

FILE NAME: Reichhold (REI)

DATE: 1964 Oct 31

DOC#: REI014

DOCUMENT DESCRIPTION: Article from Trade Journal – Science
Newsletter

(15)

October 31, 1964

VOL. 86, NO. 18 PAGES 273-288

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Fastest and Mightiest

See Page 279

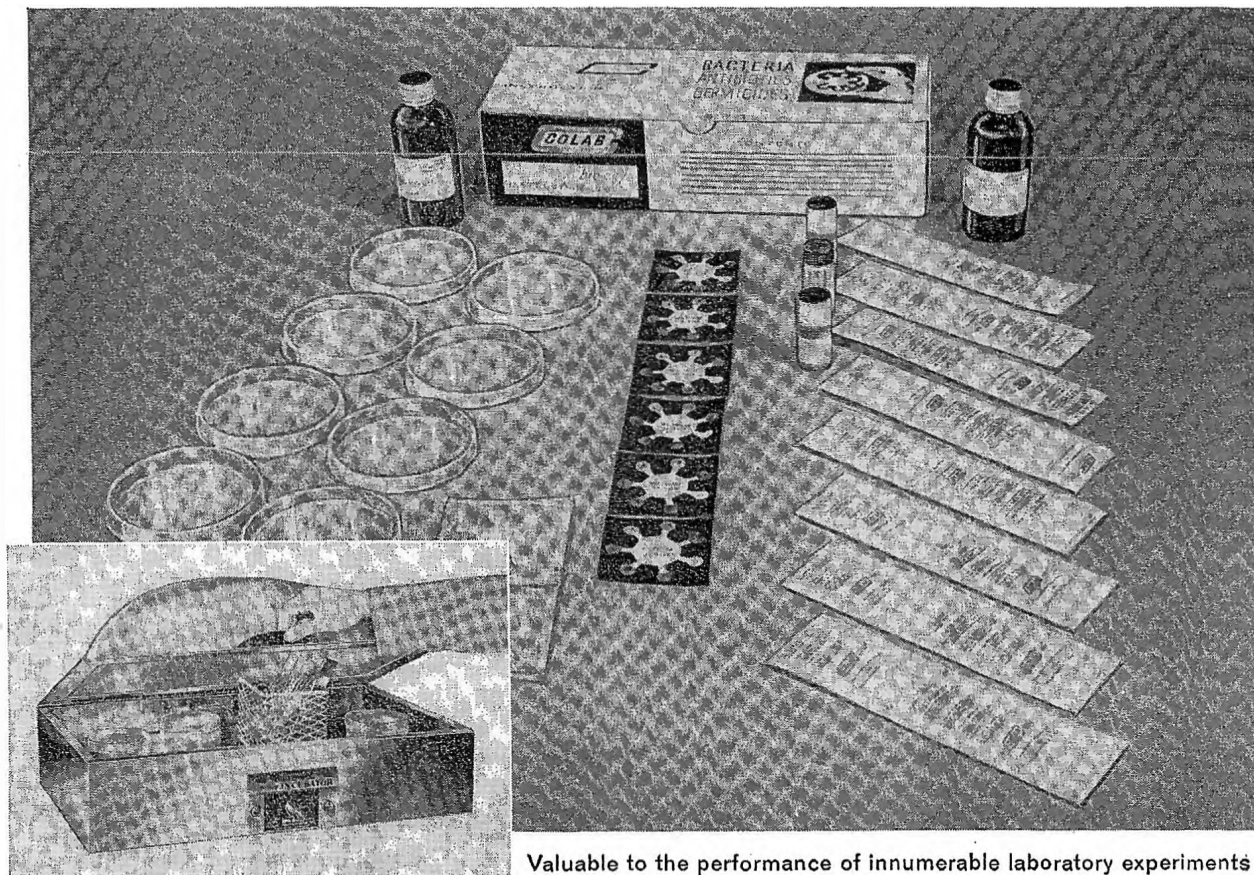
UNIV OF DELAWARE
MEMORIAL LIBRARY
DEC 65 106-276 5

A complete teaching unit

FOR THE STUDY OF

BACTERIA

and their sensitivity to antibiotics and germicides



Visible Dome Incubator Also Available

Valuable to the performance of innumerable laboratory experiments with microorganisms and demonstrating bacterial sensitivity to antibiotics and other drugs, disinfectants and germicides.

11-66G
BACTERIOLOGICAL TEACHING KITS
\$3.25 ea.
 12 or more Kits . . . \$3.00 ea.
 F.O.B. Chicago Heights



TEACHING UNIT CONTAINS:

- 8 plastic sterile disposable petri dishes.
- 1 vial of Ringer's Solution containing 1% sodium hexametaphosphate which will dissolve a calcium alginate swab
- 8 sterile calcium alginate swabs packaged one per envelope
- 1 vial Stuart's Transport Medium which can retain the viability of bacterial specimens for as long as two to three weeks.
- 1 100 ml screw cap vial for procuring liquid or solid specimens.
- 2 bottles each containing 100 ml of a highly nutritive bacteriological medium.
- 6 packets containing Multidisk sensitivity discs impregnated with:

P Green	Penicillin
S Blue	Streptomycin
A Yellow	Chlortetracycline
N Pink	Neomycin
E Red	Erythromycin
C Purple	Chloramphenicol
- 2 sterile blank Multidisks which may be used to show the bacterial activity of germicides and disinfectants

Literature on Teaching Kit and Visible Dome Incubator Available on Request.

COLAB LABORATORIES, INC. • CHICAGO HEIGHTS, ILLINOIS, U.S.A.

In Canada order from: CONSOLIDATED LABORATORIES (CANADA) LTD 66 Milvan Drive, Weston, Ontario

PHYSIOLOGY

Talk Via Brain Waves

Controlling the activity of brain waves might enable paralyzed stroke victims, despite their lack of muscle movement, to communicate with others—By William MacLaurin

➤ A NEW TWIST in interpreting brain waves shows promise as a possible way to bring paralyzed stroke victims out of their "living death" world of no muscle movement back into the world of communication.

As with many great scientific advances, the discovery was made unintentionally. During an experiment in which a scientist was measuring his own brain waves, he was suddenly impressed with the fact that he could control their activity.

Dr. Edmond M. Dewan, Air Force Cambridge Research Laboratories, Hanscom Air Force Base, Bedford, Mass., told SCIENCE SERVICE it was at that time that he recognized the possibility of communicating with brain waves.

The particular brain waves he has been working with are called alpha waves. It is believed these waves are produced by a generalized flow of electricity through the gray matter of the brain.

The interesting thing about these waves is that they can be controlled without muscle movement. All a person has to do to turn them on is relax as if going to sleep. To turn them off, all one has to do is concentrate on a scene or object.

For this reason, Dr. Dewan believes these waves can conceivably be used as a communication device for persons who have lost their ability to move. Once such a person has learned how to manipulate his alpha

wave rhythm pattern, it becomes possible for him to communicate through Morse Code, or some other simple response system.

Dr. Dewan said one possible drawback to his idea is that all people do not have the ability to turn their alpha waves on and off. It is believed by some experts, however, that the majority of people can.

The process of recording these brain waves is really quite elementary, Dr. Dewan said. It consists of nothing more than placing electrodes on the head and running the signals emitted through a special amplifier and filter to eliminate all other waves except the normal 10-cycle-per-second alpha waves.

This apparatus is hooked to a switch that allows electricity to flow when the alpha waves come through. When the alpha rhythm is blocked the switch goes off, stopping the current.

As of now, no stroke victims have been tested with the system. The only "guinea pig" who has been used is Dr. Dewan himself, but he is thinking about expanding his experimental sample.

Dr. Dewan said brain wave communication is not a way to read other people's minds. It is simply a device whereby one person can "speak his mind" without vocalizing or without moving a muscle.

Other brain waves could also be used someday for communication, Dr. Dewan said.

• Science News Letter, 86:275 October 31, 1964

have been testing arrangements of one to ten vibrators to determine what patterns can be discriminated from others. By doing this they hope to discover "vocabulary" patterns which will not become mixed up when a message is transmitted.

While the Princeton scientists are doing much that may be of great practical importance to man in the future, they emphasize that their role is that of basic researchers.

"We have not looked into the question of the whole range of individual differences in sensitivity, or things like that, very much—just what the skin can do," Dr. Geldard said. "If one subject can do it, that is enough to show that it is possible."

• Science News Letter, 86:275 October 31, 1964

PHYSIOLOGY

Brain Waves Link Blood Pressure and Mind

➤ BRAIN ACTIVITY is the major determinant of blood pressure during sleep, a medical researcher told the American Heart Association meeting in Atlantic City.

Dr. David W. Richardson of the Medical College of Virginia, Richmond, said he and other investigators found this to be so by measuring electrical brain waves in 19 healthy persons while they slept. Persons who were awake could not be used because the brain's waves are "drowned out" by other body processes.

Blood pressure was found to drop gradually as sleep deepened, Dr. Richardson said. However, an abrupt decrease in the depth of sleep was always accompanied within two seconds by a sharp rise in blood pressure.

Co-authors of the paper presented by Dr. Richardson were Dr. John A. Honour of Oxford, England, and Dr. George W. Fenton of London.

• Science News Letter, 86:275 October 31, 1964

PSYCHOLOGY

'Hearing Through Skin'

➤ STEER an airplane without using eyes and ears?

Exciting research being conducted at Princeton University, Princeton, N.J., may someday make such a feat possible. It may also permit blind and deaf persons to gain experiences that would normally be outside their world.

This research deals with "skin communication," or perceiving through the skin, messages that have been restricted to other senses. At Princeton, scientists have been trying to get the skin to follow a language in much the same way that the ear does.

Dr. Frank A. Geldard, professor of psychology at Princeton, and a leader in skin communication research, is approaching the problem of hearing through the skin by using vibrations. These vibrations are arranged in "vibratese" or a vibrator language that has 45 elements.

This new language was developed because past experiments have shown that skin cannot distinguish well between voice frequencies. For example, when the fingertips are placed upon the diaphragm of a loudspeaker,

a rise in "loudness" is perceived as a drop in "pitch."

So far, experiments with the new language have appeared promising. One person who was taught vibratese received messages at 38 words per minute with 90% accuracy. The military standard for Morse Code is only 18 words per minute.

Vibratese is passed on to the skin by a small vibrator invented by Dr. Geldard's close associate at Princeton, Dr. Carl E. Sherrick. The vibrator is light, powerful and can be attached anywhere on the body.

Dr. Sherrick told SCIENCE SERVICE that definite learning processes are needed for people to pick up this skin communication. It does not have mystical and other-world connotations as does another skin phenomenon, "finger sight."

A big difference between the two is that finger sight—the ability some people seem to have of differentiating between colors with their fingers—does not involve pressure stimulus as does skin communication with vibrations, Dr. Sherrick indicated.

For the past year, the Princeton scientists



Cutler-Hammer

CELL ANALYZER—This new system for cellular studies, the CYDAC cytophotometer, speeds up cell analysis and records resulting data for later computer processing. The device was developed by Cutler-Hammer's Airborne Instruments Laboratory Division for the National Cancer Institute.

Doctors Trim 2 Inches Off Flabby Waists!

German doctors at the famous Max-Planck Institute have discovered an instant-workout method that can reduce waistlines in 30 days. Called "isometric contractions," one 80-second daily workout can reduce waistline fast. 10 simple exercises can put the whole family in shape fast. No sweat, strain or tiring repetitions. Acclaimed internationally by physiologists, coaches, athletes. Results guaranteed. Free, illustrated information. Write **AWARD-WINNING ISOMETRICS**, Minute Home-Gym, Inc., Dept. B, 87 Centuck Station, Yonkers, N. Y. 10710.

It's Like Driving In A Contour Chair!



WITH TOURIST AUTOMOTIVE HEAD REST engineered for driving pleasure. Until you use TOURIST you can't possibly appreciate what it adds in comfort. Patented adjustment makes relaxing passenger head rest. OR supports back and shoulders to keep driver alert. Helps prevent "whiplash injuries". Straps on in seconds with various fittings, stays put. Shaped foam, with rich leather-soft vinyl cover, gold trim. Specify: Gray, white, red, beige, blue, tan, or black. \$8.95 postpaid. Deluxe for driver \$9.95. (Order Model V for Volkswagen.) Send check or money order to . . . TOURIST Corp., Dept. SN10, 5801 N. Federal, Denver, Colo. 80221

SURPLUS SATELLITE BATTERIES 99¢ each



These Government surplus storage battery cells are nickel-cadmium sintered plate type used in satellites and missiles due to characteristics not possessed by any other battery. i.e. Lifetime service, constant voltage during discharge, extreme temperature ranges, discharges in any position, compact, high discharge rates (up to 25 times ampere hour capacity), no corrosive fumes, not harmed by storage, overcharging and freezing.

CELLS ARE 1.25 V. EA. REGARDLESS OF TYPE. Replace with these cells to operate any equipment using dry or wet batteries where portability, dependability, and ruggedness are requisites. Select cells from list to best fit application.

NICKEL-CADMIUM PLASTIC CASED CELLS:

Esse Type	Ampere Hours	Dimensions Inches	Wt. Ozs.	Cond. (N) New (U) Used	Price
AH4	4-6	8.00 x 2.00 x .5	6	U*	\$.99
AH4R	4-6	8.00 x 2.00 x .5	6	U	1.49
AH4R	4-6	8.00 x 2.00 x .5	8	N	2.49
AH6	6-10	4.00 x 2.12 x 1.06	8	N	4.95
AH20N	20-30	8.12 x 3.12 x 1.06	40	U*	9.95
AH34N	30-40	9.38 x 3.12 x 1.38	52	U	9.95
AH60N	60-80	11.25 x 5.00 x 1.38	104	U	14.95

Types ending in 'N' are nylon cased; others are acrylic plastic.

NICKEL-CADMIUM STEEL CASED CELLS:

Type M 30, size 8.875 x 3 x 1.750. Wt. 3 1/2 lbs. 30 AH. Used* \$2.95, New \$5.95 per cell.

Aircraft 28 V. Battery made up with 20 of these cells—Used* \$60, New \$125. Overall size 10" x 10" x 10". Wt. approx. 60 lbs.

Type LAL12H NICAD, 60 AH 12 V. laboratory battery made up in hardwood rack with 10 cells, overall size 11 1/2 x 5 x 26 1/4". Wt. 100 lbs.—New \$125.

IRON-NICKEL:

Type B-4 Edison 30 AH 6 V. battery of 3 cells in hardwood rack, used—\$25, New—\$40. Overall size approx. 18 x 10 x 6". Approx. wt. 50 lbs.

Guarantee: All cells are guaranteed for satisfaction or your money back except cells marked with an asterisk (*) which are sent as received from used Government stocks and not checked before shipping.

SEND FOR FREE PAMPHLET.

ESSE RADIO COMPANY

368 S. Meridian St., Indianapolis, Indiana 46225

MEDICINE

Danger of Lung Cancer In Asbestos Workers

➤ ASBESTOS WORKERS are in great danger of lung cancer and asbestosis, a serious lung disease caused by inhaling asbestos dust.

A conference on biological effects of asbestos in New York City, sponsored by the New York Academy of Sciences was told that cancer in these workers, either in the chest or elsewhere in the body, is believed related to exposure to asbestos dust.

A study of more than 1,500 asbestos insulation workers in the New York-New Jersey area showed that of the 307 who died during the past 20 years, 40% had died of cancer and 5% to 6% had died of asbestosis.

Of those who started to work with asbestos 40 or more years ago, 94% gave X-ray evidence of asbestosis, Dr. I. J. Selikoff of Mount Sinai Hospital, New York, said.

Another study, reported by Dr. W. J. Smither of the Asbestos Research Council, London, revealed a definite increase in the occurrence of lung cancer among workers in an east end asbestos factory in London.

A surprising discovery, Dr. Smither said, was that a relatively high number of cancers started in the pleura and peritoneum, the membranes lining the chest and abdominal cavities, and covering the organs within these cavities.

Asbestos dust is also affecting the lungs of city dwellers, regardless of whether or not they are asbestos workers, Dr. J. G. Thomson of the University of Cape Town Medical School, Cape Town, South Africa, pointed out.

Autopsies of 500 persons over 15 years of age in Cape Town and 500 more in Miami, Fla., showed asbestos "bodies" in many lung smears. (Asbestos bodies are asbestos fibers coated with an iron-containing substance.)

The use of asbestos has increased greatly in the past 50 years. Asbestos cement products such as pipes, flat and corrugated sheets and shingles, manufactured in most countries of the world, make up the largest use of asbestos. The second largest use of asbestos is in the manufacture of asphalt and vinyl asbestos floor tile.

• Science News Letter, 86:276 October 31, 1964

PUBLIC HEALTH

Urge TB Checks for Department Store Santas

➤ DEPARTMENT STORE Santa Claus should have tuberculin tests or chest X-rays because of their intimate contact with young children, the National Tuberculosis Association warns. Last year, at least one child developed tuberculosis after climbing up on the lap of a department store Santa Claus to ask for presents.

The association has issued a special Christmas season message to all department stores and other retail establishments employing Santa Clauses to be sure these jolly Saint Nicks are as healthy as they look.

• Science News Letter, 86:276 October 31, 1964

Questions

DENTISTRY—How have Army dentists been coping with mouth and jaw injuries in primitive areas? p. 281.

EDUCATION—What new method is being used to fight illiteracy in underprivileged areas? p. 278.

PSYCHOLOGY—How can a person hear through skin? p. 275.

PUBLIC HEALTH—Why should Santa Clauses be required to take tuberculosis tests? p. 276.

SPACE—What new innovations highlight the recently unveiled F-111 fighter plane, better known as TFX? p. 279.

TECHNOLOGY—How have scientists been taking a new look at the internal structure of the earth? p. 280

SCIENCE NEWS LETTER

VOL. 86 OCTOBER 31, 1964 NO. 18

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington, D. C. 20036. NORih 7-2255. Cable Address: SCIENSERV.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7 1/2 cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage. Change of address: Three weeks notice is required. Please state exactly how magazine is addressed. Include zip code.

Copyright © 1964 by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicated services issued by Science Service. Science Service also produces and distributes THINGS of science (monthly), produces and publishes books, and conducts the National Science Youth Program.

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member of Audit Bureau of Circulation.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Athelstan F. Spilhaus, University of Minnesota; Wallace R. Brode,*** Washington, D. C.; Bowen C. Dees, National Science Foundation. Nominated by the National Academy of Sciences: Henry Allen Moe, The Clark Foundation; Harlow Shapley, Harvard College Observatory; Detlev W. Bronk, Rockefeller Institute. Nominated by National Research Council: Leonard Carmichael,* National Geographic Society; Benjamin H. Waller, Johns Hopkins University; Eric A. Walker, Pennsylvania State University. Nominated by Journalistic Profession: O. W. Riegel, Washington and Lee University; Gordon B. Fister, Allentown (Pa.) Call-Chronicle; Ralph B. Curry, Flint Journal. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; Ludwell Denny, Scripps-Howard Newspapers; Edward W. Scripps II,** Edward W. Scripps Trust. *President; **Vice-President; ***Treasurer.

Staff—Director: Watson Davis. Assistant Director: Dorothy Schriver. Writers: Ann Ewing, William MacLaurin, Faye Marley, William McCann, Barbara Tuft, Judith Viest, Walter Wingo, Ruby Yoshioka. Science Youth Division: Joseph H. Kraus. Photography: Fremont Davis. Production: Marla Nelson. Syndicate Sales: Forrest L. Snakenberg. Librarian: Margit Friedrich. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410. Advertising Manager: Fred A. Moulton, METropolitan 8-2562, Washington, D. C.

GENERAL SCIENCE

Science Honored Hoover

The late President Herbert Hoover, who promoted scientific advancement throughout his life, received some of the scientific world's highest honors—By Barbara Tufty

► THE 31st PRESIDENT of the United States held honors no other President has held—among which is membership in the eminent scientific society, the National Academy of Sciences.

Herbert Hoover, who died Oct. 20, was also the first American President to have an asteroid named for him. Hooveria, one of the thousands of minor planets orbiting around the sun, was discovered by Professor Johann Palisan of the University of Vienna, Austria, in March 1920, and named for Mr. Hoover while he was engaged in providing food for Europe after World War I, before he was President.

Mr. Hoover started his career as a mining engineer after his graduation in 1895 from Stanford University, Calif.

He was in charge of very large mining enterprises in Australia, China, Burma, the Ural Mountains, Mongolian Siberia and South Africa. One early success in his mining career was to advance the flotation process of mining in Australia and work out a means of profitably recovering the metal zinc from low-grade silver ore.

During this technical stage of his life, Mr. Hoover successfully solved many social problems of workmen and their communities in areas throughout the world. For example, the Kyshtim project in the Ural Mountains maintained a community of 70,000 people who "were lifted by him through his scientific and social work from poverty and squalor to a high state of comfort and prosperity," stated the late Dr. Vernon Kellogg, an original trustee of SCIENCE SERVICE, early chairman of the National Research Council and close friend of Mr. Hoover's.

Mr. Hoover constantly stressed the importance of science and strongly urged the support by the people of "pure or fundamental sciences as a necessary basis for continuing advance in applied science."

"We have prided ourselves on our practicality as a nation," he said in a speech in 1925 before the American Society of Mechanical Engineers. "Would it not be a practical thing to do to give adequate organized financial support to pure science? If, by chance, we develop a little contribution to abstract learning and knowledge, our nation will be immensely greater for it."

In 1902, he was elected a member of the American Association for the Advancement of Science, and a fellow in 1915.

In 1922, he was elected a member of the National Academy of Sciences and in 1925 became chairman of a special board of men of science and public affairs called to establish a National Research Fund of several million dollars for the support of work in fundamental science.

Possibly one of the most honored Presidents in our history, Mr. Hoover received

honorary degrees from 85 institutions in the United States and abroad; 468 medals, awards, honors, including 67 gold medals from American and foreign organizations and societies; and 60 honorary memberships in scientific and technical societies.

Some of the awards for scientific merit include medals from the Mining and Metallurgical Society of America for "distinguished contribution to literature of mining," from the National Academy of Sciences for "eminence in the application of science to the public welfare," from the American Institute of Mining and Metallurgical Engineers for "achievement in mining," and in 1929 the John Fritz Gold Medal awarded jointly by the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers for notable scientific or industrial achievement.

In 1900 he was the first recipient of the Hoover Medal from the American Institute of Mining Engineers, an honor instituted to commemorate Hoover's civic and humanitarian achievements.

With his wife, Lou Henry, Mr. Hoover translated from original Latin a monumental book, "De Re Metallica," by G. Agricola, written in 1556 on mining and metallurgy. This translation appeared when Mr. Hoover was a resident in London, just before World War I.

• Science News Letter, 86:277 October 31, 1964

ASTRONOMY

Quiet Sun Is 'Acting Up' With Unusual Sunspots

► THE SUN, which is in the quiet phase of its 11-year activity cycle, is bursting forth with unusual sunspot and solar flare liveliness, a representative of International Quiet Sun Year's (IQSY) program reported.

The present quiet period was preceded by the most turbulent noisy phase recorded since systematic observation of the sun's activity was started 200 years ago. Dr. Martin A. Pomerantz, chairman of the U.S. Committee for IQSY, reported this in *Physics Today*, Oct. 1964.

• Science News Letter, 86:277 October 31, 1964

TECHNOLOGY

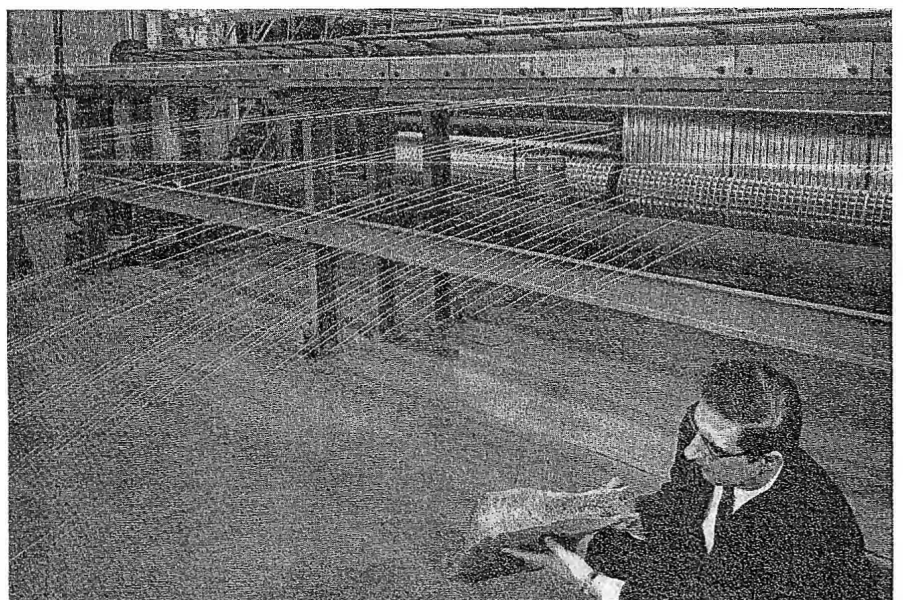
Giant Space Loom Weaves Stainless Steel

► A GIANT LOOM that can weave stainless steel, as well as normal yarn, is turning out goods for space.

The loom produces structures made of a material called Airmat, two airtight layers of cloth, connected by a network of "drop threads" woven between them. Airmat is being made and studied by Goodyear Aerospace Corporation, Akron, Ohio, as a means of converting boosters and free-falling re-entry capsules into maneuverable glide vehicles.

The loom, ordered as part of a United States Air Force contract, is one of the largest machines in the aerospace industry. Its product, Airmat, however, is not confined to possible use in space. It has been used for projects as earthbound as gymnasiums for the U.S. Navy's Polaris submarines.

• Science News Letter, 86:277 October 31, 1964



Goodyear

LOOM TO WEAVE STEEL—Stainless steel strands that are used to make Airmat material are shown being fed into the giant loom. An engineer inspects a sample of the finished product with the metallic threads stretched between the outer surfaces.

EDUCATION

Parent Learns With Child

► SCIENCE EXPERIMENTING, with both parent and child participating, may help overcome illiteracy in underprivileged areas.

An experimental program which is designed to fill the gaps in education that schools in deprived areas either could not or have failed to provide, is underway at Howard University in Washington, D.C., under the direction of Dr. Joseph C. Paige.

Known as the Elementary Science Project, the program attempts to teach children and parents simultaneously. Children from kindergarten through sixth grade are given simple instructions for science experiments which they perform jointly with their parents either in groups at school or in individual homes.

Families are prepared for participation in the program by visits from coordinators and interviewers.

Dr. Paige told SCIENCE SERVICE that "a major view of the project is that these children and their parents are merely temporarily handicapped by the absence of some significant factors in their environment," and that "a major goal of the program is to reduce the time of this disadvantage, especially in the science area."

During the period March 1 through Sept. 30, materials were tested on a group of children and parents from a low socioeconomic area and evaluated.

A further testing of materials and expansion of the project will continue through the school year.

In addition to the center in Washington, centers for the project have been established

in North Carolina and at the East River Children's Center of Mills College of Education in New York. A center is also planned for Jacksonville, Fla.

Materials for the program include science packets, kits and simple items adapted to the group.

SCIENCE SERVICE cooperated by supplying THINGS of science experimental kits. Special adaptations of units on sound, color, taste, space materials, metals and magnetic force, among others, are being used in the tests.

Modifications of materials developed by Science Materials Center, Inc., New York City, Ward's Natural Science Establishment, Rochester, N.Y., and some of the new experimental science programs were also used.

Because of the short attention span of children, the science experiments designed are short and simple, but still hold the interest of the performers.

A new activity of the Elementary Science Project, Dr. Paige said, is to provide science participation experiences for children, aged 7 to 14, in cooperation with the Commissioners' Youth Council of the District of Columbia.

The home experiences are supplemented with Saturday sessions held in the department of physics on the Howard University campus. Graduate assistants, university tutors and volunteers from the physical science program and the natural science honors program serve as tutors and group leaders.

Dr. Paige stated that activities are mostly performed using THINGS of science in this

program which was initiated early this month.

Project leaders hope that from the experimental program, guidelines for determining the effectiveness of science as a medium or vehicle for the promotion of literacy in general may evolve.

The project is supported by a grant from the Cooperative Research Branch, U.S. Office of Education.

Dr. Paige said that the project, now established as a non-profit organization, has met with overwhelming success and promise. The present plan would extend the life of the program through 1971.

• Science News Letter, 86:278 October 31, 1964

TECHNOLOGY

Computer Can Read Almost Illegible Writing

► A GIANT COMPUTER is "learning" to read handwriting and hand printing ranging in legibility from the efforts of grade-school children to the fast scribbles of college professors.

The success of this computer program, reported to the National Electronics Conference in Chicago, brings closer the time when computers can tackle without human supervision such jobs as the scrutiny of income tax returns, the processing of bank checks and statements, even the appraisal of weather maps for forecasting.

These and many other vital tasks could be handled by computers with high reading skills and the ability to learn from what they read.

To develop such ability in a machine means that it must first of all be programmed (instructed by tape or punch cards) to recognize various kinds of visual patterns—a problem on which engineers and computer scientists have been working for the past eight years.

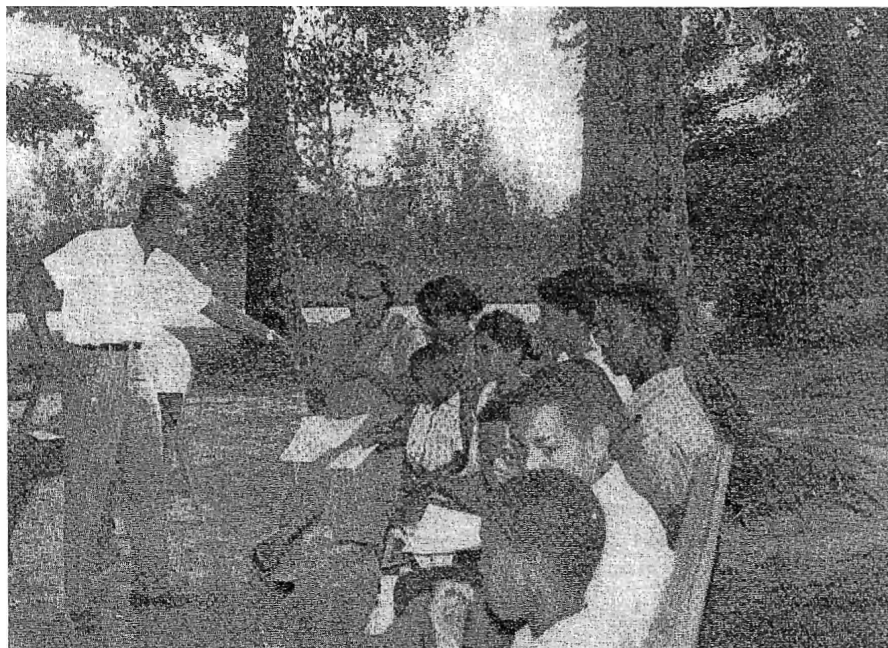
Recognition of machine-printed letters is relatively easy; investigators in the field have already developed such computer programs for research projects, although not for common commercial use. But to get the computer to recognize and act on a wider variety of visual patterns, none precisely alike and none completely predictable, as in handwriting, weather maps or targets in space, requires a system of far greater complexity.

Today's development, reported by Prof. King-sun Fu and graduate student C. H. Chen, of the School of Electrical Engineering, Purdue University, Lafayette, Ind., takes a long step in that direction. The Purdue computer learns from each new hand-written or hand-printed sample it "sees," changing its programmed instructions so it can recognize still more varieties of the same letters.

The researchers accomplished this by applying a sequential decision procedure, not previously used in practical problems of pattern recognition.

The computer makes a series of decisions in sequence, totaling a fraction of a second. The result of each calculation governs the next move. As the final step the computer prints out the letter it recognizes.

• Science News Letter, 86:278 October 31, 1964



Elementary Science Project

OUTDOOR CLASSROOM—Dr. Joseph C. Paige explains some elementary principles of sound using a THINGS of science experimental kit to children and their parents in one of the North Carolina groups of the Elementary Science Project.

SPACE

F-111 Gives and Takes

New innovations—the crew escape capsule, adjustable wings and low-level navigation system—highlight the recently unveiled F-111 supersonic fighter plane—By Jonathan Eberhart

See Front Cover

► THE F-111 SUPERSONIC FIGHTER plane, better known as the controversial TFX, borrows substantially from the nation's manned space program, and, in turn, is making some contributions of its own.

The most spectacular item in the F-111 to come out of space research is the remarkable crew escape module, in which the two-man crew would be ejected from the aircraft in case of an emergency.

The capsule is similar in many ways to the Mercury and Gemini space vehicles. In fact, McDonnell Aircraft Company, St. Louis, designer-builder of the capsule, was picked for the job by F-111 contractor General Dynamics because of its experience in crew capsule design for such programs as Projects Mercury and Gemini.

Emergency landing of the capsule is very much like that of the space-going versions. A parachute is shot out of the top of the capsule after a rocket motor has blasted the capsule clear of the plane.

A group of inflatable "balloons" beneath the capsule enable it to land "softly" on either land or water.

The capsule is designed to stay right side up as it hangs from the parachute, but it will also automatically right itself if it should somehow land upside down in the water.

The capsule is similar to the Russian "Sunrise," in that it provides a "shirtsleeve environment," requiring no pressure suits even at maximum altitudes above 60,000 feet. The crew of the F-111 will wear no oxygen masks, pressure suits or parachutes.

Unfortunately, the many spectators and officials at the first rollout of the plane at Fort Worth, Texas, Oct. 15 were not able to see the capsule. Due to its complicated design, the capsule will be in the hands of McDonnell for some months.

The capsule-less aircraft is shown on this week's front cover.

Though the space-age crew escape module is unique to the F-111, the feature by which the plane will no doubt be identified is the variable-sweep wing. The wing, adjustable in flight from an almost straight-out sweep angle of 16 degrees to a radically swept 72.5 degrees, is not a borrower from the space program, but rather a possible future beneficiary of it.

The reason for the adjustable wing is that it enables high performance of the plane both at subsonic speeds and at maximums above mach 2.5.

Similar variable-wing designs have been suggested by many experts as the basis for future earth-orbital "shuttles"—vehicles that would perform well at the outermost fringes of the atmosphere, as well as throughout the descent to earth. Such vehicles have been proposed for use in tasks ranging from

changing the crews of long-life space stations to performing emergency space rescue operations.

As America's (and the world's) first variable-wing airplane, the F-111 will be an invaluable proving ground for numerous applications.

Still another of the ties between the "earthbound" F-111 and the exploration of space is the navigation system. Among the F-111's numerous electronic devices is a bizarre gadget called "terrain-following radar," which could be just the thing to help Project Apollo astronauts land the Lunar Excursion Module (LEM) on the moon.

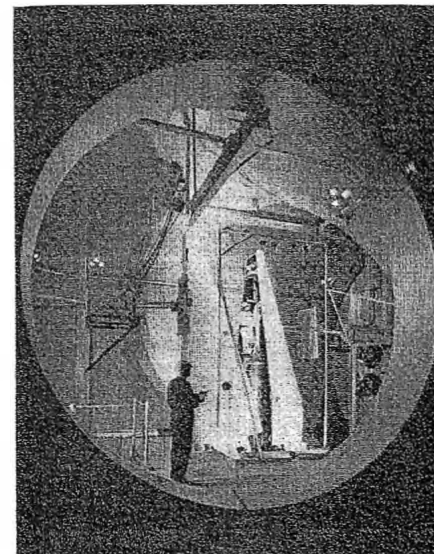
Terrain-following radar is essentially a conventional, low-level radar system, coupled to an elaborate electronic computer, which in turn is coupled to the altitude controls of the plane. It enables the pilot to fly right down at the "nap of the earth," below the level of enemy radar detection systems. If a hill or some other obstacle suddenly looms up in front of the plane, the system will automatically lift the plane over the obstacle, reacting much more quickly than the pilot ever could.

What help can this be on the moon? When the LEM and its crew are preparing to land, they will have enough fuel to travel

horizontally for one quarter of a mile, looking, through actual windows, for the exact spot. On a completely unknown planet, such a terrain-following system as that of the F-111 might prevent a major catastrophe.

The F-111 is a true "idea plane," and could be responsible for benefits far beyond the scope of its own performance.

• Science News Letter, 86:279 October 31, 1964



National Aeronautics and Space Administration

SIMULATED SPACE—The nose fairing for the Surveyor spacecraft expected to soft-land on the moon's surface is undergoing tests in this space environment chamber at NASA's Lewis Research Center in Cleveland, Ohio

SPACE

Map Interplanetary Field

► A SATELLITE IN SPACE and an observatory instrument on the ground have joined forces and "mapped" the shape and strength of the lines of force in the interplanetary magnetic field.

The satellite is the first Interplanetary Monitoring Probe, IMP-I, launched last Nov. 26. The other half of the team is the solar magnetograph at the Mount Wilson Observatory, near Pasadena, Calif.

The data from the joint experiment have indicated that the magnetic field near the earth closely "mimics" the field at the visible surface of the sun, the photosphere.

Changes in the direction of the field on the sun, detected by the Mt. Wilson magnetometer, are followed four and a half days later by similar changes in the magnetic field near the earth, which are measured by the magnetometers aboard the satellite. This indicates that the lines of force extend continuously across the 93 million miles of space between sun and earth.

The information from IMP confirms a theory called the "water-sprinkler" hypothesis which says that the lines of force emanating from the sun in the plane of the earth's orbit behave like streams of water whipping out from the whirling head of

a lawn sprinkler, due to the spinning of the sun and to the flow of the "solar wind."

Dr. Norman F. Ness of the Federal space agency's Goddard Space Flight Center, Greenbelt, Md., developed the IMP-I experiment. The solar magnetograph was the combined project of Drs. Harold and Horace Babcock of Mt. Wilson, and is operated by Dr. Robert Howard of the observatory staff.

Their research has revealed that the magnetic field changes direction over a 27-day cycle, with the change near the earth following the one at the sun by four and a half days. The time delay indicates that the average velocity of the solar wind is 230 miles per second.

The rotation of the sun tends to curve the lines of force which are dragged out from the sun by the solar wind. The faster the "wind," the straighter are the lines of force. At very high speeds, the lines would extend almost straight out, like the spokes of a wheel.

The data from satellite and observatory are the latest in a series of findings showing that outer space is not space at all, but a sea of ionized gases, atomic particles, shifting magnetic fields and planetary debris.

• Science News Letter, 86:279 October 31, 1964

TECHNOLOGY

New Instruments Study Earth's Internal Make-up

► SCIENTISTS are taking a fresh look at the internal structure of the earth by means of new and sophisticated instruments for picking out subtle earth vibrations.

This report by a University of California at Los Angeles team follows observations made during the Chilean and recent Alaskan earthquakes.

The group members, Drs. Louis B. Slichter, Gordon J. F. MacDonald, Michele Caputo, and Clarence L. Hager of the Institute of Geophysics and Planetary Physics used two LaCoste-Romberg gravimeters, new and sensitive instruments that can measure slow global vibrations, or modes, during large earthquakes.

Detecting modes during a shattering earthquake is somewhat like trying to pick out each separate note and overtone from a piano crashing off a truck.

"First we must have very acute instruments, then we have to strain the raw information through a computer to unscramble the mess, and then we spend months interpreting what we've got," Dr. Slichter explained.

Previously, scientists relied mainly on measuring the travel times of high-frequency seismic waves to probe the earth's interior.

The new method complements the older one, and each can serve as a check on the other. For instance, in analyzing the modes of the Alaska earthquake, the scientists found that the radial vibrations have a shorter period than expected from older earth-models.

• Science News Letter, 86:280 October 31, 1964

GENERAL SCIENCE

Nobel Winners Endorse Johnson and Humphrey

► THIRTY-THREE Nobel Prize winners, including Dr. Glenn T. Seaborg, head of the Atomic Energy Commission, and author John Steinbeck, have announced their support of President Lyndon B. Johnson and Senator Hubert H. Humphrey in the current election campaign.

A statement issued by the group said, "... the next President of the United States must be responsible ... patient ... (and) a man who understands and appreciates the nature of a nuclear age ...

"We have carefully examined the record of President Johnson and that of Senator Barry M. Goldwater. We believe President Johnson meets these qualifications and that his opponent does not."

Dr. Konrad Bloch of Harvard University, whose work with cholesterol and fatty acids won him this year's Nobel Prize in Physiology or Medicine together with Prof. Feodor Lynen of the Max Planck Institute in Munich, was included among signers of the statement.

Of the 14 physics prizewinners in the group, all but one received their awards for research in atomic energy, beginning with Dr. Carl D. Anderson, now with the

California Institute of Technology, who discovered the positron in 1936.

The most recently awarded physicist on the list is Dr. Maria Geoppert-Mayer of the University of California, who shared with another scientist her 1963 Nobel award for work on the shell theory of the atomic nucleus.

Besides the physics prizewinners, the group includes 14 prizewinners in medicine and physiology, four in chemistry and one in literature.

The group declared itself united by the belief that "... the great issue of the impending election is the issue of war and peace."

• Science News Letter, 86:280 October 31, 1964

GENERAL SCIENCE

Two Eminent Scientists Disagree on Candidates

► DIFFERING OPINIONS on what will happen to science when Barry M. Goldwater or Lyndon B. Johnson is elected President are voiced by two renowned scientists in Science, 146:380, 1964.

Standing behind Senator Goldwater is Dr. Edward Teller, associate director of the Lawrence Radiation Laboratory in California, and a member of the Republican Task Force on Science, Space and the Atom.

In favor of President Johnson's election is Dr. George B. Kistiakowsky of Harvard University, co-chairman of Scientists and Engineers for Johnson.

Under President Johnson, the U.S. could expect continuing Federal support of science, technology and education, says Dr. Kistiakowsky, who served as science adviser to President Eisenhower. He stated that Senator Goldwater, on the other hand, advocates a withdrawal of government funds from a whole series of programs, including education.

"Senator Goldwater's attitude toward Federal support of science in general or basic research in particular is difficult to determine," Dr. Kistiakowsky added. However, "his actions have been and are most likely to be counter to Federal support of many vital scientific activities."

Dr. Teller, who played a key role in the development of the hydrogen bomb, feels that under a Goldwater administration, there might be a lesser emphasis on big science and greater encouragement for individual and local initiatives to continue America's exploration of science.

"Our space program may begin to look more like science and less like a stunt," Dr. Teller said, commenting upon the "extravagance" of the "crash program" for the moon shot.

By advocating less Federal spending on programs such as education, Senator Goldwater stands for a decentralized education plan, Dr. Teller believes.

The Senator is not a typical professional politician, but a man personally interested in the world of technology, states Dr. Teller.

"I believe he will not take a superficial view of the development of science," he said.

• Science News Letter, 86:280 October 31, 1964

IN SCIENCE

TECHNOLOGY

New Computer Technique Designs Furnace Walls

► DESIGNERS of big commercial furnaces can save time and money by using an electronic computer, thanks to the Federal Bureau of Mines.

The bureau has developed a computer technique that will compare insulating properties, wall thickness and costs of many different wall materials, eliminating tedious paper-and-pencil methods. The procedure can be applied to many types of furnaces, from those used in power plants to heating units for large buildings.

• Science News Letter, 86:280 October 31, 1964

PUBLIC HEALTH

Encephalitis Hits More Women Than Men

► COOL WEATHER in New Jersey has driven the mosquito *Culex pipiens* indoors and as a result, twice as many women as men have been hit by insect-borne encephalitis, SCIENCE SERVICE has learned.

Dr. Harry D. Pratt, a scientist director in the U.S. Public Health Service, with headquarters at the Communicable Disease Center, Atlanta, Ga., said that 32-degree weather in New Jersey had driven the infected mosquitoes into chicken coops, garages and houses.

"Mosquitoes get the encephalitis infection from birds when the insects bite them," Dr. Pratt said. "Then if the mosquitoes live two weeks the infection gets into their salivary glands and people get infected from the insect's saliva. That thing that bites you is injecting infected saliva."

Although birds are the normal reservoir for St. Louis encephalitis, which is the type in New Jersey for the first time, public health service officials are doing an extensive job in that state trapping other wildlife such as bats, rabbits and squirrels to see if these animals also harbor the virus.

Encephalitis has reached a new high in the United States this year, with nearly half of the more than 2,000 suspected cases caused by mosquitoes. Encephalitis is also known to follow measles and mumps.

A total of 938 cases of suspected mosquito-borne encephalitis has been reported in 1964. The previous high in any one year was 625 suspected cases in 1956.

Dr. Pratt, who received the 14th annual Gorgas medal in Washington, Oct. 21, during the annual convention of the Association of Military Surgeons of the U.S., is credited with leading the program that wiped out malaria in Puerto Rico in 1946. He is now working on eradication of the *Aedes aegypti* mosquito where it still exists in the U.S. This type of mosquito breeds near houses and transmits both yellow fever and dengue fever.

• Science News Letter, 86:280 October 31, 1964

SFA
N.
Fe

► -
Spa
reci
tist
ma
7
sele
plei
N
be
hav
In
star
S
by
Ho
req
sin
I
pile
cial
I
Dec

COW
TV
Im

► A
for
line
W
by
gray
from
gon
stic
Elec
carr
telep

MILI
Mc
Ec

► B
velo
fied
A
Gen
land
folle
deve
Re
nucl
with
N
of th
that
whic
atom

WCE FIELDS

SPACE

NASA Seeks Scientists For Space Flights

► THE NATIONAL AERONAUTICS and Space Administration announced that it will recruit between 10 and 20 volunteer scientists to accompany U.S. astronauts on future manned space flights.

The program is beginning at once and selection of the first group should be completed by next spring.

NASA officials said that applicants must be U.S. citizens, under six feet tall and have been born on or after Aug. 1, 1930. In addition, certain academic and medical standards must be met.

Screening of candidates will be conducted by NASA's manned space flight center at Houston, Tex., where applicants will be required to take part in a limited space simulation program.

Those scientists selected will be given pilot training where necessary, NASA officials pointed out.

The deadline for filing applications is Dec. 31, 1964.

• Science News Letter, 86:281 October 31, 1964

COMMUNICATIONS

TV Sends Microscope Image Over Phone Lines

► AN electron microscope image was sent for the first time over ordinary telephone lines using slow-scan television.

With a system called Videx, developed by the International Telephone and Telegraph Corp., the images were sent 25 miles from the Argonne National Laboratory, Argonne, Ill., to the McCormick Place Exposition Center, Chicago, scene of the National Electronics Conference. The pictures were carried over the regular commercial voice telephone lines of Illinois Bell Telephone Co.

• Science News Letter, 86:281 October 31, 1964

MILITARY SCIENCE

Making Nuclear Bomb Easier All the Time

► BASIC PROBLEMS connected with developing a nuclear device have been simplified in recent years.

Advanced nations such as Sweden, West Germany, Austria, Belgium, The Netherlands, Switzerland, Norway and Italy could follow the footsteps of Red China and also develop a bomb if they really want to.

Red China is believed to have begun its nuclear program during the Korean War with large technological boosts from Russia.

Nuclear researchers have eliminated much of the expensive and time-consuming work that went into the U.S. Manhattan Project, which led to the development of the first atom bomb.

Aspiring nuclear scientists from all over the world can now find most of the information they need to build a bomb in their own public library. This fact, together with the great reduction in costs of equipment and raw materials, has taken away most of the difficulty of A-bomb construction.

The Red Chinese explosion did not generate the public shock that the first Russian atomic blast did. As far back as 1960, American and British scientists had predicted Red China would soon follow France in the development of an atomic bomb.

It is estimated that the Red Chinese will not have an effective delivery system, such as missiles, to threaten anyone until the mid-1970s. So, as long as Red China is unable to take the bomb beyond her own backyard, most observers feel there is no immediate cause for alarm.

• Science News Letter, 86:281 October 31, 1964

DENTISTRY

Army Dentists Still Treat Arrow Wounds

► BAMBOO SPEARS and arrows cause jaw and facial injuries to infantrymen fighting in primitive areas such as Viet Nam— injuries requiring dental surgery at forward medical units.

Col. Charles C. Alling, U.S. Army chief of military dental research, told the 71st annual meeting of military surgeons of the United States in Washington that the largest number of casualties to the mouth and jaw occur among infantry riflemen—the thin hard edge of the combat army.

"During the hot peace of the last decade," said Col. Alling, "U.S. Army oral surgeons have trained and served on permanent and field hospital staffs throughout the world as integral members of the total military health team."

Lightweight, rugged, dependable field equipment will be necessary for the military dentist to serve combat troops in the remote battlefields of the future, Col. Alling said. Simple equipment must be kept up under the shocks of air drops and the extremes of temperature and humidity.

The following are some of the needs of oral surgeons who serve fast-moving ground combat forces today:

Simpler methods for sterilizing instruments and soldiers' mouth wounds; anesthetics that will act unusually fast and allow rapid recovery; materials for repair work that would be strong enough for chewing, would stop decay and could easily be placed in a quickly and incompletely prepared tooth; artificial denture frames developed from techniques that could be used in the field.

Research projects to fill these needs are now being conducted by the Army, and Col. Alling anticipates fewer losses from duty for dental and mouth treatments in the near future. Army inductees also lose time for much dental work before they are ready for army service because of poor dental hygiene.

Maj. Gen. Joseph L. Bernier, chief of the Army Dental Corps, collaborated in the research reported by Col. Alling.

• Science News Letter, 86:281 October 31, 1964

MEDICINE

Circumcision Urged To Prevent Cancer

► ALL BOY BABIES should be circumcised to prevent cancer of the male sex organ and to cut down the number of malignancies of the neck of the womb (cervical cancer) among women, advised a New Jersey physician.

The reason for circumcision is cleanliness, to prevent accumulation of an irritating mixture called smegma in the narrow space between the male glans and the overlying foreskin. There is little cervical cancer among Jewish women, studies have shown, and this is believed due to the fact that Jewish males are customarily circumcised.

Dr. Sidney A. Gladstone of Paterson, N.J., told the American Society of Clinical Pathologists meeting in Bel Harbour, Fla., that mounting evidence showed the protective value of circumcision.

About 25,000 women in the United States develop cervical cancer every year, and somewhere between 2,000 and 6,000 men are variously reported as having sex-organ cancer.

A recent study of 120 cancers of the male sex organ, reported by Dr. Archie L. Dean Jr., of the New York Memorial Hospital for Cancer and Allied Diseases, showed that none of the patients had been circumcised in infancy. Among the Hindus of India and China, who do not practice circumcision at all, the number of cases of male sex-organ cancer is very large. Nearly 20% of the cancer in Chinese males is this type of cancer, and as many as 10% of male cancer victims in India are afflicted.

Cervical cancer becomes apparent about 20 years after a woman's sexual intercourse begins, Dr. Gladstone said. This type of cancer does not occur in the absence of sexual intercourse, as among nuns, but prostitutes have it most commonly. He said this is presumably because they have the greatest exposure to smegma from contact with a large number of uncircumcised men.

• Science News Letter, 86:281 October 31, 1964

MEDICINE

Mongrel Dog Survives Liver Transplant

► THE LIVER may prove to be less of a transplant problem than the kidney if an animal experiment in Denver is an indication of what can be expected of humans.

A mongrel Denver dog has been living seven months since the transplant, two months without the drug imuran. This drug is used to offset the immunity problem that usually causes rejection.

Dr. Thomas E. Starzl of the University of Colorado Medical School and the Veterans Administration Hospital, Denver, told the 50th annual meeting of the American College of Surgeons in Chicago that the dog liver had been transplanted from an unrelated mongrel and so far the organ had been accepted without problems.

• Science News Letter, 86:281 October 31, 1964

Waste Into Energy

Industry now is easing many headaches by burning useless waste products in giant furnaces and creating valuable heat energy.

By RALPH THOMAS

► PEANUT SHELLS, coffee grounds, bark, sawdust, sugar cane fibers—in short, almost everything but the pig's squeal—is being burned as waste material in our nation's huge industrial boilers to produce heat energy to cut fuel costs and to dispose of cumbersome by-products.

Every homeowner can testify that the piles of leaves, twigs, grass and dried weeds gathered from the backyard are a disposal problem. The most obvious solution is in burning the refuse, which is cheaper than paying to have it hauled away.

If the "burn it" policy could produce additional savings on household fuel and hot water bills, the method would be even more inviting. Although homeowners cannot use this method, industry is adopting such a system of burning unused materials to slash waste and cut soaring operating costs.

Fuel Savings Are High

Much is written about industry's progress in automatic control systems, highly complex production machinery, step-saving processes and a host of other widely heralded developments.

Less well known, but just as important, is industry's search to cut fuel bills and to retrieve some of the millions of dollars that almost literally pour from smokestacks daily.

Prospective fuel savings alone are enough to stimulate a second look at the chamber in which fuel is burned, called the furnace. However, there are other reasons for considering what materials are burned and how. Industrial processes and improper fuel combustion often cause disposal problems and pollute air, rivers and streams.

Special equipment can extract valuable heat energy and convert many leftover materials to useful products, while curbing pollution. It can also wring valuable energy from many of the materials once hauled to the dump for a price.

Installation of such "waste heat" units has grown by leaps and bounds during the past decade.

Making use of by-product fuels, gases and waste heat is a complicated engineering problem. Each plant and process has specific conditions calling for custom-made equipment. The range of operating requirements has led to many designs of units for such basic industries as pulp and paper, petroleum, smelting and steel.

Leading manufacturers of steam-generating equipment—such as the Babcock & Wilcox Company, Combustion Engineering, Foster Wheeler, Riley Stoker and Wickes—

have pursued waste heat utilization through many years of research and development.

Waste-Heat Categories

Steam-generating boilers separate into three basic categories—those burning liquid or solid waste products, those using heat from process gases or those burning waste gases directly.

In today's boilers, a surprising array of by-products can be fired with an auxiliary fuel or burned directly to dispose of them more economically. Boilers burning liquid or solid wastes are designed to fire such by-product fuels as wood, bark, shavings, sawdust and sander dust, such used chemicals as spent cooking liquor from pulping processes, peanut shells, and even bagasse, which is a sugar cane residue.

Bagasse has become an economically significant "waste fuel" in certain parts of the world. One of the world's largest bagasse boilers was installed in Puerto Rico's biggest sugar mill. Steam generated from burning this potentially burdensome by-product is used throughout the mill for process and power generation.

Pulp and paper mills require large quantities of steam and power, which are partially generated by burning liquors. Collec-

tion, combustion and recovery of waste heat and chemicals make problems for the engineer, but repay the investor with fuel savings and reclaimed cooking chemicals.

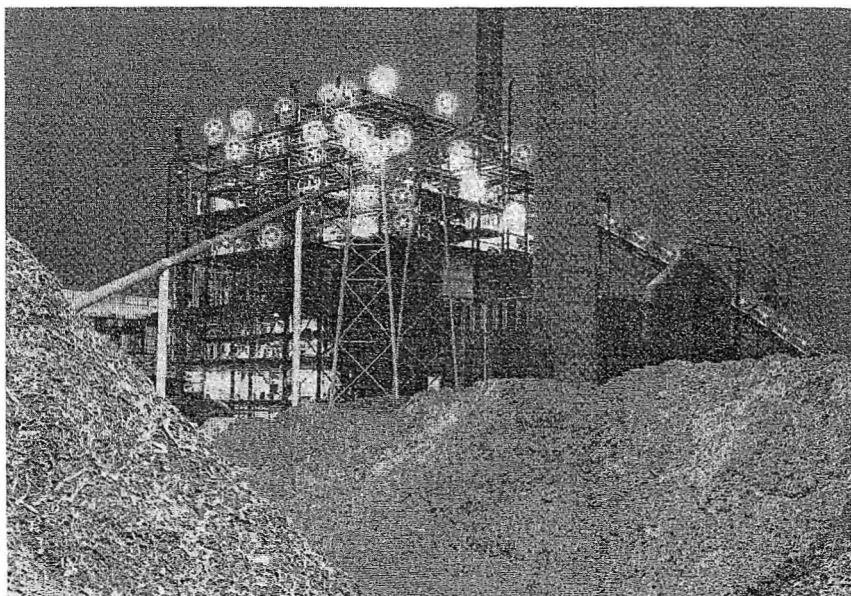
Some manufacturers report installing boilers that will burn peanut shells and even coffee grounds from an instant coffee plant to make steam.

Another method is being used by an Alaskan pulp mill. It is saving on fuel and power costs by burning its bark and lignin waste products in a specially designed boiler, which generates steam for the mill's pulping process. The results are evident—a reduction in waste disposal problems while cutting fuel costs.

Boilers that burn waste gases or use their heat involve complex engineering studies and custom-made units. Many high-temperature gases must be cooled to collect and recover metallic solids carried in the waste gas. Such units are installed in copper refining furnaces, cement and rotary kilns, gas turbines, open hearth and oxygen converter furnaces for the steel industry, and petroleum refineries.

Carbon Monoxide Boiler

One unit of this kind, made by Babcock & Wilcox for the petroleum industry, is known as the carbon monoxide boiler. It collects and burns carbon monoxide gas produced in the catalytic cracking of petroleum for high octane gasoline. Steam generated by the carbon monoxide unit runs machinery and heats the refinery's buildings.



Babcock & Wilcox Co.

USING WASTES—More and more industries are finding that previously unused wastes can be burned, thus increasing production at lower costs. This power and recovery boiler, built by Babcock & Wilcox Company for the Great Southern Land and Paper Company's mill at Cedar Springs, Ga., burns a mixture of bark and coal (on the other side of the unit) to generate steam for the mill's operation.

By burning the high-temperature gases (1,000 degrees Fahrenheit) that ordinarily would be discharged into the atmosphere, the boiler pays for itself with fuel savings in just a few years.

The steel industry also is benefiting from the increasing number and size of waste heat boiler installations. Republic Steel Corporation has ordered from Babcock & Wilcox the world's largest capacity waste boiler. Designed to reclaim heat from waste gases of two oxygen-lanced open-hearth furnaces, the boiler will generate nearly 300,000 pounds of steam per hour to operate machinery and heat buildings.

Many industries overseas are showing increased interest in cost-cutting installations, such as a petrochemical complex being built in Argentina. The plant's design includes three waste heat boilers that will use hot exhaust from gas turbine generators to make steam for chemical processes and for driving turbines.

The exhaust (about 800 degrees Fahrenheit) will be combined with a base fuel and fired in the boiler. Reclaiming the heat reduces fuel consumption and the oxygen is sufficient to support combustion.

Steam-generating equipment manufacturers have been conducting extensive research and testing models of new and more efficient methods to convert waste heat into useful energy. Most waste and by-products can be heated and turned into energy.

One of the latest improvements is a water-cooled steam-generating hood for basic oxygen steelmaking, a process coming into widespread use in the United States. Made essentially of hundreds of welded steel tubes, the membrane hood fits over the furnace to collect, transport, cool and recover heat value from the high temperature gases (3,500 degrees Fahrenheit).

By cooling the furnace gases, gas cleanup systems can operate still more effectively to remove dust, helping to curb air pollution.

The unit makes steam, at rates up to 200,000 pounds per hour, that can be used by steel mills for power generation and process heat.

Industry's fuel savings can be conservatively estimated at millions of dollars annually—dollars that otherwise might literally have gone "up the stack."

• Science News Letter, 86:282 October 31, 1964

INVENTION

Patents of the Week

The newest policeman's aid is a dual-purpose axe to capture criminals that chops holes in doors and then shoots tear gas grenades—By William McCann

► AN AXE that can chop a hole in a door and shoot tear gas into a room barricaded by a criminal has been developed to help make police work a little less dangerous.

Rather than having to batter down a door and face the muzzle of a trapped criminal's gun, police can slash a hole in a door with the axe. With the axe sticking in the door they can pull a ring, shooting a tear gas grenade into the room through a tube that has its opening at the face of the axe.

The device, which is about 30 inches long and weighs 15 pounds, can be swung like a sledge hammer against the door by an officer standing off to one side, thus avoiding exposure to gunfire through the door.

Carl Weinert, Pittsburgh, Pa., was awarded patent 3,152,417 by the U.S. Patent Office for his police saver, which was successfully tested at the FBI Academy at Quantico, Va., earlier this year. Patent rights were assigned to Federal Laboratories, Inc., Saltsburg, Pa.

The invention is most effective in attempting to apprehend an armed criminal in a room without windows or in areas where shooting tear gas from the outside would not be advisable. Mr. Weinert reported in his patent.

Smoke and Fire Alarm

A device that can "see" smoke or "feel" fire and then whistle for firemen has been patented.

The device is a smoke and fire alarm which contains a heat-responsive thermostat and a photoelectric cell unit. The thermo-

stat senses if a room gets too hot and causes an aerosol-operated horn to bellow for help. Similarly, the horn will blow if the hazy smoke comes between the light beam from the photoelectric cell and a receiving eye located across from the cell on the alarm.

The smoke and fire alarm was invented by John L. Jensen, Estherville, Iowa, who was awarded patent 3,153,226

Back Seat Head Rest

Back seat drivers can now sit back comfortably with the aid of a newly developed back seat head rest.

William Buhl, Medford, Ore., earned patent 3,152,831 for the head rest, which may be easily removed and used as a cushioned seat. It has been designed so that it will not block the driver's view through the back window.

• Science News Letter, 86:283 Oct. 31, 1964

Do You Know?

Most young women in the United States suffer from "pump bumps," a bony outgrowth on their heels, which results from closely-fitting high-heeled shoes

The number of blind people in the world is expected to increase from today's 14 million to 20 million by the year 2000

• Science News Letter, 86:283 October 31, 1964

VERNIER MAGNIFIER \$1.25 p.p.



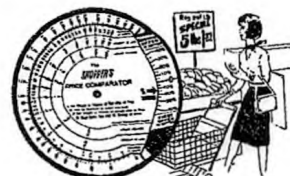
Illustration 1/2 size

Examine stamps, coins, printers screens, minerals, insects, etc.
A general utility magnifier. Clear plastic base. Contains two Alnico magnets @ 1/2 price. Limited stock. Boxed brand NEW. Send 1.25 at once. Products bulletin 25d.

HARRY ROSS

Scientific & Lab Apparatus
61-L Reade St., N.Y. 7, N.Y.

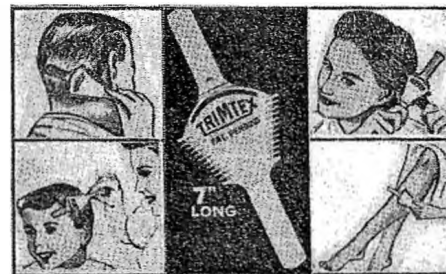
DON'T
BE
MISLED
BY
PRICES!



Price Comparator computes true unit price of two comparable products having different weight and prices. Automatic arrow points to the best buy and tells you how much you save. Laminated in plastic. ONLY \$1.00 postpaid.

DYNA-SLIDE COMPANY

600 S. Michigan Ave. Chicago 5, Illinois



Save Time & Hundreds of \$\$ on Expensive Hair Trims

Use magic TRIMTEX invention. Automatic diagonal cutting action & Super 100 control assure superior tapered, salon-looking trims. Short, medium, latest Italian & Beanie "Racer Trims". Quick & easy, 100% safe, a MUST for all homes. Also ideal & gentle as a breeze for hair on Ladies' arms & legs. Can't cut, scrape or coarsen delicate skin. Try TRIMTEX 30 days & save cost many times. Money back if not 100% pleased. Only \$9.98. 2-\$3.75. 3-\$5.25. 4-\$6.75. 5-\$8.25. 6-\$9.75. 7-\$11.25. 8-\$12.75. 9-\$14.25. 10-\$15.75. 11-\$17.25. 12-\$18.75. 13-\$20.25. 14-\$21.75. 15-\$23.25. 16-\$24.75. 17-\$26.25. 18-\$27.75. 19-\$29.25. 20-\$30.75. 21-\$32.25. 22-\$33.75. 23-\$35.25. 24-\$36.75. 25-\$38.25. 26-\$39.75. 27-\$41.25. 28-\$42.75. 29-\$44.25. 30-\$45.75. 31-\$47.25. 32-\$48.75. 33-\$50.25. 34-\$51.75. 35-\$53.25. 36-\$54.75. 37-\$56.25. 38-\$57.75. 39-\$59.25. 40-\$60.75. 41-\$62.25. 42-\$63.75. 43-\$65.25. 44-\$66.75. 45-\$68.25. 46-\$69.75. 47-\$71.25. 48-\$72.75. 49-\$74.25. 50-\$75.75. 51-\$77.25. 52-\$78.75. 53-\$80.25. 54-\$81.75. 55-\$83.25. 56-\$84.75. 57-\$86.25. 58-\$87.75. 59-\$89.25. 60-\$90.75. 61-\$92.25. 62-\$93.75. 63-\$95.25. 64-\$96.75. 65-\$98.25. 66-\$99.75. 67-\$101.25. 68-\$102.75. 69-\$104.25. 70-\$105.75. 71-\$107.25. 72-\$108.75. 73-\$110.25. 74-\$111.75. 75-\$113.25. 76-\$114.75. 77-\$116.25. 78-\$117.75. 79-\$119.25. 80-\$120.75. 81-\$122.25. 82-\$123.75. 83-\$125.25. 84-\$126.75. 85-\$128.25. 86-\$129.75. 87-\$131.25. 88-\$132.75. 89-\$134.25. 90-\$135.75. 91-\$137.25. 92-\$138.75. 93-\$140.25. 94-\$141.75. 95-\$143.25. 96-\$144.75. 97-\$146.25. 98-\$147.75. 99-\$149.25. 100-\$150.75. 101-\$152.25. 102-\$153.75. 103-\$155.25. 104-\$156.75. 105-\$158.25. 106-\$159.75. 107-\$161.25. 108-\$162.75. 109-\$164.25. 110-\$165.75. 111-\$167.25. 112-\$168.75. 113-\$170.25. 114-\$171.75. 115-\$173.25. 116-\$174.75. 117-\$176.25. 118-\$177.75. 119-\$179.25. 120-\$180.75. 121-\$182.25. 122-\$183.75. 123-\$185.25. 124-\$186.75. 125-\$188.25. 126-\$189.75. 127-\$191.25. 128-\$192.75. 129-\$194.25. 130-\$195.75. 131-\$197.25. 132-\$198.75. 133-\$200.25. 134-\$201.75. 135-\$203.25. 136-\$204.75. 137-\$206.25. 138-\$207.75. 139-\$209.25. 140-\$210.75. 141-\$212.25. 142-\$213.75. 143-\$215.25. 144-\$216.75. 145-\$218.25. 146-\$219.75. 147-\$221.25. 148-\$222.75. 149-\$224.25. 150-\$225.75. 151-\$227.25. 152-\$228.75. 153-\$230.25. 154-\$231.75. 155-\$233.25. 156-\$234.75. 157-\$236.25. 158-\$237.75. 159-\$239.25. 160-\$240.75. 161-\$242.25. 162-\$243.75. 163-\$245.25. 164-\$246.75. 165-\$248.25. 166-\$249.75. 167-\$251.25. 168-\$252.75. 169-\$254.25. 170-\$255.75. 171-\$257.25. 172-\$258.75. 173-\$260.25. 174-\$261.75. 175-\$263.25. 176-\$264.75. 177-\$266.25. 178-\$267.75. 179-\$269.25. 180-\$270.75. 181-\$272.25. 182-\$273.75. 183-\$275.25. 184-\$276.75. 185-\$278.25. 186-\$279.75. 187-\$281.25. 188-\$282.75. 189-\$284.25. 190-\$285.75. 191-\$287.25. 192-\$288.75. 193-\$290.25. 194-\$291.75. 195-\$293.25. 196-\$294.75. 197-\$296.25. 198-\$297.75. 199-\$299.25. 200-\$300.75. 201-\$302.25. 202-\$303.75. 203-\$305.25. 204-\$306.75. 205-\$308.25. 206-\$309.75. 207-\$311.25. 208-\$312.75. 209-\$314.25. 210-\$315.75. 211-\$317.25. 212-\$318.75. 213-\$320.25. 214-\$321.75. 215-\$323.25. 216-\$324.75. 217-\$326.25. 218-\$327.75. 219-\$329.25. 220-\$330.75. 221-\$332.25. 222-\$333.75. 223-\$335.25. 224-\$336.75. 225-\$338.25. 226-\$339.75. 227-\$341.25. 228-\$342.75. 229-\$344.25. 230-\$345.75. 231-\$347.25. 232-\$348.75. 233-\$350.25. 234-\$351.75. 235-\$353.25. 236-\$354.75. 237-\$356.25. 238-\$357.75. 239-\$359.25. 240-\$360.75. 241-\$362.25. 242-\$363.75. 243-\$365.25. 244-\$366.75. 245-\$368.25. 246-\$369.75. 247-\$371.25. 248-\$372.75. 249-\$374.25. 250-\$375.75. 251-\$377.25. 252-\$378.75. 253-\$380.25. 254-\$381.75. 255-\$383.25. 256-\$384.75. 257-\$386.25. 258-\$387.75. 259-\$389.25. 260-\$390.75. 261-\$392.25. 262-\$393.75. 263-\$395.25. 264-\$396.75. 265-\$398.25. 266-\$399.75. 267-\$401.25. 268-\$402.75. 269-\$404.25. 270-\$405.75. 271-\$407.25. 272-\$408.75. 273-\$410.25. 274-\$411.75. 275-\$413.25. 276-\$414.75. 277-\$416.25. 278-\$417.75. 279-\$419.25. 280-\$420.75. 281-\$422.25. 282-\$423.75. 283-\$425.25. 284-\$426.75. 285-\$428.25. 286-\$429.75. 287-\$431.25. 288-\$432.75. 289-\$434.25. 290-\$435.75. 291-\$437.25. 292-\$438.75. 293-\$440.25. 294-\$441.75. 295-\$443.25. 296-\$444.75. 297-\$446.25. 298-\$447.75. 299-\$449.25. 300-\$450.75. 301-\$452.25. 302-\$453.75. 303-\$455.25. 304-\$456.75. 305-\$458.25. 306-\$459.75. 307-\$461.25. 308-\$462.75. 309-\$464.25. 310-\$465.75. 311-\$467.25. 312-\$468.75. 313-\$470.25. 314-\$471.75. 315-\$473.25. 316-\$474.75. 317-\$476.25. 318-\$477.75. 319-\$479.25. 320-\$480.75. 321-\$482.25. 322-\$483.75. 323-\$485.25. 324-\$486.75. 325-\$488.25. 326-\$489.75. 327-\$491.25. 328-\$492.75. 329-\$494.25. 330-\$495.75. 331-\$497.25. 332-\$498.75. 333-\$500.25. 334-\$501.75. 335-\$503.25. 336-\$504.75. 337-\$506.25. 338-\$507.75. 339-\$509.25. 340-\$510.75. 341-\$512.25. 342-\$513.75. 343-\$515.25. 344-\$516.75. 345-\$518.25. 346-\$519.75. 347-\$521.25. 348-\$522.75. 349-\$524.25. 350-\$525.75. 351-\$527.25. 352-\$528.75. 353-\$530.25. 354-\$531.75. 355-\$533.25. 356-\$534.75. 357-\$536.25. 358-\$537.75. 359-\$539.25. 360-\$540.75. 361-\$542.25. 362-\$543.75. 363-\$545.25. 364-\$546.75. 365-\$548.25. 366-\$549.75. 367-\$551.25. 368-\$552.75. 369-\$554.25. 370-\$555.75. 371-\$557.25. 372-\$558.75. 373-\$560.25. 374-\$561.75. 375-\$563.25. 376-\$564.75. 377-\$566.25. 378-\$567.75. 379-\$569.25. 380-\$570.75. 381-\$572.25. 382-\$573.75. 383-\$575.25. 384-\$576.75. 385-\$578.25. 386-\$579.75. 387-\$581.25. 388-\$582.75. 389-\$584.25. 390-\$585.75. 391-\$587.25. 392-\$588.75. 393-\$590.25. 394-\$591.75. 395-\$593.25. 396-\$594.75. 397-\$596.25. 398-\$597.75. 399-\$599.25. 400-\$600.75. 401-\$602.25. 402-\$603.75. 403-\$605.25. 404-\$606.75. 405-\$608.25. 406-\$609.75. 407-\$611.25. 408-\$612.75. 409-\$614.25. 410-\$615.75. 411-\$617.25. 412-\$618.75. 413-\$620.25. 414-\$621.75. 415-\$623.25. 416-\$624.75. 417-\$626.25. 418-\$627.75. 419-\$629.25. 420-\$630.75. 421-\$632.25. 422-\$633.75. 423-\$635.25. 424-\$636.75. 425-\$638.25. 426-\$639.75. 427-\$641.25. 428-\$642.75. 429-\$644.25. 430-\$645.75. 431-\$647.25. 432-\$648.75. 433-\$650.25. 434-\$651.75. 435-\$653.25. 436-\$654.75. 437-\$656.25. 438-\$657.75. 439-\$659.25. 440-\$660.75. 441-\$662.25. 442-\$663.75. 443-\$665.25. 444-\$666.75. 445-\$668.25. 446-\$669.75. 447-\$671.25. 448-\$672.75. 449-\$674.25. 450-\$675.75. 451-\$677.25. 452-\$678.75. 453-\$680.25. 454-\$681.75. 455-\$683.25. 456-\$684.75. 457-\$686.25. 458-\$687.75. 459-\$689.25. 460-\$690.75. 461-\$692.25. 462-\$693.75. 463-\$695.25. 464-\$696.75. 465-\$698.25. 466-\$699.75. 467-\$701.25. 468-\$702.75. 469-\$704.25. 470-\$705.75. 471-\$707.25. 472-\$708.75. 473-\$710.25. 474-\$711.75. 475-\$713.25. 476-\$714.75. 477-\$716.25. 478-\$717.75. 479-\$719.25. 480-\$720.75. 481-\$722.25. 482-\$723.75. 483-\$725.25. 484-\$726.75. 485-\$728.25. 486-\$729.75. 487-\$731.25. 488-\$732.75. 489-\$734.25. 490-\$735.75. 491-\$737.25. 492-\$738.75. 493-\$740.25. 494-\$741.75. 495-\$743.25. 496-\$744.75. 497-\$746.25. 498-\$747.75. 499-\$749.25. 500-\$750.75. 501-\$752.25. 502-\$753.75. 503-\$755.25. 504-\$756.75. 505-\$758.25. 506-\$759.75. 507-\$761.25. 508-\$762.75. 509-\$764.25. 510-\$765.75. 511-\$767.25. 512-\$768.75. 513-\$770.25. 514-\$771.75. 515-\$773.25. 516-\$774.75. 517-\$776.25. 518-\$777.75. 519-\$779.25. 520-\$780.75. 521-\$782.25. 522-\$783.75. 523-\$785.25. 524-\$786.75. 525-\$788.25. 526-\$789.75. 527-\$791.25. 528-\$792.75. 529-\$794.25. 530-\$795.75. 531-\$797.25. 532-\$798.75. 533-\$800.25. 534-\$801.75. 535-\$803.25. 536-\$804.75. 537-\$806.25. 538-\$807.75. 539-\$809.25. 540-\$810.75. 541-\$812.25. 542-\$813.75. 543-\$815.25. 544-\$816.75. 545-\$818.25. 546-\$819.75. 547-\$821.25. 548-\$822.75. 549-\$824.25. 550-\$825.75. 551-\$827.25. 552-\$828.75. 553-\$830.25. 554-\$831.75. 555-\$833.25. 556-\$834.75. 557-\$836.25. 558-\$837.75. 559-\$839.25. 560-\$840.75. 561-\$842.25. 562-\$843.75. 563-\$845.25. 564-\$846.75. 565-\$848.25. 566-\$849.75. 567-\$851.25. 568-\$852.75. 569-\$854.25. 570-\$855.75. 571-\$857.25. 572-\$858.75. 573-\$860.25. 574-\$861.75. 575-\$863.25. 576-\$864.75. 577-\$866.25. 578-\$867.75. 579-\$869.25. 580-\$870.75. 581-\$872.25. 582-\$873.75. 583-\$875.25. 584-\$876.75. 585-\$878.25. 586-\$879.75. 587-\$881.25. 588-\$882.75. 589-\$884.25. 590-\$885.75. 591-\$887.25. 592-\$888.75. 593-\$890.25. 594-\$891.75. 595-\$893.25. 596-\$894.75. 597-\$896.25. 598-\$897.75. 599-\$899.25. 600-\$900.75. 601-\$902.25. 602-\$903.75. 603-\$905.25. 604-\$906.75. 605-\$908.25. 606-\$909.75. 607-\$911.25. 608-\$912.75. 609-\$914.25. 610-\$915.75. 611-\$917.25. 612-\$918.75. 613-\$920.25. 614-\$921.75. 615-\$923.25. 616-\$924.75. 617-\$926.25. 618-\$927.75. 619-\$929.25. 620-\$930.75. 621-\$932.25. 622-\$933.75. 623-\$935.25. 624-\$936.75. 625-\$938.25. 626-\$939.75. 627-\$941.25. 628-\$942.75. 629-\$944.25. 630-\$945.75. 631-\$947.25. 632-\$948.75. 633-\$950.25. 634-\$951.75. 635-\$953.25. 636-\$954.75. 637-\$956.25. 638-\$957.75. 639-\$959.25. 640-\$960.75. 641-\$962.25. 642-\$963.75. 643-\$965.25. 644-\$966.75. 645-\$968.25. 646-\$969.75. 647-\$971.25. 648-\$972.75. 649-\$974.25. 650-\$975.75. 651-\$977.25. 652-\$978.75. 653-\$980.25. 654-\$981.75. 655-\$983.25. 656-\$984.75. 657-\$986.25. 658-\$987.75. 659-\$989.25. 660-\$990.75. 661-\$992.25. 662-\$993.75. 663-\$995.25. 664-\$996.75. 665-\$998.25. 666-\$999.75. 667-\$1001.25. 668-\$1002.75. 669-\$1004.25. 670-\$1005.75. 671-\$1007.25. 672-\$1008.75. 673-\$1010.25. 674-\$1011.75. 675-\$1013.25. 676-\$1014.75. 677-\$1016.25. 678-\$1017.75. 679-\$1019.25. 680-\$1020.75. 681-\$1022.25. 682-\$1023.75. 683-\$1025.25. 684-\$1026.75. 685-\$1028.25. 686-\$1029.75. 687-\$1031.25. 688-\$1032.75. 689-\$1034.25. 690-\$1035.75. 691-\$1037.25. 692-\$1038.75. 693-\$1040.25. 694-\$1041.75. 695-\$1043.25. 696-\$1044.75. 697-\$1046.25. 698-\$1047.75. 699-\$1049.25. 700-\$1050.75. 701-\$1052.25. 702-\$1053.75. 703-\$1055.25. 704-\$1056.75. 705-\$1058.25. 706-\$1059.75. 707-\$1061.25. 708-\$1062.75. 709-\$1064.25. 710-\$1065.75. 711-\$1067.25. 712-\$1068.75. 713-\$1070.25. 714-\$1071.75. 715-\$1073.25. 716-\$1074.75. 717-\$1076.25. 718-\$1077.75. 719-\$1079.25. 720-\$1080.75. 721-\$1082.25. 722-\$1083.75. 723-\$1085.25. 724-\$1086.75. 725-\$1088.25. 726-\$1089.75. 727-\$1091.25. 728-\$1092.75. 729-\$1094.25. 730-\$1095.75. 731-\$1097.25. 732-\$1098.75. 733-\$1100.25. 734-\$1101.75. 735-\$1103.25. 736-\$1104.75. 737-\$1106.25. 738-\$1107.75. 739-\$1109.25. 740-\$1110.75. 741-\$1112.25. 742-\$1113.75. 743-\$1115.25. 744-\$1116.75. 745-\$1118.25. 746-\$1119.75. 747-\$1121.25. 748-\$1122.75. 749-\$1124.25. 750-\$1125.75. 751-\$1127.25. 752-\$1128.75. 753-\$1130.25. 754-\$1131.75. 755-\$1133.25. 756-\$1134.75. 757-\$1136.25. 758-\$1137.75. 759-\$1139.25. 760-\$1140.75. 761-\$1142.25. 762-\$1143.75. 763-\$1145.25. 764-\$1146.75. 765-\$1148.25. 766-\$1149.75. 767-\$1151.25. 768-\$1152.75. 769-\$1154.25. 770-\$1155.75. 771-\$1157.25. 772-\$1158.75. 773-\$1160.25.

Books of the Week

Listing is for readers' information, not advertising. For convenient purchase of any book listed or any U.S. book in print, remit retail price (we pay postage) plus 25¢ handling charge if price is less than \$2 to Book Department, Science Service, 1719 N St., N.W., Washington, D. C. 20036.

ADVANCES IN DRUG RESEARCH, Vol. 1—N. J. Harper and Alma B. Simmonds, Eds.—Academic Press, 208 p., diagrams, \$6.25. Among other research, presents significant current progress in penicillins and related structures.

ALL ABOUT BIOLOGY—Bernard Glemser—Random House, 140 p., photographs, illus. by Eva Cellini, \$1.95. Tells young readers about the beginnings of life, some great discoveries in biology, and single- and multi-cell animals.

ANIMALS AS SOCIAL BEINGS—Adolf Portmann, transl. from German by Oliver Cohn—Harper, 246 p., illus., paper, \$1.85. Reprint (1961), on basic phenomena of the social behavior of animals.

ANTARCTIC SNOW AND ICE STUDIES—Malcolm Mellor, Ed.—Am. Geophysical Union, 277 p., illus., \$12. Volume 2 of Antarctic Research Studies, a collection of original papers on glaciology, snow accumulation and densification, drainage systems, and firn cores.

THE ARCHEOLOGY OF CAPE DENBIGH—J. L. Giddings—Brown Univ. Press, 331 p., 73 plates, \$12.50. Detailed report on the field work and excavations of early Eskimo artifacts of flaked stone on the northern Bering Sea coast of Alaska.

BED DISABILITY AMONG THE CHRONICALLY LIMITED, United States, July 1957 to June 1961—PHS (GPO), 62 p., paper, 45¢. Statistics on the average annual number of days of bed disability for all persons with detailed tables by categories.

BIBLIOGRAPHY: 1926-1964—Henry Field—Field Research Projects, 112 p., paper, \$3. Presents list of 584 titles covering researches on the anthropogeography of southwestern Asia, and annotated list of documents microfilmed.

BIOLOGICAL CONTROL OF INSECT PESTS AND WEEDS—Paul DeBach, Ed. with Evert I. Schlinger—Reinhold, 844 p., illus., \$22.50. Authoritative handbook written by specialists, organized in logical sequence to cover historical development, the ecological basis of biological control, systematics, introduction and colonization programs, conservation of natural enemies, insect pathology, and biological weed control.

DELIGHTS OF THE SLIDE RULE—Clyde B. Clason—Crowell, 246 p., illus., \$5. Describes ways for using the slide rule for entertainment and mind-stretching.

THE ELECTRONIC STRUCTURE OF MOLECULES: A New Approach—J. W. Linnett—Wiley, 167 p., diagrams, \$4.75. Describes the basic content of the hypothesis that electrons in a molecule should be treated as two sets with opposite spins, and applies the hypothesis to particular molecules.

ELECTROSPARK MACHINING OF METALS, Vol. 2—B. R. Lazarenko, Ed., transl. from Russian—Consultants, 195 p., illus., paper, \$22.50. Collection of research papers on the application of the electroerosion method to various manufacturing processes and operations.

ETHICS AND SCIENCE—Henry Margenau—Van Nostrand, 302 p., \$7.50. Rejecting the concept of relativism in ethics, the author concerns himself with ways in which ethical rules can be made objective and valid for all. (See story on p. 287.)

EVOLUTION IN ACTION—Julian Huxley—New Am. Lib., 141 p., photographs, paper, 60¢. Reprint (1958), views evolution as a process affecting nature and man.

FACE OF NORTH AMERICA: The Natural History of a Continent—Peter Farb, introd. by Stewart L. Udell—Harper, 254 p., photographs, illus. by Bob Hines and Jerome Connolly, \$3.95. Young reader's edition of handsome book about our continent and the processes of nature.

FUNCTIONAL ANALYSIS—Albert Wilansky—Blaisdell Pub. Co., 291 p., \$8.50. Written to serve as a senior or beginning graduate text, includes 2000 problems for independent study.

GIVE AND TAKE: The Development of Tissue Transplantation—Francis D. Moore—Doubleday, 182 p., illus., \$5.50. Tells the story, with scientific detail and individual case histories, of the successful transplantation of healthy human kidneys in people dying of kidney failure.

THE GOOD BEASTS: Memories, Mostly Fond, of Animals Wild and Tame—John T. Rowland—Norton, 254 p., illus. by Joseph Cellini, \$4.95. Affectionate memoirs about life with animals.

GREATER DEAD THAN ALIVE—Curtis D. MacDougall—Public Affairs Press, 263 p., \$4.50. Concerned with the posthumous recognition of creative men in all fields of human endeavor, including science and invention.

GULL NUMBER 737—Jean Craighead George—Crowell, 198 p., illus., \$3.50. Story about a boy getting acquainted with research in ornithology.

HANDBOOK OF CONSUMER MOTIVATIONS: The Psychology of the World of Objects—Ernest Dichter—McGraw, 486 p., illus. by Robert Glasek, \$10. Written for the communications specialist, the book is organized into aspects of human motivations as they apply to consumers of all kinds of products and services.

ASTRONOMY

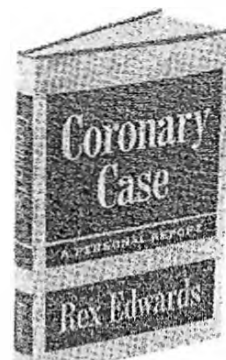
For Everyone

Enjoy SKY AND TELESCOPE magazine monthly. Profusely illustrated. Observing and telescope making departments, monthly star and planet charts. Subscription in U.S.: \$6.00, 1 year; \$11.00, 2 years. Sample copy 60¢.

SKY AND TELESCOPE Dept. SNL Cambridge 38, Mass.

CORONARY CASE

A Personal Report
By Rex Edwards



The author describes his battle and victory over "the biggest single killer in the U.S. today"—coronary disease. The pressure of a busy life as a film and television writer brought on a severe coronary attack when he was forty-five and it was not until eight months later that the author was able to resume all his activities. He writes of his illness and recovery and tells what he learned about preventing first attacks and recurrent attacks.

\$3.95 Postfree • 10-Day Money-Back Guarantee
EMERSON BOOKS, Inc., Dept. 217-P
251 West 19th Street, New York 11

METHODS OF REAL ANALYSIS—Richard R. Goldberg—Blaisdell Pub. Co., 359 p., \$9.50. Text on elementary theory of functions of a real variable, contains material on sequences, series and the foundations of calculus.

NATURALIST-EXPLORERS—Wyatt Blassingame—Watts, F., 145 p., illus. by Fred Sweeney, \$3.95. Tells young people about the contributions and lives of such men as Linnaeus, Darwin, von Humboldt and Muir.

OCEANOGRAPHICAL ENGINEERING—Robert L. Wiegel—Prentice-Hall, 532 p., illus., \$18. Deals with the applications of physical oceanography to civil engineering, such as wave force effects on structures, mooring line stresses, harbor oscillations, and ocean mixing processes.

OPTICS: The Nature and Applications of Light—Irvin D. Gluck—Holt, 154 p., illus., \$2.50; paper, \$1.28. Addressing itself to students, amateur astronomers and camera fans, the book covers the optics of such new developments as lasers, radiotelescopes and electron microscopes.

• Science News Letter, 86:284 October 31, 1964

Nature Note

Portuguese Man-of-War

► THAT BEAUTIFUL purple balloon sailing serenely over the warm ocean waves is actually a living fortress composed of many tiny but dangerous sea creatures.

Many kinds of polyps, as these soft sea animals are called, are attached on the underside of the iridescent bubble, an ovoid membrane about six inches long with a ridge down the middle.

The individual polyps have assumed specialized tasks on the Portuguese man-of-war, *Physalia pelagica*. Some protect the balloon from enemies, some trap and kill fish, some absorb the food and others are engaged in the task of reproduction.

The defense polyps have long tentacles which can stream out for several feet or retract and coil up like a wire spring. Situated along these tentacles are thousands of nematocysts which contain toxins so strong they can easily paralyze and kill fish of considerable size. Swimmers coming in contact with these stingers can suffer such agony and cramps that they could drown.

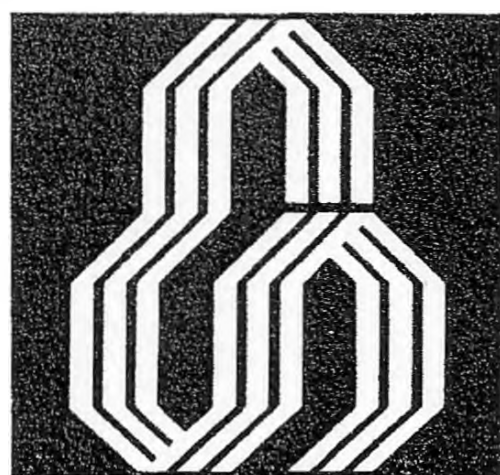
Once the tentacles have paralyzed a fish, they contract and recoil, drawing the food up to the base of the float where the clustered nutritive polyps start to engulf and digest the prey. Strange to say, one small fish, the nemeus, has adapted itself to survive the stinging tentacles and often lurks protected among the coiling strands.

The bright blue, pink and sometimes greenish balloons are driven by the wind, with the masses of colonies underneath acting like a keel as the strange craft sails across tropical and subtropical seas. The balloon, filled with gasses generated by the polyps, can be deflated through a valve on top, and the whole ship can sink, only to rise again as the bubble is filled with gas.

• Science News Letter, 86:284 October 31, 1964

PAPER FOLDING MADE EASY!

Create scores of beautiful, unusual, amusing paper objects—toys, decorations, etc., with clearest introduction to Japanese art of origami. "Paper Folding for Beginners" Rigney. 95pp. \$1.00 + 10¢ postage. Money-back guarantee. Dept. SNL, Dover, 180 Varick St., N.Y. 14, N.Y.



\$12,500
CORNING
SCIENCE
PRIZE

FOR THE BEST BOOK-LENGTH
MANUSCRIPT IN THE FIELD OF
THE NATURAL OR PHYSICAL
SCIENCES FOR THE GENERAL
READER — DEADLINE JULY 1,
1965 — RULES AND DETAILS
AVAILABLE FROM

Corning Science Prize Editor
Little, Brown and Company
34 Beacon Street, Boston, Mass. 02106

LEARN FROM SCIENCE EXPERIMENTS

Boys and girls, teachers, parents, even grandparents are aware of the part science plays in the world. They want to know more, to understand HOW and WHY.

Things of science kits

teach scientific principles and background information by the "Do-it-Yourself" method.

IDEAL for beginners whether children or adults, who want to know more of what makes things tick. Hours of challenging FUN for the alert retired senior citizen.



Kits dealing with Biology, Chemistry, Physics, Mathematics, Psychology, Geology, Astronomy, Cartography, are all included in this outstanding collection of Scientific Experiments. Unusual specimens for your home or school museum.

Have fun experimenting with THINGS of science and learn science by performing more than 800 experiments.

Designed for home and school use. A kitchen may become your laboratory. Ideal for the school without a laboratory.

Order the complete collection and save. All 41 kits for only \$19.50. Order in quantity—Any selection of 5 or more kits 50 cents each. Single kit 75 cents.

COTTON—Spin your own yarn from cotton fiber. Seven specimens and 12 diagrams explain the elaborate processing of finished fabric from raw cotton. #270

METAL FASTENERS—Though simple in construction, a screw is precisely machined. Many uses of screws and rivets are demonstrated in 16 experiments. #271

WAVE THEORY OF LIGHT—The eye of a small needle will help you understand this age-old theory by means of diffraction and interference. Specially designed materials enable you to observe diffraction patterns, measure the cloud particles around the moon and observe other phenomena in 21 fascinating experiments. #272

DINOSAUR FRAGMENT—A 150 million year old fossil for your science museum together with other interesting fossils to examine and study. #274

MAKE YOUR OWN MACHINES—Experiment and discover the science of the inclined plane, wedge, lever, screw, pulley and gear, all simple machines. #275

COPPER—From natural state through the processes of recovery and refining to finished

products you can trace the science of this vital metal with nine specimens and ten experiments. #276

TREE PRODUCTS—Spruce trees yield a variety of products—yeast, organic reducing agent and paper. Experiment with each of these products and learn the fascinating story of their processing. #277

SPACE MATERIALS—Study these unusual materials used in space research that few people have an opportunity to see: copper dipoles like those now orbiting the earth and aluminum film you can see through. #278

POLYMER-FIBER—Cellulose in various stages of the papermaking process combined with different polymer resins can produce a wide range of materials from battery separators to a leather-like substance. 18 experiments. #279

ANGIOSPERMS—27 experiments to perform with different types of seeds in the largest class of all plants of the vegetable kingdom, from the very large scarlet runner bean to the tiny aster seed. #280

STATIC ELECTRICITY—Sparks from your fingertips when you walk across a carpet and touch metal? On a cold, dry day you can experiment

with the phenomena of static electricity using the materials in this unit. Gives understanding of some of the fundamental facts of physics. 17 experiments. #227

CLOTH WITHOUT WEAVING—Non-woven fabrics have been known for some time—felts made from fur, hair or wool. Now there are new types of such fabrics, made from vegetable and synthetic fibers. You can feel them, test them, use them and imagine clothes of tomorrow so inexpensive that they can be discarded instead of washed. #228

STARS AND CONSTELLATIONS—Can be located and observed with the aid of this star-finder. Planet table allows you to locate other members of the solar system. Make a simple planetarium. 10 experiments. #229

TWIRL THIS COLOR TOP—Discover for yourself the laws of the mixing of colors. Usually science laboratories spend many dollars for apparatus with which to perform color experiments. Test yourself: Red and green make what? 27 experiments. #233

OPTICAL ILLUSIONS—Seeing is often deceiving. You cannot always trust your eyes. A set of 14 drawings shows how misleading figures

can be. Bird in a cage, distorted room, the window shape and other illusions. 21 experiments. #224

CODES AND CIPHERS MADE TO ORDER—Principles of Cryptography explained and demonstrated. Can you read this: I HIR TRSA LEUN? A cipher slide-rule allows you to write in your own code. Make your own invisible ink. 12 experiments. #225

CRYSTALS—Can be used to help tell the composition of chemicals. You never see table salt in anything other than a cubic form. Samples of chemicals typical of crystal systems. Patterns for crystal models. 13 experiments. #223

BUILD A SEXTANT—Shoot the sun, determine angles, get acquainted with principles of navigation. All materials furnished. 11 experiments. #234

SOUND—A phenomenon which is one of the most important sources of information about the world. Materials provided for 24 experiments designed to introduce the fundamental principles of sound. #243

SEASHELLS—Six specimens and 21 experiments with data on how shells grow, collecting and naming shells, reference books for the identification and habits of mollusks; information on national and local shell clubs. #255

GEOMETRIC MODELS—Developed to illustrate a variety of ideas and theorems from plane geometry. Kit contains ten specimens needed to construct four flexible models. #257

POLYSTYRENE PLASTIC—To acquaint you with an important plastic and how it may be varied to give special purpose materials. Twenty-five experiments demonstrate basic properties. #245

SURVIVAL FOOD—See and learn about the type of foods that would be used in case of a

national emergency. Five specimens. 18 experiments. #250

INCENSE—Has excited man's sense of smell as long as civilization has existed. Nine different scents are included plus materials to make your own incense. #254

ANCIENT GEMS—Eight semiprecious stones with 21 experiments to acquaint you with these gems. Materials and instruction in the lapidary art. #246

SPECIALIZED PAPERS—Stretchable paper is one of the eleven specimens included which illustrate the wide applications of paper in home and industry. #217

PAPERMAKING—Make your own paper from the materials included and learn about the commercial production of paper. 10 experiments. #282

PROBABILITY—Materials to introduce you to this fascinating branch of mathematics and demonstrate some of its applications. #262

MARBLE—Eight specimens from various localities the world over to study in 25 different experiments. #261

SILICONES—Seven specimens and 25 experiments illustrate the most important properties of this unusual group of man-made chemicals. #263

TASTE—Twenty-two experiments to test your sense of taste and to demonstrate its importance in our lives. #265

SPACE-AGE MINERALS—From rocks and minerals of the earth are coming many of the new materials used in space exploration. Six specimens. 13 experiments. #266

ENZYMES—Experiment and learn the properties of the four different enzymes included and

determine the ingredients of the unknown specimen. #269

SILK—This interesting fiber is traced from the silk cocoon to finished fabric. Five specimens. 27 experiments. #264

MAPS & CHARTS—Look at the world from above the north pole as projected on a flat surface. The story of map making as demonstrated by seven specimens. #268

MATHEMATICAL PAPER FOLDING—Mathematics becomes shapes by constructing models using plane and solid geometry and even algebra. #267

TRIBOLUMINESCENCE—Strike two pieces of quartzite together and see the spark of light and note its color. The light is produced by mechanically deforming crystal structures. 24 experiments to perform dealing with this fascinating phenomenon. #281

IT'S ALL DONE WITH MIRRORS—Make a heliograph and send code messages to a friend. Construct a periscope, a stereoscope and a simple kaleidoscope. The science of plane mirrors made simple and fun in 15 experiments. #239

MINUTE SEEDS—350,000 of them weigh one ounce. The plant from one of these tiny seeds is 20 million times the weight of the seed. Tobacco culture demonstrated by 21 experiments. #258

COMPUTATION—Learn to use the slide rule, Napier's rods and various other computation devices to aid you in mathematical calculations. #273

CURVES—Using straight lines construct curves by curve stitching and paper folding. Diagrams will help you make conic sections and relate them to each other. #284

MAIL COUPON NOW

To: SCIENCE SERVICE, 1719 N Street, N.W., Washington, D. C. 20036

Send Complete Collection (41 kits) @ \$19.50.....\$

Send kits indicated by X on list below, totalling _____ kits at 50 cents per
kit for any five or more.....\$

Single kit 75 cents.....\$

TOTAL ENCLOSED (we pay postage).....\$

Send to: (please print)

Name _____

Address _____

City, State, Zip Code _____

Your name and address if different from above _____

698

- ☐ COTTON #270
- ☐ METAL FASTENERS #271
- ☐ WAVE THEORY OF LIGHT #272
- ☐ DINOSAUR FRAGMENT #274
- ☐ MAKE YOUR OWN MACHINES #275
- ☐ COPPER #276
- ☐ TREE PRODUCTS #277
- ☐ SPACE MATERIALS #278
- ☐ POLYMER-FIBER #279
- ☐ ANGIOSPERMS #280
- ☐ STATIC ELECTRICITY #227
- ☐ CLOTH WITHOUT WEAVING #228
- ☐ STARS AND CONSTELLATIONS #229
- ☐ TWIRL THIS COLOR TOP #233

- ☐ OPTICAL ILLUSIONS #224
- ☐ CODES AND CIPHERS #225
- ☐ CRYSTALS #223
- ☐ BUILD A SEXTANT #234
- ☐ SOUND #243
- ☐ SEASHELLS #255
- ☐ GEOMETRIC MODELS #257
- ☐ POLYSTYRENE PLASTIC #245
- ☐ SURVIVAL FOOD #250
- ☐ INCENSE #254
- ☐ ANCIENT GEMS #246
- ☐ SPECIALIZED PAPERS #217
- ☐ PAPERMAKING #282
- ☐ PROBABILITY #262

- ☐ MARBLE #261
- ☐ SILICONES #263
- ☐ TASTE #265
- ☐ SPACE-AGE MINERALS #266
- ☐ ENZYMES #269
- ☐ SILK #264
- ☐ MAPS & CHARTS #268
- ☐ MATHEMATICAL PAPER FOLDING #267
- ☐ TRIBOLUMINESCENCE #281
- ☐ IT'S ALL DONE WITH MIRRORS #239
- ☐ MINUTE SEEDS #258
- ☐ COMPUTATION #273
- ☐ CURVES #284

GE
S
H

>
be
of
say
sit
Ph

Sc
ge
en
tw
etl

su
Br
R
etl
wl
all

ev
di
etl
ph

in
ev
Pr
Ph
th
ge
wi
to

ge
bo
ht
tu

ci
th
"l
Pr
pr
a

nc
de
re
pr

Id
be
m
gl

st
co
en
to

Pl
en
re:
m:
be
lec

GENERAL SCIENCE

Science and Ethics Have Close Parallels

► WHILE SCIENCE is widely admired because of its successes, ethics is a matter of concern mainly because of its failures, says Prof. Henry Margenau, Yale University's first Eugene Higgins Professor of Physics and Natural Philosophy.

In his newly published book, *Ethics and Science* (Van Nostrand, \$7.50), Dr. Margenau views ethics as a successful human enterprise, however, and draws parallels between ethics and science, without reducing ethics to science.

Dr. Margenau, who has served as a consultant to the Atomic Energy Commission, Brookhaven National Laboratory and the Rand Corporation, begins the search for ethical norms by trying to determine whether they are, or can be made valid for all mankind.

Logically and empirically he finds no evidence to reject this possibility. If there did exist a "true contradiction" among these ethical systems, Dr. Margenau believes moral philosophy would be at an impasse.

This same impasse could also be reached in science if contradictions existed. However, after examining the laws of science, Prof. Margenau, a past president of the Philosophy of Science Association, finds that these laws converge: "The belief is general that if the end ever arrives, there will be one all inclusive scientific explanatory theory."

Returning to the area of ethics, Dr. Margenau applies this knowledge and finds that both science and ethics have deep roots in human nature, and that human nature in turn unites both nations and cultures.

Since scientific method reflects "the principles of reason" expressed in "laws of thought" and channeled still further into "laws of action," it seems unreasonable to Prof. Margenau that while science approaches reality, ethics would drift without a goal.

"These laws (scientific) are the product, not the starting point, of man's ethical endeavor," he says. "If science progressively reveals one part of human nature, ethics progressively reveals another."

After studying different ethical systems, Dr. Margenau finds that contrary to general belief, ethical norms do exist: "The agreement as to personal and ethical conduct is global and amazing."

The reason for disagreement, he says, stems from a lack in understanding the constructive nature of ethics, and an over-emphasis on values which divert attention to the wrong areas.

Prof. Margenau, a fellow of the American Physical Society and of the American Academy of Arts and Sciences, counsels his reader not to worry about values, but to make whatever basis of belief, whether it be The Sermon on the Mount or the Analects of Confucius, work in his own life.

• Science News Letter, 86:287 October 31, 1964

Whatever YOU need in a teaching microscope...



Bausch & Lomb
STANDARD TEACHING
MICROSCOPES



Bausch & Lomb
STEREOZOOM®
MICROSCOPES



Bausch & Lomb
ELEMENTARY SCHOOL
MICROSCOPES



Bausch & Lomb
SCIENCE TEACHING
ZOOMSCOPES



Bausch & Lomb
STUDENT
STEREOMICROSCOPE

Bausch & Lomb *has it!*

- Four price ranges . . . from \$12 up . . . to fit every size school budget.
- Five different basic models . . . meet every micro-science teaching need . . . from first grade to college.
- Every microscope designed and made specifically for teaching . . . for constant, hard student usage . . . fully guaranteed for life.

Write for complete information to Bausch & Lomb Incorporated, 16010 Bausch St., Rochester, N. Y. 14602

BAUSCH & LOMB



New Ideas and Gadgets

Ask for Gadget Bulletin 1272 for sources of new things described. Send a self-addressed envelope to SCIENCE SERVICE, 1719 N St., N.W., Washington, D. C. 20036. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **TIMED EXTENSION CORD** automatically turns light off at a pre-selected time within periods of from one minute to four hours. Capable of controlling up to three electrical devices at one time, it can be used to turn off Christmas trees, sun lamps, television, heating pads, store windows or other units at a desired time. It operates on 125-volt household current and has a six-foot cord.

• Science News Letter, 86:288 October 31, 1964

⚙️ **DARKROOM PEN** is especially designed for doctors, nurses, policemen, photographers and others who have occasion to write in the dark. The lower part of the pen is encased in transparent plastic through which a soft red light suitable for darkroom use shines. The upper part which houses the battery is made of satin-finished metal. The pen cover, also of metal, has a convenient pocket clip.

• Science News Letter, 86:288 October 31, 1964

⚙️ **BAIT BUCKET** with a perforated liner helps keep minnows in good condition permitting them to be bathed in a constant flow of fresh, cool water. In use, covered securely, the liner is lowered into the lake or stream and tied to the fishing craft. Made of impact-resistant smooth plastic, the bucket does not damage the scales of the fish.

• Science News Letter, 86:288 October 31, 1964

⚙️ **SNOW THROWER**, shown in photograph, that can also be used as a power



scoop or shovel is lightweight and compact and can be hung on the wall when not in use. Useful for cleaning snow from steps, porches, walks or driveways, it can also be used for digging under snowbound cars. Capable of throwing up to one ton of snow a minute as far as 15 feet, it adjusts to seven throwing positions and is powered by a two-cycle engine that can function in any position.

• Science News Letter, 86:288 October 31, 1964

⚙️ **QUICK BATTERY CHARGER** eliminates the need to lift the hood of the car or touch the battery itself when the battery dies. By simply plugging one end of the cord of the charger into a standard electrical outlet and the other into the cigarette lighter of the car, the battery is quickly recharged. Usable on all cars having 12-volt batteries, it is shock and short proof. The unit comes in a luggage type case.

• Science News Letter, 86:288 October 31, 1964

⚙️ **ELECTRIC WASTEBASKET** shreds important papers not meant to be read again, as they are discarded. Automatic and requiring no buttons, the wastebasket starts when paper sheets are fed into it and stops when the paper is completely shredded. The size of an ordinary wastebasket, the rectangular unit fits under the desk and plugs into any 110-volt outlet. It also serves as a regular wastebasket.

• Science News Letter, 86:288 October 31, 1964

⚙️ **DOG LEASH** that includes a spring control device makes walking the dog easier. The spring included just below the leather hand strap absorbs the strain of the dog's pulls and lunges, protecting the person's arm and also the animal from sudden choking. Encased in plastic, the spring is unbreakable and will not overextend. The steel twist chain of the 48-inch leash will not rust.

• Science News Letter, 86:288 October 31, 1964

Doctors Are Reading

Elderly Ulcer Patients Survive Early Surgery

➤ **PERSONS OVER 60** years of age who have peptic ulcers should not put off surgery until massive bleeding requires emergency treatment, two Boston surgeons warned in the New England Journal of Medicine, 271:803, 1964.

The death rate reported in a study of partial removal of the stomach (subtotal gastrectomy) when massive bleeding occurred was 21%, but when patients chose to have such an operation in earlier stages, only 0.4% died. The study was made at Peter Bent Brigham Hospital over a ten-year period.

Forty percent of the bleeding patients were more than 65 years old, and the majority of those dying after surgery for massive bleeding were more than 60.

Follow-up information on these elderly people revealed that they lived at least five years after choosing to have early surgery, Drs. John R. Brooks and Angelo J. Eraklis reported.

Hereditary Drug Resistance

The first case of drug resistance in a family has been reported from California in the New England Journal of Medicine, 271:809, 1964.

Seven family members of Irish-English extraction in three generations showed extraordinary resistance to coumarin anticoagulant drugs, Dr. Robert A. O'Reilly of the Santa Clara County

Hospital, San Jose, Calif., and a team at Children's Hospital, San Francisco, found.

The family was warned to avoid taking vitamin K and medications containing barbiturates because of the peculiarities of their clotting factors. Drs. Paul M. Aggeler and M. Silvija Hoag, with Lois S. Leong and Mona L. Kropatkin, reported the study.

Undertake Botulism Poisoning Study

The large number of cases of food poisoning and deaths from botulism in 1963 (46 cases and 14 deaths) has stimulated renewed interest in research on this subject by at least six U.S. Government agencies.

These cases represent the highest total for any one year since 1939 and the eighth highest since 1899, Public Health Reports, Oct. 1964, said. Commercially canned food accounted for five cases with two deaths. In addition, 19 cases caused by commercially smoked products resulted in seven deaths. Home-processed foods were responsible for 22 cases, including five deaths.

The Food and Drug Administration is undertaking increased inspections of can sealing and has warned the public to avoid use of food in bulging or leaking cans. Dr. G. G. Slocum, chief, division of microbiology, Food and Drug Administration, with Dr. W. M. Decker and B. J. Osheroff of the Public Health Service, reported the study of the status of botulism in the United States.

• Science News Letter, 86:288 October 31, 1964