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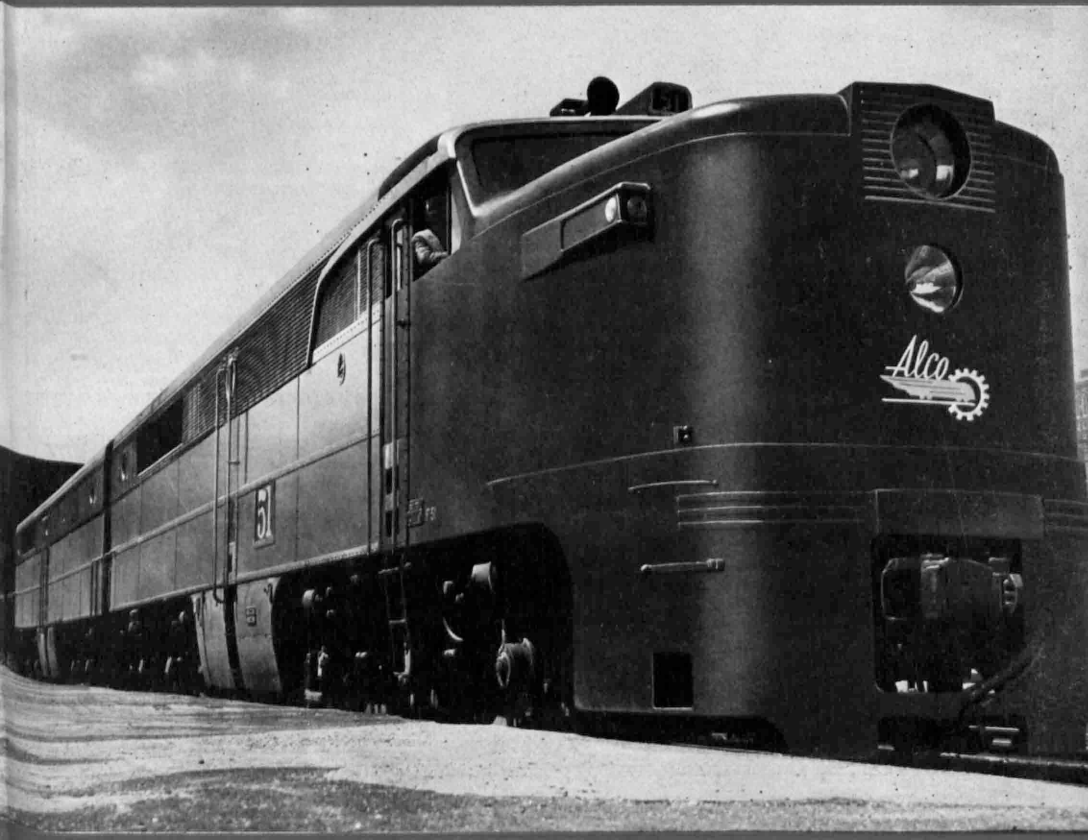
SCIENCE NEWS LETTER

Vol. 50, No. 13

THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 28, 1946



Speedy Streamliner

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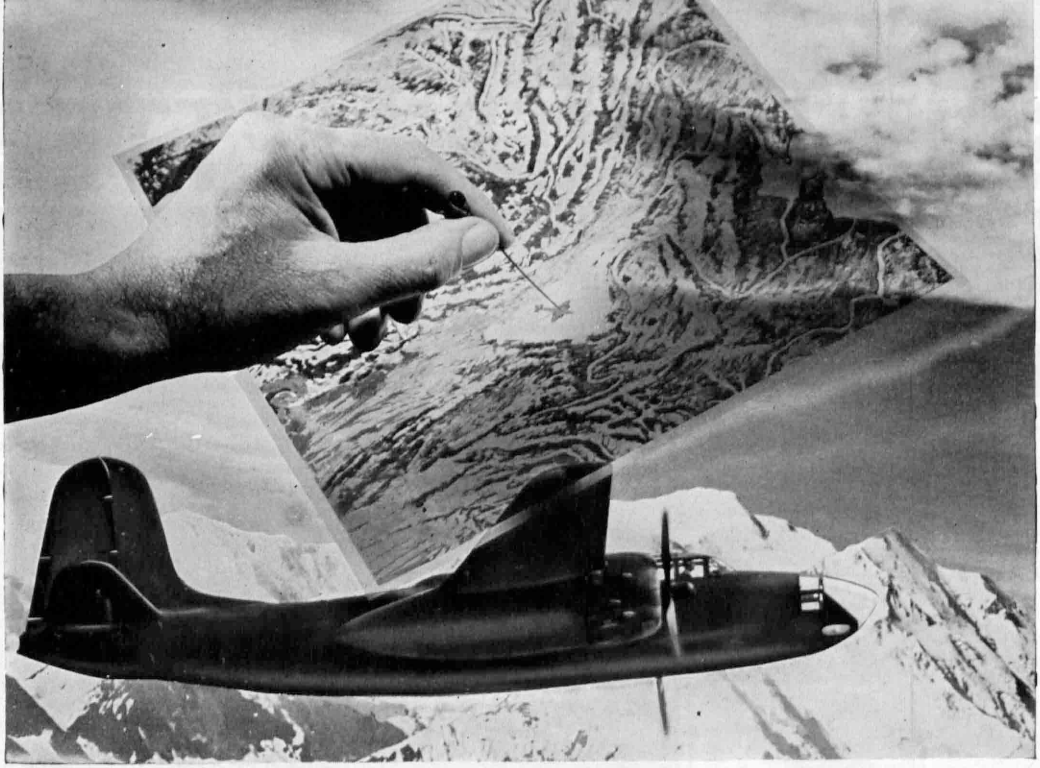
A SCIENCE SERVICE PUBLICATION

1921 TWENTY-FIFTH ANNIVERSARY 1946



Developed by RCA as an aid to blind bombing in wartime, Shoran is a new radar yardstick for world mapping

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Until recently a closely guarded military secret, Shoran was developed at RCA Laboratories—a world center of radio and electronic research. Here, in this vast community of scientists, the same imagination and skills that developed Shoran keep RCA and RCA Victor the outstanding names in radio, television and recorded entertainment.

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PHYSICS

Massless Matter Announced

Weightless particles moving with the velocity of light may be possible, according to relativistic wave equations, reports scientist to the American Physical Society.

By WATSON DAVIS
Director, Science Service

IN THEIR probings of the most basic subdivisions of the universe in which we live, scientists should now look for two new and unsuspected particles that have no weight or mass even though they may actually exist.

Dr. E. P. Wigner, Princeton University physicist and head of the Clinton Laboratories, Oak Ridge, Tenn., told the American Physical Society meeting in New York that relativistic wave equations suggest the possibility of such new particles.

These theoretically massless particles would move with the velocity of light, which is the fastest speed possible in the universe.

Often the first step in the discovery of a new particle is the demonstration theoretically that it can exist. This was the case with the neutron, which plays such an important part in the atomic bomb because it is the atomic projectile that fissions the plutonium atom.

Further research will tell whether the particles, or light-like entities, suggested by Dr. Wigner actually exist. There will be two kinds of them, one that can be thought of as analogous to transverse sound waves and the other to longitudinal sound waves.

The most discussed particles in the field of physics today are the mesons which are extremely shortlived products of collisions of earthly atoms with cosmic rays. Evidence of the existence of a kind of meson that is a thousand times the mass of the electron, and five times the weight of the kind of mesons previously known, was presented to the meeting by a French physicist, Dr. L. Le Prince-Ringuet.

New ideas in the important problem of how action one place affects something a distance away were presented by Dr. John A. Wheeler of Princeton University. Looked at with what would be called an everyday, commonsense viewpoint, this results in the possibility that something so affected by something else would sort of know in advance of the action that something was going to happen. Mathematically, the new theory of action at a distance is useful, and that is what the scientists are interested in, even if it does not seem possible or logical when an attempt is made to put it into words. The new theories are likely to prove of use in understanding the action of very high energy particles such as exist in the cosmic rays and in the giant new atom smashers now being built.

Complete conversion of matter into energy, releasing subnuclear power that would make atomic energy almost old-fashioned, is foreseen as a possibility by Dr. John A. Wheeler, Princeton University physicist, in an announcement at the meeting of the American Physical Society. The atomic bomb changes only a small fraction of its matter into energy.

"Cosmic rays bombarding the upper atmosphere are constantly breaking up protons and neutrons (particles in the hearts of atoms)," Dr. Wheeler explained. This is analogous to the artificial breaking up of the atomic nucleus by fission in the atomic bomb or pile. The cosmic ray bombardment releases particles called mesons which live only two millionths of a second. Exploration of these mesons is a hotly pursued research task today.

Discovery of how to release the untapped power in the elementary particles of matter on a reasonable scale, Dr. Wheeler said, might "completely alter our economy and the basis of our military security."

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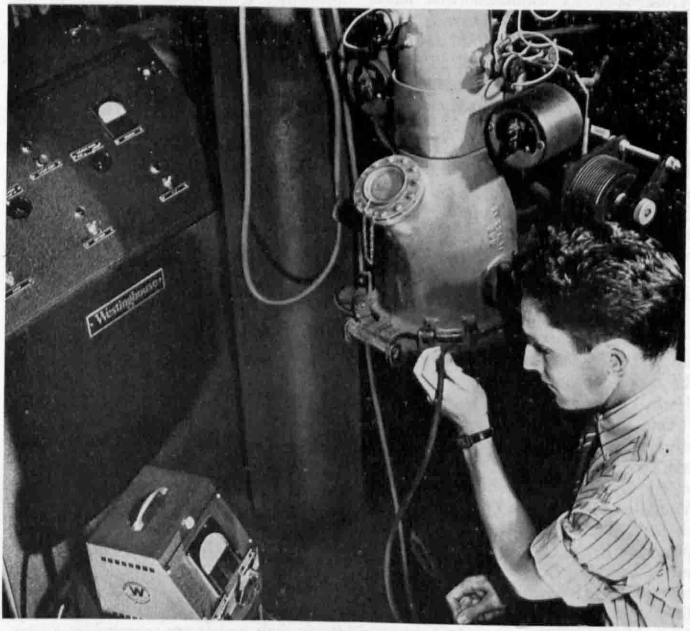

LEAK DETECTOR—Tiny leaks in the vacuum systems used in atomic research and other electronic and chemical processes can be detected by this device, developed by Westinghouse. If there is a leak, helium gas will enter the system and be detected by a sensitive electronic tube in the large black unit at the left. The amount of helium entering the vacuum system will be recorded on the meter dials, indicating the size of the leak.

NUCLEAR PHYSICS

Cosmic Ray Data Told

Rocket tests give newest data on mysterious radiation in upper atmosphere studied by relays of research physicists.

➤ COSMIC RAYS were counted at approximately 20 times the rate found on the earth's surface by a Nazi V-2 rocket soaring over 40 miles high above the desert at White Sands, N. Mex., scientists at the Naval Research Laboratory reported.

S. E. Golian, Dr. E. H. Krause and Dr. G. J. Perlow announced that a very high rate of penetrating cosmic radiation was revealed by instruments in the weapon fired by the Army's Ordnance Department June 28 carrying instruments planned by the Naval Research Laboratory.

From between altitudes of 200,000 feet and 350,000 feet, multi-channel radio equipment showed the high radiation. While scientists estimated that about 70 percent of the cosmic rays reaching the ground are "hard count" rays that can penetrate six inches of lead, "practically all" the cosmic rays above 40 miles were described as "hard count."

Only 41 seconds of data were gathered by the rocket, the scientists reported, with radio interference blacking out most of the 353-second flight. Data from Geiger counters in the rocket were relayed to ground observers by the radio equipment and were received only for intervals after the rocket had reached 40 miles high and before it began to fall to earth.

The instruments carried on the flight are believed to have been destroyed as the rocket crashed into the sands of the desert, burying its cargo.

One hundred miles above our heads cosmic rays are smashing atoms with more power than any man-made high voltage machine can wield. Dr. J. A. VanAllen of the Johns Hopkins University Applied Physics Laboratory reported to the American Physical Society record-breaking high altitude observations obtained when a V-2 rocket was fired upward on July 30 at White Sands, New Mexico.

Cosmic ray showers were 300 times more numerous in the upper atmosphere than at the ground level. The peak concentration of the mesotron particles generated by the cosmic rays was at 100,000 feet (19 miles).

Data obtained from rocket flights are being studied by a number of research institutions, each laboratory being assigned a rocket in rotation, on a schedule planned to extend at least until next spring. Physicists are eagerly scanning each chapter of the reports from these high altitude tests.

The reason scientists are particularly interested in cosmic rays is that they smash into atoms of the atmosphere and produce particles which may give clues as to how to convert matter into energy upon a larger scale than in the atomic bomb.

The mesotron, the potent particle which is considered to hold the key to the atomic nucleus, has finally been measured with some assurance of accuracy.

Its mass has been shown by direct evidence to be very close to the figure assigned to it by theoretical physicists—202 times the mass of the electron. Calculations had indicated it had a mass of 200.

The figure was reported to the American Physical Society meeting in New York by Drs. William B. Fretter and Robert B. Brode, of the University of California physics department.

The scientists reported the cloud chamber analysis of 26 mesotrons, far more than have ever been observed before in any single study.

Mesotrons are believed in some way to supply the force which gives the nucleus its tremendous energy and binds it into an almost impregnable unit.

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CHEMISTRY

Spectrograph Reveals Chemical Structure

➤ THE CHEMICAL content and structure of the molecules of materials other than metals are revealed by a new instrument developed recently. A special type of infrared spectrograph designed by Dr. Donald K. Coles of the Westinghouse Research Laboratories automatically determines how much of what chemical is in an unknown material and shows the molecular structure.

Heat rays in the infra-red region of the spectrum are beamed through the material to produce an absorption pattern, revealing what wavelength or frequency of radiation has been absorbed. This determines the presence of a certain structural element and the amount is disclosed by the amount of absorption.

The push-button-operated instrument cannot be used for metals but is used for liquids, gases and many solids, including plastics. Dr. Coles says that the new spectrograph also is valuable for fundamental research in showing the molecular structure of materials.

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ASTRONOMY

Venus Outshines Stars

Venus, now the "evening star," will reach its greatest brilliance in October. It is brightest when a crescent, but will be too far south for good observation.

LOOK TO the southwest these autumn evenings just after sunset, and there you will see (if the sky is clear) a very brilliant planet, which is Venus, now the "evening star." On Oct. 13 it reaches greatest brilliance, with magnitude minus 4.3, more than 60 times as bright as Vega, the most brilliant star to be seen these evenings.

Through a telescope Venus now has the appearance of the moon when three or four days past new; that is, it is a crescent. Moon and Venus appear in the crescent phase for the same reason, namely, that as they swing between the earth and the sun the sunlit hemisphere is turned away from us. But while the moon remains at nearly the same distance whether it is a crescent or full, Venus approaches much closer as the crescent becomes more and more narrow.

This accounts for the fact that while the moon is brightest when it is full, Venus reaches maximum brightness as a crescent. When it is "full" it is far beyond the sun and apparently much smaller than it is in October. By November, it will be still closer, but the crescent will be so very narrow that its brilliance will be reduced again. In October the apparent area of the illuminated portion visible to us is greatest, and then it is brightest.

Even though Venus becomes so bright this month, it is not very well placed for observation because it is almost as far south as it can get, and so it sets soon after the sun. It does not remain up long enough to get a place on the accompanying maps, as these show the appearance of the skies at 10:00 p. m., your own standard time, on Oct. 1, an hour earlier at the middle of the month and two hours earlier at the ned.

For a similar reason the innermost planet Mercury, though it is in the evening sky all month and reaches its greatest distance to the east of the sun on Oct. 31, when it is close to Venus is hard to see. It is of magnitude zero, far fainter than Venus.

Saturn, in the constellation of Cancer, the crab, rises about midnight, while Mars and Jupiter during October are nearly in line with the sun, and hence cannot be observed.

Vega, the brightest star now seen, is high in the west, in Lyra, the lyre. Above it is first magnitude Deneb, in Cygnus, the swan. To the left is the even more brilliant Altair, part of Aquila, the eagle. Low in the south is Fomalhaut, of Piscis Austrinus, the southern fish, a group which makes for these latitudes only a brief appearance in the autumn.

In the northeast we can see Capella, in Auriga, the charioteer. To the right of this constellation we can now see part of Taurus, the bull, with ruddy Aldebaran. A typical constellation of winter-time, its debut in the evening sky is a reminder that winter is rapidly approaching.

Celestial Time Table for October

Oct.	EST.	
1	9:00 a. m.	Moon farthest, distance 251,400 miles
3	4:54 a. m.	Moon in first quarter
9	9:30 p. m.	Giacobinid meteors
10	3:40 p. m.	Full moon
13	5:00 a. m.	Moon nearest, distance 226,400 miles
	3:00 p. m.	Venus greatest brilliance
17	8:28 a. m.	Moon in last quarter
18	7:34 a. m.	Moon passes Saturn
24	6:32 p. m.	New moon
27	6:02 a. m.	Moon passes Venus
29	4:00 a. m.	Moon farthest distance 252,000 miles
31	5:00 a. m.	Mercury farthest east of sun
	7:00 p. m.	Mercury passes Venus

Subtract one hour for CST, two hours for MST, and three for PST.

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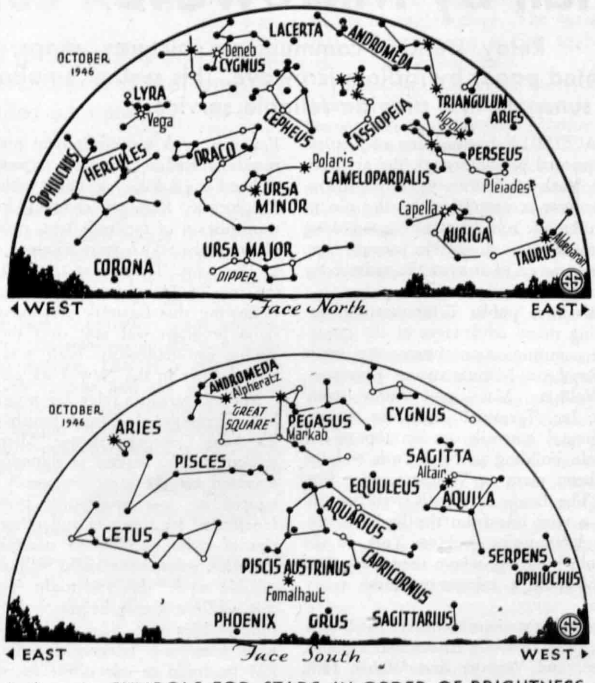
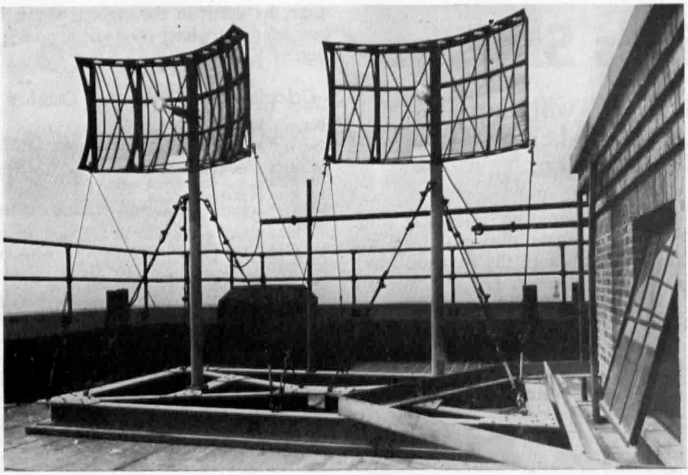
Plastic floors, more quiet than wood or tile, are recommended for future schoolrooms.

A *cyclotron* can make more kinds of radioactive isotopes than the uranium pile, but the pile makes dozens of varieties at one time, and makes them in large quantities.





MICROWAVE STATION—Raytheon transmitting and receiving antennas at the New York City terminal. Microwaves travel in straight lines as light waves do. Relay stations are placed on towers or as high elevations as possible so that no hills and mountains intervene.

PHYSICS

Mail by Microwave

Relay stations communicate pictures, maps, and printed pages by radio microwave. This system, unaffected by sunspots, will provide reliable service.

➤ FACSIMILE transmission of pictures and printed pages through the air from New York to Boston by radio microwaves was accomplished by the use of six automatic relay stations erected along the route. It is a notable forward step in the science of microwave radio relay communication.

This first public demonstration, exhibiting many advantages of the microwave communication system, was made by Raytheon Manufacturing Company, of Waltham, Mass., and Radio Inventions, Inc. Terminal points for the experimental network are on top of the Lincoln building in New York and the Raytheon plant at Waltham, near Boston. The facsimile signals were carried over a wire line from the Radio Inventions laboratories in New York to the Lincoln building, where they were used to modulate a microwave radio transmitter.

The relay stations are located at Lewisboro, N. Y., Oxford, Bristol and Tolland, Conn., and Webster and Waban Hill, Mass. During the demonstration, Hogan Faximile, with test equipment manufactured in Radio Inventions laboratories, utilized a 4.8 kilocycle band within the 15-kilocycle Ratheon channel for the transmission of facsimile text, maps and photographs which were received clearly at Waltham. They were transmitted at the rate of 24 square inches a minute. Following this facsimile transmission, a radio program was sent over the relay circuit simultaneously with text from a teleprinter in the New York terminal.

Microwave radio relay communication has advantages. J. Ernest Smith of the Raytheon Company states, "Microwave stations may be beamed on opposite paths operated on the same frequency while located in close geographic proximity. Unaffected by sunspots and other vagaries of radio peculiar to standard frequencies, microwave radio will provide reliable service day and night. Through this medium it may be practical to serve communities not adequately provided with telephone, telegraph, radio, FM, FM facsimile or television coverage."

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AGRICULTURE

1947 Crops Will Need More Fertilizers

➤ MORE fertilizers will be needed for crops to be harvested in 1947 than were used even for the bumper crops of 1946 now being gathered into barns, F. S. Lodge of the National Fertilizer Association told the meeting of the American Chemical Society.

The U. S. Department of Agriculture, he said, has set up as needs for the fiscal year 1946-47: 800,000 tons of nitrogen, 1,850,000 tons of phosphoric acid and 800,000 tons of potash. All these figures are substantially higher than the corresponding ones for the 1945-46 season.

It would be possible to meet all these needs, the speaker commented, except for the necessity for exports to meet government commitments to UNRRA, famine relief, and use in occupied territories. These may cause drafts on our reserve supplies, especially nitrogen, which will have to be replaced from the production of converted munitions plants which have been put into operation again.

Time is of the essence, Mr. Lodge insisted. It takes time to manufacture and mix fertilizers; a certain "curing" period is required before marketing; and days or weeks are consumed in transportation. In the meantime, the planting season does not wait.

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CHEMISTRY

Ether and Alcohol Made By Cheaper Modern Means

➤ CHEAPER alcohol is made in a modern scientific way from ethylene, the American Institute of Chemical Engineers meeting was told.

Industrial ethyl alcohol has always been prepared by the ancient method of fermentation, but synthetic plants are replacing the sugar, starches, and blackstrap molasses with ethylene, prepared by petroleum cracking operations. Ethyl ether, the anesthetic, is prepared in the same process.

The ethylene is absorbed in sulfuric acid to make sulfates which are hydrolyzed to crude alcohol and a byproduct of ethyl ether, C. M. Beamer of the Standard Oil Company of New Jersey reported.

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ASTRONOMY

Stars with Halos

A new theory for the internal constitution of certain peculiar types of stars is presented at the Zeeman Congress in Amsterdam.

➤ IN THE heavens there are stars with invisible halos, Dr. Otto Struve, director of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas, stated at a meeting of scientists in commemoration of the 50th anniversary of the discovery of the Zeeman effect.

When we look at Pleone and Gamma Cassiopeiae through a telescope, we see only a small, intensely hot star, Dr. Struve stated. We look right through a thin shell or ring that surrounds the star.

In the ultraviolet region the shell, formed by gaseous matter thrown off at the star's equator, is nearly opaque. In the photographic region, however, it is almost wholly transparent. If our atmosphere did not cut off all light short of 2900 Angstroms, we should see a large hazy ring of gas.

Gaseous matter in the form of a tenuous ring or shell was thrown off at the equator of two stars, Pleione and Gamma Cassiopeiae, many years ago. We on earth could not see the luminous gas spewing out of the stars, but study of their spectra indicates this stellar disaster occurred.

A new theory for the internal constitution of certain peculiar types of stars was suggested at the meeting by Dr. Donald H. Menzel, of Harvard College Observatory.

"The sun is by no means the only object to exhibit extreme excitation," Dr. Menzel said in referring to the presence of temperatures of a million degrees in the corona of our own sun. "Objects such as the repeating nova, RS Ophiuchi, display high intensities of highly energized iron lines long after their outburst. There are a number of related objects which show a combination of high-and low-temperature excitation simultaneously. Many years ago I suggested that such objects were double stars, consisting of a cool red star and a hot companion. This proposal has been widely accepted, but I no longer subscribe to it."

The Harvard astronomer's new model is that of a single star with a very hot, small, condensed nucleus, surrounded by a very extensive atmosphere that derives its support from a combination of radiation pressure, turbulence, and stellar rotation. The star is built something like a planetary nebula, with a hot core, but with an envelope which transforms most of the high-temperature radiation into red light appropriate to the large radius of the envelope. The surface of this envelope seems at first to be the surface of the star itself.

As for the sun itself, however, Dr. Menzel points out, the source of high coronal excitation and temperature is as much of a mystery as ever.

"The turbulent state of the solar atmosphere suggests that deep-seated disturbances work their way convectively to the surface," Dr. Menzel stated. "Vortices similar to sunspot vortices may be of assistance in permitting material to spurt from the interior through their low-pressure tubes in the center of the vortex."

The Zeeman effect was discovered by a Dutch physicist, Peter Zeeman, in 1896. It is the phenomenon whereby light which is radiated from a source in or surrounded by a magnetic field is divided into parts, polarized in certain ways according to the direction of the field. The spectrum of spots on the sun is easily analyzed to show that sunspots are magnets which produce the Zeeman effect in their radiation.

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ENGINEERING

Streamliner Rides Rails

New locomotive is designed for economy and speed. Three 2,000 horsepower turbosupercharged diesel engines give it a potential speed of 120 miles an hour.

See Front Cover

➤ A NEW-TYPE streamlined 6,000 horsepower diesel-electric locomotive, shown on the cover of this SCIENCE NEWS LETTER, is a turning point in production of rail motive power.

This Alco-GE locomotive, built by the American Locomotive Company, is powered by three 2,000 horsepower turbosupercharged diesel engines that will deliver more passenger miles, more ton-miles at higher speeds and lower cost than any other heavy duty locomotive now on the rails.

It has been delivered to the Santa Fe Railway for service on fast passenger trains between Chicago and the west coast. Six others of the same type are now under construction for the same road at the Schenectady plant of the locomotive company. This first produced has undergone 30 days severe road tests on the Lehigh Valley Railroad.

Economy in operation is an important feature of this new locomotive. Its three engines are in separate compartments and can be operated singly, or in pairs, or all together. Two engines can maintain train speeds under favorable conditions. The locomotive, with its three engines, has a potential speed ranging up to 120 miles an hour.

Low fuel consumption is also accountable for the economy of the new Alco-GE locomotive. This is a result of a four-cycle engine and the use of constant pressure turbosuperchargers to increase engine efficiency. Constant pressure turbosupercharging is a method of utilizing hot exhaust gases efficiently to drive a gas turbine which operates a compressor to force air into the cylinders at high pressure.

The three-unit locomotive weighs 450 tons and has an overall length of nearly 195 feet. It can be driven from either end. Controls for all three engine units are placed in both front and rear cabs for this purpose.

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During the war the *Japanese* converted many of the Java tea factories to production of chemicals, textiles and electrical supplies.

INVENTION

Device Fastens Gun To Motorcycle Front

➤ MOTORIZED crime should find an effective discourager in an invention on which U. S. patent 2,407,884 has been awarded to Greenhow Johnston of Richmond, Va. It is a framework making it possible to mount a "tommy" gun over the front wheel of a motorcycle, so that it can be used in the pursuit of fleeing vehicles under conditions that justify gunfire.

A cable release leads from the trigger to a finger-lever on one of the handlebars, enabling the pursuing officer to open fire without even partially surrendering control over his vehicle. Naturally, great accuracy is not expected from this kind of fire; but at hot-pursuit ranges a burst of .45-caliber bullets should punch enough holes in the target (and its occupants) to be effective.

The gun mount is provided with means for traversing and elevating the weapon. These are locked in "road order," but can be quickly released to permit aimed fire from a stationary position. Also, it is possible for the officer to snatch the gun off the mount and use it as a hand weapon.

A modification of the mount is adapted for use on the hood of a motor car or truck; here, traversing and elevating can be carried on by remote control while the vehicle is moving.

For more peaceable purposes, either mount can be used to carry a still or motion picture camera. Pictures made in this way should be useful in the study of traffic behavior—and perhaps also in the courtroom if a transgressor is caught in the act.

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ENGINEERING

Artificial Sunshine Is Possible for Homes

➤ IF YOU want artificial sunshine within your home, you can get it, but it takes a combination of various electric lights to approximate sunlight of the summer noonday kind, with ultraviolet rays to give a mild sunburn and infra-red radiation with their heating effects.

Dr. G. F. Prideaux, a General Electric lighting scientist, told the Illuminating Engineering Society how he produced artificial sunshine. He used 300-watt lamps for the red and infra-red radiation; 3000-watt mercury lamps for the blue end of the visible spectrum; white fluorescent lamps to fill the gap between the mercury and the tungsten lamps; and special sunlamps to produce the ultraviolet. A thin layer of water was used to filter out the longwave infra-red, much as does the water vapor in the atmosphere.

"Approximately one-third of the energy generated is removed by the water filter," he said, "one-third more removed by ventilation above the lamp bank, and the remaining third is radiated into the room and must be removed by ventilation to keep the air temperature down to a comfortable 80 degrees Fahrenheit." Such sunshine rooms, he stated, should be of interest to convalescent hospitals, athletic clubs, and progressive industrial plants.

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CHEMISTRY

2, 4-D Clears Weeds From Pastures, Around Lakes

➤ 2,4-D, sensational weed-killing chemical that has been getting its first real workout this year, can safely be used to clear weeds out of pastures. Cows can eat it with perfect safety, experiments conducted by scientists of the U. S. Department of Agriculture have shown.

Cows and sheep were grazed in a pasture that had been given a spraying of double the concentration needed for weed control. They developed no symptoms of any kind, and post-mortem examination of some of them after slaughtering showed internal organs perfectly sound.

One cow received a special dose of about one-fifth of an ounce of 2,4-D daily. Blood samples showed its presence in her circulation, but it did not appear in her milk.

The one risk of trouble, the experiments concluded, is the chance of poisonous impurities being present in commercial preparations of 2,4-D.

2,4-D is proving successful in subduing aquatic weeds that shelter breeding areas of malaria mosquitoes along the margins of lakes created by the Tennessee Valley dams.

Experimental applications of 2,4-D have been made by airplane, truck and boat units equipped with power sprayers, reports Dr. E. L. Bishop, TVA Director of Health. Results have been so encouraging that larger use of the chemical is planned for next year.

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IN SCIEN

CHEMISTRY

Distilling Process Saves Full Flavor of Apples

➤ FULL FLAVOR of the apple is captured and held, in a new method for making apple essence worked out by Howard P. Milleville and Roderick K. Eskew of the Eastern Regional Research Laboratory of the U. S. Department of Agriculture in Philadelphia. This overcomes the greatest objection to concentrated apple juice produced by present methods: that it has lost the greater part of the aroma of real apples.

The method is very simple. Instead of just boiling down the apple juice, the two chemists distill the first tenth of it, which carries all the aroma hitherto lost. This constitutes the apple essence. The rest of the juice is concentrated in the usual way for convenience in storage and economy in transportation.

When preparing for use, it is only necessary to add water to bring the concentrate back to its original volume, then enough of the essence to restore the full flavor.

Apple essence can, of course, be used for flavoring other foods and drinks, such as ices and sherbets, fruit jellies and lemonade.

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PHYSIOLOGY

Transplantation of Sex Glands Is Successful

➤ FEMALE sex glands of white mice have been successfully transplanted into the bodies of white rats, and the corresponding glands of white rats similarly transplanted into white mice, reports Dr. James M. Sanders of the University of Missouri, in *Science*, (Sept. 13). One rat and one mouse, out of several animals of both species thus operated, subsequently produced normal litters of young.

Ovarian transplantations have previously been reported, but so far as is known they have always been made from one animal to another of the same species. Rats and mice belong to different species, though within the same genus.

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E FIELDS

ANTHROPOLOGY

Group Studies Primitive South American Tribes

➤ VANISHING remnants of the primitive Indian tribes that inhabit South America's southernmost island, Tierra del Fuego, have been studied by a scientific mission sent out by the Chilean government. A preliminary communication of their results has been sent to the editor of *Science* (Aug. 13) by Dr. Alejandro Lipschutz, chief of the mission.

There are only a few score individuals left in each of the three tribes in the region, and the mission was able to make body measurements of a considerable proportion of them. Blood types were also determined. All pure-blooded individuals examined were of type 0, which is the type of American Indians in general. There has been some intermingling of European ancestry, and persons of this mixed stock in some instances had blood of types A, B and AB.

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PHYSIOLOGY

Tried Brain Waves To Power Artificial Legs

➤ USE of brain waves to manage an artificial leg was the hope of German scientists, an Air Materiel Command Technical Intelligence team at Wright Field learned from questioning the scientists at the Aeronautical Research Institute of Munich.

Brain waves, strictly speaking, are the records of changes in electric potential that accompany brain activity. Electrical changes always accompany nerve impulse. The electric currents are a by-product and, except from the heart's surface, are extremely weak. Amplifiers are needed to detect and measure them.

The German artificial leg had electromechanical devices wired to the cut nerve endings in the patient's stump. The German investigators believed that galvanic electricity flowing along the nerves would supply the power impulses and that these could be controlled mentally, manipulating the leg according to the wishes of the owner. The galvanic electricity is the direct current which is a by-product of nerve impulses.

The amputee would employ varying degrees of concentration on the theory that mental intensity would act like a rheostat, controlling the amount of nervous electricity and moving the leg in the manner desired.

"The Germans were as much interested in proving the disputed point of the existence of nervous electricity as they were in perfecting a foolproof artificial leg," investigators of the Air Materiel Command report.

The "electrical leg" was still in an experimental stage when the war ended.

How the Germans expected these weak, microvolt currents to power a leg without an unbearably heavy and bulky amplifier is not stated in the announcement. Neither is there any mention of how the Germans expected to keep the nerve endings in the stump from dying and becoming useless as a source of current.

An electrical arm being experimented upon in this country will be powered by a single, permanent magnet motor in the elbow joint and miniature airplane type storage batteries at the waist of the amputee.

Science News Letter, September 28, 1946

EDUCATION

Better Roads Must Replace Mud Ones to Schools

➤ THE OLD mud road leading to the "little red school house" must pass from the American scene, or many of the 4,400,000 rural children who are transported to modern centralized schools will continue to be "ten-o'clock scholars" on snowy and muddy days.

According to Charles M. Upham, engineer-director of the American Road Builders' Association, 40,000 consolidated schools require from 80,000 to 90,000 buses which travel an average of 25 miles daily in one-way operation. There are at least 10,000 other schools that should be centralized, but most of them are on mud roads.

The dollar-and-cents value of all-weather surfaces for secondary or side-roads will benefit rural education, as well as farmers who have to take produce to town. Mr. Upham also suggested that tax-payers will be glad to learn that the average transportation cost of $24.50 per rural pupil for a year is actually less than the same pupil would spend in streetcar or bus fare in the average city.

Science News Letter, September 28, 1946

AGRICULTURE

Improved Oat Variety Increases Crop

➤ RELIEF OF the food shortage is forecast in western agricultural experiments.

Improved varieties of oats that resist rusts and smuts are increasing production in North Central and Northeastern states. It is estimated that the new varieties were grown on about 25,000,000 acres in 1945 and added an extra 250,000,000 bushels to the 1945 oat crop.

Victoria, a vigorous late-maturing crown rust- and smut-resistant variety, was crossed with Richland, an early stem-rust-resistant variety, to make the most important oat hybrid.

Research was done by U. S. Department of Agriculture experts in cooperation with state experiment stations.

Science News Letter, September 28, 1946

CHEMISTRY

Atomic Bomb Explodes Into 30 Fission Products

➤ THIRTY self-destroying chemical elements produced by the atomic bomb were made known when two Canadian scientists working at the Chalk River Laboratory of the Canadian National Research Council sent a report to the British journal *Nature* (Aug. 3) on the fission products of uranium 235.

Heretofore, it has been stated authoritatively that radioactive forms of about 30 elements were produced when the bomb exploded or the chain reaction occurred. Only radioactive isotopes of five elements had been actually named: barium, iodine, yttrium, and two rare gases, xenon and krypton.

Drs. W. E. Grummitt and G. Wilkinson in their report list 30 radioactive isotopes, giving their half-lives and their energy levels.

Six of these isotopes are previously undiscovered anywhere: three of tin, two of antimony and one of cesium.

Two of the elements in the debris of the atomic energy reaction are very long-lived. Cesium 135 has a radioactive half-life of about 100 years, while strontium 90 has a half-life of about 70 years.

Two others have half-lives of 290 days, cerium 144 and ruthenium 106.

Science News Letter, September 28, 1946

ASTRONOMY

Thousands of Stars to Fall

Astronomers are hoping for one of history's greatest meteor showers on the night of Oct. 9 to 10. Meteor streams are too erratic to make positive predictions.

By MARTHA G. MORROW

➤ THOUSANDS upon thousands of "shooting stars" are expected to flash across the sky one night early in October. Plowing through debris left by a comet passing that way just a few days earlier, the earth will cause one of the most brilliant meteor showers ever witnessed, if hopes of astronomers are fulfilled. Our planet is due to cross this heavenly highway the night of Oct. 9-10.

The earth will come within 135,000 miles of the path taken by the faint Giacobini-Zinner comet. It will pass the comet's orbit just eight days after the comet itself speeds by the celestial intersection.

One of the most remarkable of meteor showers startled the world on Oct. 9, 1933, when the earth crossed this same highway in the heavens. When the shower was at its height, as many as 350 meteors an hour flashed across the the heavens. One observer actually counted 22,500 falling stars within five and a half hours. This historic display was caused by the same comet that has again been spotted in the heavens.

The earth 13 years ago was about 500,000 miles from the comet's orbit, almost four times as distant as it will be this October. The comet preceded the earth by 80 days, not eight days as in the present case. That is why the shower this year may be even more remarkable than the 1933 Giacobini shower.

But astronomers are reluctant to risk too positive predictions. Dr. Fred L. Whipple of Harvard Observatory, a world authority on meteors, cautions: "No certain prediction can be made concerning the magnitude of any meteor shower." He remembers sadly the vast hopes built up concerning the expected great shower of Leonid meteors in 1899, an event that disappointed both astronomers and the public.

"The watch for a shower of meteors is similar to a day's fishing trip," states Dr. Leland E. Cunningham, comet enthusiast at the University of California. "A fisherman knows that fish are somewhere about, but cannot know ahead of time whether he will catch any of them. So it is with meteors: we know there will be myriads of cosmic specks near the earth on Oct. 9, but we don't know whether they will come close enough for the earth to 'catch' some of them in its atmosphere and make them flash as meteors."

"Meteor streams are too erratic in behavior for me to dare promise a great shower," warns Dr. Charles P. Olivier, director of the Flower Observatory and president of the American Meteor Society. "The chances do seem excellent, however, and it would be unforgivable to miss what may well be the best shower of the century through carelessness or unpreparedness."

Rediscovery of the Giacobini-Zinner comet late in May by Dr. Hamilton M. Jeffers of Lick Observatory, Calif., set the stage for the celestial fireworks this fall. The comet was located close to the position previously calculated for it by the British astronomer F. R. Cripps. When spotted, the comet was of the seventeenth magnitude, far too faint to be seen with the unaided eye or even through a small telescope. Since then, however, it has brightened until it is now about ninth magnitude.

SKY-STREAKER — The Giacobini-Zinner comet, now visible and responsible for the expected meteor shower on Oct. 9, was photographed by B. P. Sharpless of the U. S. Naval Observatory.

Discovered in 1900 and recovered in 1913, the comet takes about six and a half years to travel around its orbit. But only when its journey brings it to the vicinity of the earth so that our planet runs into its celestial dust, as in 1933 and again this year, is there a good chance of a spectacular meteor shower.

It is then that many tiny bullets from space burn up through friction after they enter the upper layers of the earth's atmosphere. Some are pea-sized, others are no larger than grains of sand. They usually flare up about 70 miles above the earth's surface and disappear about 50 miles above.

Observers stand the best chance of witnessing a spectacular display sometime during the night of Wednesday-Thursday, Oct. 9-10, estimates Dr. Cunningham, who has made involved calculations on the comet's orbit. Nevertheless the possibility of a shower's occurring after midnight on Oct. 8-9, or on the evening of Oct. 10 should not be overlooked.

Earth Within 500,000 Miles

The earth will be within 500,000 miles of the comet's orbit, the distance it was during the spectacular shower in 1933, from 7:30 a. m., EST on Oct. 9 until 11:30 a. m., EST, Oct. 10. A shower should occur any time during this interval, or even during several hours before or after, so look for it on the three successive nights.

If the shower does occur as scheduled, meteors will be seen in all parts of the sky. The "shooting stars" will seem to radiate, like the ribs of an umbrella, from a point called the radiant, near Nu Draconis, the head of Draco, the dragon. At about ten o'clock in the evening, local time, this constellation will be in the northwest, about two-thirds the way up from the horizon. (See diagram, page 197.)

Although called "falling stars," the meteors will fly in all directions, even upward. Those nearest the radiant will have the shortest apparent paths, and a meteor exactly at the radiant will seem stationary, simply appearing and vanishing without apparent motion. Meteors further away will flash greater distances across the heavens.

The moon, unfortunately, will be nearly full. Under a full moon most of the faint meteors seen in 1933 would not have been noticed. In watching for these meteors, avoid the glare of the moon and look toward the north, away from its bright disk.

In 1933 the brilliant shower was visible for only a few hours for people in Europe; the earth had plowed through the cosmic debris before darkness came to America. This time the meteoric display is expected to be at its height for people in America. But, the majority of the meteors were faint last time, only about one in twenty being of the first magnitude or brighter; likewise this year the majority probably again will be quite faint. To see the full glory of the shower, you should be in the open country, far from city lights.

Count Shooting Stars

Amateurs can help by sending reports of the meteor shower to the American Meteor Society, at the Flower Observatory, Upper Darby, Penn. Just count the number of "shooting stars" you see during ten-minute intervals. Dr. Olivier, president of the society, suggests you report the exact minute of starting and stopping to count, the direction in which you were facing, your exact location and whether the sky was clear or cloudy. Be sure to give your name and address.

Each person should count all the meteors he actually sees, whether seen by others or not. If you are an old hand at counting meteors, you might at least once each hour spend ten minutes counting the meteors of each magnitude. If you have low-power binoculars or a comet-seeker available, determine the number of meteors of various magnitudes seen through such instruments.

If the shower comes up to expectations, a number of shooting stars may be caught on a photograph. Although a meteor streaking across the sky is only occasionally captured on a film, a photograph taken during the recent historic shower showed the record number of 26 faint meteor trails near the great star Vega.

For Clear Photograph

To get a clear photograph, place the camera in a fixed position, facing it away from the moon, which is far from the radiant, and set the head of Draco on the edge of the field of vision. Beware of haze. Estimate how long your camera can be open without fogging—this will probably be a half hour at best. Record each time of opening and closing the shutter.

The stars, instead of appearing as bright dots, will leave slightly curved trails on the film. If you do "catch" a meteor, you will have no trouble in identifying it—the meteor will show up as a long, straight line, probably cutting across the paths taken by the stars. The American Meteor Society hopes that particularly good pictures will be sent in.

Meteor Swarms

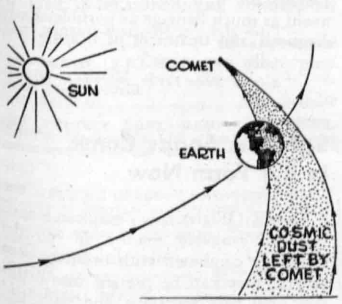
Meteor swarms move in elliptical orbits, encircling the sun in a gigantic necklace of cosmic debris. Many meteor swarms follow the same orbits as those of known comets. This shower offers an excellent opportunity for testing the relationship between comets and meteors.

Are the tiny solid particles more or less uniformly spread out behind the comet along its orbit, being thicker near the comet and thinning out at a distance behind it? Or does the heavenly dust and gravel occur in bunches with nearly clear gaps between? Only by studying many meteor showers closely associated with comets can we hope to answer such questions.

But debris that may be following the comet's orbit exactly at some particular

(*Turn to page 204*)

FALLING STARS—Spectacular Leonid shower of 1833, so dense that thousands of meteors were seen in a single night, is pictured by a contemporary artist.



COSMIC DUST—A meteor shower is caused by the earth's plowing through a stream of cosmic dust such as that believed left by a comet.

Do You Know?

About one out of every seven *jobs* in America is made by the automotive industry.

Although *diabetes* can be controlled by use of insulin, scientists as yet know of no way to prevent this disease.

The *scales of herring*, caught in Canadian waters, are the source of "pearl essence", used to make artificial jewelry, knife handles and dresser sets.

So rich in *carotene* are carrots that even the name "carotene" is taken from them; in the human body, vitamin A is made from carotene.

The first use of *coal* as a common fuel in the world is probably recorded in the Saxon Chronicle of Abbey of Peterborough in 862.

The use of radioactive *"tracers"* to study living physiology dates as far back as 1922 when Hevesy of Denmark studied in this way the uptake of lead by living plants.

A mysterious *disease*, killing Italian chestnut trees, threatens the supply of chestnut flour which has been saving part of the Italian population from starvation during the food famine.

From Page 203

time will probably not continue to do so forever, cautions Dr. Cunningham. This is because the orbits of most short-period comets pass quite close to Jupiter's path and sooner or later the comet and planet will be almost together in space.

When that happens, Jupiter will alter considerably both the comet's orbit and that of the tiny particles that become meteors when entangled in the earth's atmosphere. But Jupiter will probably not pull both the comet and the debris an equal distance from their paths. Thus after such a close encounter with Jupiter, the meteors will no longer exactly follow the comet's orbit.

The comet's orbit cannot be used exactly to predict when the earth will run into the cosmic dust. Nor can we observe the meteors in space—they must strike the earth's atmosphere before any brighten. That is why astronomers, though hoping October will bring us a very spectacular meteor display, are unwilling to go out on a limb and definitely predict such a shower.

Science News Letter, September 28, 1946

BACTERIOLOGY

Germs Get Resistant To Streptomycin

➤ "RAPID DEVELOPMENT of extreme resistance to streptomycin" by various germs is reported by a group of Boston physicians in the *Journal of the American Medical Association* (Sept. 7).

The physicians are Drs. Maxwell Finland, Roderick Murray, H. William Harris, Lawrence Kilham and Manson Meads of Harvard Medical School and Boston City Hospital.

In eight out of 12 patients with urinary tract infections, the infecting organisms developed resistance to streptomycin so rapidly that the antibiotic drug failed to help the patients.

Germ resistance to this drug, it is pointed out, may be of "considerably greater importance" than the resistance that develops to sulfa drugs and penicillin.

Science News Letter, September 28, 1946

MEDICINE

Don't Neglect Ear Aches

➤ WITH the season for football, colds and many childhood diseases getting started, parents need to remember the effect these may have on a child's hearing and be alert to prevent any hearing loss from them. The usual parental worry over football is for broken bones, dislocations and serious sprains. The Indiana State Medical Association calls attention to another cause for concern. Lifetime damage to hearing, it points out, may result from a broken nose in a grade school football game that is not properly cared for. Nasal passages could grow together, keeping air from the ear with resulting loss of hearing.

"Any slight ear ache," the medical association warns, "should mean a trip to the doctor. Medical supervision of all ear troubles and of all communicable diseases which are known to affect the hearing is imperative. Children should be kept under strict care when they have a cough or cold or sore throat. And they should be immunized against all communicable diseases for which there is any protection.

"How to blow their nose properly is something they should be taught. Their ears should be protected in swimming and diving, and parents should never put any medicine in young ears unless a doctor orders it.

"Frequently loss of hearing is so slow that parents may not suspect anything for years and think the child is absorbed in play or just inattentive. Indiana and many other states require periodic hearing tests of school children. Reports on these tests should be followed up by parents for it is their responsibility to avoid as much damage as possible. Early diagnosis and treatment of hearing loss are vitally important."

Science News Letter, September 28, 1946

INVENTION

Soapless Soaps Come In Bar Form Now

➤ SOME OF the new "soapless soaps", hitherto available mainly in powder form, are combined with ordinary soap so that they can be pressed into orthodox soap bars for toilet and bath use. John W. Bodman, research director for Lever Brothers Company, has assigned to this firm rights in his patent, No. 2,407,647.

Science News Letter, September 28, 1946

WAR BARGAINS in LENSES and PRISMS

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3036-Q	80 Degree Roof	60 mms.	36 mms.	4.00
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ASTRONOMY

Six More Heavyweight Stars Known to Exist

➤ SIX MORE ton-per-cubic-inch superdense stars are now known to exist in the universe, raising the total discovered to 24.

Two American astronomers, Dr. W. J. Luyten of the University of Minnesota and Dr. P. D. Jose of Tucson, announced the discovery of the additional white dwarf "degenerate" stars, in connection with celebration of the 75th anniversary of the founding of Argentina's national observatory at Cordoba.

The new champion heavyweight stars were discovered during an astronomical photographic survey with the 36-inch Steward reflecting telescope of the University of Arizona.

The white dwarf stars are the least visible compounds of some double star systems. The companion of Sirius was the first white dwarf star discovered. A cubic inch of the companion of Sirius, brought to earth, would weigh a ton. The material of these small, hot stars is so tightly packed together that they are in some cases hundreds of times as dense as water.

Science News Letter, September 28, 1946

ARBORICULTURE

NATURE RAMBLINGS by Frank Thone

Time for Pruning

➤ AUTUMN is the time for pruning, which is all the surgery most trees should need. Indeed, if you have the care of a tree from its youth onward, simple pruning is all the care it will require to prevent the disastrous heart-rot that would later necessitate a visit from the expensive tree surgeon with his chisels and concrete fillings. The fungi and other microorganisms that cause this rot invariably invade the tree through some untended wound where a branch has been broken or improperly cut off, leaving a naked stub open to their insidious attack.

The right way to cut a branch off a tree is to set your saw just as close to the line where it joins the trunk as possible. But don't saw straight downward, parallel with the trunk. That will leave too large a wound, which will take too many years for the bark-growth to heal. Cut outward at a very slight angle, so as to go as squarely as possible across the diameter of the branch itself. That will leave a slight hump, but not unsightly, and in a few years the bark will have grown completely over it and no one will notice it at all. The right way to prune is shown on the right, in the sketch.

The way a branch should never be sawed off is shown on the left. It takes a very long time for the bark to shove its edges over the end of a stub like this. Frequently the bark will die back to the trunk instead, leaving the rotting stub as a sure highway for invasion by rot fungi.

While you are making your cut, be very careful to support the branch, lest its weight break it off before you have finished, thereby tearing a long strip of bark and perhaps a splinter-gash into the wood itself. Wounds of this kind are nasty, again invitations to fungi, and in any case unsightly until they have healed. If your branch is a large one, better undercut it a few inches out before starting your main cut. Then if it does break off it will do no harm.

After you have your branch cleanly cut off, brush away any sawdust and bits of bark that may be clinging to the face of the cut and paint it immediately. A little later give it a second, and even a third coat. This is the best way to keep out decay organisms. Ordinary house paint is good enough, but best of all is a good, flexible, weather-resistant asphalt paint.

Science News Letter, September 28, 1946

INVENTION

Cotton Harvester Strips Staple from Plant

➤ ANOTHER EFFORT at the mechanical harvesting of cotton is represented in patent 2,406,058, granted to Claud T. Boone, Sr., of Dallas, Texas. Mr. Boone's machine is technically not a picker but a stripper. On either side of a tractor are mounted a pair of sloping rollers with knurled surfaces, geared to turn in opposite directions, and fitted with guides to lead the cotton plants between them. The rough surfaces of the rollers pull off the cotton, as well as a certain amount of foliage. This is doffed by a pair of spiral conveyors immediately alongside, which carry the cotton back to a following trailer.

Science News Letter, September 28, 1946

PHYSICS

Sound Waves Detect Flaws, Aid Welders

➤ USING SOUND waves to detect flaws in the edges of metal plates, a supersonic reflectoscope is being used to determine plates suitable for welding.

The Sperry supersonic reflectoscope, developed by University of Michigan engineers, sends sound waves into plates to be welded. The time of reflection of these waves reveals flaws in the plate.

Welding engineers of The Babcock and Wilcox Company declare the reflectoscope is the only non-destructive method for testing plates before welding.

Science News Letter, September 28, 1946

RADIO

Fluorescent Lighting May Affect Radio Reception

➤ IF YOU are using fluorescent lamps in your home, your radio reception may be poor, Dr. L. F. Shorey of the University of Vermont told the Illuminating Engineering Society meeting in Quebec. However, the remedy is relatively simple, he said, by using wire-mesh shades and an electric filter.

Dr. Shorey, together with S. M. Gray of Sylvania Electric Products, Inc., presented a paper on a study of radio interference caused by fluorescent lamps in the home. Their report discusses how such interference is measured and reduced below a tolerable noise level.

Total interference, they said, results from three sources; feedback through the wires of the house circuit; radiation of the high-frequency current components from the wires; and radiation coming directly from the lamps.

Line feedback is reduced by the use of an electrical filter, while bulb radiation interference is reduced by the application of a wire-mesh screen built into the lamp shade.

"By a proper combination of these two schemes," they declared, "total interference is suppressed to a quite satisfactory level even with small distances separating the lamp and receiver antenna."

Science News Letter, September 28, 1946

Books of the Week

BE GLAD YOU'RE NEUROTIC—Louis E. Bisch, Ph.D.—*McGraw-Hill*, 230 p., $2.50. This book is intended to give you a new insight into yourself, your intimates and associates—no matter how well you think you know them already. A test by the author is supplied in the book so that you can find out just how neurotic you are.

THE CONTROL OF VENEREAL DISEASE—R. A. Vonderlehr, M.D. and J. R. Heller, Jr., M.D.—*Reynal & Hitchcock*, 246 p., $2.75. A report to the general public on the history of venereal disease and its control in America and the American armed forces during the war years.

DENTISTRY: An Agency of Health Service—Malcolm W. Carr, D.D.S.—*Commonwealth Fund*, 219 p., tables, $1.50. This book presents a comprehensive picture of dentistry in the United States; its history, training, present activities and problems, and some indication of future trends.

EDUCATION IN COLOMBIA—John H. Furbay—*Government Printing Office*, 111 p., tables, illus., paper, 25 cents. Federal Security Agency, U. S. Office of Education Bulletin 1946, No. 6.

EDUCATION IN COSTA RICA—John H. Furbay—*Government Printing Office*, 62 p., tables, illus., paper, 15 cents. Federal Security Agency, U. S. Office of Education Bulletin 1946, No. 6.

EVERYDAY AUTOMOBILE REPAIRS—William H. Crouse—*McGraw-Hill*, 296 p., illus., $3.00. Written in simple, non-technical language, this book provides basic material on the operation of the automobile, explains what troubles may occur, and then shows you how you can diagnose and correct them yourself.

MODERN MUSIC—Max Graf—*Philosophical Library*, 320 p., $3.00. This book deals with the development of the music of the twentieth century. Leading personalities in the music world of our era, composers and musicians alike are brought to life in the chapters.

A NEW CARNIVOROUS DINOSAUR FROM THE LANCE FORMATION OF MONTANA—Charles Gilmore—*Smithsonian Institution*, 19 p., plates, paper, 25 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 13, Pub. 3857.

THE NEW SCIENCE OF SURGERY—Frank Slaughter, M.D.—*Julian Messner*, 286 p., $3.50. The story of the conquest of shock, pain, and infection—the revolutionary achievements of our wartime surgeons, achievements that will mean life and health for millions who would have faced only pain and death ten years ago.

THE NONMARINE MOLLUSKS OF SAN JOSE ISLAND, WITH NOTES ON THOSE OF PEDRO GONZALEZ ISLAND, PEARL ISLANDS, PANAMA—J. P. E. Morrison—*Smithsonian Institution*, 49 p., plates, paper, 30 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 9. Pub. 3850.

THE TREATMENT OF BRONCHIAL ASTHMA—Vincent Derbes, M.D., and Hugo Engelhardt, M.D.—*Lippincott*, 466 p., tables and illus., $8.00. A book giving practical, workable information on how to diagnose and treat those troublesome asthmatic disorders seen in daily practice.

Science News Letter, September 28, 1946

INVENTION

Plastic Coating Makes Better Work Gloves

➤ WORK GLOVES, made of plastic-coated fabrics, are promised for the near future. Much of the glove is Canton flannel, but the thumb, index finger and palm-surface are covered with vinyl butyral, a tough, fiexible plastic made by the Monsanto Chemical Company, that gives protection similar to leather.

The plastic coating is washable. Grease, oil and grime can be removed with a solvent. The gloves will be made by regular glove manufacturers, Monsanto furnishing the plastic. This coating material has good wearing qualities and gives a good trip. The gloves coated with it will sell in the ordinary price-range of work gloves.

Science News Letter, September 28, 1946

New Machines And Gadgets

TOASTING FORK, for outdoor cooking over bonfires or barbecue grills, has three tines on one end of a long stainless steel shaft, and a small crank on the other. Between is a tube to enclose the shaft and use as a holder. Turning the crank rotates the cooking food over the fire.

Science News Letter, September 28, 1946

WOOL OR HAIR treated with a newly patented process in which formamidinesulfinic acid is employed undergoes certain physical and chemical changes. The shrinkage tendency of the wool and its disagreeable odors are decreased. With hair, it has value in permanently waving, curling and dekinking.

Science News Letter, September 28, 1946

HIGH-FREQUENCY induction heater, that widens the scope of electronic heating, is in a steel cabinet less than four feet square. It can be used for brazing, soft soldering, fusing, hardening, annealing, tempering, as well as for other purposes. It has two water-cooled oscillators and six rectifiers.

Science News Letter, September 28, 1946

PACKAGE OPENER, a kitchen tool to cut the edges of cardboard food containers, has two flanged parts angled with each other so that they fit the corner of the package. Centered between them is a sloping razor blade that cuts as the device is drawn forward on the container edge.

Science News Letter, September 28, 1946

METAL LOCATOR, to spot metallic foreign substances within the body, indicates the presence and orientation of the metal by visible and audible means. A primary coil creates an alternating magnetic field about a probe, shown in the picture. Any hidden magnetic metal causes a current change in a secondary coil.

Science News Letter, September 28, 1946

ELECTRIC fly screen with a new-type transformer consists of two pairs of sturdy bars, spaced ⅜ inches apart, supported in a metal frame. The transformer delivers enough electricity to the bars to kill insects trying to pass through, but not enough to affect larger animals.

Science News Letter, September 28, 1946

PORTABLE mortising tool, developed and used in Germany, applies a chain saw principle in cutting a mortise to make joints in pieces of lumber. It is mounted on two steel posts and slides up and down when cutting. The power-driven tool can make a mortise cut five inches deep.

Science News Letter, September 28, 1946

RAZOR BLADE holder is made of a single piece of springy wire bent to hold a blade by the notches on its ends, with the open ends of the wire for the handle. A cross section, placed under the blade to form a guard, is obtained by bending the wire forward at each rear corner.

Science News Letter, September 28, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 330. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.*

Question Box

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CHEMISTRY

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