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SCIENCE NEWS LETTER

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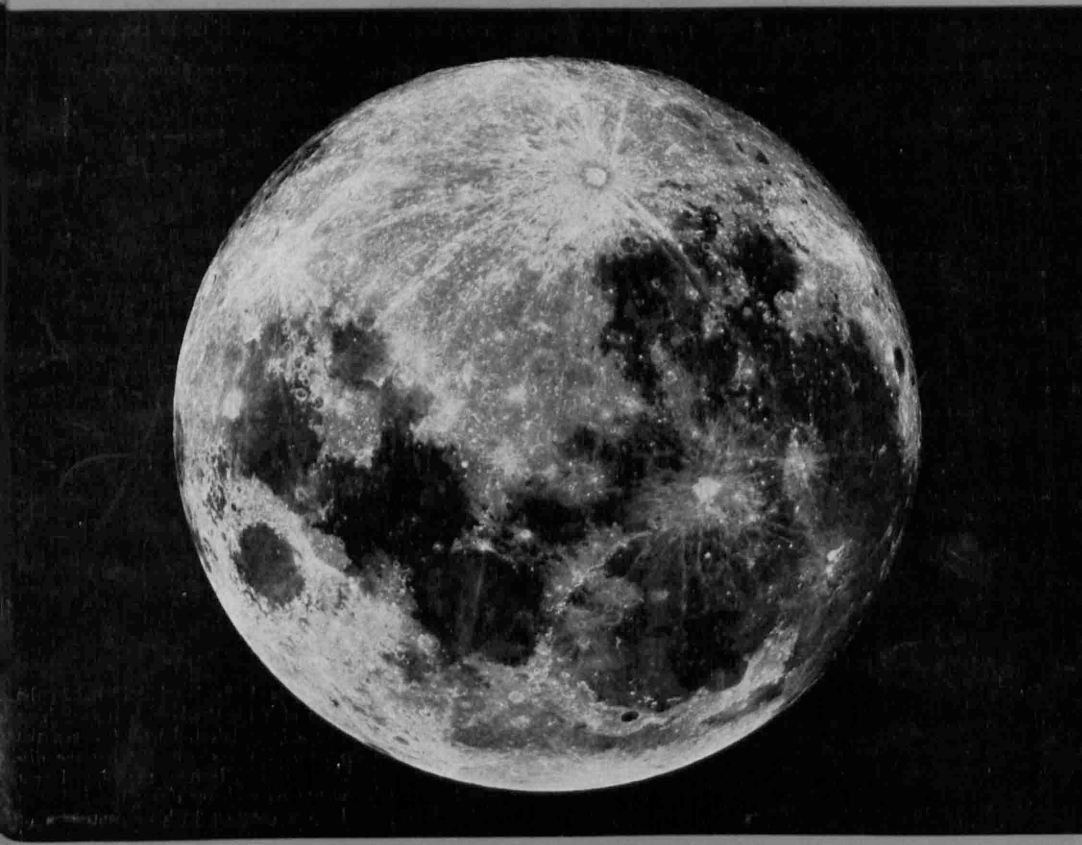
THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 21, 1946



Telescopic View

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A SCIENCE SERVICE PUBLICATION

1921 TWENTY-FIFTH ANNIVERSARY 1946

MEDICINE

Streptomycin Halts TB

➤ STREPTOMYCIN may have "tremendous value as a stopgap measure" in treatment of tuberculosis. It may be five years before its real place in treatment of this disease is fully known. More studies of streptomycin for tuberculosis are "urgently needed."

This verdict comes from the National Research Council's committee on therapeutics and other agents. This is the committee, headed by Dr. Chester S. Keefer of Boston, which has been supervising clinical studies of streptomycin and which last week reported results in other diseases. The final report appears in the Journal of the American Medical Association, (Sept. 14).

The use of streptomycin in tuberculosis was studied by Drs. W. H. Feldman and H. C. Hinshaw at the Mayo Clinic and Foundation and Dr. Walsh McDermott of the New York Hospital.

Streptomycin is not a cure for tuberculosis, the report makes clear. It is considered a palliative. It apparently stops the germs in the body but does not wipe them out. That is why it is considered a valuable stopgap. It can perhaps hold the germs at bay so that other treatment and the patient's own resistance get a chance to overcome them. As a stopgap it could be given before or after other treatment, including surgery. It would have to be given for at least three to six months, even as a stopgap measure, it appears from studies of it so far.

This brings up the problem of harmful effects from the streptomycin. These are not infrequent, the report states, and increase in frequency with increasing dosage. Headache, flushing of the skin, vertigo (not the ordinary dizziness), fever and skin eruptions are among the unpleasant effects of streptomycin.

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MEDICINE

New Malaria Threat

➤ A NEW malaria threat that will bear watching has been discovered by malaria fighters of the U. S. Public Health Service and the South Carolina State Board of Health, Drs. Curtis W. Sabrosky, G. E. McDaniel and R. F. Reider.

A mosquito named Anopheles crucians may be a more dangerous carrier of malaria than its relative A. quadrimaculatus, their findings suggest. A. quadrimaculatus, or "quad" as it is nicknamed by malaria fighters, has so far been considered the principal malaria carrying mosquito of eastern and southeastern United States.

Crucians, the scientists found when they dissected mosquitoes caught in South Carolina last fall, had five or more times as many malaria parasites in their salivary glands as the quads. Most of the crucians were freshly engorged with blood, but none of it was human or bird and poultry blood, indicating none of the batch caught and dissected had been getting malaria germs from humans or giving it to them with their last biting and feeding.

Crucians has never before been considered important as a malaria carrier. It is widespread throughout the southern states and is more active and relatively more abundant earlier and later in the season than quad, the principal malaria carrier. These facts, the scientists state in their report to the journal, *Science*, (Sept. 13), indicate that "the role of crucians in malaria transmission will bear further investigation."

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CHEMISTRY

Pulp Mill Waste Now Produces Lactic Acid

➤ LACTIC acid, which has considerable use in industry, food and medicine, can be produced cheaply from sulfate liquor, the pulp mill waste that is one of the nation's worst industrial headaches. A new fermentation process was described by Dr. Reid H. Leonard and Prof. W. H. Peterson of the University of Wisconsin at the meeting of the American Chemical Society in Chicago.

The crude liquor is first steam-treated to drive out sulfur dioxide, slightly alkalinized with lime and filtered to remove the sulfite precipitate. Then the fermenting organism, a special strain of Lactobacillus, is planted in it. Fermentation for 40 to 48 hours produces a little under 2% of lactic acid. The acid is taken out of the watery solution with an organic solvent such as amyl alcohol.

Acetic acid, another valuable industrial chemical, is also formed during the fermentation, and can be separated from the lactic acid by distillation. The yields per ton of pulp would be about 285 pounds of lactic acid and 75 pounds of acetic acid. While sulfite waste fermentation to lactic acid is technically possible, it will not solve the problem on the basis of the present market, the Wisconsin chemists pointed out. A mill with a 100-ton-per-day capacity could produce 9,000,000 pounds of the acid per year, which is far in excess of present sales.

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DENTISTRY

Penicillin Lozenges For Diseases of Mouth

➤ PENICILLIN has scored again, this time in the field of dentistry.

Two University of California dentists report that penicillin is probably the most potent weapon yet developed against many diseases of the mouth, and has no peer in the prevention and treatment of infections in dental operations.

Results from the use of penicillin in more than 200 cases were described by Drs. Roy B. Wright and Robert W. Rule, of the College of Dentistry, as spectacular in many cases.

"The results far surpass any previous form of dental medication we have used," the dentists said.

They treated, in addition to cases of infection following operation, a number of oral diseases, including several forms of gingivitis, Vincent's angina, and several ulcerative conditions of the mouth.

The penicillin is administered in the form of a lozenge, which is something like a large tablet. Placed between the gum and the cheek, the lozenge dissolves slowly, bathing the injured area constantly with the drug. The ability to keep a constant high concentration of the drug in contact with the affected area and the simplicity of administration are the chief advantages of the drug used this way.

The dentists noted that while penicillin is not effective against all forms of oral infection, it is lethal to a great many germs causing such infections.

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CHEMISTRY

Atomic Energy Questions

American Chemical Society at Chicago discusses how to use nuclear energy and prevent use of atomic bombs in war. Power from atom economically feasible.

➤ THE TWO prime questions that chemists asked at their national meetings last week were:

Can the destructiveness of the atomic bomb be put under effective control so as to prevent war?

Will atomic energy supply commercial power in competition with coal, oil and other fuels?

The two queries are very much related, because exactly the same processes are used in making power and making bomb material. Unless the problem of control of the bomb is licked on a world scale it won't be safe to allow anyone to use uranium and thorium for generating power.

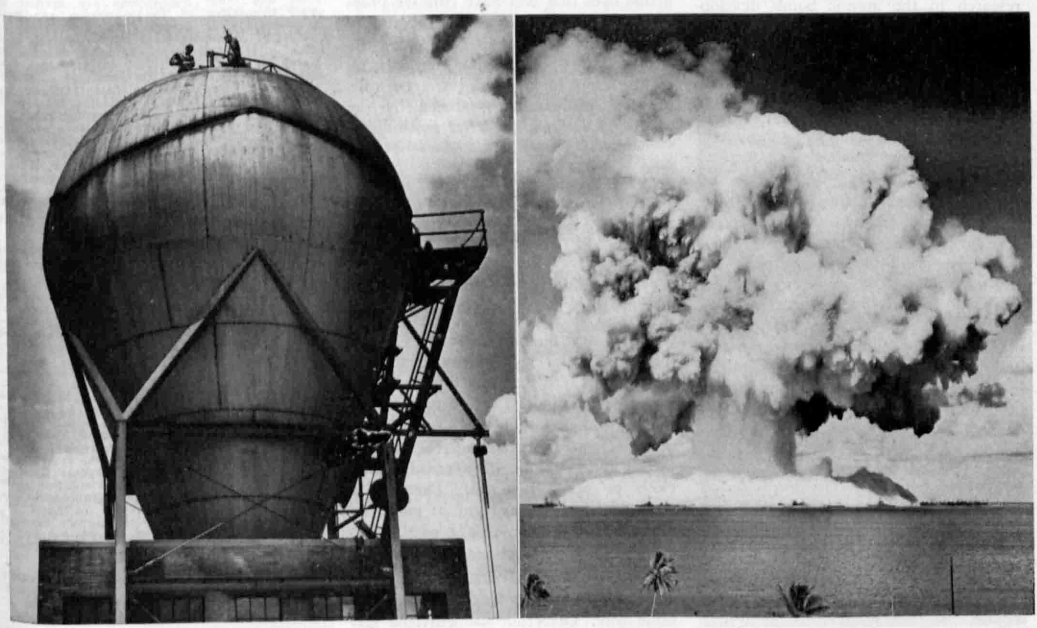
Among the chemists and other scientists, as among military men, politicians and others, there are those who go along with the idea that the best way to prevent atomic war in the world is for the United States to continue to make and stockpile atomic bombs and thus scare the rest of the world into not trying to make bombs and using them on us in an atomic Pearl Harbor. Col. Bradley Dewey, president of the American Chemical Society, is a typical exponent of this view.

Others will uphold the official U. S. A. plan for a world atomic authority that will assume control over fissionable elements and see to it that they are used for good and not for destruction. Exponents of this view, speaking at the meeting, were TVA Chairman David E. Lilienthal and Dr. Charles A. Thomas of the Monsanto Chemical Company. Both are among the five authors of the State Department report basic to present United Nations discussion.

Dr. Thomas is the authority whose figures were used in the report on the cost of nuclear power issued recently by the United Nations Atomic Energy Commission. This showed that a large power plant fueled with uranium would produce power almost as cheaply as a conventional coal power plant. Relative costs will be even lower if the cost of coal power continues an upward trend and the solving of technical problems in atomic power plants continues.

But the chemists who work on petroleum and fuels from oil are not unduly worried about being out of jobs in the near future as a result of nuclear energy competition. Changes will come slowly, and years will pass before oil and coal come into any real conflict with atomic energy.

At least two atomic energy power plants are being developed experimentally, one at Oak Ridge, Tenn., and the other at Hanford, Wash. Both of them



DESTINATION UNKNOWN—This huge atom-smasher is being modernized for an excursion into the realms of pure science. It is capable also of producing excursions into destruction with blasts such as the Baker Day explosion pictured above. Photographs by Westinghouse and Joint Army Task Force One.

will merely use the chain reaction pile for furnishing heat to conventional steam boilers and the rest of a standard power plant.

Some extremely tough problems confront the designers. The chain reaction must be operated at high temperatures, and just a little below the explosive fission point. There would be much greater chance of such a pile getting out of hand than the slower-acting piles used to manufacture plutonium or produce radioactive isotopes for medical and industrial uses. The disposal of radioactive fission products and the materials made radioactive by the pile, all highly poisonous, is another major problem.

These are chemical and engineering problems which scientists and engineers are confident they can solve. They seem simple, despite their complexity, beside the world task of uniting various nations and peoples in a human and political control of atomic energy on an international scale.

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CHEMISTRY

Wastes Made Useful

➤ WHEN atomic power runs our great cities, sewage, garbage and other wastes will become valuable assets to the community, sterilized and cleaned by powerful super-radiations so that new and useful products are turned out and drinking water runs out of the sewers.

This was predicted to the American Chemical Society by Dr. Milton Burton, now University of Notre Dame chemist, formerly head of radiation chemistry research in the atomic bomb development.

Cities of the future will run their sanitary waste disposal systems as parts of their atomic energy power plants. Troublesome products now difficult to dispose of will actually become sources of desirable new materials for medical and household use.

Homes, offices, factories and streets will be illuminated by a cold light made possible by radioactive materials manufactured in the atomic energy piles, Dr. Burton predicted. The same kind of longlived artificially radioactive isotopes as are now being distributed for medical use and scientific investigation will be allowed to bombard chemicals to produce intense light without much heat under such radiation attack.

These are the same kinds of phosphors that are used in the popular fluorescent lamps of today. But the future will see lamps without wires carrying electricity to them because their energy will come from the exploding of radiations from radioactive elements created in the atomic power plants.

New chemical processes for industry will result from the penetrating, high-energy radiation obtainable from atomic energy piles in large quantities and at high intensities.

Substances that usually can not be made to combine will join together to form strange and useful products, Dr. Burton predicted, when they are brought under the influence of the powerful atomic radiations. Coal, natural gas and clays will be made to form new compounds of industrial importance, including plastics never before made, even in the laboratory.

New drugs, new vaccines, new radioactive dyes that will have curative properties for specific parts of the body are also foreseen.

New kinds of plants and animals, resulting from changes in the germ cells of new generations produced by the atomic radiations, are other possibilities.

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CHEMISTRY

Now Sugar Coating Protects Dinner Table

➤ SUGAR-COATING the dinner table to make it proof against spilled cocktails or marring from hot dishes is a possibility when new discoveries by Dr. E. Yanovsky of the U. S. Department of Agriculture's Eastern Regional Research Laboratory at Philadelphia are applied.

A film of allyl ether, from many kinds of sugar, including the sucrose we put in our coffee, is placed on wood, metal, cloth or other material. Then it is changed into plastic, right in place, by heat and oxygen, so that a coating extremely resistant to solvents, oils and heat is formed. Starch from potatoes, corn and tapioca can be used in much the same way. Glycerine and ethylene glycol, antifreeze chemical, can also be treated in the same way to get sturdy plastic castings.

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CHEMISTRY

Rubber Production Speeded By New Accelerators

➤ POSTWAR production of natural rubber will be materially speeded up by a new method of coagulating the crude rubber and getting it out of the latex as tapped from the trees, which was described before the meeting of the American Chemical Society. The method was developed at the Malayan Research Laboratories of the B. F. Goodrich Company. Certain phenols, fatty acids and alcohols have been found most suitable.

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ASTRONOMY

Moon Has No Atmosphere

Light and dark fringes sweeping across a telescope as a star disappears behind the moon confirm belief that the moon is without an atmosphere.

➤ FURTHER evidence that the moon has no atmosphere was obtained through observations of the diameters of stars by a unique method described by Dr. A. E. Whitford of Washburn Observatory, of the University of Wisconsin, at the meeting of the American Astronomical Society to which Washburn Observatory played host.

One of the long-standing problems of astronomy is that of the direct measurement of the apparent diameters of the stars. We know that stars are large—many of them hundreds of times bigger than the sun—yet their tremendous distances reduce them to apparent pinpoints of light which defy enlargement even with such telescopes as the 100-inch on Mt. Wilson.

It is with this same telescope, however, that Dr. Whitford this past summer observed stars disappearing behind the moon. It is notable that in the past the star has always been seen to disappear instantaneously behind the moon, and this fact has often been cited as proof that the moon has no air. If it did have air, then the star's light would gradually diminish instead of snapping out instantly.

Dr. Whitford points out, however, that the optical effect known as diffraction really makes the pointlike star image have a series of rings at the time the moon hides the star from our sight. Diffraction phenomena have been known to physicists for over a century, and light and dark fringes a few thousandths of an inch apart can be seen under proper conditions at the edge of the shadow of an obstruction. In the case of the moon, however, the obstruction is 238,000 miles away and the diffraction fringes are therefore 30 feet apart. They sweep across the telescope at a speed of over 1,000 miles per hour. But because the star is not quite a point, the fringes are not as pronounced dark and light as would otherwise be expected and from this difference the star's diameter is calculated.

"Thus with the moon's aid, it is possible to circumvent the inability of even the largest telescope to make any star appear other than as a point," said Dr. Whitford. "The largest diameter, expressed as an angle seen at the earth, was 1/120 of a second of arc, equivalent to a pea at 75 miles. The smallest diameter measured by this occultation method was about one tenth as great. The close agreement with theory confirms the belief that the moon has no atmosphere. Even a trace would have hopelessly blurred the fringes."

To obtain the required high-speed record of the way the star's light varied as it went behind the moon, Dr. Whitford employed a photoelectric cell, an oscilloscope, and a moving-film camera. There is a waver in intensity lasting for about 1/50 of a second before the star goes out, and this waver is what the apparatus he devised was made to analyze.

See Front Cover

The picture on the cover of the SCIENCE NEWS LETTER, if held at a distance of about 40 feet, will appear to the naked eye as the moon does in the sky. Tycho (at top south) is the crater from which the ray system radiates—makes full moon look like a peeled orange. Turn the picture upside down for non-telescopic view.

The photograph was taken with the Lick Observatory 36-inch refractor by J. F. Chappell, Lick Observatory staff photographer. The moon was aged 13.8 days and the cover reproduction is three-quarters of the negative size.

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ASTRONOMY

Moon Rockets Fairly Safe From Meteorites

➤ SPACE ships of the future may be equipped with relatively thin coverings and still be well-protected from the run-of-the-mine meteors which haunt the solar system, Dr. Fred L. Whipple of Harvard College Observatory told members of the American Astronomical Society meeting.

Dr. Whipple defines the average meteor or "shooting star" as one of the eighth magnitude. That is, when such a meteor penetrates the earth's atmosphere and the friction heats it to incandescence, it is not even bright enough to be seen with the naked eye, which can see only to the sixth magnitude (the higher the magnitude the fainter the star). The brighter ones that are seen as flashes across the sky are much less abundant.

The average meteor is the size of a small pinhead and weighs about a milligram. Nevertheless, it travels through space so fast that an unprotected rocket ship might soon come to grief.

But a spherical space vessel 12 feet in diameter covered with a one-quarter-inch steel skin will be penetrated by a meteorite corresponding to an eighth magnitude or brighter meteor at the rate of only once in 50 years. For thinner coverings, however, the probability of penetration increases rapidly.

Dr. Whipple suggested further protection from larger meteorites in the form of a millimeter-thick sheet of metal surrounding the one-quarter-inch skin of the space vessel at a distance of an inch. But this may prove unnecessary.

METEOR STREAKS SKY—It is meteors such as this one photographed at Yerkes Observatory that threaten rocket ships of the future.

for 50 years is a long time for one space trip—or it may be considered as representing many, many trips.

The very rare collision that may occur with a large meteorite, say the size of a walnut or a baseball, would completely destroy the space ship. Fortunately, the probability of such an encounter is very small.

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ASTRONOMY

More Repeating Novae

➤ STARS that are known to suddenly flare up to thousands of times their original brightness are becoming more numerous. This is because of further study of past observations as well as of new ones continually being added to the list.

Harvard astronomers Margaret Walton Mayall and Leon Campbell told of the behavior of the recent recurrent nova, T. Corona Borealis, and the addition of Nova Sagittae 1913 to the list of repeating novae, at the meeting of the American Astronomical Society.

The word nova is used by astronomers to describe a star which suddenly flares to a thousand or tens of thousands of times its usual brightness. It is not really a new star at all, but a special type of variable star. The nova outburst seems to be a kind of safety-valve outlet. Evidence indicates that the longer the period between outbursts of the same star, the brighter it becomes when it does burst. All novae rise to maximum brightness in a few hours or days, then slowly fade away to their former insignificance.

T Cor Bor, as astronomers call the nova in the constellation of the Northern Crown (Corona Borealis), originally rose to the second magnitude in 1866. Just 80 years later it repeated its rise again, becoming nearly as bright.

Leon Campbell, recorder for the American Association of Variable Star Observers, stated that the rate of decrease from maximum to minimum light of the 1866 and 1946 outbursts was practically the same, the forms of the curves at minimum are nearly identical and the rise to a secondary maximum alike, both for time elapsed after the initial outbursts and the magnitude attained.

"Whatever the underlying causes in the behavior of T Coronae Borealis at these two outbursts, it would appear that they must be the same. The study of recurring novae thus becomes all the more important," Mr. Campbell said.

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ASTRONOMY

Star Space Not Hot

➤ "INTERSTELLAR space is not so hot!" Dr. Lyman Spitzer, Jr., of Yale University Observatory, stated at the meeting of the American Astronomical Society. His studies show that interactions between gases and solid grains, which have previously been neglected, will cool down the interstellar gases.

How low the temperature may fall is still quite uncertain, since information is lacking on the many physical processes which affect the final temperature. But temperatures similar to those found on the earth may be quite possible in interstellar space.

It has been realized for some time that the temperature of matter between the stars is very different for gases and for small solid grains of the size of dust and smoke particles. The solid grains radiate their energy so effectively that out in space, far away from any one particular star, their temperature falls to a very low value—around 459 degrees below zero Fahrenheit, the absolute zero at which all heat is gone. Gases, on the other hand, radiate energy so poorly, especially at lower temperatures, that if left to themselves out in space they would come to about the same temperature as that of the surface of a typical star—about 20,000 degrees Fahrenheit.

Ionized Gases

In some regions of space, Dr. Spitzer stated, the gases—predominantly atomic hydrogen—are ionized. In such regions the energy absorbed in repeated ionizations keeps the gas temperature up to nearly the 20,000 degrees mentioned above. However, in those regions where the gases are not ionized, the gas temperature may be reduced to a low value by the cooling effect of the solid grains.

"The presence of such low gas temperatures is significant," Dr. Spitzer said, "in that it may facilitate the condensation of gas into additional solid grains. Such condensation may be an important step in the continual formation of stars from diffuse matter spread out in space." The growth of stars is one of the fundamental problems astronomers are especially trying to solve.

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ASTRONOMY

Location of Galaxy Center Found by Infrared Probing

➤ NEW light has been thrown on the position of the center of the Milky Way galaxy, but it was "dark" or infrared light. Dr. Joel Stebbins and Dr. A. E. Whitford, astronomers at the University of Madison's Washburn Observatory, told members of their work during the summers of 1945 and 1946, using the 60-inch reflecting telescope atop Mount Wilson in California.

The apparent position of the center of our galaxy in the direction of the constellation of Sagittarius has been known for a quarter of a century, but a bright nucleus or clustering of stars about the center as in other galaxies has never been observed, presumably because it was obscured by interstellar dust clouds.

To penetrate the interstellar clouds, the Wisconsin astronomers used infrared light. The effect is just the same as using a color screen and red-sensitive plates to photograph more clearly distant landscapes seen through the earth's atmosphere. They attached to the 60-inch telescope a photocell and filter glass giving effective sensitivity near wavelength 10,300 angstroms, or 1.03 microns, definitely in the infrared region well beyond the sensitivity of the human eye.

They swept the telescope across the region of Sagittarius, repeating each sweep with red or violet filters to identify foreground stars and star clouds by their color. Any feature near the actual center of the galaxy would surely be much reddened by the greater absorption of its light while traveling the greater distance to reach the earth.

Parallel to the equator of the galaxy, a persisent bulge was found, its form being roughly outlined by an elliptical figure some 8 degrees long and 3½ degrees wide, with its center at longitude 326½ degrees. The apparent photographic magnitude (not infrared) of the bulge would be magnitude 24.5 per square second, or only 1/10 the brightness of the darkest patch of blank sky in the neighborhood.

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DERMATOLOGY

Adults Have no Ringworm

Ringworm of the scalp disappears when children begin to grow up because fat glands of scalp secrete acids that can kill the fungus causing it.

➤ THE REASON why grown-ups never get ringworm of the scalp and children get over it even without treatment when they start growing up at the age of 12 or 13 has been discovered by Stephen Rothman, Adelaide M. Smiljanic, and Arthur L. Shapiro of the University of Chicago and Alfred W. Weitkamp of the Standard Oil Company of Indiana.

It is because, starting at the time the child begins to mature, the fat glands of the scalp start secreting much more of certain fatty acids that can kill the fungus which causes scalp ringworm. Hair fat of grown-ups has five times the fungus-killing action that children's hair fat has, the scientists state in their report to the journal, *Science*, (Aug. 30).

They recently collected over 100 pounds of hair from grown-ups, representing more than 10,000 haircuts. From this they extracted certain fatty acids which had anti-fungus activity. One of them is called pelargonic acid. They hoped this could be used to cure ringworm in children, but in actual trials it did not. They believe it might be used to check epidemics but this has not yet been tried.

They tried mixing it with material which would enable the fatty acid to penetrate the hard keratin material of the hair, but results so far have not been encouraging.

The natural recovery from ringworm that comes with maturity, they conclude, is due to the higher concentration of certain fatty acids and to their getting into the inside of the follicle or little sac from which the hair grows. From this it gets to the surface of the hair and the surface of the scalp. Infected hairs remain infected until they fall out, but new hairs replacing them are protected from infection by the fatty acids inside the hair follicle. When all the infected hair has fallen out in the course of natural shedding, which proceeds much more slowly in small children, the infection is cleared up, never to return if the child has begun to mature.

Pelargonic acid or similar fungus-checking substances might check epidemics of ringworm if used on non-infected children because the spread of the fungus from one hair to another via the follicular wall to the scalp and from there to the inner follicular wall of the next hair and to the hair shaft outside the follicle or sac can be checked.

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ASTRONOMY

Harvard Will Erect New Type Telescope

➤ A NEW type of telescope will be erected at Harvard Observatory's station in South Africa through international cooperation among the governments of Eire and Northern Ireland, and Harvard University.

Dr. Harlow Shapley, director of Harvard College Observatory, told members of the American Astronomical Society that just prior to the meeting last week he received from Dr. Eric Lindsay, director of the Armagh Observatory, Ireland, a cablegram reporting the full concurrence and participation of the two Irish governments in the plan.

The telescope, to be of a new design by Dr. James G. Baker of Harvard, is an adaptation of the well-known Schmidt Camera. Schmidt telescopes combine a thin correcting plate or lens, and a spherical mirror. Dr. Baker's design adds another mirror to the system, producing a flat field instead of the curved field. This eliminates the necessity of curving the photographic plates.

The area of the sky to be covered by the Baker-Schmidt camera is more than 10 times as large as that of an ordinary reflecting telescope. Very short exposures are possible, enabling rapid photographing of faint stars and nebulae.

This plan for international cooperation was first discussed by Prime Minister de Valera and Dr. Shapley when the latter was on his way to a meeting of the International Astronomical Union at Copenhagen last March. Irish astronomers will share in the operation of the new instrument and will study the nature and distribution of stars in the Milky Way, portions of which, inaccessible to northern telescopes, can be observed in South Africa.

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MEDICINE

Shocked Mouse Squeaks To Test Drug Potency

➤ A 15-VOLT electric shock on the tail is enough to make any mouse squeak. But, when fortified with aspirin or more potent morphine, mice at the Wellcome Research Laboratories, Tuckahoe, N. Y., bravely hold back their squeaks until the effects of the pain-relieving drug wear off.

By counting the number of shocks tolerated before a drugged mouse squeaks, Drs. John F. Reinhard and Edwin J. de Beer have accurately tested the strength of many common drugs, they reported.

Using morphine as a standard, the scientists have measured the potency of varying doses of alcohol, acetophenetidin, acetanilid, antipyrine, aminopyrine, aspirin, and Demerol by the new mouse-squeak test.

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MEDICINE

New Blood Type Is Discovered

➤ DISCOVERY of what appears to be a new blood type is announced by Dr. A. E. Mourant of the Ministry of Health's Blood Group Reference Laboratory in London.

The discovery was made in examination of blood from two women whose new babies suffered from jaundice which was at first suspected of being the result of Rh substance in the blood. Further study showed that the blood of the two women contained identical substances, called agglutinins, "of a variety not previously described," Dr. Mourant reports in the scientific journal, *Nature* (Aug. 17).

The new substance has been given the name "Lewis" with the permission of one of the women who has it in her blood, Mrs. H. D. G. Lewis, and her husband.

The new type apparently occurs frequently. Dr. Mourant found that 24 out of 96 group 0 bloods of English people are agglutinated by the new Lewis antigen.

The substance is inherited and may be a Mendelian dominant rather than a recessive character.

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SAFETY

Faulty Lights Head Car Defect Hazards

➤ NEARLY one-third of the cars on America's highways have one or more hazardous defects, judging from results of a nation-wide police traffic safety check.

Rear and stop lights not operating headed the list of dangerous faults revealed in the check on more than two and one-half million automobiles between May 15 and June 30, the International Association of Chiefs of Police reports.

More than a quarter of the defects were in the rear and stop lights, with faulty front lights second. Defective brakes, windshield wipers, horns and tires followed in that order.

Canadian police, checking more than 125,000 cars in the same period, found 34.2% with defects compared with 31.6% for the American cars in the check.

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INVENTION

New Process Makes Butter Cheaper, More Sanitary

➤ BUTTER can be made more rapidly, at lower labor costs, and in cleaner and more sanitary fashion by a new process that does away with conventional churning, claims Arthur W. Farrall of Wilmette, Ill., on behalf of his system of manufacture, on which U. S. patent 2,406,819 has been issued.

Butter fat in milk or cream consists of separate globules, held apart from their neighbors by their surrounding films of a watery solution of proteins. Churning is simply a mechanical means for breaking these separating films and literally hammering the bits of butter fat together into a mass, Mr. Farrall explains. His process undertakes to achieve the same end without the hammering.

In his highly mechanized setup, the cream is first heated above the melting-point of butter fat. While still hot, it is run through a centrifugal separator which turns it out with a fat content as high as 75% or 80%.

The hot cream is then put through a machine called an emulsion breaker, where it is forced through jet nozzles under high pressure. This breaks the separating watery films and lets the bits of butter fat coalesce into a continuous mass in which the watery whey is dispersed in drops. That is, it is now butter.

Further "working," to reduce the amount of whey, is carried out mechanically. Also, by either vacuum evaporation or centrifuging, the watery content may be reduced practically to zero, producing concentrated butter oil, which is more suitable for long storage or far shipment.

From beginning to end, the materials are entirely enclosed, so that neither human hands nor outside air can introduce dirt or spoilage microorganisms.

Science News Letter, September 21, 1946

INDUSTRY

Tobacco Prices Affect Quantity of Frog Legs

➤ IF YOU like to eat frog legs, don't buy any expensive Cuban cigars. The number of frog legs for American eating is partly determined by the price of tobacco in Cuba.

It works this way: when tobacco prices are low, both growers and workers turn to frog hunting for added income; when Cuba's tobacco industry is thriving, less attention is paid to the frogs.

But even with prosperous tobacco prices, Joseph L. Martinez, foreign service clerk at the U. S. Embassy here, has reported to the Commerce Department that a plentiful supply of frogs may mean a big increase in Cuba's frog-leg exports to American tables.

Only eight years old, Cuba's frog legs business with the U. S. reached a record high of 381,457 pounds in 1941 and last year is estimated to have been more than 300,000 pounds. The Cuban Ministry of Agriculture believes that the Island now has sufficient frogs to send 500,000 pounds to the Americans each year.

Cuba has several cleaning and packing stations for the frogs, but there are no commercial breeding ponds because of the feeding problem. Frogs eat live animal food, chiefly shrimps and minnows in Cuba, and when these are not available, the frogs turn cannibals and eat other frogs. A drought following the hurricane of 1944 reduced the numbers of the frogs, but breeding is now reported back to normal.

Frog skins, formerly wasted, may become another important Cuban product, with a New York firm reported to be planning to manufacture handbag fittings, parts of women's shoes and other items from the skins.

Science News Letter, September 21, 1946

IN SCIEN

CHEMISTRY

Snow-White Potato Chips May Be Available Soon

➤ NO MORE brown streaks in your potato chips—you soon may be buying snow white ones.

A new method that treats raw potato slices with hot water before they go into the hot oil bath was announced by A. R. Patton and W. E. Pyke of Colorado State College at the American Chemical Society meeting in Chicago.

Traces of amino acids and reducing sugars which react chemically during frying to produce an objectionable brown color are extracted by the hot water. If white potato chips lack appeal, evenly colored ones can be fried by the new process.

Science News Letter, September 21, 1946

GENETICS

Mustard Gas Finds Job in Civilian Life

➤ MUSTARD GAS, one of the wickedest weapons of World War I but left on the shelf during World War II, has found what appears to be an extremely important peacetime job. It can change the hereditary character of certain animals and plants, and thus may presently be used by breeders for speeding evolutionary processes, as X-rays, ultraviolet rays and radium are used at present.

Latest accomplishment of this kind has been the production of 29 new physiological varieties of a fungus, by mustard-gas treatment of the parent species' spores. This was done by a four-man research team at Stanford University, whose first report appears in *Science*, (Sept. 6).

The fungus on which they worked has no economic value, but it happens to be a very convenient guinea-pig organism in the lower orders of the plant kingdom. Application of the results to economically important fungi, such as Penicillium, may come later.

The research team, who worked at the School of Biological Sciences at Stanford, consisted of Dr. N. H. Horowitz, Dr. M. B. Houlahan, Dr. M. G. Hungate and Dr. B. Wright.

Science News Letter, September 21, 1946

E FIELDS

PSYCHOLOGY

Heroes' Talk of Fear Is More Than Modesty

➤ HEROES GET scared. They all tell you how afraid they were when the going was toughest. It isn't mere modesty that makes them say so; they're just stating the plain facts.

At the meeting of the American Psychological Association Prof. Laurance F. Shaffer of Teachers College, Columbia University, gave scientific backing to flyers' own stories of the fears that gnawed at them on practically every mission. Symptoms were greatly speeded heartbeat, tense muscles, irritability, dry mouth, sweating, that "gone" feeling in the pit of your stomach, and a strange sense of unreality. It was worse when there was no immediate way of hitting back.

Among effective controls for fear were confidence in the "Old Man", "talking it up" among themselves, and sheer personal pride. Hope of promotions, pay or medals didn't count much; neither did hatred of the enemy.

Science News Letter, September 21, 1946

MEDICINE

Sudden Weather Changes Affect Body Functions

➤ WHEN the weather suddenly turns hot and humid, as in the tail of a tropical hurricane, the strength of your grip may be reduced.

This was the case among patients in Richmond, Va., studied by Dr. Ernst Fischer of the Baruch Center of Physical Medicine at the Medical College of Virginia.

If, as his preliminary findings suggest, weather affects muscle strength, mechanical efficiency and work production in factories may be distinctly influenced by changing fronts of warm and cold air, he said at the meeting of the American Congress of Physical Therapy in New York.

Using modern scientific methods to check up on Hippocrates, the Father of Medicine, Dr. Fischer believes that Greek physician "had something" when he suggested 2,000 years ago that climate and weather affect bodily functions and influence sickness.

The sharp changes in weather, as high and low pressure areas moving across the country, affect body functions, Dr. Fischer believes.

"In diseases where patients are just able to maintain a precarious balance, weather changes often cause a change for the worse," he stated. "Glaucoma, other eye diseases, tuberculosis, asthma and the psychotic (mental) disturbances seem to be affected by weather conditions. The onset of infantile paralysis seems to coincide with the passing of a cold front during warm summer months.

"Weather changes seem to place an excess burden on the human organism and seem to influence the maximal muscle efforts of normal subjects," he said.

Different persons react in different ways, he added, and the same person's reactions may vary at different seasons.

Science News Letter, September 21, 1946

TRANSPORTATION

Navy's LSM Carries Food in China's Famine

➤ RICE FOR China's hungry millions, instead of fighting men and munitions of war, constitutes the newest cargo for the Navy's shallow-draft Landing Ship, Medium (LSM). One of these sturdy vessels, the USS LSM 470, has just completed its second round trip through the dangerous rapids that bottle-neck the Yangtse river voyage between Chungking, in rice-rich Szechuan province, to Hankow, center of the famine area.

Worst menace in the 600-mile river trip is offered by 130 miles of gorge-choked rapids, where the current runs at 10 to 12 knots. The LSM, which is 300 feet long, with a cargo capacity of 315 tons, made the first up-river run with a load of aviation gasoline and penicillin. The people of Chungking celebrated its arrival with fireworks and flowers. On the test run downstream, the vessel carried a load of embassy furniture from Chungking to Nanking, with a token shipment of 10 tons of rice.

On the second trip, which proved the more hazardous of the two, the LSM settled down to business. The upbound cargo was 300 tons of firebrick needed at Chungking; the down-bound cargo consisted entirely of rice—a full 315 tons.

The Chinese government is now negotiating for the purchase of several surplus Navy ships of this type for use on the upper Yangtse.

Science News Letter, September 21, 1946

CHEMISTRY

Chemicals Keep DDT Safe From Decomposition by Iron

➤ A WAY to keep DDT from losing its effectiveness against insects has been discovered by Francis A. Gunther and Lois R. Tow of the University of California Citrus Experiment Station.

Even moderately high temperatures may cause DDT preparations to decompose and lose their ability to destroy insects, they point out in their report to the journal, *Science* (Aug. 30).

The decomposition is the result of catalytic action of iron. Most technical DDT contains traces of iron or iron salts by the time it reaches the surface being treated.

Two chemicals, picolinic acid (GD 2100) and salicylal-amino-guanidine (GD 2101), the scientists report, will prevent the catalytic action of the iron and protect DDT against decomposition.

Science News Letter, September 21, 1946

PUBLIC HEALTH

Industrial Workers Gain Half Year of Life

➤ ANOTHER half-year of life has been gained, or the end of life postponed six months, for industrial workers during the past year, figures from the Metropolitan Life Insurance Company's records show.

The expectation of life at birth reached an all-time high of 64.95 years during 1945 among the company's industrial policy holders. The figure is a half-year greater than for 1944 and one and one-half years greater than for 1941, the last prewar year.

The gain during the war years is considered extraordinarily good in view of the hardships and dislocations in civilian life and the special risks aside from enemy action run by men in the services.

The gain is attributed largely to two factors:

1. The generally raised standard of living resulting from full employment at relatively high wages.

2. Widespread use of the sulfa drugs and penicillin.

Further extension of life in future is expected as a result of continued efforts of medical science and public health administration which have accomplished so much to prevent disease and premature death.

Science News Letter, September 21, 1946

MEDICINE

One Million Diabetics

Disease occurs almost as often as cancer, and outranks polio 20:1. Insulin saves lives but many problems remain to be solved after 25 years of use.

➤ THE NUMBER of diabetes cases is 10 or 20 times as great as the number of infantile paralysis cases. It exceeds in many states the number of tuberculosis cases. Diabetes occurs almost as often as cancer. There are well over 1,000,000 diabetics on the North American continent.

These figures were cited by Dr. Russell M. Wilder of the Mayo Clinic and other speakers at the meeting of the American Diabetes Association.

The meeting was held at the University of Toronto to commemorate the discovery there 25 years ago of insulin, the chemical which has given life and health to hundreds of thousands afflicted with diabetes.

Even with insulin, much remains to be done to extend the lives and improve the health of diabetic persons, Dr. Wilder stated. Not all of them receive the benefits of insulin and only a small percentage enjoy the general care they should have.

"These are urgent reasons," he declared, "to arouse the public and the medical profession to the special needs of diabetic patients.

"Diabetic coma can be prevented," he continued. "Diabetic women now may safely go through pregnancy and give birth to healthy babies. Diabetic persons can be protected from the special dangers to them of infectious complications, and from the special risks to them of necessary surgical operations.

"There still remain, however, other aspects of the diabetic problem which have not been mastered and which indeed appear more formidable at the end of this quarter century than they did at its beginning. I refer to the degenerative complications which so frequently accompany diabetes and especially to lesions (disease) of the retina, the kidneys and the arteries."

Insulin Epic Praised

➤ HIGH PRAISE was given by the president of the association, Dr. Joseph H. Barach of Pittsburgh, to the University of Toronto for the way in which it handled the insulin discovery.

"When insulin was discovered and you had it in the palm of your hand to do with as you liked, when the world would have enriched you with gold beyond the dreams of avarice, you insisted that insulin be made available to everyone who might need it at a minimum of cost, and without material profit to yourselves," he said. "By that fine example, many communities the world over have undertaken to supply insulin to the poor, without any cost at all. You gave insulin to mankind, a finished and a perfected product, and you saw to it that it was made easily available to all who might need it. You have said, and you have lived up to the human ideal, 'that man is his brother's keeper'; and for that, again, we honor you this day."

Diet Still a Problem

➤ THE PROPER diet for a person with diabetes is still a problem and a matter for debate among physicians, it appears from discussions at the meeting.

At the time of the discovery of insulin, diabetic persons hoped the need for dieting would be eliminated. Doctors were cautious but many patients were either reckless or had grown desperate over the strict diets of that day. They took insulin and ate what they pleased. If they escaped serious trouble, authorities say, it was either luck or because they had adopted habits of eating that were good for them and followed those habits in spite of the freedom their doctors may have allowed them.

Diet is still important for the control of diabetes, Dr. Frank N. Allan, of the Lahey Clinic, Boston, gave as his opinion.

For the patient who has just developed diabetes, and especially for young persons, treatment should aim at controlling the disease completely if possible, so as to prolong the patient's life and protect him from complications later, such as eye, kidney and blood vessel disorders. For this aim, diet and insulin are generally needed.

Older patients, those who have had diabetes a long time, or whose diabetes is so severe it cannot be entirely controlled even with insulin and rigid diet, may be given a more liberal diet and less intensive treatment, the aim being to keep them comfortable.

Psychological factors must also be considered in prescribing diets for diabetics, Dr. Allan pointed out. Some patients want to know all about the disease and the reasons for changes or restrictions in the diet. Others feel overwhelmed by this complicated matter and do better if given definite orders of what to eat and what not to eat.

Diabetic comas, dreaded complication which heralded death in pre-insulin days, is now "inexcusable," Dr. I. M. Rabinowitch of McGill University declared.

The only exceptions are cases in which the coma is precipitated by an infection or some other acute illness which interferes with the action of insulin, he stated.

Coma should not strike more than three out of every 10,000 persons with diabetes, and of these three, only one should die, he declared on the basis of experience in the clinic for diabetes at the Montreal General Hospital.

The death rate among those of this clinic's patients who go into coma is expected to be high, 33%, because the condition develops only in patients having an infection so severe that it blocks the action of the insulin produced in the body or, in insulin-treated patients, of the insulin injected. The chances are, therefore, that it will block the action of much of the insulin being injected to control the coma.

If the coma is caused by faulty diet, the death rate should be very low, since there is no reason why insulin would not act in the usual manner.

High Calorie Diet

➤ ONLY one death per year from diabetic coma; only one diabetic in four requiring insulin; and one of these four being able to discontinue its use—this is the enviable record achieved among the large group of patients attending the clinic at the Montreal General Hospital. The high carbohydrate-low calorie diet prescribed there is responsible, in Dr. Rabinowitch's opinion. The results of 15 years of experience with it, he stated, bear out the observation made in 1934 that in man, carbohydrates, or starches and sugars, improve tolerance to carbohydrates whereas fats impair it, and carbohydrates increase sensitivity to in-

(Turn to page 190)

CHEMISTRY

Niacin Production By New Synthesis

➤ AN improvement in the method by which niacin, or nicotinic acid, is made was announced by Dr. Donald F. Othmer and Dr. Sidney A. Savitt of the Polytechnic Institute of Brooklyn. This vitamin, now used at the rate of a million pounds a year for flour enrichment, is synthesized from a compound known as beta picoline. Dr. Savitt's contribution consists in a better and cheaper method of separating this from two chemically related but physiologically useless compounds, gamma picoline and 2,6 lutidine.

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CHEMISTRY

Hearts of Atoms Can't Keep Still

➤ THE hearts of atoms that make up molecules just cannot keep still. Pulsation in unison is the basis of the bond that holds chemical elements together to form the stuff of the universe. This may sound like a love story of the elements. It is a new theory of chemical bonds presented to the American Chemical Society by a du Pont chemist, Dr. Melvin A. Cook of Gibbstown, N. J. He finds that what attracts and holds together elements can be explained by assuming that the nuclei or hearts of the atoms within the molecule cannot exist in stationary equilibrium but must execute periodic vibrations relative to each other.

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CHEMISTRY

Alcohol Production Tripled in War

➤ ETHYL alcohol production was tripled during the war, largely to supply raw material for synthetic rubber, stated Dr. Walter C. Hess, of the Industrial College of the Armed Forces. This capacity is not likely to be needed for peacetime purposes, he added; though demand for industrial alcohol as a solvent, and as a raw material in many industries, will remain very great.

Other wartime chemical outputs that exceed present and immediate future demands mentioned by Dr. Hess were calcium carbide and plastics, both of which were more than double the anticipated needs of this country in 1950. One industry which may be able to work up to nearly full capacity is synthetic ammonia production. This was needed for munitions in the war, but is almost as urgently needed for fertilizer in a famine-threatened world.

Science News Letter, September 21, 1946

ENGINEERING

Ohio Floats Giant Drydock

➤ WHEN a large-size floating drydock for ocean vessels slid sideways into the Ohio last month, Pittsburghers took pride because it is the largest ocean craft ever built on the inland rivers of America. It is not, perhaps, the largest built on inland waters; the Great Lakes still claim that honor.

The vessel has a long trip ahead of it before it tastes salt water. It will proceed, manned by the Navy for which it was built, down the Ohio and Mississippi, 2,000 miles to the Gulf of Mexico. First, however, it will rest at an outfitting dock where work of completing the vessel is under way, then undergo lifting tests.

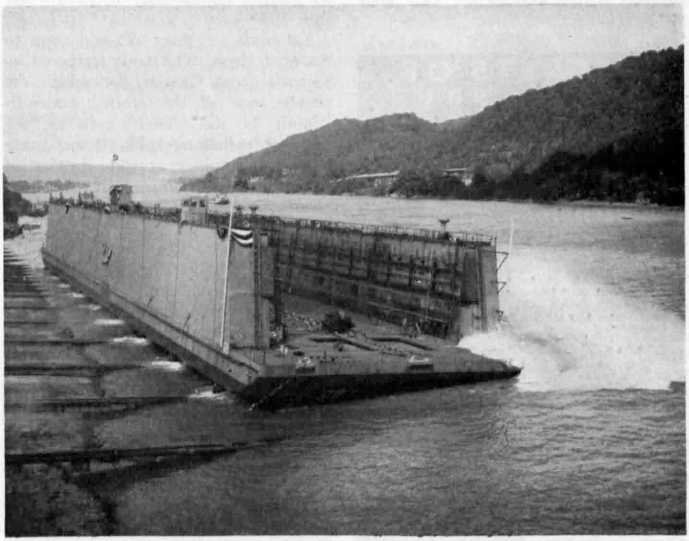
This shiplifting giant, defined by the Navy as an auxiliary repair dock, is 448 feet long, 97 feet wide, and 45 feet high. It is large enough to accommodate ships of the Liberty type. It is an all-metal craft with its hull plates butt-welded. It has no propellers, being moved from place to place on the end of a towline.

However, for repair work, it is a complete unit with quarters for its crew and skilled mechanics. It has diesel electric generators for light and power. It has machineshops, workshops, and its own water distilling plant. It has recreational space for its men, and tremendous food storage capacity so that many workers can be well fed for long periods at remote places.

Before leaving the Pittsburgh area, the drydock will undergo submergence tests. The Ohio is not normally deep enough for such tests with a floating drydock this size, so a special "hole" has been dug by Army Engineers in the bed of the river just above the Montgomery dam near Rochester, Pa. This provides water 45 feet deep.

The vessel was built by Dravo Corporation, under supervision of the Navy at its Neville Island Yards.

Science News Letter, September 21, 1946



GIANT DRYDOCK—The ARD-33, giant ship-lifting drydock and the largest hull ever built on inland rivers of America, was constructed for the Navy by the Dravo Corporation. The floating drydock was launched Aug. 10, and will serve the U. S. Navy Fleet as an auxiliary repair dock. It has a lifting capacity of 6,000 tons.

Do You Know?

Chinese made iron chain *suspension bridges* 2,000 years ago.

French *wine* production of the future is uncertain because of the war destruction and deterioration of vineyards.

Live *turtles* seem hardly an export commodity, but Costa Rica shipped over 150 tons of them during 1945.

Secondary *roads* used by rural mail carriers in the U. S. A. serve 30,000,000 people.

Sulfuric acid is not a plant food, but some 5,000,000 tons are used annually in the United States in fertilizer production.

Why a human being attracts an insect is not quite known; *odor* has been suspected, but skin deodorants have not proved effective as repellents.

Prefabricated cast-iron *houses* were proposed nearly a century ago for shipment to California to relieve a housing shortage in the days of the 1849 gold rush.

BOTANY-ORNITHOLOGY

NATURE RAMBLINGS by Frank Thone

Berries for Birds

➤ AUTUMN brings many bright berries and fruits along with the late brightness of its asters, gentians and cardinal flowers. They are very attractive to look at, these coral-berries, snowberries, black-haws, false bittersweet and all the rest. But their attractiveness is all to the eye; no human tongue, not even that of the omnivorous small boy, could find them tempting. They are either bitter, or impossibly sour, or at best insipid.

Yet birds eat them all, and seem to thrive on them. The hardy feathered sojourners from Canada, for which the snowy zone of the United States is "South for the winter" even eat the dark, gritty-looking fruits of the sumac and the pallid, gray-white berries of poison ivy. They are probably the principal means of distribution for some of these berry-bearing species, for the birds digest the pulp off the seeds, letting the latter pass through their digestive tracts still in viable condiion.

How the birds manage to down these ill-tasting fruits, and even make them a major item in their winter diet, is something of a puzzle. Some zoologists claim that birds in general are "taste-blind." If they are, it must be a great help to them, considering the ill savor, not only of these berries but of many other things that birds eat.

If you are a suburban or rural dweller, it would be a good idea to include in your yard plantings some of the bright-berried bushes that birds frequent, setting them out where they can be easily seen from living-room or kitchen windows. Then, when the ground is snow-covered and birds come around to these natural lunch counters, you will be able to reap without effort the pleasant reward their beauty will give you for the little trouble you have taken.

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CHEMISTRY

Edna and Dina: War-Born Twins

➤ TWO war-babies with the deceptively feminine designations of EDNA and DINA were described by Dr. Ralph Connor of the Rohm and Haas Company. They are both explosives.

EDNA is short for ethylenedinitramine, a compound not quite as powerful as the already-disclosed super-high explosive RDX, but less touchy. Also, EDNA could be made out of ingredients not needed for RDX, which permitted simultaneous manufacture without competition for short supplies.

DINA is di-(2-nitroxyethyl)-nitramine, needed for suppressing the blinding flash of artillery powder in night firing. It was of particular value after the development of radar range-finding caused most naval gun battles to take place at night.

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MEDICINE

Antivitamin Medicine Foreseen in Future

➤ DOCTORS in the future may prescribe antivitamins as well as vitamins, it appears from a report to the meeting of the American Chemical Society by Morris Soodak and Dr. Leopold Cerecedo of Fordham University.

An antivitamin, as its name suggests, is a chemical that is antagonistic to a vitamin, competing with it for a place in one of the enzymes necessary to normal body functioning.

Oxythiamine, an antivitamin for thiamin or vitamin B_1, was reported by the Fordham scientists. Mice given oxythiamine starved to death for lack of thiamin but other mice were saved by large doses of the vitamin.

Successful competition by antivitamins sometimes starves disease germs as well as animals. This suggests the possible use of the antivitamins as remedies for some diseases.

The most rational approach to the discovery of new chemical remedies, the Fordham scientists pointed out, lies in further study of compounds like the antivitamins which are closely related in chemical structure to substances normally occurring in living organisms.

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LIFE SAVER—Good crop years during the war saved Europe.

MINING

Have We Enough Metals?

➤ WHETHER the United States is a "have" or a "have not" nation in respect to certain important strategic minerals is an unanswered question, Reno H. Sales, chief geologist of the Anaconda Copper Mining Co., told the American Mining Congress at its meeting in Denver last week.

Wide differences of opinion have been expressed on this question, he said, and some have referred to "vast deposits of low-grade ores" which may be used when better methods of recovery have been developed. The expression, he continued, "may be applicable to certain metals such as iron, aluminum, and low-grade manganese, but it applies neither to copper, lead, nor zinc."

The effect of the war on the ultimate reserve situation "has been greatly exaggerated," he declared. "The war excess production over normal output was not great enough to justify the claim that that war was responsible for the situation in which we now find ourselves. The war made a lot of people metal conscious . . . but I doubt whether the users of metals, including manufacturers and ultimate consumers, have more than a vague understanding of the importance of metal reserves."

There are undiscovered reserves in hidden deposits, Mr. Sales believes. Their discovery, however, "presents an extremely difficult problem under the present status of our prospecting technique." Everything possible should be done to encourage the prospector and the small miner, he stated, because it is to them we must look for the original discoveries from which reserves are ultimately developed. "There has been no demonstration as yet that our country is in the 'have not' class."

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CHEMISTRY

Redheads Have What It Takes—For Red Hair

➤ REDHEADS have something blondes and brunets do not have. It is a matter of chemistry, demonstrated at the National Chemical Exposition, held in connection with the American Chemical Society meeting.

It is a new organic compound of iron, which can be isolated only from bright red human hair. Drs. Peter Flesch and Stephen Rothman of the University of Chicago department of medicine discovered that this chemical is one of the class of compounds that changes color with difference in acidity, varying between bright rose-pink and brown.

The redhead iron pigment can not be used to make hair red. It is now merely a chemical curiosity, resulting from fundamental research on the chemistry of hair color.

Science News Letter, September 21, 1946

AGRICULTURE

Good War Crops Spared Europe

➤ EUROPE'S famine conditions might be far worse than they are, had not the war years on the Continent also been good crop years, Prof. Wendel H. Griffith of St. Louis University medical school told the meeting of the American Chemical Society. During the war, Prof. Griffith was chief of the nutrition branch of the Office of Chief Surgeon, E. T. O.

Although rationing and hard times prevailed in the cities, he added, the country people in Germany and German-occupied countries did not fare too badly. They simply kept enough of the food they produced to provide for their own needs before sending anything to the cities.

The Nazi policy of deliberate starvation of prisoners naturally worked hardships on prisoners of war, and even worse hardships on political prisoners. The malnutrition itself, however, carried with it a certain kind of protection: due to the slowed-down physiological processes of the emaciated prisoners, the effects of vitamin lacks were less pronounced than might have been expected.

Science News Letter, September 21, 1946

NUCLEAR PHYSICS

Carbon Nuclei Speeded

➤ DETAILS OF prewar tests on atomic bullets three times as heavy as those in ordinary use have been reported at the University of California.

The tests, on the acceleration of carbon nuclei in the 225-ton cyclotron, point the way to methods of producing new trans-uranic elements and non-explosive fission in almost any kind of atom.

The carbon nuclei were accelerated to energies of 96,000,000 electron volts. While this is by far the greatest energy to which any heavy particle has been accelerated, its importance is not in the total energy achieved, since the energy is equally distributed among the six protons and six neutrons in the carbon nucleus, giving each particle an energy of only about 8,000,000 electron volts.

Rather the importance of using this type of atomic bullet lies in the ability to alter an atom more radically than can be done with lighter projectiles. For example, the addition of a carbon nucleus to any atom would result in a jump of six steps up the periodic table; the bombardment of uranium thus should produce element 98, an element not known to exist.

Scientists say that the addition of such energy would make the new atom highly excited. If, for example, bismuth were bombarded with carbon nuclei, the result would be an atom of actinium, which probably would be so highly excited that it should undergo fission.

This type of fission would be expected to yield new information about the atom, but could not be used in producing a new type atomic bomb. The reason is that an atomic bomb depends on a chain reaction in which there is a continuous release of neutrons. The actinium atom would not produce enough neutrons to continue the reaction, which would die out quickly.

At the present time atom-smashing with heavy nuclei is not very efficient, because an intense beam of the projectiles cannot be attained. The reason for this is that heavy nuclei have many more electrons surrounding them than the projectiles in standard use, such as deuterons and protons, and the electrons are hard to strip off. When this handicap is overcome it is believed that the use of heavy bullets will be an important addition to the arsenal of atom-smashing.

The carbon nuclei experiments were originated by Dr. Luis Alvarez, professor of physics in the Radiation Laboratory, and were continued by Dr. Emilio Segre, professor of physics, and Dr. Cornelius Tobias, instructor in medical physics.

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ASTRONOMY

Sunlight Above Ozone Is V-2 Rocket Goal

➤ SOME parts of sunlight which are blocked from the view of earthbound telescopes and observatories are expected to be studied with V-2 rockets.

The rocket to be fired at White Sands, N. Mex., Oct. 24, will carry apparatus for photographing the spectrum of the sun in the far ultraviolet region. This is the radiation from the sun which is cut off by the ozone and other layers in the upper air. If it should reach the surface, this radiation would produce devastating effects upon life in general.

Ordinary sunburn is produced by the longer ultraviolet wavelengths that can penetrate the air. At the height of 100 miles reached by V-2 rockets at present, only one-tenth of one percent of the atmosphere remains above the instruments. The ozone layer is about 30 to 40 miles above the surface of the earth.

A spectrograph employing lithium fluoride elements was described to astronomers meeting in Madison by Dr. J. Allen Hynek, Ohio State University astronomer associated with the Johns Hopkins University Laboratory of Applied Physics. This laboratory has charge of the scientific equipment to be carried in the V-2 rocket to be fired Oct. 24. The spectrograph will photograph sunlight during the test. Lithium fluoride transmits ultraviolet light as short as 1,500 Angstroms, whereas ordinary glass does not.

In addition to the solar spectrograph, the rocket will carry two cosmic ray telescopes and associated recording apparatus.

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In direct summer sunlight, a brick *wall* painted white is about 14 degrees cooler than one of unpainted brick.

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sulin, whereas fats decrease it.

Neglect of diet, which is the cause of coma in most cases reported, is due, Dr. Rabinowitch believes, to the difficulty patients have in following the diet and other measures in treatment. Because the rules at his clinic are easy to follow, patients are more careful to follow them, and therefore more likely to escape coma.

Radioactive Sodium Helps

➤ RADIOACTIVE sodium produced in the cyclotron at Columbia University has helped some 500 diabetic patients during the last three years, Dr. Beverly Chew Smith, of Columbia's College of Physicians and Surgeons, reported.

The radioactive material is used to save legs threatened with amputation because of gangrene. It is injected into a vein in the arm. A Geiger counter placed against the sole of the foot clicks off the amount of radiation reaching the sole of the foot from the radioactive material injected into the bloodstream. This and similar counts elsewhere on the leg give the doctor knowledge of the state of blood circulation. He can then tell whether the foot might be saved even if gangrene has started, or if an amputation is necessary, how far up the leg it must be done.

Knee joints can be saved and patients rehabilitated, Dr. Smith declared, urging physicians to make every effort to save the knee joint. Amputation above the knee makes it much more difficult for the patient to get around, even with modern artificial limbs, than amputation below the knee.

Diabetics, especially those with poor circulation, must be taught the danger of cutting a corn or callous and of wearing shoes that raise blisters or press on corns or bunions, Dr. Smith warned. Such activities, especially if the skin is not clean and the scissors or razor not sterile, are almost certain to start the infection that requires amputation to save the patient's life.

In 40 out of 100 amputations at Presbyterian Hospital in diabetics with poor blood circulation the cause of the infection that led to gangrene and loss of a leg was cutting of or shoe pressure on a callous, corn, nail, bunion or blister.

Science News Letter, September 21, 1946

Chile uses much of its *whale-oil* in the manufacture of soap.

Books of the Week

ADVENTURING IN SCIENCE, DIRECTED ACTIVITIES 1—Powers, Neuner, Bruner, and Bradley—*Ginn and Co.*, diagrs., illus., paper, 64 cents. A workbook to guide pupils in their study of the accompanying textbook, Exploring Our World.

AMERICA: 1355-1364—Hjalmar R. Holand—*Duell, Sloan & Pearce*, 256 p., diagrs. and illus., $4.00. A story of America's hitherto unknown earliest history, of events in the fourteenth century that are fascinating and revealing.

IF YOU ASK MY ADVICE—Henry Pleasants, Jr. M. D.—*Bruce Humphries, Inc.*, 110 p., $2.00. A varied collection of articles written in plain, understandable language, attempting to bring doctor and patient, or doctor and anxious family down to a common level on certain extremely important problems of life.

PERSONAL COUNSEL: A Supplement to Morals—Robert Frank—*Informative Books*, 306 p., $3.50. A non-technical book discussing the intimate personal problems of most young people. This is undertaken inductively by applying the subject matter in hypothetical consultations, in which a physician-columnist is called upon to clarify a number of problems that few people will take the time or opportunity to discuss with a professional counselor.

TWENTIETH CENTURY EDUCATION: Recent Developments in American Education—P. F. Valentine, ed.—*Philosophical Library*, 655 p., $7.50. This book is a comprehensive symposium, giving an over-all view of the major issues and problems in contemporary education. The thirty contributors of this volume treat at length all levels of education, from early childhood to vocational and physical training and higher education.

WEATHER GLOSSARY—Alfred H. Thiessen—*Gov't. Printing Office*, 299 p., 65 cents. A book that clearly and fully defines words used in meteorology. The terms, whether single words or phrases, are arranged alphabetically; the parts of speech, spelling, and capitalization follow usages found in standard American dictionaries. W. B. No. 1445, Aug. 1, 1946.

Science News Letter, September 21, 1946

BIOCHEMISTRY

Protein Building-Blocks Come to the Fore

➤ AMINO acids, the molecular "building-blocks" out of which proteins are constructed, were very much to the fore in discussions at the American Chemical Society meeting among the nutritional and food chemists. Increased realization of the importance of these compounds came as one result of wartime studies, and increasing ability to deal with them to best advantage in correcting human nutritional deficiencies was reported by several workers.

At the University of Illinois, young men volunteered as human guinea pigs in studies of the relative importances of the various amino acids. Of the 21 known compounds in this class, eight were found to be essential for the maintenance of human life. So long as one of the volunteers received his daily ration of all eight, plus necessary fats, carbohydrates and vitamins, he got along all right. But if one of the eight was omitted from his ration for any length of time, he began to show the effects.

Whereas it was formerly possible to obtain amino acids only by breaking up the protein molecules that contain them, some of them can now be manufactured synthetically on a practicable quantity basis, Dr. C. M. Suter and Dr. Sydney Archer of the Sterling-Winthrop Research Institute told their colleagues. Costs can be expected to go down as volume rises to meet increased demand.

Science News Letter, September 21, 1946

PHYSICS

Inaudible Sound Makes "Impossible" Mixtures

➤ OIL and water can be made to mix and stay mixed, in a permanent emulsion, by supersonics, which are sound waves of inaudibly high frequencies thrown off by an electrically agitated quartz crystal immersed in oil, Supersonics can also make long-lasting water suspensions of ultra-fine clays like bentonite, needed for numerous technical purposes.

Edward O. Whiteley of New York has invented a special vessel for making these "impossible" mixtures, on which he has been granted patent 2,407,462. It is made of rubber or other flexible material, reinforced with spun glass or asbestos fibers. Its flexible bottom and walls transmit the supersonic vibrations more effectively than relatively rigid materials like glass or metal.

A fluid better than oil for the transmission of supersonic vibrations has been compounded by Dr. Warren P. Mason of the Bell Telephone Laboratories, for patent 2,407,315. It consists of 57% dimethyl phthalate and 43% xylene hexafluoride.

Science News Letter, September 21, 1946

Experiments with rats have given conclusive evidence that pantothenic acid, one of the B vitamins, is necessary for reproduction.

PHYSICS

Maneuvering During Flight Visually Shifts Target

➤ AN AVIATOR sees an object seemingly move when his airplane performs acrobatic or combat maneuvers although the object is perfectly stationary in relation to the flyer himself.

This visually perceived movement, as much as 60 degrees from true position, is due to angular acceleration and centrifugal force, two Naval scientists, Lt. Comdr. Brant Clark and Capt. Ashton Graybiel, of the Navy's School of Aviation Medicine, Pensacola, Fla.. stated.

Science News Letter, September 21, 1946

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.

Use of *defoliants*, leaf-stripping chemicals, saves money for cotton growers by heading off army worms, speeding up hand harvesting, and letting sunlight through to cotton bolls produced on lower branches.

New Machines And Gadgets

⚙ *SCREW-HOLDING screwdriver, designed for setting and driving screws in hard-to-get-at places, has a slidable tube over the shank. When pushed forward, it separates the double blades of the tool, holding the screw securely and preventing the screwdriver from slipping off.*

Science News Letter, September 21, 1946

⚙ *ECHO-SOUNDING equipment, of a type developed for the Navy during the war, has a transmitter that produces a supersonic impulse to send vibrations to the sea bottom if within 200 fathoms. The returning echo is picked up by a receiver and converted into electrical energy that actuates the automatic depth-recording mechanism.*

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⚙ *SPINACH WASHER, for home use, has a perforated cylinder, to hold the leafy vegetables, which can be rotated within a horizontal cylinder, with a base on which it stands in a sink. Water from the faucet enters the outer cylinder, passes through the perforations to the rotating vegetable, and drains out below.*

Science News Letter, September 21, 1946

⚙ *BRUISE-PROOF basket is made of open wire covered with rubber to prevent injury to fruit and vegetables tossed against the sides by harvesters. The picture shows its construction.*

Science News Letter, September 21, 1946

⚙ *FLOATING STILL produces drinking water from seawater. A transparent plastic pillow-size bag has stretched within it a black pad of highly absorbent material. This pad is soaked with seawater, the bag inflated with air, and then floated on the sea. The sun's heat turns the seawater into vapor which condenses in the bag.*

Science News Letter, September 21, 1946

⚙ *AUTOMOBILE sunshade that covers the entire top of the car is made of suitable material supported in place above the top by a light frame centrally attached to the roof gutters on each side of the car. Front and rear of the frame are anchored by cords to the bumpers.*

Science News Letter, September 21, 1946

⚙ *MOBILE restaurant in a truck can sell 1000 ready-to-serve items, such as sandwiches, coffee, ice cream, pie and baked goods, without returning to the commissary. It is built for feeding people at industrial plants or at special gatherings such as ball games.*

Science News Letter, September 21, 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 329. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

Question Box

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What were scientists afraid would endanger space ships of the future? p. 181.

CHEMISTRY

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In what way other than as a food is sugar used on the dinner table? p. 180.

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