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SCIENCE NEWS LETTER

Vol. 51, No. 20

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 17, 1947



Pipe-Laying From Above

See Page 316

A SCIENCE SERVICE PUBLICATION



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MEDICINE

Chemical Helps Hearing

Treatment with histamine may restore hearing to many overtaken by sudden deafness. Swelling of ear labyrinth causes condition.

▶ A NEW TREATMENT which restores hearing to victims of sudden deafness has been discovered by Drs. Olav E. Hallberg and Bayard T. Horton of the Mayo Clinic in Rochester.

"Many of the unfortunate persons" afflicted with this particular type of deafness will be helped by the new treatment, the doctors believe.

The treatment consists of daily injections into the veins of a chemical called histamine. This chemical has been used by Dr. Horton and associates to treat Meniere's disease, a condition featured by a special kind of dizziness, nausea, vomiting and sometimes deafness. In treating Meniere's disease the doctors were concentrating on relieving the incapacitating spells of dizziness, or vertigo. They noticed, however, that about half the patients got some improvement in hearing.

First use of the chemical primarily to relieve deafness was made two years ago. This was in the case of a 45-year-old man who came to the Mayo Clinic the day after he had suddenly gone completely deaf in his right ear. He had a buzzing, ringing sensation in his ear, but no nausea, vomiting or dizziness. He was given histamine injections daily for 12 days. On the seventh day, when there still had been no change in his hearing, the doctors were about to give up. They continued the treatment, however, and on the ninth day the man was able to hear with his previously deafened ear. After the twelfth treatment, his hearing was normal. An examination 18 months later showed he still could hear normally.

Spontaneous recovery of hearing in a case of this type had never before been seen by the Mayo Clinic doctors.

Three other patients were treated with histamine. Two were helped to recover some hearing but the third was not. The doctors believe this was because treatment was started too long after the damage to the nerve of the hearing. The sooner the treatment is begun, they say, the better the outlook.

The type of deafness in which the treatment is expected to help is one which occurs suddenly in older people.

In most cases it is caused by hemorrhage into the labyrinth of the ear and is generally total and permanent. Doctors have called it "labyrinthine apoplexy."

A dropsy-like swelling of the ear's labyrinth, rather than bleeding into the labyrinth, is the cause of the condition, in the opinion of the Mayo doctors.

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GENERAL SCIENCE

American Engineer Awarded Watt International Medal

▶ DR. STEPHEN P. Timoshenko, professor emeritus of theoretical and applied mechanics at Stanford University, has been awarded the James Watt International Medal of the Council of the In-

stitution of Mechanical Engineers of Great Britain.

The medal is awarded every two years to commemorate James Watt, pioneer in the development of the steam engine. The late Henry Ford was the only other American who received the medal.

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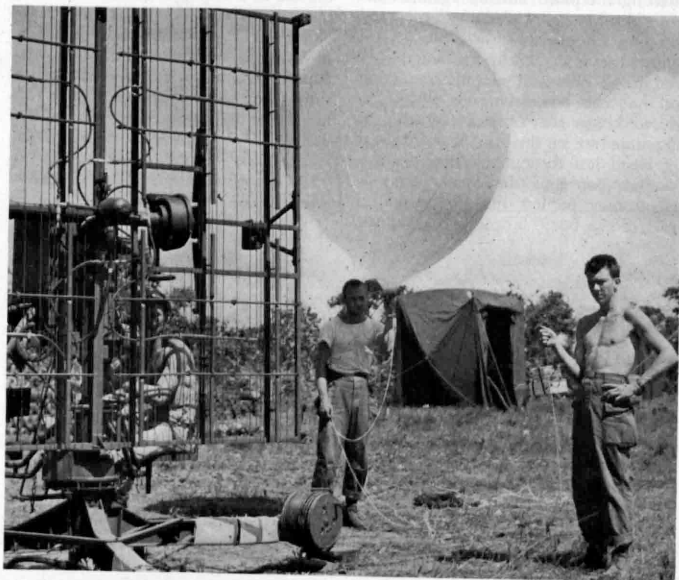
BACTERIOLOGY

New Antibiotic Attacks Seed-Dwelling Bacteria

▶ BACTERIA that lurk in the coat of seeds, and attack the young plants when they begin to sprout, can be successfully fought with an antibiotic compound secreted by the soil-dwelling germ known as *Bacillus subtilis*. This compound, which has been named subtilin, was used both on pure cultures of the seed-attacking bacterium and on seeds which had purposely been infected with it, by Dr. J. J. Goodman and Prof. A. W. Henry of the University of Alberta. In both series of experiments it prevented growth of the disease organism.

Details of the work of the two Canadian researchers are given in *Science* (March 21).

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WEATHER AND ECLIPSE—With the joint Army Air Forces-National Geographic expedition in Brazil, meteorologists are making a survey of that region of Brazil and observing the weather above the sun's eclipse. A radio-sonde radio-equipped balloon is being installed.

MEDICINE

Blood Trapped in Shock

Radioactive iron and iodine have made possible a study of shock that has resulted in new knowledge of blood circulation. Isotope technique is best method of study.

► NEW KNOWLEDGE about the circulation of the blood and treatment of shock has been gained by the use of radioactive iron and iodine. Without the use of radioactive isotopes, such as are made in the atom bomb uranium pile, this new knowledge could not have been gained. Dr. John G. Gibson, 2nd, of Harvard Medical School, declared at a conference on isotopes in Nashville. The conference, held at Vanderbilt University in cooperation with the Clinton Laboratories and the Oak Ridge Institute of Nuclear Studies, is devoted chiefly to use of radioactive chemicals as tracers and in treatment of patients.

Treatment of shock should be devoted not only to restoring the total volume of red blood cells in the body, Dr. Gibson's studies show. It should also be directed toward starting the blood flowing again in the tiny blood vessels called capillaries and keeping it circulating in these vessels.

In a state of shock, the amount of red blood cells and plasma circulating in the veins and arteries is always reduced below the amount that can be accounted for on the basis of the amount of blood lost through bleeding from a wound. Some of the unaccounted-for blood may be lost into the damaged part of the body, instead of out of the

body, or by bleeding from the intestines in certain types of shock.

Regardless of cause, Dr. Gibson has found that in shock red blood cells get "trapped" in the tiny blood vessels in all the organs of the body. This trapping is widespread. As a result, the amount of blood flowing in capillary blood vessels through all the organs is reduced. The normal amount of blood in these capillaries is less than a fifth of the total volume of blood in the body. So the trapping of even a small part of it may fatally reduce the flow of blood through the capillaries.

Red blood cells tagged with two kinds of radioactive iron and blood serum albumin tagged with radioactive iodine were used in the studies. Before this radioactive isotope method became available, blood circulation was studied by the use of a blue dye and by measuring the mass of red cells that collect at the bottom of a glass tube when a sample of blood is whirled around in a centrifuge. Discrepancies between the results from these measurements in humans who had hemorrhages showed that the results obtained did not give a correct picture of the blood circulation. The isotope technique is free from the errors of the other methods.

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ACOUSTICS

Science-Music Institute

► LEOPOLD STOKOWSKI left his baton at home when he joined scientists in a technical discussion of science and music at the opening session of the Acoustical Society of America's meeting in New York.

The famous symphony conductor was one of several musicians who talked over the joint problems of the science of sounds with the scientists.

Speaking for the musicians, Dr. Howard Hanson, director of the Eastman School of Music, Rochester, N. Y., explained, "The musician of today often finds himself somewhat at the mercy of the sound engineer, the radio control

operator, or the designer of electronic music instruments.

"He is bewildered by the language of the cycle and decibel and by the complexity of the circuits, controls and equipment.

"The engineer on the other hand," Dr. Hanson pointed out, "is frequently unable to appreciate the point of view of the artists, whether through lack of training or by virtue of his temperament."

A three-way attack on the problem of getting the musicians and the scientists together was proposed by a committee of the Acoustical Society. The program

would include common terminology for both science and music, setting up rules for measuring music and its effect on people and more get-togethers and greater exchange of information between the scientists and musicians.

Conductor Stokowski discussed a proposed institute of musical science. Dr. Harvey Fletcher of the Bell Telephone Laboratories, Murray Hill, N. J., suggested that the research program of the institute could range from the physics of producing sounds to the psychology of music appreciation of listeners.

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The white pine wood used in matches is cured for 12 to 18 months.

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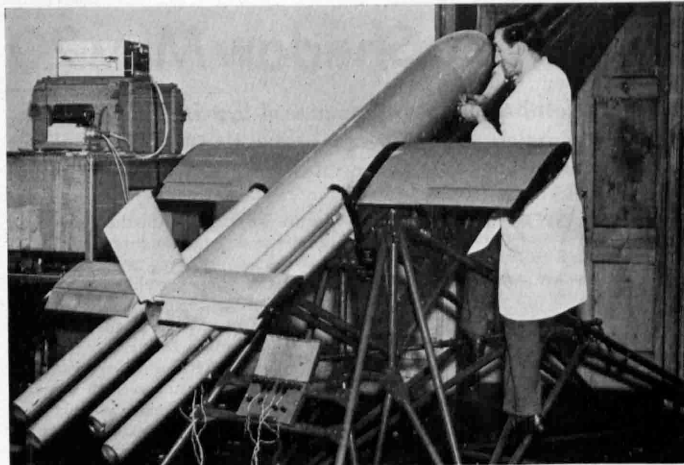
SCIENCE SERVICE

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A-BOMB DEFENSE?—The "Stooge", first radio-controlled rocket missile developed in Britain, may be a possible defense against bombers carrying atomic bombs. It has an endurance of 40 seconds, a range of about eight miles, and a speed of over 500 miles per hour.

ACOUSTICS

Music Terms Confusing

Scientist tells musicians that symbols of music need to be simple for scientific use. Music for hospitals and industry proves valuable.

▶ **THOSE MUSICAL** notes which confuse the beginner on the piano drew fire from another quarter. A scientist termed the musician's symbols "worse than inadequate" for scientific use.

M. F. Meyer of Miami, Fla., told the Acoustical Society of America that musical terms in "fractions" are no help to science, either. He called for a clear, simple numerical system to replace the musician's present terminology.

Music may be "written for the soul" but musical experience is a scientific matter, Prof. Meyer explained.

"The causality of musical experience can be no other than basic facts of neurological chemistry," he declared.

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Healing Music Needs Study

▶ **ALTHOUGH** music is used in some hospitals, more study is needed to discover how music can be used to aid healing, a group of scientists cautioned at the Acoustical Society meeting.

R. C. Lewis of the War Department

Special Staff, Washington, D. C., Dr. Harold Burriss-Meyer, Stevens Institute of Technology in Hoboken, N. J., and R. L. Cardinell of Muzak Corporation, New York, N. Y., said that a "considerable amount of circumstantial evidence has been accumulated testifying to potential values in music as a therapeutic aid."

Reporting that Russia, England and possibly Italy are also doing some work on music and medicine, the scientists urged an organization at the national level for research on the problem.

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Hearing Music At Work

▶ **MUSIC** in industry also needs more scientific study, Mr. Cardinell and Dr. Burriss-Meyer reported. They said that the number of people hearing music while they work jumped from a few hundred to an estimated 5,000,000 in six years.

They warned against "haphazard approaches" to the use of music, but ad-

ded that increased production and better relations between employees and employers have been demonstrated.

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AERONAUTICS

Artificial Night Sky Improved for Students

▶ **AN IMPROVEMENT** in the artificial night sky under which aviation students in Link trainers do their simulated flying is the subject of patent 2,420,048, assigned to Link Aviation, Inc., by the inventor, H. A. Marsh of Boston. It changes the apparent rate of motion of the stars according to the direction of flight.

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ARCHITECTURE

Space-Saving Hangar Designed for Efficiency

▶ **A SPACE-SAVING** hangar for servicing the giant airplanes that dominate today's skies has been designed by A. S. Miller, C. W. Frank and R. R. Hagglund, all of Minneapolis. They have just been granted U. S. patent 2,420,186 on their plan.

The design is predicated on the fact that most of the airplane parts that need servicing—engines, steering gear, etc.—are located forward. Accordingly, the building is approximately triangular, with vaulted roofs forming a kind of tight trefoil pattern. The forward ends of three planes are run under these three roofs, and sliding sectional doors run up to about mid-fuselage. The middle sections have semicircular pieces cut out of their free edges, which meet to form a circle around the fuselage. A soft blanket or curtain helps form a closer fit.

Separating the three hangar segments is a Y-shaped building consisting of three long arms mutually subtending angles of 120 degrees. This provides space for shops, administrative offices, etc.

The inventors point out that a new field with little traffic can start with one segment, adding others as conditions justify new construction. They also claim considerable economy in heating during the winter, and point out that cargo loading and passenger embarkation can be carried on under shelter.

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AERONAUTICS

Flashes Light Runways

Krypton lighting system will provide the link in all-weather flying and make landings safer. Flashes penetrate dense weather for 1,000 feet.

"BOTTLED lightning" is the key to a new approach and runway lighting system. It is the missing link in all-weather flying. It fills the gap between instrument flying through overcast with radio and radar aids and the actual touch on the runway which the pilot must make with the help of his own eyes.

The lighting system is far more powerful than any previously developed, claim Westinghouse engineers responsible for the system. The lights are called the world's brightest. They have 3,300,000,000 peak candlepower each, they declare. The lights produce lightning-like flashes strong enough to penetrate any weather for at least 1,000 feet.

When the new system is used an approaching pilot will be guided in zero-zero weather by instrument means to proper position at the outer end of the approach lane. Then he will be able to see the long line of 72 brilliant approach lights. They guide him to the runway. The system uses another combination of lights to tell him whether the runway is clear, while a third set of brilliantly lights the landing strip.

The bottled lightning is a lamp four inches long which is a quartz tube filled with krypton, one of nature's rarest gases. When the impact of a surge of electricity heats the gas to incandescence, the lamp flashes with an all-out brilliance of 9,000,000 candlepower per square inch. A reflector and an optical system in the lighting fixture magnifies the flash to three and a third billion beam candlepower, Westinghouse scientists state.

Thirty-six of these krypton flash units are placed in line alternately with 36 new neon units for a distance of about two-thirds of a mile along the approach path. When flashed one after another, the lights appear as a stroke of lightning to the pilot. It flashes 40 times a minute, toward the runway.

The neon lamps, each about two feet long and the size of a fountain pen, may be operated as steady burning lights having 100 or 1,000 or 10,000 candlepower, as fog conditions demand. When used as flashing units, these lights pro-

duce 100,000 or 10,000,000 candlepower, whichever is required. The runway itself is lighted by lamps about 100 times brighter than those now in commercial use. These brilliant approach and runway lights need be used only when weather conditions require.

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AGRICULTURE

2,4-D Saves Hand Labor In Tobacco Cultivation

➤ 2,4-D and related growth-control chemicals promise to make it possible to grow tobacco without a great deal of the tedious and costly hand labor now involved in one phase of its cultivation—the job known as "suckering". This promise has developed as a result of experiments carried out by Dr. Robert A. Steinberg of the U. S. Department of Agriculture, at the great federal experiment station at Beltsville, Md.

In growing tobacco, it is customary to decapitate the plants at blossoming time, removing the flowering shoot. This ordinarily stimulates the growth of side branches, or suckers, that spring from buds formed just where the leaf joins the stem. It is now necessary to go through the field several times, picking off these suckers by hand. This is the job known as suckering.

Dr. Steinberg grew several lots of

tobacco plants under exactly similar conditions. After topping, he left two lots unsuckered, and kept two lots suckered by hand, in the customary way. The others he treated with a dab of 2,4-D or other growth-control chemical, applied on the cut surface of the stem, after topping.

All the chemically treated groups of plants produced greater weights of tobacco than did the hand-suckered control groups, which in turn outyielded the plants on which the suckers had been permitted to grow. Increases in leaf yield by the chemically treated plants ranged from 11% to 20%. 2,4-D produced the largest yield increase. However, another chemical, alpha-2-chlorophenoxypropionic acid, came within a fraction of a per cent of tying its performance.

These results were obtained in a relatively small-scale experiment. The method will be applied on a full field scale this season, with two kinds of tobacco, to decide whether hand suckering can be supplanted by chemical growth-control in commercial production.

Details of Dr. Steinberg's first experiment are presented in *Science* (Apr. 25).

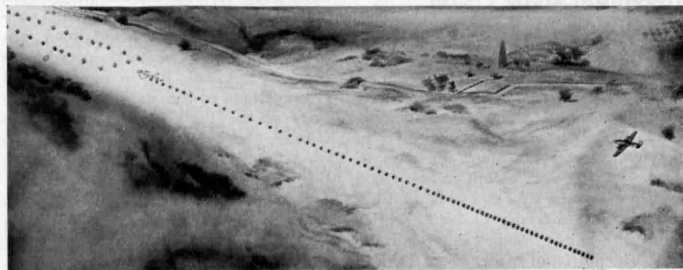
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ENGINEERING

Helping Engine for Trucks

➤ AN AUXILIARY engine for overloaded trucks and buses to enable them to maintain normal speed on stiff grades, is the invention on which patent 2,419,929 has been granted to the late George D. Wilcox of Detroit. The second engine delivers its power to the same gearbox as the main engine, but is held idle by an automatic control until it is needed.

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BOTTLED LIGHTNING—As the airplane at the right approaches for its landing, the pilot will see the flash of 72 lights. The green light or red cross at the head of the runway is a last minute traffic director.

PUBLIC HEALTH

Doctors Expect Another Big Polio Epidemic

▶ ANOTHER BIG polio year is expected this summer by infantile paralysis experts. Without making any specific predictions, they told members of the American College of Physicians that there will probably be a lot of polio in the United States and elsewhere for a number of years to come.

One authority, Dr. Thomas Rivers of the Rockefeller Institute was quoted as having said that he feels we are in a pandemic. Pandemic is the term scientists use to describe a world-wide epidemic, such as the influenza outbreak of 1917-1918.

During the last four years there has been the largest total number of cases of polio in the United States in the history of the nation, Dr. Edward A. Piszczek of Chicago reported.

The increase is not just a matter of more accurate reporting. Doctors actually are seeing more cases, Dr. Piszczek said. The virus germ that causes infantile paralysis has grown more virulent. Until it begins to lose some of its virulence, we shall go on having lots of polio cases every year, the authorities believe. Since the beginning of this year 33 states have reported more polio than for the same time last year. Authorities are watching with special concern increases in some states which for the past four or five years have had very little polio.

Doctors are also getting better results in treating polio, though there are no "miracle drugs" for the disease.

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WILDLIFE

Mountain Lions Prefer Porcupine to Veal

▶ MOUNTAIN LIONS have unaccountable tastes. They seem to prefer porcupine to veal. Despite their ill reputation as killers of livestock, bristles of porcupines were far more abundant in 2,000 samples of mountain-lion food wastes examined by Dr. Frank C. Hibben of the University of New Mexico than were hairs of domestic animals. To be exact, he found evidences of feeding on porcupine in 5.8% of all cases, while remains of cattle, horses and mules together made up only 1.6% of all lion meals.

In Arizona and New Mexico, where Dr. Hibben carried on most of his studies, deer are the mountain lion's principal food, constituting 82% of the total supply. Examination of lion-killed deer carcasses which he was able to find indicated that in many instances the victim had been crippled or otherwise partly disabled, thus making it an easier prey. If this should prove generally the case, there would be some support for the claim often made, that predatory animals serve as agents of natural selection, culling out the weaker and less desirable specimens of game animals.

Nor is the mountain lion a wasteful feeder. One deer carcass serves him for about ten meals.

Other animals on which the big cat preys include rabbits, prairie-dog, badger, fox, coyote, beaver, elk and an occasional wild rat.

Just as the mountain lion is not deterred by the porcupine's bristles, neither is he stopped by chemical-warfare defense. There was plenty of evidence that he eats skunks.

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ECOLOGY

If Region Is Colder, Animals Are Bigger

▶ "THE COLDER the bigger" expresses a general rule for warm-blooded animals, Dr. Gordon Alexander of the University of Colorado pointed out to the meeting of the Southwestern Division of the American Association for the Advancement of Science. Under the title of Bergman's Principle, this rule has long been known to hold for distribution in latitude: the biggest animals of a given species are found farthest north.

Now this rule has also been found to hold good for distribution in altitude, among non-migrating species. In temperate climates, the up-and-down seasonal migration of mountain populations beclouds the issue. But in recent critical examinations of the stable bird populations of the high mountains of New Guinea, the biggest specimens were always found at the highest levels, where the weather was the coolest.

Strangely enough, however, the rule is inverted when it comes to cold-blooded forms, such as insects. Mountain populations of a given species of grasshopper were found to have the biggest specimens nearest the base and the smallest near the summit.

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IN SCIENCE

PHYSICS

AAF Uses Wing as Antenna For Reducing Radio Static

▶ THE WING of an airplane can be made to act as an antenna to reduce static.

Exciter coils have been installed between the inboard engines and the fuselage of planes by Wright Field engineers of the Air Materiel Command. The coils make the wing itself serve as the antenna. This does away with the standard wire antennas.

Icing and oscillation of the wire antennas will produce static. Army Air Force engineers believe the new system will reduce the static.

Another disadvantage of the wire antenna is the drag which cuts down speed. With the wing serving as the antenna, this difficulty is overcome.

A flush-mounted slit antenna at the side gunner's position in a B-17 bomber has also been installed experimentally as another answer to the antenna problem. Reported to be adaptable to most types of aircraft, this antenna is planned for use with the navigational aids which guide the pilot down safely in bad weather.

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PHYSICS

Beta Ray Spectrometer To Aid Isotope Study

▶ NEWEST TOOL for scientific study of radioactive isotopes is a beta ray spectrometer developed at the National Bureau of Standards.

The new spectrometer has a magnetic lens which can form images with electrons sent off by a radioactive material. Beta rays are high speed electrons, negatively charged particles which are a part of all atoms. The instrument also will aid in the study of gamma rays, the short, powerful X-ray-like radiations which are more penetrating than beta rays.

First research job for the beta ray spectrometer at the Bureau of Standards will be in measuring the penetrating power of gamma and beta rays from the radioactive isotopes now available to scientists from chain-reacting piles.

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E FIELDS

CHEMISTRY

Alcohol Vapor Is Used To Purify Lactic Acid

➤ TWO CHEMISTS of the U. S. Department of Agriculture Regional Research Laboratory at Philadelphia, Edward M. Filachione and Charles H. Fisher, have developed a method of purifying lactic acid, much used in food and beverage industries, out of the crude fermented mixtures in which it is produced. They bubble alcohol vapor through the liquid; the alcohol picks out the lactic acid and leaves the impurities behind. Later it is separated from the lactic acid, and re-used. Patent 2,420,234, granted on this invention, is assigned royalty-free to the government.

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ACOUSTICS

Musicians Can Calculate Harmony on Slide-Rule

➤ DON'T BE SURPRISED if you see a musician pull out a slide-rule and start making calculations before he begins playing. And future Beethovens or Irving Berlins may sit down with a slide-rule when they compose new pieces of music.

The slide-rule for music was presented at the Acoustical Society of America meeting in New York by L. E. Waddington of C. G. Conn, Ltd., Elkhart, Ind. He explained that musical data and the science of sound as related to music can be adapted to a slide-rule because they involve relationships which are the same for any key.

"Musicians," Mr. Waddington said, "are seldom concerned with the mathematical background of their art, but an understanding of the underlying physical principles of music can be very helpful to the student in considerations of problems related to harmony, intonation and general band instrument design."

Information adjusted on the slide-rule includes chord structures, scale building, instrumental transportation, interval relations and degrees of scale.

Music of the 17th and early 18th centuries was played as it actually

sounded for scientists at the Acoustical Society meeting. W. B. White of the School of Pianoforte Technology, Chicago, explained that we use a different system of tuning keyboard instruments than was used when the music he played was composed.

Today's piano tuning, called the equal temperament system, was first demonstrated by Sebastian Bach early in the 18th century. Before Bach's time, tuning known as the mean-tone system was used.

Mr. White demonstrated the difference between the systems by playing music composed before instruments were tuned the way they are now.

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ANIMAL HUSBANDRY

Medicine Fattens Hogs Quicker on Less Corn

➤ A SURE-FIRE country joke, back when Grandpa was a boy, told of the old farmer who accidentally spilled his wife's bottle of Anti-Fat into the slop he was getting ready for the hogs—and then couldn't understand why they didn't put on weight.

Now it looks as if that old gag is going to be reversed, by giving hogs medicine that will make them get fat quicker on less corn. The medicine is thiouracil, a drug that checks the action of the thyroid gland. A really active thyroid is the gland that gives people (and sometimes pigs) that Cassius-like lean and hungry look.

Scientists at the New Jersey Agricultural Experiment Station added a little thiouracil to the rations of ten 200-pound hogs, and kept ten others on the same rations but without the drug, as controls. After 38 days the group of hogs that got the thiouracil gained a total of 610 pounds, as compared with a 470-pound gain by the control group.

The greater weight gain was made economically, too. The thiouracil group ate 524 pounds of feed for each 100 pounds of gain, while the controls used 723 pounds of feed for each 100 pounds of added weight.

Thiouracil is not on the market yet, but farmers who want to try it, once it is available, are warned not to use it on young pigs; it will stunt their growth. The best time to use it is during the last 45 days of the fattening period.

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PLANT PHYSIOLOGY

New Weed Killers Affect Root Growth in Plants

➤ DDT, 2,4-D and other new chemical weapons against insects and weeds will have to be used with an eye to their effects on crop plants, it appears from studies reported before the meeting in Colorado Springs of the Southwestern Division of the American Association for the Advancement of Science by Dr. J. L. Fults and Dr. M. G. Payne of Colorado A and M College.

Rather heavy doses of DDT in pots of soil induced bean plants growing in them to throw out an extra-heavy web of secondary roots. On the other hand, a fairly close chemical relative known as Colorado 9 reduced the secondary root below normal.

Even low concentrations of 2,4-D in soil had unfavorable effects on the nodule bacteria that capture nitrogen from the air for plants of the bean and clover family. The two researchers cited the work of another pair of scientists who had discovered that DDT has a discouraging effect on the same useful bacteria. DDT's chemical cousin, the insecticide Colorado 9, does not depress the nodule bacteria.

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CHEMISTRY

Chemicals Make Water Shine In Dark to Aid Navigation

➤ CHEMICALS that create a bright glow when dropped on water, of great possible usefulness to seamen and transocean flyers, are the subject of patent 2,420,286, issued to three chemists working in the laboratories of the American Cyanamid Company of New York, Dr. H. T. Lacey, H. E. Millson and F. H. Heiss. Among possible uses are marking the surface for a plane making an emergency night landing at sea, giving a "seamark" for navigational purposes for either ships or planes, and showing the location of lifeboats or liferafts to searching planes in the dark.

A typical formula consists of 3-aminophthalhydrazide, sodium perborate, potassium ferricyanide and trisodium phosphate. The ingredients, ground to fine powder, are mixed dry and preferably formed into tablets or cakes with a binder. Only on contact with water do they react to produce chemiluminescence.

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ARCHITECTURE

Metallic and Plastic Homes

Aluminum, steel and plastics will rival wood for houses. Most new housing materials will be used in combination with some wood.

By A. C. MONAHAN

Wood emerges from war years with many rivals in the building field. Houses of steel, aluminum, plastics and lightweight concrete may be expected in large numbers in the future. "Conventional" Americans may prefer the traditional house of lumber that dates back to log cabin days, but others will take advantage of the newer materials.

Heavy war drains on lumber and an increasing scarcity of growing timber are two of the important reasons substitutes have been developed. To these may be added the struggle of wartime metal and plastic producers to find a continued market for the products they learned to make in large quantities, such as aluminum and magnesium for war planes and plastics for hundreds of applications.

Then there are many little-known but plentiful minerals suitable for use in building materials, particularly in lightweight concrete blocks and in wallboards. They are already invading former lumber fields. Also there are new resins by which former unusable vegetable matter and metals are combined into building panels of great strength and durability.

Combined With Wood

Most of these newer materials will be used in combination with some wood. There will always be a market for all the lumber that America can produce. Flooring of wood, for example, will remain the preferred material of many housewives, but others will like floors of tile, linoleum, rubber and plastic spreads. Even concrete flooring will grow in favor now that scientists have given it "spring" by the addition of asphalt in the mix.

Aluminum promises to be one of America's principal building materials of the future. Several aluminum houses are now being constructed in quantities. The light metal has several advantages. Dwellings of aluminum can be constructed to resemble in appearance the homes that are traditional in America. The metal resists all weather action, and can be used painted or unpainted as desired. A plentiful supply of aluminum is

assured. Giant aluminum manufacturing plants erected during the war to turn out the vast quantities of this material needed in war planes are still available for civilian production. Also, by a new process developed by the National Bureau of Standards, the metal can be obtained from common kaolin clay without dependence on imported bauxite.

During the war, America produced both in 1943 and 1944 well over 1,500,000,000 pounds of this light aluminum metal each year. Production in 1945 dropped to less than a billion pounds due to the cancellation of gigantic orders for warplanes following V-J Day. Many plants were closed because few then foresaw the coming demands for aluminum in the building field and for many other uses, ranging from railway cars to electric wiring to meet a shortage of copper.

Aluminum Houses

As examples of aluminum houses now under production, two may be mentioned. One is the so-called Butler-Built of conventional design, and the other is the Fuller house which is circular in shape. This circular house has its side-walls and partitions of aluminum suspended from a concealed central steel

mast with radiating ribs somewhat like an umbrella.

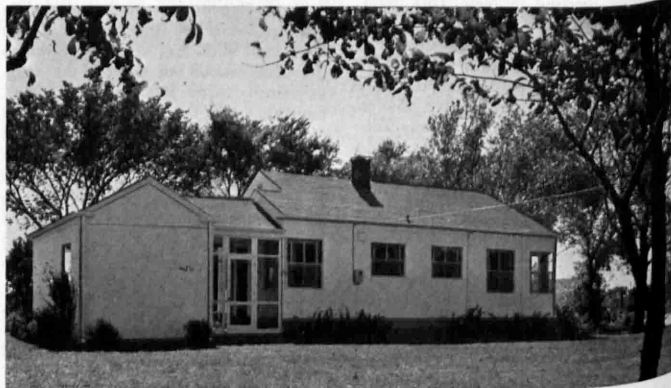
A typical Butler-Built house, recently on display in Kansas City, Mo., the home of the Butler Manufacturing Co., is a two-bedroom structure 24 by 33 feet in overall dimensions. It contains a living room about 17 by 12 feet in size, a kitchen with a dining area, a bath, and a central utility room which can be used for a heating plant if no cellar is dug.

Steel Roof

The roof structure is steel over which any type of roofing may be placed. Side-walls are aluminum panels with four-inch flanges used in uniting the panels. They form four-inch studs extending into the interior of the room to which interior walls of aluminum or other material may be attached. Flooring is wood, asphalt or tile. Interior and exterior can be painted any color desired, or may be left unpainted.

Insulation in the walls, floor and ceiling help make the building warm. In addition, there is a reflective value in the aluminum wall surfaces that assists the house to retain its interior heat in cold weather, and to keep away summer outside heat.

The circular Fuller house has some special values to offset its unconventional shape. A circular wall incloses more square feet of inside space than a rectangular or square construction with an equal



EFFICIENT—Prefabricated houses such as this home are designed for efficiency.

wall-length. Also the shape is claimed to make heating and ventilation easier and more uniform.

This house, 36 feet in diameter, has 1017 square feet of floor space, enough for a combined living and dining room, two bedrooms, two baths and an entrance hallway. It only weighs four tons, one-tenth the weight of conventional frame houses. "Although the sidewalls are light aluminum, the building is warm because it is well insulated. It is also strong, and the builder says can withstand a 180-mile gale.

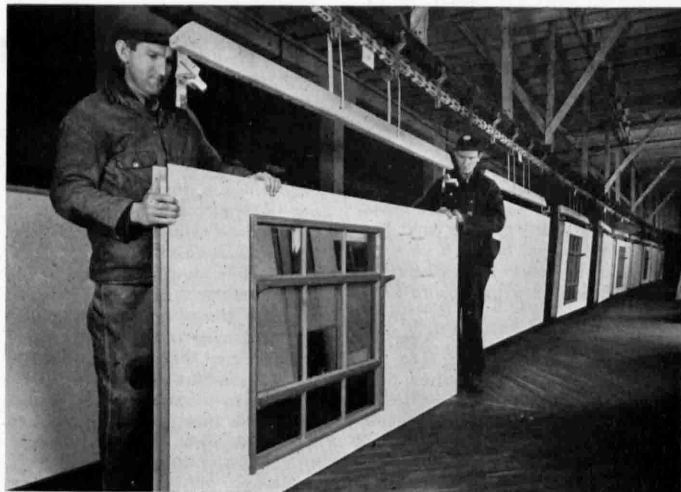
In addition to what are called all-aluminum houses, there are many others in which aluminum is used as outside sheathing and roofing, and as inside partitions. The Reynolds Metal Co., of Louisville, for instance, is making aluminum clapboard siding, weatherboard siding, shingles and strip roofing, also corrugated roofing and siding. Such rust-proof, fire-proof metal sheeting can be placed over almost any type of outside wall.

Most of the newer building materials are better suited for fabrication within factories for so-called prefabricated homes than they are in "on-the-job" construction. This is because metals usually require machinery for cutting and shaping, and panels of wood or wood substitutes, bonded by resins, require pressure to perfect good union. Light-weight concretes are on-the-job materials, except when used to form exterior or interior paneling.

Light, Strong Panels

Factory-built panels in large sections ready for assembly into complete houses can be much lighter than ordinary construction and still as strong if properly fabricated. The process used by Gunnison Homes, Inc., may be cited as an example. Gunnison is one of the well-known builders of prefabricated houses, putting out buildings of eight basic sizes, any of which can be varied in appearances by orientation and minor changes.

The sidewalls of the Gunnison houses are panels strong enough to bear the weight of the roof and ceilings. These panels contain lumber frames of material considerably lighter than ordinarily used in house construction. Ply-wood sheets are attached to the frames with a thermosetting phenolic resin. The space within is filled with chemically treated rock wool bat insulation. The result is a durable construction, stronger than nailed structures even if much less in thickness, and one that is highly resistant to the passage of heat.



HOUSE IN A HURRY—Enough panels for a complete house come off the conveyor every 25 minutes.

Magnesium, plentiful and much lighter than aluminum, is rapidly coming into use in the construction of airplanes, canoes, car bodies and many other objects. It may soon be used in building construction, particularly alloyed with aluminum.

Titanium is another light metal with possible wide usage in construction fields now that a method has been developed for producing it from its very plentiful ores. It is about twice as heavy as magnesium, but still much lighter than steel. It is the ninth most plentiful chemical element in the world, and is exceeded only by iron, aluminum and magnesium in metals suitable for engineering uses. It is already widely used in a chemical compound. Titanium oxide is one of the principal pigments used in white paint.

There are many minerals that can be used as aggregate, or fillers, to make light-weight concrete. Vermiculite gives a concrete weighing only from one-eighth to one-third the blocks or panels of equal size made with sand or gravel. Others range in weight between those of this mineral and those of the customary sand and gravel.

The plentiful light-weight aggregate materials suitable in construction that are now available in the United States include haydite, foamed slag, cinders, pumice, diatomite, perlite and vermiculite. These have all been tested by the National Housing Agency and are recommended by that government office. Most

of them are materials that expand greatly by special treatment, usually by heat.

Haydite is made from a great variety of clays and shale. Foamed slags are made by treating hot molten blast-furnace slag with water. Pumice is a siliceous mineral of volcanic origin. Diatomite is composed of deposits of the siliceous shells of microscopic aquatic plants called diatoms. Perlite is a natural volcanic glass. Vermiculite, mined by at least a dozen companies widely distributed in America, is a mineral that expands up to 30 times its original volume by a simple heat treatment.

Science News Letter, May 17, 1947

CHEMISTRY

Vacuum-Steam Treatment Makes Milder Tobacco

➤ TOBACCO is made milder in its smoking properties, and its final color closely controlled, by a vacuum-and-steam treatment on which A. J. Berger and H. S. Greene of Cincinnati have taken out patent 2,419,109. Before being placed in the treating chamber, the tobacco is moistened. Then air is pumped out, and steam is admitted to the chamber, where it is held for an hour at a temperature of from 235 to 260 degrees Fahrenheit. This produces the mildness. Color is controlled by the degree of preliminary moistening; the damper the tobacco, the darker it becomes.

Science News Letter, May 17, 1947

ENGINEERING

Helicopters Lay Pipelines

See Front Cover

► Helicopters demonstrated their ability to lay pipe lines in "impossible" places at an Army Engineer Corps field day at Ft. Belvoir, Va. Since modern armies move more on their gasoline tanks than on their traditional bellies, a place for the "windmill planes" in keeping tanks, planes, trucks and jeeps supplied seems assured.

Two types of pipe were accurately dropped by two helicopters. The first was a three-inch hose of solvent-proof synthetic rubber. Five hundred feet of this was stowed in a special container under the helicopter body, the outer end attached by a line to a small anchor. When the anchor was dropped the line pulled out the hose, which was laid out straight as a string in a matter of sec-

onds. This type of temporary pipe line can be used for getting urgently needed fuel across rivers, narrow canyons and other difficult obstacles.

The second is a more permanent type, made of 20-foot sections of aluminum tubing six inches in diameter. The helicopter carried 12 of these in two bundles, which it dropped to the ground while hovering at a height of about 10 feet. A ground crew assembled the sections, uniting them with a newly designed clamp that requires only two bolts. The sections are amazingly light for their size, weighing only 60 pounds apiece. One man can easily lift and carry one of them.

Gasoline pipe lines played an important part in the recent war, especially in the campaigns through France and the Low Countries and into Germany. However, the weight of the steel sections, which had to be moved by truck, was a severe handicap. About 80% of the effort expended by the Engineers in getting pipe lines laid went into building roads for hauling materials. With the new featherweight pipe, capable of easy air transportation, this difficulty should not recur.

Science News Letter, May 17, 1947

NUTRITION

Invalid Food Nourishes With Less Nitrogen Content

► THE OLD-TIME rhymester who wrote, "I cannot eat but little meat" should have attended the meeting of the American Chemical Society's division of medicinal chemistry. A new food preparation, described as a hydrolyzate of casein, was declared by Dr. Charles F. Kade, Jr., of Frederick Stearns and Company, to be able to maintain the necessary protein nourishment of weakened patients at a lower nitrogen intake than usual. This enables such patients to rebuild their tissues with a minimum load on their digestive organs.

Science News Letter, May 17, 1947

The felt hammer in a piano possesses a unique property; whether striking heavily or lightly, it will always, at the same touch on the key, produce the same tone in volume and quality.

Do You Know?

Gas is the simplest fuel to burn; fuel oils require atomization.

Straw, oat hulls and whey were used to produce fats in Germany during the war; a mold was used in the process.

Carbon granules made from anthracite coal are used in telephone transmitters.

A new form of an old transparent plastic filters out harmful ultraviolet radiation that causes sunburn; it is suitable for aircraft enclosures and tops of sightseeing buses.

Fluorine, for many years an unharmed, unruly chemical element, but put to many uses during the past few years, was first isolated in 1886.

Modern shampoo preparations are no longer soaps but chemical products containing sulfated castor or olive oils and sulfated fatty alcohols; the mixture is a superior cleanser and it rinses clean.

Activated silica sols, a new chemical engineering tool, are widely used in treating raw water; other uses, including treatment of sewage, oil wastes, and papermill white water, are being developed.

Cutting edges of cemented carbide tool tips are sometimes injured by the presence of moisture in chlorinated and sulfurized cutting oils; the moisture weakens the tip by attacking the cobalt binder used.



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BIOLOGY

Egg Cells Transplanted

Superior babies-to-be have been transplanted into the body of a foster mother rabbit. Development may become valuable in livestock production.

► "REFRIGERATOR babies" are science's latest step toward practical production of more and better livestock. This newest step marks an advance in the already-developed technique of transplanting before birth superior babies-to-be into mothers of just ordinary breeding.

In experiments at the Worcester Foundation for Experimental Biology in Shrewsbury, Mass., Dr. Min-Chueh Chang kept egg-cells, extracted from female rabbits, at low temperatures for several days. Then he transplanted them into the bodies of foster-mother rabbits. The little rabbits flourished and grew big, and finally were born just as though their real mothers had seen them through their pre-natal life.

This represents another step in advance of "test-tube" babies, produced by the fertilization of fresh egg cells taken from the mother animal's body and immediately implanted into another

female that serves as foster-mother.

Applied to larger and more valuable animals, the technique can become very important, especially to the livestock industry. Dr. Chang calls attention to this future possibility in his report to the British journal, *Nature* (May 3).

In the experiments, egg-cells were removed from female rabbits and stored at low temperatures, ranging from 32 degrees to 59 degrees Fahrenheit for periods of from 24 to 168 hours. Then they were warmed up to approximately normal body temperature and held there for 24 hours, to see whether normal cell-division, or cleavage, would occur. Those showing normal cleavage were transplanted into the foster-mother animals' bodies, and part of them developed into normal rabbits in due time.

Best results were obtained with egg-cells that had been kept at 50 degrees Fahrenheit, but at least some of those stored at freezing point (32 degrees)

also developed.

The transplantation technique used in these experiments was originally developed by Dr. Gregory Pincus, in whose laboratory Dr. Chang worked.

Science News Letter, May 17, 1947

PHYSICS

Rat Trap Slays Victims By Electricity "Set" Tube

► THE WORLD should beat a wide path to the door of Wilbur E. Lake of Fostoria, Mich., for he has invented a simple trap that kills any number of rats with electricity and needs no re-setting. It consists of a tube big enough for a rat to enter, held at a sloping angle alongside stairs or shelves. Part way down is a container holding an enticingly scented bait. Within the tube also are a pair of electrodes. When the rat passes between these he completes the circuit and is killed. His dead body slides down the slope—and the trap is ready for its next victim. Patent number on this invention is 2,417,601.

Science News Letter, May 17, 1947

When airplanes fly at supersonic speeds, temperatures in cockpits may rise high above that of boiling water because of heat generated by friction, an Army air surgeon predicts.

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BOTANY

NATURE RAMBLINGS

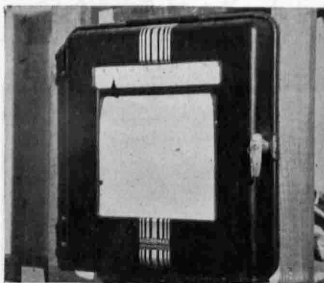
by Frank Thorne



Fives and Threes

➤ **COUNT PETALS** on as many kinds of flowers as you can find. Opposite the name of each, put down the number of petals its flowers show, thus: wild rose 5, violet 5, trillium 3, toothwort 4, star-grass 3, and so on. After you have made your list as long as you can, take a look at the numbers. Notice how they are dominated by 5 and 3.

Those two prime numbers are the



Micromax Saves Observer's Time By Recording Solar Radiation

The Micromax Recorder shown above is one of two which are helping Smithsonian scientists measure solar radiation faster and more easily for the Army's tent research at Camp Lee, Va. It records radiation falling on an Eppley Pyrheliometer; the other Micromax, not shown, charts fabric temperatures beneath various glass filters. These instruments save nearly all of the time which would be needed for hand plotting of the same data.

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trademarks of the two great divisions of the flowering plants. Five is the dominant number among the plants that come up with two seed-leaves, the dicotyledons, or for short, "dicots". Three is the mark of the plants with only one seed-leaf, the monocotyledons, or "monocots."

This "fiveness" is not confined to number of petals alone. The whole flower is apt to have its parts in fives or multiples of five—five sepals, five or ten stamens, five seed-chambers in the fruit. Similarly, the "threeness" of the monocots will run through all the structures. What appear to be six petals in lily, amaryllis, dogtooth violet and tulip are really three true petals surrounded by three sepals that have become petal-like. Botanists, to avoid splitting hairs, call them "perianth-parts."

Sometimes the petals or perianth-parts have become fused together, so that the corolla is bell- or trumpet-shaped, as in lily-of-the-valley and trumpet-creeper. Yet even here you are apt to find points or lobes on the margin proclaiming its origin—again threes (or sixes) and fives. And the inner structure of the flower, the stamens and the parts of the pistil, will be arranged according to the old basic numbers.

There are, of course, departures from the schemes of fives and threes. The mustard-and-cress family, for example, is so strongly four-petaled and four-sepaled that the group has been named the crucifers, or cross-bearers. Also there are flowers with petals so modified that it is difficult to tell anything about the basic number-scheme—Dutchman's breeches, for example, and the wild orchids. Also, there are some flowers that produce simply indeterminate numbers of all parts, such as waterlily, magnolia and anemone. But after you have lived with plants for a while you get to regarding these as exceptions or aberrations, and the five-and-three arrangement as the norm.

Science News Letter, May 17, 1947

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WILDLIFE

Abnormal Salamanders Have Extra Toes and Legs

➤ **SALAMANDERS** with supernumerary toes and even with whole extra legs were reported by Dr. David W. Bishop and Dr. Robert Hamilton, of the University of Colorado, to the meeting of the Southwestern Division of the American Association for the Advancement of Science. These little tailed relatives of toads and frogs had their extra toes on their hind legs only, and three individuals had extra hind legs, all of which had more than the normal number of toes.

These abnormal salamanders, 19 all told, were found in a small Colorado lake at 8,500 feet elevation. The two zoologists believe they represent a stock in which the tendency to produce "spare parts" is hereditary. They are continuing their studies, in an effort to discover what factors operate in the growth of supernumerary toes and legs.

Science News Letter, May 17, 1947

CHEMISTRY

New Gasoline Synthesis

➤ **AN IMPROVED** way to produce synthetic gasoline out of the carbon monoxide and hydrogen of water-gas is covered by patent 2,418,899, issued to three New York inventors, E. F. Pevere, G. B. Hatch and E. E. Sensel, and assigned to The Texas Company. The improvement consists primarily in the addition of isobutane or other branched-chain hydrocarbon to the gas mixture. The product, the inventors state, has antiknock properties superior to those of previous synthetic motor fuels.

Science News Letter, May 17, 1947

YOUR HAIR AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

Two medical specialists tell you what to do to save and beautify your hair—stimulate healthier hair growth, and deal with many problems, as: Dandruff—gray hair—thinning hair—care of the scalp—baldness—abnormal types of hair—excessive oiliness—brittle dryness—hair falling out—infection—parasites—hair hygiene, etc., etc.

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Books of the Week

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ALGEBRA FOR COLLEGE STUDENTS—Jack R. Britton and L. Clifton Snively—*Rinehart*, 529 p., \$3. A complete development of algebra for college students whose mathematical preparation was weak.

THE AMERICAN SPECIES OF HYMENOPHYLLUM SECTION SPHAEROCIONIUM—C. V. Morton—*Smithsonian Inst.*, Contrib. from U. S. Nat. Herbarium, Vol. 29, Part 3, 62 p., paper, 30 cents. The results of 15 years study of more than 1,000 specimens of this genus of fern.

FUNDAMENTAL CHEMISTRY—Horace G. Deming—*Wiley*, 2nd ed., 745 p., illus., \$4. This college text is designed to teach the student to think. It includes modern nuclear fission and transformation, the recently discovered elements, and a good coverage of antibiotics. It stresses accurate and precise definition as a necessity to clarity of thought.

GENERAL BOOKBINDING—Chris Groneman—*McKnight and McKnight*, 64 p., illus., paper, \$1. Clearly illustrated, this project has been tested and most of the equipment can be constructed in school shop or home workshop.

GENERAL LEATHERCRAFT—Raymond Cherry—*McKnight and McKnight*, 108 p., illus., paper, \$1.20. To help people interested in this pleasant hobby, it contains related information, operation sheets, projects and designs.

KNUDSEN: A BIOGRAPHY—Norman Beasley—*Whitlesley House*, 396 p., \$3.75. A portrait of achievement in America, this is a biography of the president of General Motors who held many important wartime positions.

MATHEMATICS FOR THE CONSUMER—R. Schorling, J. R. Clark, F. G. Lankfor, Jr.—*World Bk.*, 438 p., illus., \$1.96. A new course in mathematics designed to help people cope with problems in daily living; spending money for food, shelter and material benefits, habits of thrift, investments, budgets, and interpretation of statistical data.

PHYSICS FOR THE NEW AGE—R. H. Carleton and H. H. Williams—*Lippincott*, 656 p., illus., \$2.80. A high school text in basic physics emphasizing its place in

modern developments: automobile, airplane, jet propulsion, electronics, television, radar, photography, and atomic science.

A POUND OF PREVENTION: How Teachers Can Meet the Emotional Needs of Young Children—James L. Hymes, Jr.—*Teachers Service Committee on the Emotional Needs of Children*, 63 p., illus., paper, 25 cents. Sponsored by the Caroline Zachry Institute of Human Development, this is one of a series of pamphlets to be prepared on this and related subjects.

THE PRACTICAL BREWER—Master Brewers' Assn. of Am.—*publ. by the assn.*, 228 p., illus., \$2.50. This is a manual for the brewing industry.

PRECISION OF RING DATING IN TREE RING CHRONOLOGIES—A. E. Douglass—*Univ. of Arizona*, Lab. of Tree-Ring Research Bulletin No. 3, 21 p., illus., paper, 30 cents. Emphasizes the precision of the dating of individual rings by the use of the methods and procedures of dendrochronology.

60 YEARS WITH MEN AND MACHINES—Fred H. Colvin—*Whitlesley House*, 297 p., illus., \$3.50. A history of the development of machinery since 1884. This period included the bicycle, the automobile, the airplane, railroads, new machine tools for industry.

THEORY AND APPLICATION OF RADIO-FREQUENCY HEATING—G. H. Brown, C. N. Hoyer, and R. A. Bierwirth—*Van Nostrand*, 370 p., illus., \$6.50. Useful for industrial and radio engineers, this text will help both use this new industrial tool.

TRANSACTIONS OF THE WISCONSIN ACADEMY OF SCIENCE, ARTS, AND LETTERS,

vol. XXXVII, *publ. by the Academy*, 374 p., \$4. Covering the year 1945, this volume contains articles on hares, grouse, mosquitoes, fish parasites, use of pheromol in treatment of bacterial fish diseases, creel census on the Brule River, and activities of the first year of the Wisconsin Junior Academy of Science.

THE WORLD GROWS ROUND MY DOOR—David Fairchild—*Scribners*, 347 p., illus., \$5. This plant explorer has brought to fruit beside his door many of the plants he found abroad and acclimatized in America.

Science News Letter, May 17, 1947

GENETICS

Red-Green Colorblind Men Can Put Blame on Women

➤ MORE MEN than women are so colorblind that they can't tell the red cherries from the green leaves. But the men can blame women for their defect.

Men get red-green colorblindness from mothers who do not themselves have it. New confirmation for this scientific theory was found by Dr. R. W. Pickford of the University of Glasgow and reported to the British journal, *Nature* (May 3).

Among 191 men and 185 women with normal color vision, Dr. Pickford found more women than men have some difficulty distinguishing red from green. And women with colorblind men in the family are less sensitive than other women to these colors. The proportion of colorblind women was just about what would be expected if colorblindness is sex-linked and inherited from their mothers.

Science News Letter, May 17, 1947

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❁ **PAINT BRUSH conditioner** is a container in which brushes are surrounded by a vapor evaporated from a felt pad lining. The vapor is a solvent for the paint, varnish or lacquer in the brush, and softens hard-as-rock brushes in a few days, it is claimed, without injury to bristles.

Science News Letter, May 17, 1947

❁ **ICE CHEST**, convertible into an electric refrigerator right in the home in one hour's installation time, is designed to make later payment of the mechanical feature easier. The factory-packaged electric unit can be bought when desired, and is designed for easy fitting into the former ice compartment.

Science News Letter, May 17, 1947

❁ **ILLUMINATED weather map** shows in white and red colors of different intensities areas of high and low pressure. The map, on a translucent surface, is backed by a panel of tiny lamps so arranged that either a single white or red one lights up a separated area. A manually operated keyboard turns on the proper lamp.

Science News Letter, May 17, 1947

❁ **DESK EQUIPMENT** of an inter-office communication system by which an executive carries on conversations with associates has a radio receiver concealed within it. In use, the intercom automatically cuts off the radio.

Science News Letter, May 17, 1947



❁ **FIRE-FIGHTING clothing**, developed by the Army for rescue work, has an outer shell of water-repellent cotton duck lined with resin-coated cotton cloth, and an inner lining of fiberglas cloth backed with wool. The window of the helmet, shown in the picture, is a heat-resistant plastic.

Science News Letter, May 17, 1947

❁ **DRIP-PROOF faucet**, the washer of which can be changed without turning off the water in water mains, has been developed in England. When changing the washer, a special plug replaces the faucet nozzle; then the top of the faucet can be removed without leakage. Double washers in the faucet prevent dripping.

Science News Letter, May 17, 1947

❁ **ASBESTOS blankets**, for jet-propelled aircraft engines and exhausts, are basically a special asbestos fiber mat shielded with a metallic membrane and enclosed in a wire mesh. They are flexible and easily applied, and can withstand the intense heat of engine cones, turbine casing and tail pipes.

Science News Letter, May 17, 1947

You are invited to accept one of the few memberships still vacant in

Things of science

Membership is strictly limited to 10,000 and will be for at least the next nine months. This is America's most unique "club."

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Question Box

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What will musicians calculate on a slide-rule? p. 313.

AERONAUTICS

How will runways be lighted for night safety? p. 311.

AGRICULTURE

What medicine fattens hogs quicker on less corn? p. 313.

ARCHITECTURE

What building materials will rival wood for homes? p. 314.

BOTANY

What are the petal numbers that mark the two great divisions of flowering plants? p. 318.

Pictures: Science Service, cover; National Geographic, 307, 309; Army Air Forces, 309; British Information Services, 310; Westinghouse Corp., p. 311; Buller Manufacturing Co., p. 314; Gannett Homes Inc., p. 315.

Where published sources are used they are cited.

CHEMISTRY

How is a plastic made from common clay? p. 309.

GENERAL SCIENCE

How many Americans have received the James Watt International Medal? p. 307.

MEDICINE

What kind of deafness does a new treatment with histamine help? p. 307.

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PUBLIC HEALTH

Do doctors expect another polio epidemic this summer? p. 312.