater owner satisfaction than this same amount of money spent in furnishing a higher-octane gasoline."

Any advantages in reducing engine knock obtained with high-octane gasoline is appreciably reduced when antifreeze is used, was reported by Herschel G. Smith, of the Gulf Oil Corporation. "Water is a more effective coolant, due to better heat transfer from the cylinder walls, than any known anti-freeze compound." He suggested that, with engines equipped with thermostatic control on the cooling system, for best performance a setting should be made for control at a lower temperature when antifreeze is used than with water alone.

The odor of gasoline gives no clue either to its performance or to its corrosiveness, said John Happel and S. P. Cauley, of the Socony-Vacuum Oil Company. For this reason they urged the elimination of tests now made for foul-smelling compounds called mercaptans. "The average gasoline consumer is much more conscious of factors governing gasoline performance than of the superficial specifications which were considered significant in the past. He recognizes the importance of such items as mileage, freedom from knocking, satisfactory starting and warm-up. Just as the introduction of colored gasolines resulted in the abandonment of rigid color specifica-
tions, so the relatively small number of cases in which the consumer is in a position to be affected by gasoline odor militates against this item being of major importance in gasoline quality.''

THE HIT-AND-RUN DRIVER PROBLEM

(Copyright, 1940, by Science Service)

A plan for solving the problem of the hit-and-run driver was presented by Dr. Lowell S. Selling, psychiatrist of the Recorder's Court, Detroit, Mich., at the meeting in Cincinnati of the American Psychiatric Association.

A study of some fifty hit-and-run drivers brought to the Detroit court gave Dr. Selling information as to the mental state of a hit-and-run driver and from this he evolved his plan for solving the serious problem they present.

Almost half of the hit-and-run drivers (twenty out of the fifty) had unstable psychopathic personalities. A second important group were feebleminded, and another group was made up of neurotic persons who had infantile reactions and feelings of inferiority.

Dr. Selling concluded that 'any mental deviation is likely to result in fleeing from the scene of the accident.'

His recommendations for solving the hit-and-run driver problem are:

1. The feebleminded should be highly trained and coached if they are to drive at all.
2. The psychoneurotic should not be permitted to enter an automobile when in a highly unstable or upset state.
3. Persons with a bad background who are improperly equipped mentally or physically for driving should be especially warned and their problem must be dealt with in psychiatric fashion.
4. Potential traffic offenders, and these are all growing people, should be diagnosed and treated by other clinical means before they reach the age where they will commit a hit-and-run offense.—JANE STAFFORD.

ICE-AGE ANIMALS

What exactly were the first prowling, lumbering and charging beasts that early man entering from Asia had to face and slay?

A scientist on the trail of Ice-Age animals figuring in the dawn chapter of American history, some 25,000 years ago, is Dr. E. H. Colbert, of the American Museum of Natural History.

No dinosaurs, of course! The popular notion that enemy number one of early man was a 'r'aring' dinosaur dies hard—harder than the dinosaurs did. The last un-lamented dinosaur passed on some 80,000,000 years ago. Compared to that, man is a youngster, with possibly a million years to his 'past.'

But first hunters to roam America's wilderness, late in the Ice Age, had to face a circus of large and formidable beasts. No modern circus can boast any of these species.

Surely present when man arrived in the New World, Dr. Colbert concludes, were woolly mammoths and mastodons, clumsy giant sloths and giant beaver, wild horses and camels. Bison, too, were plentiful, though of a different species from bison shot by later Indians.

Among those 'probably' present, Dr. Colbert lists giant tapirs, peccaries, saber-tooth tigers and an ancient form of jaguar.

After sharing the wilderness with man for a while, the wild creatures of that age vanished. Man may have helped them along to extinction, Dr. Colbert suspects, not only by his hunting, but by more effective exterminators, such as diseases or pests. When they died off suddenly has not yet been discovered. And Dr. Colbert says rather pessimistically, 'We may never know why these animals became extinct.'—EMILY C. DAVIS.

ITEMS

According to a survey of crop weather by the U. S. Weather Bureau, May was a month of little rain. In this it contrasts sharply with April, which in some sections of the country was decidedly a wet month. Even in the Southeast, however, where April was on the dry side, May also brought deficient rainfall. The one area where there was really heavy rainfall during the last week of May was where rain was most needed. There were falls of as much as four inches in portions of Arkansas, Texas and southeastern Oklahoma.

The disastrous earthquake of Friday, May 24, in Peru, centered very close to the shoreline, probably on the sea bottom a short distance off Callao, seaport of Lima, the Peruvian capital. Seismologists of the U. S. Coast and Geodetic Survey, after studying reports wired to Science Service, gave a provisional location as in latitude 12 degrees south, longitude 78 degrees west. Time of origin was 11:33.8 A.M., E.S.T.

The Montana State College Observatory, under the direction of Professor Eric Therkelsen, reported no less than four earthquakes. In addition to the Peruvian disturbance, there were others at 6:52 and 10:58 A.M. and at 5:00 P.M. None of these three has yet been located.

Seismologists of the U. S. Coast and Geodetic Survey stated, after studying instrumental records from a number of North American observatories, that a strong earthquake shock rocked the uninhabited wilderness near the Alaska-Canada boundary just south of the Arctic Circle early on Tuesday evening, May 28. The epicenter was located approximately in latitude 68 degrees north, longitude 139 degrees west. This is in the headwaters of the Porcupine River, about 50 miles east of the boundary. The region is usually considered non-seismic, or free of earthquake liabilities. Exact time of origin was 8:57.6 P.M., E.S.T.

Tincture of iodine as an antiseptic for cuts should be used in the first instance, leaving mercuriochrome to the physician. This advice was given, in effect, by Dr. Leonard J. Piccoli, professor of pharmacology of Fordham University and American Red Cross first aid instructor, at the Richmond meeting of the American Pharmaceutical Association. Tincture of iodine, his laboratory studies show, is at least three times more powerful as an antiseptic than the aqueous solution of mercuriochrome found in most first aid kits and in family medicine chests. The per cent. acetone-alcohol solution of mercuriochrome used by physicians, however, is relatively as efficient as tincture of iodine.
THE SCIENTIFIC MONTHLY
J. McKEEN CATTELL, F. R. MOULTON and WARE CATTELL, Editors

CONTENTS FOR JUNE

THE SOCIO-BIOLOGY OF MAN. Professor M. F. Ashley-Montagu.

SCIENCE AND CULTURE. Lawrence K. Frank.

A SERPENT-SEEKING SAFARI IN EQUATORIA. I. Arthur Loveridge.

SUNLIGHT AND PLANT LIFE. Dr. Earl S. Johnston.

ON THE ROCK-STRUCTURES AND PLANTS OF OLD RAG MOUNTAIN, VIRGINIA. Dr. Titus Ulke.

ORGANISM, SOCIETY AND SCIENCE. III. Professor R. W. Gerard.

HOSPITALS AND THE ADVANCEMENT OF SCIENCE. Dr. Charles E. Remy.

BLUE JAY: BRIGAND OR BENEFACCTOR? Professor Arnold Gesell.

GENERAL FORMAL EDUCATION BY FIELD OF EMINENCE. Dr. Mapheus Smith.

BOOKS ON SCIENCE FOR LAYMEN:

Samples of Science; Are Mental Disorders Increasing?; Present and Future of Television; Shell Collector's Handbook.

THE PROGRESS OF SCIENCE:
The Annual Meeting of the National Academy of Sciences; The American Association Meets in Seattle; Progress in Harnessing Power from Uranium; Is Atomic Power at Hand?; The Milky Disease vs. The Japanese Beetle.

INDEX.

PUBLISHED FOR THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
BY THE SCIENCE PRESS
LANCASTER, PA.—GRAND CENTRAL TERMINAL, NEW YORK CITY—GARRISON, N. Y.
Yearly Subscription $5.00 :: :: :: Single Copies 50 cents

When You Need Laboratory Furniture
—TURN TO KEWAUNEE

and Save 3 Ways

Furnishing laboratories is a specialist's business. It's best to depend on experience in this work, to avoid disappointments and waste. Kewaunee, backed by over 35 years' experience in designing, building and installing laboratory furniture, stands ready to assist you with your laboratory furnishing problems. You'll save time—save mistakes—save money. Get quotations on Kewaunee Quality Furniture. You'll find prices are competitive. Write today to—

Kewaunee Mfg. Co.
LABORATORY FURNITURE EXPERTS
115 Lincoln St., Kewaunee, Wis.
Eastern Branch: 220 E. 42nd St., New York, N. Y.
Mid-West Office: 1208 Madison St., Evanston, Ill.
Representatives in Principal Cities

In Your Specifications Include KARCITE
MOLDED CERAMIC SINKS

A Kewaunee Product developed in the Laboratories of Mellon Institute of Industrial Research. Molded in one piece with rounded corners and perfect slope to drain. Free from distortion—inert to solvents and mineral acids (except hydrofluoric). Will not crack or break under ordinary weight shocks and thermal shocks. Gray black color—smooth-surfaced—dull gloss finish. Lighter — stronger — easier to clean. Also distributed by most other leading manufacturers of Laboratory Furniture. So, on all orders, specify Karcite Sinks. Write for Catalog and Price List.
**Now Available...**

**Universal Indicator Solution**

**EFFECTIVE RANGE**—pH 4 to pH 10

**ACCURACY**—To within 0.5 pH

**COLORS**—Systematic succession of spectrum colors.

**COLOR CHANGES**—At whole pH numbers

**CATALOG LISTING**—No. 4953, Universal Indicator Solution; 100 cc., $1.00

A description of the color changes, as well as suggested applications of this prepared universal indicator, will be forwarded promptly upon request. . . Eastman Kodak Company, Chemical Sales Division, Rochester, N. Y.

**EASTMAN ORGANIC CHEMICALS**

---

**LaMotte Combination Soil Testing Outfit**

One of the most popular outfits, contains tests for pH, potash, phosphorus, and nitrates, all assembled in one wooden carrying case with complete apparatus, reagents and instructions; price $35.00 f.o.b. Baltimore, Md. Other combinations can be supplied varying from three tests up to eight. Prices on request.

LaMotte Chemical Products Co.
Dept. "H" Towson, Baltimore, Md.

---

**BIOSTATISTICIAN:** B.A. (Barnard '38), M.S. (N.Y.U. '40) wants position as statistical research worker in biology, public health or allied fields. Experienced; references; some typing and stenography. Address "B.M.", care of *Science*, 3941 Grand Central Terminal, New York, N. Y.

**INSTRUMENT MAKER, MACHINIST**

Middle-aged, with electrical knowledge and some engineering training and experience, seeks position as laboratory assistant or mechanic or on development work; part time considered; location anywhere. Egbert, 453 West 34th St., New York, N. Y. Long-Acre 9192(7-11).

---

**Wilderness Walking Vacations**

In Adirondacks and Great Smokies without roughing it. Comfortable sporting camps for overnights and meals. Optional daily walks of varying lengths by considerate leaders. Congenial companions. 68 page booklet, 10 cents. Hiking Trips Bureau, Hohokus, N. J.

---

**Bargains in New and Used Glasses!**


J. ALDEN LORING. OWEGO, N.Y. Catalog free, Box B.
Zeiss Monocular Aplanatic Magnifiers are lens combinations giving a large flat field, sharply defined from center to margin, and with freedom from color fringes. For these reasons they are the magnifiers to use where the best possible quality of the image is essential. The Zeiss Aplanatic Folding Magnifiers, in dust-proof Bakelite mounts, are especially popular as pocket lenses for many purposes. They can also be supplied to fit ring holders with handle, or sliding sleeves, tripods and other mounts. Magnifications 2.5x, 6x, 8x, 9x, or 10x. At your dealers.

Catalog MED 343-A247 free upon request

Repair Service

Purchasers and owners of Zeiss equipment can be assured of uninterrupted service by factory trained workmen in our large repair shop at the main office in New York, or in the repair shop of our Los Angeles branch.

CARL ZEISS, Inc., 485 FIFTH AVE., NEW YORK
728 So. Hill St., Los Angeles