but a low water permeability in order to prevent a premature exhaustion of the incorporated silver supply, while surfaces mostly dry require certain hygroscopic properties and an appreciable water permeability. Consequently the performance for which a particular surface material is designed represents by necessity a compromise between the rate of sterilization per unit area, the rate of replacement and the total "life time" required for the surface.

The method used for testing the germicidal activity of these surfaces was the following: Samples of the surface material (about 6 cm²) on various bases were placed in humidified containers (for preventing bacterial destruction by drying). The test microorganisms suspended in the desired medium were pipetted onto the surface in volumes of 0.05-0.1 cc, spreading the liquid into a film. Analogously the controls were obtained on neutral surfaces. At definite time intervals this film or part of it was removed by a sterile cotton swab, and was immediately introduced into 9 cc of lactose-beef or thiglycollate broth. After incubation at 37° C. for 1 to 5 days the growth was determined. A similar technique was applied for the quantitative determination of cell reduction by titration: the entire film was absorbed by the swab, the latter then soaked for 30 minutes in nutrient broth with frequent shaking before 1 cc was serially diluted and plated in nutrient agar. Colony counts were made after three to five days.

The test microorganisms used so far have been E. coli, Staph. aureus, B. proteus, B. subtilis Cl. pasteurianum, Penicillium, Rhizopus and Sacch. cerevisiae.

Distilled tap and peptone water, nutrient broth, 5 per cent. sucrose and dextrose solutions, cider and milk have been used as suspending media.

The germicidal action obtainable with various surface materials according to extended tests with the above methods are briefly this:

The rate of sterilization varies with the composition of the surface, the highest rate measured sterilizes E. coli at 10⁸ cells/cc in less than one minute. Materials requiring rates of more than 5 minutes for E. coli at at least 10⁸ cells/cc were discarded. The bacterial concentration does not influence in general the rate of sterilization.

For a given surface this rate does not vary appreciably with different types of organisms (except for spores). Mold suspensions containing high concentrations of spores were readily sterilized in all suspending media except nutrient broth and milk. This was demonstrated by exposing heavy mold suspensions in cider and sugar-peptone solutions for 1 to 5 minutes to surfaces applied within standard boll’
caps, before applying them to 12-ounce bottles containing sterile cider or broth. After sealing, the nutrient was kept in permanent contact with the cap. Subsequent incubation (30 to 60 days) did not produce growth in any bottle, while control bottles with untreated caps showed heavy growth. For bacterial spores (B. subtilis, 10 days old, washed and heated to 100° C. for 5 minutes) reduction up to 97 per cent. has been obtained after 15 to 30 minutes exposure.

In general the rate of disinfection depends upon the concentration of protein-like matter in the suspending medium. In this respect milk is most severe, and a surface which destroys E. coli in water in about 2 minutes requires 15 to 30 minutes for the sterilization of non-sporulating bacteria in milk.

Endurance tests for various surface materials were made on a special testing machine, which dipped each sample every fifth minute for about 30 seconds into H₂O. At arbitrary intervals the above test was performed and it was found that the activity remained practically unimpaired for up to 30,000 infections over a period of 2 months. The final failure coincided in general with the destruction of the plastic surface by mechanical wear.

Without such treatment good surfaces have not shown disactivation during storage.

A. Goetz  R. Tracy  S. Goetz

RARE METALS INSTITUTE,
CALIFORNIA INSTITUTE OF TECHNOLOGY

NEW BOOKS


WARNER, W. LLOYD and PAUL S. LUNT. The Status System of a Modern Community. Pp. 240. Yale University Press. $3.00.

### Introductory College Chemistry

By H. G. Deming, Professor of Chemistry, University of Nebraska. Second Edition Revised in Collaboration with B. Clifford Hendricks, Professor of Chemistry, University of Nebraska.

The second revised edition of this well-known book follows the same method of approach as before, but with changes in the order of presentation suggested by teaching experience. General principles continue to be emphasized. Particular attention is directed to the expansion of the material to include the most modern data.

Second Edition: 521 pages; 6 by 9; $3.00

### An Introduction to the Plant Sciences

By William C. Darrah, Tutor in the Department of Biology and Research Curator in the Botanical Museum, Harvard University.

A concise account of the nature of the plant kingdom. It is intended for use by students in a half-year or one-semester course in botany or plant biology. Emphasis is placed on these four recent developments: the organismal concept; the break from traditional classifications; the physiological or biochemical approach; and the utilitarian and humanistic emphasis.

332 pages; 6 by 9; $2.75

### Conservation of National Resources

By George T. Renner, Professor of Geography, Teachers College, Columbia University.

A textbook for use in teachers colleges, normal schools, and college departments of education, as well as in departments of geography. Its purpose is to present the educational philosophy and aims, social objectives, sources of materials, and curricular considerations of conservation.

228 pages; 6 by 9; $2.75

### Introduction to the Microtechnique of Inorganic Analysis

By A. A. Benedetti-Pichler, Assistant Professor of Chemistry, Queens College, Flushing, N. Y.

New and well-organized material for classes in inorganic microanalysis. Directions are given in great detail to facilitate class use. Starting with the most elementary exercises, the instructions lead up to work of the most advanced type. Expensive special apparatus is not essential.

302 pages; 6 by 9; $3.50

### X-Ray Crystallography

By M. J. Buergger, Associate Professor of Mineralogy and Crystallography, Massachusetts Institute of Technology.

This volume is the first to deal exclusively with modern x-ray crystallography. It presents a detailed account of both theory and practice, and shows the essentials for learning the subject and for performing investigations in this field. Especially designed for student use.

531 pages; 6 by 9; $6.50

### Aerial Bombardment Protection

By H. E. Wessman, Chairman, Department of Civil Engineering, and W. A. Rose, Assistant Professor of Structural Engineering; both at New York University.

This book covers the types of bomb now in use, what sort of damage each does, and how people and buildings can be protected against them; design data for new buildings, and the necessary variations from standard structural practice; how to build shelters; how to camouflage buildings; and other important engineering contributions to civilian defense.

372 pages; 6 by 9; $4.00
THE SUN'S TEMPERATURE

Hitler, in his last speech before launching his much-delayed spring drive, repeated his alibi about the chilliness of the winter in Russia. If the earth's weather were only directly dependent on the sun's heat, it would be possible to promise him even colder winters for the next four years. Data compiled by Smithsonian Institution observers in many parts of the world, and by Dr. Charles G. Abbot, secretary of the institution, together with L. B. Aldrich and W. H. Hoover, indicate that the sun will be at its lowest ebb, thermally speaking, in 1945. After that, our planetary system's central furnace will begin to warm up again.

Unfortunately, the relation between the sun's radiation and the earth's temperature is not so simple and direct as that. Cooling off of the sun might even result indirectly in warming up of certain parts of the earth, by reducing the amount of cloudiness and thereby letting the sun's rays, even though diminished, shine longer on the earth surface.

Confident prediction of long-range fluctuations in the heat radiated by the sun can be made because of the many thousands of accurate readings of solar heat, taken daily with specially designed, highly sensitive instruments, in observatories at Mt. Montezuma in Chile, Mt. Saint Katherine in the Sinai wilderness and Table Mountain in the Mojave Desert of California. These have been carefully tabulated and are published, with interpretations, in Volume 6 of the Annals of the Astrophysical Observatory of the Smithsonian Institution, just off the press.

Study of this mass of data shows that there are 14 distinguishable intensity cycles in the sun's radiation. Some of them are of only brief duration, others require years for the swing from high to low. Once every 23 years, all the lows come in together, and that combination low-point is due in 1945.

There seems to be little direct relation between solar radiation per se and the numbers of sunspots. Sunspots, however, do have their own effect on the earth's weather. They give off vast streams of electrically charged particles that shoot through space. Some of them, entering the earth's atmosphere, serve as nuclei for the condensation of water vapor in the upper atmosphere and thus lead to the increase of cloudiness and of rainfall, which may be entirely independent of heat effects.

LATEST COMET TO RETURN THIS YEAR

A comet whose terrestrial history is more significant than its celestial record has returned to our evening skies, bringing with it an example of the results of international coordination. "Pure science knows no international barriers" is a statement made by modern scientists, but often its truth is belied by the serious facts of war.

But the heavens are still free hunting-grounds for all men, and friend and foe alike coordinate their efforts in tracking down its vagabonds, chief of which are the ever-mysterious comets. The latest wanderer into our embroiled part of the solar system is what astronomers prosaically call "periodic comet Grigg-Skjellerup."

According to Dr. Harlow Shapley, director of Harvard College Observatory, the new visitor might well be called the international salesman of the sky, for it represents first New Zealand, then Finland, then England, Belgium, the United States, Sweden, Denmark, and last, but not least, Japan. No two countries figure twice in its history, which begins with its discovery by the New Zealander, Grigg, in 1902.

The latest rediscovery of comet Grigg-Skjellerup has been made by a Japanese astronomer, S. Kanda, our information coming in the form of a cable from Lund, Sweden, where it had been received from Copenhagen, Denmark, which had received the news from Japan. (In the past year, Lund has replaced Copenhagen as a clearing house for European and Asiatic information.)

However, Kanda's observation was no news to American astronomers, as the Belgian-American, Dr. George Van Biesbroeck, at the Yerkes Observatory of the University of Chicago, had already seen the comet on April 11. Dr. Shapley stated that announcement of this failed to reach Lund, as cablegrams and radiograms can not go through, and Harvard's regular announcement cards, sent by mail, are apparently still in transit.

Finland enters this comet's history in 1922, when Skjellerup rediscovered it; after that it was seen in 1927 and at five-year intervals. Its return this year was therefore expected, and the position reported by Kanda is almost exactly at that place predicted by English astronomer Cripps (not Sir Stafford).

Amateur astronomers may want to look for comet Grigg-Skjellerup, which Kanda reported to be 10th magnitude on May 9. It is moving rapidly through the southeastern part of Gemini in a northeasterly direction. Its positions are:

- May 17: right ascension 7 hours 37 minutes, declination 15 degrees 4 minutes north;
- May 25: right ascension 8 hours 11 minutes, declination 19 degrees 32 minutes north;
- June 2: right ascension 8 hours 53 minutes, declination 25 degrees 15 minutes north.

—Charles A. Federer, Jr.

A NEW INSECTICIDE

A new insect-killing chemical, derived from Southern pine, promises to increase American independence of war-pinned imports. The substance, discovered by chemists of the Hercules Powder Company at Wilmington in the course of research on turpentine and pine oil, can be substituted for pyrethrum and rotenone in fly-killing sprays used in homes and dairy barns. It is stated to be effective against such domestic pests as mosquitoes, roaches, moths, ants, mites, silverfish, bedbugs, centipedes and spiders.

Pyrethrum, at present the principal ingredient of insect
Stereoscopic Dissecting Microscope XV

with Inclined Eyepieces and Large Field of View, Revolving Objective Carrier, Built-in Illuminating Device for Incident Light. Magnifications: 16 to 216x

Leaflet Micro 510 upon request

WE BUY, REPAIR, RECONDITION, RESELL USED ZEISS INSTRUMENTS

CARL ZEISS INC.

485 Fifth Avenue, New York

728 So. Hill Street, Los Angeles
sprays, was formerly practically a monopoly of Japan. Now it is produced on a large scale in the British African colony of Kenya, but lack of shipping has cut the supply. Rotenone, the other great fly-spray poison, comes from plants that grow in the East Indies and also in South America. But the Japs have the East Indies for the time being, and shipping lack again imposes restrictions on the South American supply. Promise of a large supply of home-made insecticide is therefore welcomed by spray manufacturers and users.

After trials on laboratory fly populations, the claim is made that the new material kills females as effectively as it does males. For some unknown reason, pyrethrum sprays have been chiefly effective against male flies. Obviously, a better kill of females is a great advantage.

The cost of the new insecticide is said to compare favorably with that of pyrethrum. Chemically, it is defined as the thiocyanatoacetate of a secondary terpene alcohol. For convenience, it has been given the trade name Thanite.

Experimental work with the killing agent in fly sprays has been carried on by a cooperative fellowship at the University of Delaware under the direction of Dr. L. A. Strearns, and in livestock sprays by the Kansas State College of Agriculture under the joint direction of Dr. Roger C. Smith, of the Entomology Department, and Dr. F. W. Atkeson and Dr. A. O. Shaw, of the Dairy Husbandry Department.

SURGICAL OPERATION FOR DEAFNESS

Delicate surgery which resulted in improved hearing for 88.9 per cent. of 117 patients who were hard of hearing is described by Dr. George E. Shambaugh, Jr., of Chicago, in the current issue of the Journal of the American Medical Association.

The patients' hearing had been damaged by an abnormal growth of sponge-like bone over the tiny "window" in the inner ear which normally admits the sound waves. Termed otosclerosis, this condition was found the cause of hearing loss in 70 per cent. of cases studied by Dr. Shambaugh in Washington.

Normally the sound waves are carried by the ear drum and the hammer, anvil and stirrup bones to the auditory nerve, and thence to the hearing centers of the brain. The sound is transmitted to the auditory nerve through a tiny oval window. In patients with advanced otosclerosis this little window is closed to sound, and the patient's hearing is impaired.

Dr. Shambaugh cuts a new window in the inner ear with a dental finishing burr. He uses a binocular dissecting microscope to help him see the very tiny inner ear structures while making the new window. During the operation, Dr. Shambaugh constantly irrigates the ear to wash away every particle of the bone dust while making the window to prevent the dust from falling into the window and leading to the formation of new bone which would close the new window. Such closing of the new-made window has been a cause of failures of the operation in the past.

Use of the microscope and the irrigation are Dr. Shambaugh's contribution to the so-called fenestration operation. He has successfully restored permanent hearing to most of his 117 patients by means of this operation over a period of more than three years.

Dr. Shambaugh considers restoration of hearing probably permanent if it remains after six months. If the operation is successful, the patient hears better than with a hearing aid.

However, Dr. Shambaugh states that the operation is not always successful and in some cases the hearing is made worse. Further, the operation is of no value if the auditory nerve does not function normally. His patients, therefore, are selected with care.

PSYCHIATRIC EXAMINATIONS OF NAVAL RECRUITS

How Navy psychiatrists are saving money and precious manpower for both the Navy and local communities by returning to suitable jobs in civilian life those men likely to break mentally under the unusually severe strains of sea warfare was disclosed by Commander Uno H. Helgessen before a joint meeting of the American Psychiatric Association and the American Psychopathological Association. Very prompt psychiatric first aid treatment for battle casualties was also urged. He suggested mobile first-aid posts which could be sent right to the scene of battle.

The Navy is not the cold, impersonal machine that military organizations are commonly thought to be, Commander Helgessen said. Consideration has been given to the effects on the individual and community morale of sending a man home after he has been sworn in.

So the Red Cross was requested to furnish psychiatric social workers who act as liaison between the Navy and the community and family. Through local Red Cross chapters, psychiatric social workers at the Navy training stations have been able to get the rejected men into their old jobs or into new ones better suited to them, or they have put them into the hands of competent clinics or welfare organizations for such assistance as they need. It is explained to the rejected man that as a civilian worker he has a function as important in this war as that of a sailor.

Those rejected include the "weak sisters," the "gripes" and those who resent authority and the "sick bay addicts" who can rarely be counted on in an emergency, as well as men with epilepsy or the early symptoms of actual mental disease. If such men were not removed from duty early in their service, it would deprive war industries of workers and at the same time be a great loss to the Navy.

"The economic loss from this kind of casualty, although it probably would run into the millions in a year's time, is not so serious as the loss in manpower and efficiency," Commander Helgessen said.

"We have no unlimited supply of commissioned officers and petty officers to train our new recruits. All the money in the world can not buy a ready-made experienced commissioned officer or petty officer. Economy of manpower is, therefore, particularly essential among officer and petty officer personnel."

Mobile psychiatric first aid posts were urged by Com-
SCIENCE

A weekly journal, established in 1883, devoted to the advancement of the natural and exact sciences, the official organ of the American Association for the Advancement of Science. For forty years SCIENCE has been conducted by its present editor, and is now generally regarded as the professional journal of American men of science.

Annual Subscription $6.00; single copies 15 cents.

THE SCIENTIFIC MONTHLY

An illustrated magazine, devoted to the diffusion of science, publishing articles by leading authorities in all departments of pure and applied science, including the applications of science to education and society.

Annual Subscription $5.00; single copies 50 cents.

THE AMERICAN NATURALIST

A bi-monthly journal established in 1867, devoted to the biological sciences, with special reference to the factors of organic evolution.

Institutional Subscription $5.00; Individual Subscription $3.00; Single Copies $1.00.

SCHOOL AND SOCIETY

A weekly journal covering the field of education in relation to the problems of American democracy. Its objects are the advancement of education as a science and the adjustment of our lower and higher schools to the needs of modern life.

Annual Subscription $5.00; single copies 15 cents.

AMERICAN MEN OF SCIENCE

Sixth Edition

A biographical directory. This book is essential for all workers in science and is an invaluable work of reference for libraries and for all having relations with scientific men. It contains about 28,000 names. Seventh edition in course of preparation.

Price: Twelve Dollars net, postage paid.

LEADERS IN EDUCATION

Second Edition

A biographical directory of leaders in education along the lines of American Men of Science. This directory contains over 17,000 names.

Price: Twelve Dollars net, postage paid.

BIOGRAPHICAL DIRECTORY OF AMERICAN SCHOLARS

In Preparation—Names of approximately ten thousand scholars of the United States will be included who are engaged in research in the fields of the humanities and of the social sciences.

Price in advance of publication $9.00.

THE SCIENCE PRESS
LANCASTER, PENNSYLVANIA

SUBSCRIPTION ORDER

TO THE SCIENCE PRESS
LANCASTER, PA.

Please find enclosed .......... in payment of subscription to ..............

................... for the year beginning ..............

Name ..........................................................

Address ....................................................

........................................................................
mander Helgesson to care for psychiatric battle casualties. These acute mental conditions following combat are of quite a different nature from peace-time neuroses. They are mental breakdowns in the face of difficulties which are not the common experience of man. It is a well-known fact that the majority of these combat casualties can be returned to useful civilian occupations if treated early enough. The trouble is that naval casualties occur in widely scattered areas and a long time, sometimes weeks, may elapse before they reach a naval hospital.

Among British casualties and also American, there are some who go into a deep stupor like that in some cases of the mental disease schizophrenia. But in the case of the battle casualties, it has been found that prompt treatment results in quick and relatively complete improvement. This peculiar form of psychiatric battle casualty seems to be more common in this war than in any before.

**FLUORINE AND TOOTH DECAY**

Hopes of preventing tooth decay by swabbing a chemical solution on the teeth appears in a report by Dr. Virgil D. Cheyne, of the School of Dentistry of Indiana University, in the *Journal* of the American Dental Association.

The solution is potassium fluoride. Drinking water that contains fluorides causes the ugly condition of mottled enamel, but even a small amount of fluorides in the water, it has been discovered, prevents tooth decay. However, this effect, it was formerly believed, depended on the fluorides getting into the teeth via the drinking water at a very early age, while the teeth are being formed in the jaws. Recent experiments by others suggested that the fluorides might get into the teeth enamel after the teeth had erupted. Dr. Cheyne swabbed a potassium fluoride solution every three months or so on the "baby" teeth of 27 four- to six-year-old children from the underprivileged sections of Indianapolis. All the children had decayed teeth at the start of the experiment. One year later these children and nineteen others with the same economic and dental status were reexamined. These nineteen untreated children had developed almost twice as much new tooth decay as the 27 treated children. Further tests on more children over a longer period of time will be needed for final evaluation of the method, but the results so far point to a new method of attacking the widespread problem of tooth decay.

**ITEMS**

New earthquake shocks felt in Guayaquil, Ecuador, on Friday, May 15, were not centered at the same point as the ones that caused death and wreckage in the city on the previous day, according to the report of seismologists of the U. S. Coast and Geodetic Survey after examining wired data transmitted from three American observatories. At least one of the disturbances originated under the sea bottom about 100 miles off the coast, in latitude 1.5 degrees north, longitude 81.5 degrees west. It was a fairly strong shock, beginning at 4:38:06 A.M., E.W.T.

That realistic background of beautiful scenery or exotic landscape that you see in a movie may be merely another movie. Instead of going on location for all outdoor scenes, the new technique of projecting allows producing companies to work indoors with all the comforts and advantages of studio life and the results of shooting in the great outdoors. R. W. Henderson, of Paramount Pictures, told the Society of Motion Picture Engineers meeting in Hollywood that this relatively new method of photographing for background purposes other motion pictures projected on a translucent screen allows the making of some scenes that would be impossible by any other means. The projection background method is also resorted to when unforeseen difficulties delay production schedules.

That ready-made spare parts for repairing defects in human skulls are now available, is reported by Dr. Claude S. Beck, of the School of Medicine of Western Reserve University, in the *Journal* of the American Medical Association. They are metal plates made of the alloy, vitallium, which have been found most satisfactory for repair of skull and other bone defects. Heretofore plates used to repair skull defects, for example, to replace a piece of skull removed in case of tumor, have been specially cast from a pattern of the defect. Dr. Beck had "the idea of using plates made up in various sizes and kept in stock so that the surgeon could use them when needed." The plates might be useful in the care of war wounds, he points out. If the wound is not infected, the plates might be put in at the first operation. Almost any defect can be repaired by plates whose measurements are 6, 10 and 14 centimeters in length and 2 or 3 centimeters in width.

The U. S. Public Health Service has published a report of what it believes is the first discovery of a live mouse on a passenger plane in quarantine. The animal was found in the galley of an airliner from San Juan, Puerto Rico, after the plane landed at the quarantine station in Miami, Fla. The Federal health service points out that mice have been found to carry the germ of lymphocytic chorio-meningitis, a dangerous but little known disease which attacks humans. More important, they state, is the possibility of plague-infected rats boarding planes unknown to passengers or crew, and contaminating food.

One million pounds of dehydrated apples are being bought by the Army for apple sauce, apple pie and eating with cereal. One part (by weight) of the dehydrated apple "nuggets" equals seven parts of sauce or pie filling, and is superior in flavor to the dried fruit, Army food experts say. So far the apple is the only dehydrated fruit, except the lemon, being purchased for U. S. troops, because for most fruits now bought on a quantity basis the dried form is satisfactory. The dehydrated fruit is said to have a "delicious, tart flavor."

Organic changes, rather than psychological, may explain the results obtained from electric shock therapy, in the opinion of Dr. Bernard Glueck, Jr., of Stony Lodge, Ossining, N. Y., reported at the Boston meeting of the American Psychopathological Association. In five patients suffering from manic-depressive and involutional psychoses, the organic disturbances of the brain cortex and other physical results from electro-shock therapy may explain their prompt response to this treatment.
BIOLOGICAL SYMPOSIA
Volume VI
GENETICS
Edited by
TH. DOBZHANSKY
Professor of Zoology, Columbia University, New York, N. Y.

This volume includes three symposia presented at the Dallas meeting of the American Association for the Advancement of Science by the American Society of Zoologists held from December 29, 1941, to January 3, 1942. It contains a total of 360 pages.

CONTENTS

I. Symposium on Temperature.
   Introduction. H. H. PROUGH.
   Temperature and Spontaneous Mutation. H. H. PROUGH.
   Induction of Polyploidy in Animals by Extremes of Temperature. G. FANKHAUSER.
   Temperature and the Differentiation of Characters in Drosophila. GEORGE P. CHILD.
   Temperature Factors in the Development and the Evolution of Sex. EMIL WITSCHI.
   Isolating Mechanisms, Evolution and Temperature. H. J. MULLER.
   Form and Function in Frizzle Poultry. WALTER LANDAUER.
   Seasonal Factors in Gall Wasp Distribution. ALFRED C. KINSEY.
   The Role of Temperature in the Speciation of Plants. JOHN A. MOORE.

II. Symposium on Isolating Mechanisms. J. T. PATTERSON, Chairman.
   The Role of Isolation in the Differentiation of Plant Species. G. LEOYARD STEBBINS, JR.
   Isolating Mechanisms in a Complex of Four Toad Species. ALBERT P. BLAIR.
   Isolating Mechanisms in Gall Wasps. ALFRED C. KINSEY.
   Isolating Mechanisms in the Genus Drosophila. J. T. PATTERSON.

III. Symposium on the Genetic Control of Embryonic Development.
   The Role of Genetic Differentials in the Embryonic Development of Amphibia. V. C.
   TWITTY.
   Morphogenesis of Genetic Abnormalities in the Chick. V. HAMBURGER.
   Physiological Genetics of Melanin Pigmentation of the Guinea Pig. SEWALL WRIGHT.

Price $3.50
THE JAQUES CATTELL PRESS
Lancaster, Pa.

The Rat
in Laboratory Investigation

By
A Staff of
Thirty Contributors

EDITED BY
JOHN Q. GRIFFITH, JR., M.D. and EDMOND J. FARRIS, Ph.D.
Associate in Medicine
University of Pennsylvania
Executive Director and Associate
in Anatomy, The Wistar Institute

In its comprehensive treatment of the rat in all fields of research, this work includes chapters on Breeding, General Methods, and Gross Anatomy, Embryology, Diet, Teeth, the Digestive System, Metabolism, the Central Nervous System, Psychological Phenomena, Circulation, Hormones, Drugs, Hematology, Radiology, Surgery, Histology, the Oseous System, the Eye, Parasitology, and Spontaneous Diseases. It thus affords a complete guidebook of laboratory technics.

J. B. LIPPINCOTT COMPANY, E. Washington Sq., Phila.

Please send me The Rat in Laboratory Investigation ($7.50)

☐ Check enclosed  ☐ Send C. O. D.  ☐ Charge my account

Name ............................................................

Address ........................................................
Health gets top priority in America's fighting forces

Vigorous health is essential for the men who must attack the enemy and bring victory to the United Nations. In past wars, disease has taken a far greater toll of life than bullets.

Today well equipped government scientific and medical staffs should receive credit for the fact that America's armed forces are better fed, better clothed and in better physical condition than any other army in history.

Almost countless are the tasks given the microscope in these undertakings.

Spencer's greatly increased facilities are breaking all production records in the race to supply the United Nations with the instruments it so vitally needs.

Optical instruments are so vital to defense that the nation's needs absorb practically all of Spencer's greatly increased production. We are, of course, endeavoring to give our customers the best possible deliveries, but understandable delays and shortages are bound to occur.

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