15¢

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 9, 1944

Saves Lives

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A SCIENCE SERVICE PUBLICATION

KEEPING UP WITH *Electricity*

BUMPLESS RIDES in trains and automobiles are forecast, because of a new-type stabilizer. Present job of the stabilizer is to make it possible for American tanks to fire with deadly accuracy, even when traveling at full speed over rough terrain. No details until after the war, but it is another of the many Westinghouse wartime developments with peacetime applications.

LIGHTNING UMBRELLA. A wire stretched over the top of a building, then grounded, forms a better protection against lightning than the old-time lightning rod, the Westinghouse High-Voltage Laboratory finds. Effect is like an umbrella, keeping the bolt entirely away from buildings where even the slightest spark might be dangerous.

THIMBLEFUL OF RECTIFICATION. Copper-oxide rectifiers are usually associated with high-current applications, but one type used in high-frequency instruments is rated at one milliampere—at one volt. It is 3/32 of an inch in diameter; a bank of four in their Micarta housing can be covered by a thimble.

OUTDOING THE LAC BUG—Shellac is produced by an Asiatic insect familiarly known as the lac bug. When the greater part of the world's population of lac bugs fell into enemy hands, this important plastic was cut off from us. Westinghouse research men then created synthetic molecules almost identical with the molecules of shellac. This new material is an even better shellac for many uses than shellac itself.

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Let us send you a free copy of the new booklet, "Books by Westinghouse Authors." Titles listed are not only in the fields of Electricity and Electronics—many of them standard texts—but also cover a wide variety of other subjects, from Astronomy to Sales Engineering. Ask for booklet SNL 94.

MEDICINE

Streptococci Weapon

May come from an anti-enzyme substance in beef sweetbreads and soybeans. May fight septic sore throat, erysipelas and rheumatic fever.

➤ A NEW weapon for fighting diseases caused by certain streptococci, such as septic throat, one form of heart disease, erysipelas and rheumatic fever, may come from an anti-enzyme substance in beef sweetbreads and soybeans.

The possibilities are now being explored, Major I. Arthur Mirsky, of the Army's Medical Corps, of the AAF Regional Station Hospital in Lincoln, Nebraska, states (*Science*, Sept. 1).

The disease germs under investigation, known as beta hemolytic streptococci, are believed to owe at least some of their disease-causing power to the fibrinolysin they produce. Fibrinolysin can liquefy human fibrin, the essential part of the blood clot. It may be an enzyme and may, Major Mirsky's studies showed, be related to enzymes such as trypsin which digest proteins.

Blood serum that measures high in ability to check the activity of trypsin also measures high in ability to check the fibrinolysin of hemolytic streptococci, Major Mirsky discovered.

Further tests were then made with a crystalline material isolated from beef pancreas, or sweetbread as it is often known to the layman. This crystalline material can check the activity of trypsin. It also completely stopped the fibrin-liquefying action of streptococcal fibrinolysin. So did another anti-trypsin material extracted from soybeans.

These anti-trypsin and anti-fibrinolysin materials from pancreas and soybeans are not toxic, tests with mice and guinea pigs showed. Since they are also readily available, it may be possible to use them as remedies in diseases caused by beta hemolytic streptococci.

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AIR-SEA RESCUE MIRROR—One of the latest signal mirrors used in air-sea rescue work is shown by Richard Hunter, of the National Bureau of Standards, to Chief Radioman George R. Tweed. Both men participated in a recent Science Service "Adventures in Science" radio broadcast. Mr. Hunter is engaged in developing signal mirrors that can be aimed for use by survivors to flash sunlight on planes and ships to attract attention. Mr. Tweed lived for two and a half years on Guam while the Japanese occupied the island, and was rescued through use of a mirror on July 10 of this year.

ENGINEERING—GEOLOGY

Horizontal Oil Drilling Proves Successful

➤ HORIZONTAL drilling for oil; deep under ground, is a new method to recover additional petroleum from partly depleted fields after the well-known pumping and pressure methods fail to bring further economical results. The scheme has now been tried out experimentally and gives promise of success.

In this plan the holes radiate like the spokes of a wheel from a chamber at the foot of a shaft sunk from the surface to and through the oil-bearing sands. A somewhat similar scheme was suggested a year or so ago for collecting natural gas from eastern gas fields.

The experimental development of oil recovery by horizontal drilling was undertaken by a group of oil-producing and oil-refining companies and individuals in a partly depleted 400-acre oil field in western Pennsylvania, the first commercial oil field in the United States. It is near the spot where E. Evans, in 1859, encouraged by an oil seep in his water well, deepened it to 72 feet and recovered by hand pumping from 10 to 15 barrels of oil a day.

The project has now been investigated by the U. S. Bureau of Mines, and a report on it will be available soon. It will give the history of the field, its geology and production, and a description of the new development.

In this project a 10-foot shaft was dug 388 feet down through the oil-producing sands and lined with one foot of concrete. About halfway down, a rectangular chamber was constructed as a middle station. At the base a circular chamber 27 feet in diameter was constructed. Drilling equipment was lowered to this chamber and the holes drilled through portholes left in the walls. The first two holes drilled are each nearly a half mile long. They incline slightly upward, so that the oil gathered will flow by gravity to the central shaft for pumping to the surface. Additional oil recovery will, it is expected, be sufficient to warrant the cost.

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MEDICINE

Chemical Fights "Blue Pus"

New antiseptic drug, relative of ethylene glycol, is effective for treating infected wounds. Is an auxiliary of sulfa drugs and penicillin.

➤ A NEW antiseptic drug which appears to be successful in ridding infected wounds of the kind of germs that cause "blue pus" has been announced (*Lancet*, August 5).

Phenoxetol is the name suggested for the chemical which is a relative of ethylene glycol, familiar as an anti-freeze mixture. One of its chemical names is ethyleneglycolmonophenylether. It is a colorless, odorless, somewhat viscous liquid which may develop a faint rose-like odor, according to the description given by H. Berry, of the University of London.

The new antiseptic is not a rival to penicillin or the sulfa drugs, but rather an auxiliary to them. Less effective against staphylococci and streptococci, it is more effective against the pyocyaneus bacillus.

The "blue pus" in wounds infected with the germ was a familiar sight to military surgeons in the 1914-1918 war, the editor of the *Lancet* points out. The infection is less serious than infection with streptococci or staphylococci, but in some kinds of wounds often delays healing.

Phenoxetol can be used with penicillin and other germ-killers, Mr. Berry reports.

Good results with the new antiseptic in treating surface wounds associated with skin loss, such as burns, are reported by Mr. Berry and colleagues, Dr. J. Gough and Miss Bess M. Still, of the Welsh National School of Medicine.

The phenoxetol used in the studies was prepared and supplied by Dr. E. Boehm, of the Nipa Laboratories at Treforest, S. Wales.

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ORDNANCE

More New Tanks

Have stepped up fire power a whole grade and at the same time increased their speed. Were demonstrated at Aberdeen Proving Ground.

➤ NEW MODEL tanks, developed by the Army's ordnance designers and exhibited at the Army Proving Ground at Aberdeen, Maryland, have stepped up their fire power a whole grade and at the same time increased their speed. That is, light tanks now carry the kind of cannon that only medium tanks used to have, and the mediums have taken unto themselves the punching power once thought possible only in heavies.

Some of the new fighting vehicles were put through an eye-opening demonstration. The Germans and the Japs have already made their acquaintance—the hard way.

The standard light tank, in earlier war months, carried a 37-millimeter gun as its heaviest weapon. The new light tank, M24, has a 75-millimeter gun, which used to be standard armament for the "Sherman" medium tank, M4. The latter now successfully swings a 105-millimeter howitzer in its turret—a weapon hitherto thought too big for anything short of a 60-ton heavy tank. Another model of the same tank mounts the long-barreled, high-velocity 76-millimeter rifle.

A new and very wicked light tank is the compact, low-silhouette job specially designed for use with airborne troops, which has been nicknamed the "Locust." It can be slung under the belly of a plane, or can ride inside a glider. It carries a 37-millimeter cannon and a .50-caliber machine gun, and it is good for 40 miles an hour on the road and 15 to 25 miles an hour over rough terrain.

Heavy armament and high speed are combined also in the newer vehicles of the tank-destroyer class. One, the M18, mounts the 76-millimeter gun. With a road speed of 50 miles an hour, it is believed to be the fastest thing in the world on tractor treads.

Another vehicle, designated as gun motor carriage M36, mounts the new 90-millimeter anti-aircraft gun, turned against tanks and other tough ground targets. No German armor can withstand it, not even the thick plates of the vaunted "Tiger" tanks. Its speed of 30 miles an hour is tops in its weight class. It sends its 24-pound shell on its way at a velocity of a half-mile a second.

This trend toward higher gun power

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and at the same time good speed for the attack is definitely in keeping with an American tradition. From the days of the "Constitution" class of frigates down to the "Iowa" battleships, American warships have been notable for the great power of their batteries. It is fitting that our present-day overland cruisers should follow so good an example.

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AERONAUTICS—METEOROLOGY

Atlantic Flyable in Winter

A Douglas transport, the "Icicle," flew regular schedules from Newfoundland to Prestwick, Scotland, and back within three days.

➤ FACTS about the weather collected last winter prove that the North Atlantic air routes are flyable both eastbound and westbound from October to February. Named the "Icicle," a Douglas C-54A transport plane flew regular schedules across the North Atlantic, making the round trip from Newfoundland to Prestwick, Scotland, and back within three days.

Thrusting its way through what have been considered the most difficult flying conditions in the world, the airplane made possible the collecting of valuable weather information. Observations taken formed the basis for much of the information used by Air Force bombing squadrons based in England. Weather data were broadcast to all Army stations every hour on the hour going east; every hour on the half hour going west.

Before westbound North Atlantic flights were made on regular schedule, many were of the opinion that the North Atlantic should be used only for eastbound flights, with the return being made on a warmer route, such as Africa, South America and Puerto Rico.

Aeronautical engineers and an AAF meteorologist went along on all flights operated by American Airlines for the Air Transport Command.

Much was learned of the weather existing over the North Atlantic and how to fly safely through it. It was found, for example, that bad weather could be circumvented by rerouting in practically every case, and that only an isolated destination with no suitable alternate would require cancelling of the flight due to the local weather prevailing at the destination. The biggest problem was winds and how to use them or avoid them. During the winter the wind blows from a westerly direction across the North Atlantic at a constant high velocity. It is not uncommon to encounter westerly winds of more than 50 miles an hour over most of the route.

The crew of the plane was constantly surprised by the drastic changes in temperature experienced. After finding the temperature in Iceland 40 degrees above zero Fahrenheit, 12 hours later they arrived in New York to find that there the temperature had dropped 30 degrees, to 10 degrees above zero. Once they stepped out of the plane at an airport within the Aretic Circle in the middle of January into a torrential rain with the temperature 42 degrees above zero.

The data collected will provide airline engineering departments and the Army Air Forces with information on how to thoroughly winterize planes for North Atlantic crossings, and may be used to plan for postwar transoceanic crossings.

Flying time between New York and England via Casablanca and western Europe is 29 hours, by the new North Atlantic route it is only 18 hours.

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PORTABLE HOSPITAL—An operation is performed in the mobile hospital unit shown in this Signal Corps photograph, taken somewhere in New Guinea. These hospitals are largely responsible for the high recovery rate of men wounded in this war.

MEDICINE

96% of Wounded Recover, Thanks to Mobile Surgery

➤ FULLY 96% of all men wounded on battlefields recover and of these, about two-thirds return to duty, the Office of the Surgeon General of the Army has announced. Modern mobile surgery and reconditioning treatment are credited with setting these records.

The mobile surgical units carry hospital equipment and skilled surgeons to the front lines, permitting operations on the battleground itself or immediately behind it. Swift evacuation of the wounded to hospitals for further surgical care follows.

The Army's new intensive program of reconditioning begins when the convalescent period is reached and includes planned, progressive exercise to speed recovery of strength and stamina, occupational therapy to encourage normal habits, and educational therapy to encourage mental advancement.

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MILITARY SCIENCE

Mechanical Map Maker

Charts the course as a jeep, tank, or truck speeds over a highway. Consists of an electronic magnetic compass, a power pack, and a plotting unit.

➤ FACTS about a new device that draws a road map while a jeep, tank, or truck speeds over highways and byways, long classified as a military secret, have been revealed by the Corps of Engineers, U. S. Army.

Named the "odograph," and known officially as the M-1 Automatic Road Reconnaissance Device, it makes many of the maps that are vital to armies in the conduct of their operations. It consists of an electronic magnetic compass, a power pack, and a plotting unit that actually draws the maps, all interconnected by means of electrical cables and flexible shafts. The three units are compact, and can be mounted in the back of a jeep, inside a tank, or on a truck.

In addition to its use for map making, it can plot the position of objectives relative to a given base, tie gun positions together, and be used in land navigation, tactical reconnaissance, and the tactical control of movements.

Field commanders plotting a course must know both the distance travelled and the direction of travel. The odograph determines the distance travelled by means of a speedometer attached by a flexible cable to the vehicle transmission. Direction is determined by means of a magnetic compass properly corrected so that the iron and steel in the jeep, tank or truck will not affect the compass, and "read" by an electronic unit. The two factors, distance and direction, are integrated mechanically in the plotting unit, passing the data through a "mechanical brain" to a plotting pencil which draws a map of the route travelled on the map table.

The odograph can plot to any scale from 1 to 20,000 to 1 to 500,000. An azimuth dial indicates the direction of the vehicle at any moment. Counters indicate the number of miles travelled north or south, and east or west of a given starting point, and the total miles travelled. Thus after a trip of six miles north, two miles west, one mile south, and two miles east, the counters would show 11 miles total travel and a net travel of 5 miles north.

The odograph was developed two years ago by the Engineer Board, Carnegie Institution of Washington's Department of Terrestrial Magnetism, and the National Defense Research Committee, and it has been produced for a year by calculator machine manufacturers.

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Tankdozer Pushes Dirt

➤ NEW DETAILS on the tankdozer, a medium Sherman tank fitted with a bulldozer blade, were also revealed. It combines the work capacity of the bulldozer with the fire power of a Sherman tank. The removable bulldozer blade assembly, actuated by a hydraulic jack, can be jettisoned in about 10 seconds, thus freeing the tank for fighting purposes.

The tankdozer has been used in Normandy to break through the hedgerows and lead the way for mechanized weapons and foot-soldiers. When called upon it replied to enemy anti-tank and machinegun fire with its 75 millimeter gun and .50 caliber machine guns.

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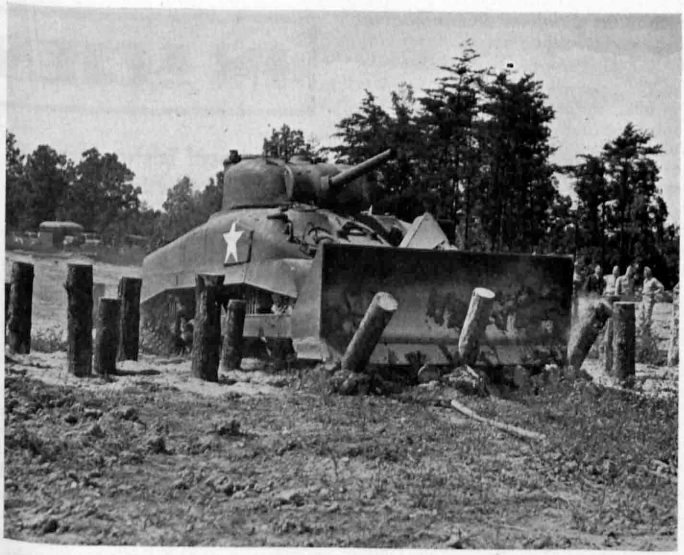
Lighter Landing Mats

➤ EMERGENCY landing mats for theaters of operation where equipment must be carried by air are now made from aluminum alloy that weighs about 50% less than similar steel mats.

Used to provide a quick temporary surface for an air field built on newly conquered territory so that fighters, bombers, and transport planes can operate near the front lines, the individual panels are about 10 feet long by 15 inches wide. The strength of the aluminum mat compares favorably with steel mats. They are interlocked by bayonets and perforations along the edges of the panel.

The weight of a runway 150 by 5,000

MECHANICAL MAP MAKER—The land Odograph automatically plots the course travelled by this jeep, providing valuable military reconnaissance information for field commanders. Captain Faustman of the Army's Engineer Board holds the cover of the electronic magnetic compass which determines the direction in which the jeep is travelling. In the foreground is the mechanical plotting unit which controls the movement of the pencil on the map table.



TANKDOZER—A medium Sherman tank mounted with a bulldozer blade snaps off 12-inch logs in a tank trap as though they were twigs. A quick release mechanism operated from within the tank allows the bulldozer blade assembly to be jettisoned in about 10 seconds, freeing the tank for fighting purposes. Thus are combined in one instrument a tank with a 75 millimeter gun and a bulldozer with its construction ability. Photograph by Fremont Davis, Science Service staff photographer.

feet for an aluminum mat is 975 tons as compared to 1,928 tons for steel. Only 163 airplane loads are required to carry the new mats, as compared to 322 loads necessary for the steel mats.

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CHEMISTRY

Built-In Trousers Crease

➤ THERE will be no excuse for creaseless trousers, or wrinkled woolens, or even stocking runs in the postwar world. Out of research to improve GI fabrics, Monsanto Chemical Company has announced the development of three new textile treating processes which promise to make these dreams come true.

"Reslooming" is a process which prolongs the life of a trousers' crease by impregnating individual fibers with a tough heat-water-and-chemical resistant plastic. It also renders woolens shrinkproof, wrinkleproof, and more durable.

Stockings that do not run, slips that do not creep out of place and fabrics that do not wear out result when fabrics are sponged or sprayed with one of a group of compounds which Monsanto Company has named Sytons.

The treatments may be given at mill or at home. The Syton compounds are made up of highly purified quartz, or silicon dioxide, dispersed in water. Submicroscopic fibrils of the polymerized quartz, less than 1/400,000 of an inch in diameter, give the hard, translucent film over the textile fibers.

The third new process makes cotton, rayon and other fabrics water-repellent by external treatment with a melamine plastic. One treatment lasts for the lifetime of the garment. As with Sytons and Reslooming, this process leaves the appearance and feel of the textiles unchanged, meantime increasing the color fastness and improving the natural sheen.

The newly developed compounds for improving textiles are at present limited to military applications.

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PUBLIC HEALTH

Tuberculosis Germs in Air Stopped by Ultraviolet

➤ NEW EVIDENCE that the sun's ultraviolet rays are a powerful weapon against tuberculosis which can probably be used to speed the conquest of the disease appears in a report by Dr. Max B. Lurie, of the Henry Phipps Institute, University of Pennsylvania (*Journal of Experimental Medicine*).

It is generally believed, Dr. Lurie points out, that tuberculosis of the lungs in humans is acquired by inhaling or aspirating particles or droplets carrying tuberculosis germs. Previous studies have shown that pure cultures of tuberculosis germs in the air can be killed by ultraviolet rays.

Now Dr. Lurie reports experiments in which these germs spread by air in the way they would be naturally by breath of tuberculosis patients may also be killed by ultraviolet rays streaming into the air. Healthy persons would thus be protected from the disease.

These new studies were made with rabbits from families susceptible to tuberculosis and also from rabbit families with strong hereditary resistance to the disease. Healthy animals lived for months in cages next to those containing tuberculous rabbits, so that the air in the healthy animals' cages was constantly mixed with air from the cages in which the sick rabbits were shedding living tuberculosis germs.

When the air was irradiated with ultraviolet light, not one of the 15 healthy animals acquired tuberculosis or showed any signs of infection in scrupulous examination of their bodies after death.

When the air was not irradiated with ultraviolet, 11, or 73%, of the 15 exposed contacts developed tuberculosis. Of these 11, nine died of the disease during the study and the other two had infections that undoubtedly would have killed them in a few months more. Three other rabbits developed positive tuberculin reactions, only one of the 15 escaping any sign of tuberculous infection.

The ultraviolet light protected the rabbits from the tuberculosis by killing the germs in the air.

"It is probable," Dr. Lurie concludes, "that ultraviolet irradiation may control air-borne contagion of human tuberculosis."

Collaborating with Dr. Lurie in the studies were Helen Tomlinson and Samuel Abramson.

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GEOLOGY

Geologic Structure of U. S. In Four-by-Six Foot Map

➤ A NEW MAP of the United States, depicting the complete geologic structure of the nation, is now finished and will be available soon. The four-by-six-foot map, in seven colors each indicating geological features, is the first of its kind ever to be published.

This map, technically a tectonic map, was prepared after nine years of work by a committee of 16 experts headed by Dr. Chester R. Longwell, professor of geology at Yale University. The committee is a division of the National Research Council. The other members were well known, widely distributed geologists from universities, the government, and from petroleum and other industries. It will be obtainable from the American Association of Petroleum Geologists, Tulsa, Okla.

The map will be of particular value to research geologists, petroleum geologists and engineers, and to college instructors in geological fields. It gives an overall picture of the major structural features of bedrock, with a consequent direct relationship to the occurrence of petroleum, and will directly aid research students working on the causes of large scale movements of the earth's crust.

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NUTRITION

Eating Starches and Fats Helps Soldiers in Arctic

➤ MEALS high in starches and sugars or in fats help offset the effect of cold weather on body temperature and on the coordination of nerves and muscles, Dr. R. W. Keeton, Prof. H. H. Mitchell and Prof. M. K. Fahnestock, of the University of Illinois, found in experiments announced by the University.

High-flying military aviators; soldiers, sailors and marines serving in the Arctic; and winter outdoor workers in northern United States, Canada and Alaska are expected to benefit from the findings.

The studies were carried on with the cooperation of the committee on medical research of the Office of Scientific Research and Development. Tests of the effects of diet at temperatures 20 degrees below zero were made with 12 volunteer human "guinea pigs."

Eating three small meals at two-hour intervals during an eight-hour exposure to intense cold instead of one large meal during the period was found to increase the benefit of the diets.

The decrease in body temperature due to the cold was reduced by two-thirds, in other words, the men were only one-third as cold by actual measurement, with the best diet of three high-fat meals as compared to one high-protein meal. The difference was noted in both internal and surface body temperature. During the tests the men wore warm clothing similar to that issued to American troops stationed in the Arctic.

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AERONAUTICS

CAA Opens Control Center For Navy in Bermuda

➤ THE CIVIL Aeronautics Administration will handle air traffic for the Navy at Bermuda. To be known officially as the CAA Approach Control Center it will assume responsibility for the safety and expediting of all aircraft within a radius of 150 miles of the base. During good weather this is merely the job of seeing that incoming and outgoing planes don't get tangled up with one another. In bad, or instrument weather, the CAA control on traffic will be of great value since the area is mostly water and affords no emergency landing fields. This handling requires high technical skill to avoid accidents in dangerous weather.

The control center will be staffed with twenty CAA personnel, and will be directed by Arney C. Leathers. Mr. Leathers has had 15 years' aviation experience, and until his new appointment has been stationed in Kansas City as chief of the CAA Airway Traffic Control Branch there.

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INVENTION

Ink-Dissolving Cleanser For Mimeograph Stencils

➤ WORKERS in offices where mimeograph stencils need to be cleaned and kept for possible future use will be interested in patent 2,356,771, which was granted to Rex V. McKinley of Vicksburg, Miss., on a simple device especially designed for that purpose. It consists essentially of a flat vertical tank in which the stencils are suspended against screen-covered frames, while an ink-dissolving liquid is forced against them in jets from a perforated pipe. The ink-soiled cleaning fluid is taken off through a drain at the bottom.

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IN SCIEN

GEOPHYSICS

Geophysical Technology Taught at New Institute

➤ SEISMOLOGY, earthquake science, has become the cornerstone of knowledge for a unique new educational enterprise, the Institute of Geophysical Technology, which will begin its work at St. Louis University on Sept. 13, under the deanship of Dr. James B. Macelwane, S.J.

Knowledge of the nature and behavior of earthquake waves can be used to man's advantage in two ways, one negative, the other positive. Negative use is the planning of buildings, bridges, dams and other engineering structures in such a way that possible earthquakes will do the least possible damage. Positive use is the generation of small artificial earthquakes by means of explosive charges, and the interpretation of their direction and rates of travel to indicate the presence of deeply buried ore deposits, oil pools and other economically important geologic structures. Courses to be given at the Institute cover both these phases of applied seismology.

Other curricula offered cov.. training in geological engineering, professional meteorology, radio communications engineering, applied electronics, and general engineering.

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BOTANY

Research Association Studies New Uses of Seaweed

➤ A RESEARCH association, formed by the British in Scotland, will study the possible use of seaweed in connection with the manufacture of textiles, plastics, foodstuffs and other products.

The work will include the collection of samples, and a study of seasonal variations, made with the aid of the Prospecto, a ship specially equipped for the survey and collection of deep sea plants. Studies will also be made of seasonal variations in the organic and inorganic constituents of various seaweeds, by chemical analysis.

Seaweed is now used on the British Isles for animal and poultry feed, and for fertilizer.

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E FIELDS

PUBLIC HEALTH

Soldiers to Be Vaccinated If Influenza Threatens

➤ AMERICAN soldiers will be vaccinated against influenza if there is any sign that the disease threatens to attack them, the War Department has announced.

The vaccine to be used contains killed influenza viruses of Type A and Type B. It was developed by Dr. Thomas Francis, Jr., and Dr. Jonas E. Salk, of the University of Michigan School of Public Health. It is made from viruses grown on allantoic and amniotic fluids of chick embryos.

Influenza cases were reduced about 75% among the vaccinated as compared with the non-vaccinated in the extensive trials of the vaccine made under the direction of the Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army. Those of the vaccinated who did get influenza had a milder form of the disease and were not sick as long as the non-vaccinated. This means a saving in man-power hours.

Plans to procure the vaccine and to use it to fight the spread of influenza in the Army if it becomes or threatens to become epidemic were made on the recommendation of the Commission on Influenza headed by Dr. Francis G. Blake, of Yale University School of Medicine.

The influenza vaccine will not be given routinely to all men in the Army, as typhoid and smallpox vaccines are. A statement of policy governing its use and a summary of the evidence for its value in checking influenza has been issued to all medical officers by the Office of the Surgeon General.

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ASTRONOMY

Period of Sunspot Maximum Will Probably Come Early

➤ THE NEXT period of sunspot maximum will probably come early, the number of pockmarks on the sun for the present cycle being greatest sometime before May, 1948.

On the average 11.1 years elapse between two successive periods of sunspot maximum. One can expect, with 95 chances out of a hundred of being right, that the interval from the last maximum to the next one will be shorter than usual, Dr. W. Gleissberg of Istanbul University Observatory reports (*Astrophysical Journal,* July).

After the last sunspot maximum, which occurred in April, 1937, the number of freckles on the sun decreased very gradually. Because of the slow decline of this cycle, it might easily be supposed that the interval between the last sunspot maximum and the next one would be relatively long. The laws of probability, however, indicate that this interval will be shorter than average, Dr. Gleissberg reports.

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ORDNANCE

"Crocodile" Throws Fire As Far as 450 Feet

➤ THE SECRET 41-ton "Crocodile" flame thrower that shoots a geyser of fire over 450 feet to produce fierce and persistent flame in the nooks and crannies of pillboxes and trenches has been revealed by the British Army Staff.

Designed primarily for use in the European theater, the new flame thrower is fitted to a standard heavily armored Churchill army tank with a controlled armored fuel-carrying trailer hitched on behind. The trailer can be jettisoned if necessary. The "Crocodile" uses a special new type of fuel, shooting a flame spray through a powerful gun. The flame thrower does not interfere with existing armaments.

Also revealed were two other flame-throwing devices, the Lifebuoy and the Wasp. The Lifebuoy consist of a ring-shaped tube, looking like a real lifebuoy, for carrying fuel, and another spherical container for compressed gas. These units are carried on a man's back. The flame is shot out of a gun in which there is a special igniting mechanism. The Lifebuoy has a shorter range than the Crocodile, only 150 feet. It is used by paratroops and infantry.

The Wasp is designed for use where a greater fuel supply and more mobile operations are needed than is possible with Infantry soldiers with the Lifebuoy. It has the longer 450 range, like the Crocodile, and is mounted on a universal carrier, or wheeled truck. The tanks of liquid fuel and compressed gas are protected from enemy fire by armor plating. The flame spouts from a gun projecting through the armor at the front of the truck.

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MEDICINE

College of Surgeons Again Cancels Annual Meeting

➤ THE ANNUAL clinical congress of the American College of Surgeons has been cancelled for the third year in succession as an aid to the war effort. The meeting this year was to have been held in Chicago, Oct. 24 to 27. More than 3,000 surgeons and some 2,000 hospital representatives usually attend these meetings.

In announcing cancellation of the congress, the Board of Regents released part of a letter from Major General Norman T. Kirk, Surgeon General, U. S. Army, stating:

"Naturally, we all like these meetings to be held and to attend them. However, from an official standpoint I must say we are needing more and more railroad transportation to move our battle casualties from the ports to our hospitals. And there are still many troops in the United States who require railroad transportation to ports in order to get them overseas. In addition, difficulty is being experienced in obtaining the necessary materiel to continue the battle. This means transportation for the raw materials that go into munitions and the shipping of these munitions to the ports after they are fabricated. Each month the need for this material overseas is increasing rather than diminishing.

"The war is far from won and I think we should all consider the war effort rather than the satisfaction of our individual desires."

Science News Letter, September 9, 1944

AGRICULTURE

Green Forage Is Dried Quickly by New Process

➤ A QUICK-DRYING method for forage of conventional, land-grown type is covered by patent 2,350,096, obtained by F. S. Chilton of Pompton Plains. N. J. His principal aim was to insure uniform rate of drying in the mass of thick, coarse stems and thin, friable leaves. This is accomplished partly by shredding the stems and partly by compressing all the material uniformly into what the inventor terms "matlets."

Hot flue gases directly from the furnace are used directly in the drying kiln. In the absence of oxygen, higher-than-ordinary temperatures can be used without scorching the forage, or even materially damaging its vitamin contents.

Science News Letter, September 9, 1944

MEDICINE

Blood Divides Seven Ways

From each pint of blood donated to the Red Cross, medical scientists can now extract seven weapons against disease and death.

By JANE STAFFORD

➤ FROM EACH pint of blood donated to the Red Cross for our armed forces, medical scientists can now extract seven weapons against disease and death.

The bloody seven are: 1. fibrinogen; 2. thrombin; 3. gamma globulin, the measles preventive; 4. isohemagglutinins, the blood grouping globulin; 5. alpha globulins, rich in the fatty substances of the blood; 6. serum albumin; 7. red blood cells.

Credit for making available the first six of these weapons goes to Dr. Edwin J. Cohn of Harvard University. Working under a contract between Harvard and the Office of Scientific Research and Development in a program initiated by the Navy, Dr. Cohn developed chemical methods for dividing blood plasma into these fractions.

Use of red blood cells, salvaged from plasma production for transfusion and for a wound-healing paste, seems to have occurred to a number of scientists at about the same time. Back in World War I, Dr. O. H. Robertson actually gave red cell suspensions rather than whole blood transfusions, according to a report in a 1918 issue of the *British Medical Journal*.

With the start of the present war, scientists abroad and in this country studied the possibilities further and a number of hospital blood plasma banks began salvaging their red cells. By the early part of 1943, Dr. Warren B. Cooksey of Detroit and Dr. William Thalhimer of New York had worked out methods whereby the red cells could be salvaged at the Red Cross blood donor centers.

Whole Blood Substitute

These salvaged red cells are used as a substitute for whole blood in treatment of some kinds of anemia, and their use has also been suggested for blood donors. Return of the donor's red cells would, it has been argued, enable him to make another donation sooner than would otherwise be possible.

Meanwhile, other scientists reported another use for salvaged red blood cells. Made into a paste, or dried and used as a powder, it has been found to speed healing of varicose ulcers, amputation stumps, infected and other kinds of wounds that are slow in healing.

The red cells for these uses are salvaged from the plasma which is needed in great quantities for saving our wounded fighting men from dying of shock. The plasma, as almost everyone knows these days, is the fluid part of the blood. For the armed forces, it has been dried and shipped in a flask with a companion flask containing distilled water for dissolving it before it is injected into the wounded man's vein.

The anti-shock action of blood plasma, however, can be accomplished equally well by the albumin which is in the plasma. This is a water soluble protein and is the largest component of the plasma.

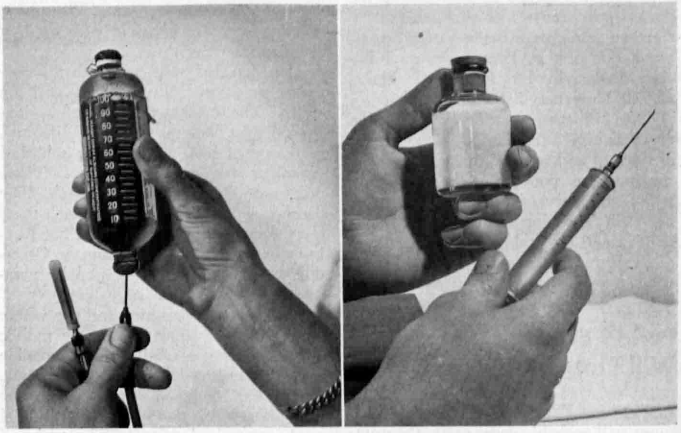
Fully a year before Pearl Harbor, the Navy Department's Bureau of Medicine and Surgery began a program of research into the possibilities of using albumin instead of plasma for fighting shock in wounded and burned men. The saving in space, always at a premium aboard ships and planes, was a prime consideration. Serum albumin will ordinarily go as far in saving life as plasma, though it occupies only one-sixth the space. This means a great saving in transport.

When the studies under Dr. Cohn's direction showed that albumin could be obtained from the plasma in large scale operations and that it was a safe, effective substitute for plasma, the Navy decided to adopt it and contracted for large scale procurement.

A foresighted clause was included in the specifications directing the manufacturers to store at low temperatures the plasma fractions which remained after the albumin had been removed.

More Valuable Material

Dr. Cohn's work had already shown the possibilities of obtaining other valuable medical material from these other fractions. First substance that separates out in the chemical treatment of plasma to obtain its albumin is fibrinogen. When acted on by the thrombin of the blood, fibrinogen is converted into fibrin, the essential portion of the blood clot. With both fibrinogen and thrombin available as by-products of albumin production,



ALBUMIN FOR SHOCK—This is the largest fraction to be obtained from chemical splitting of human blood plasma (left). It is ready for attachment to the transfusion apparatus through which it is given to a soldier. The usefulness of the fatty substances of the blood (right), has not yet been fully explored.

surgeons were given powerful aids for stopping bleeding during operations, especially on the brain.

Looking something like seafoam candy, fibrinogen is whipped into a foam and clotted. This fibrin foam is dropped into water containing thrombin and the resulting product, which looks like a damp white sponge, is applied to the bleeding point. Acting just like nature's blood clot, the fibrin foam swiftly stops the bleeding. And since it is a product of blood itself, unlike the surgical sponge, it can be safely left in the wound, since it is made completely from human blood proteins.

Surgeons have found other uses for the fibrin formed from the fibrinogen and thrombin. One is to speed skin grafting and make it more successful. Thrombin solution is sprayed over the area that will receive the graft. The grafts themselves are dipped into fibrinogen solution and and put on the thrombin-sprayed area.

The thrombin performs its usual office of converting fibrinogen into fibrin and the latter acts as a firm glue to hold the grafts in place. Stitches may not be needed, bleeding is controlled, and the grafting operation takes less time.

After the fibrinogen fraction has been removed from the plasma, other fractions are extracted. These contain globulins, chemicals in blood with different functions. One group, called the gamma globulins, have to do with resistance to disease germs. Among them is a special globulin for dealing with measles germs.

This globulin is formed in the blood in response to invasion by measles germs. Since almost every grown-up in the United States has had measles, the blood being donated to the Red Cross is a rich source of anti-measles globulin. Extracted from the plasma, the measles-immune globulin can be used either to thwart completely the invading germs or, as is preferred in children, to hold the invading germs at bay for a time.

Small Doses Effective

With a smaller dose of measles-immune globulin, the child will have a light attack of measles and be sick for a day or two. But when he recovers he may have developed enough of his own globulin to protect him against further attacks if he comes in contact with measles germs again.

This measles-immune globulin, now that sufficient supplies have been laid away for the use of the fighting forces, is to be distributed through the Red Cross and state health departments free to children all over the land. It is possible that globulins to (*Turn to page 172*)

Do You Know?

Some 20% more *tuna fish* is being canned this year than last.

A *"borrel"* to a Netherlander is his traditional gin-and-bitters.

Baby sea lions learning to swim gurgle and blow very much like a human baby in a bathtub.

Commercial fishing for *halibut* is under international regulation between the United States and Canada.

The *synthetic quinine* recently made by American chemists has the same lingering taste as the product of the cinchona tree.

Most sugars are sweet, but *lactose,* the sugar of milk, is not; it gives the bland distinctive taste to milk and milk products.

A Canadian-built *Mosquito plane* crossed the Atlantic from Labrador to North Ireland, a distance of 2,200 miles, in 6 hours 45 minutes.

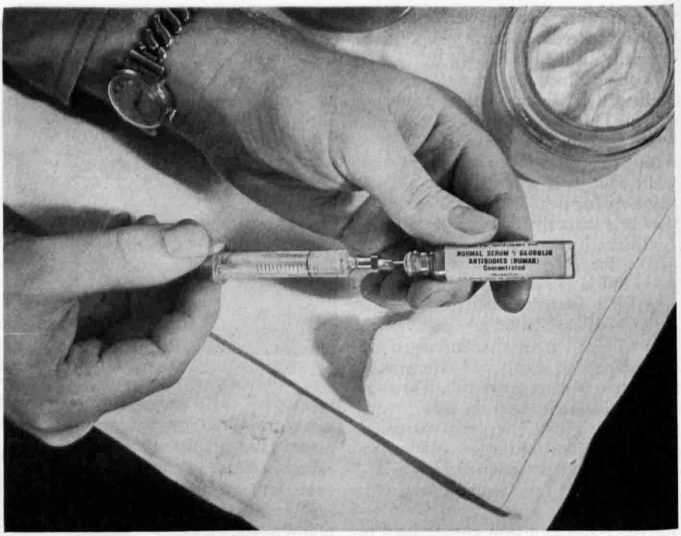
The smallest owls in the world are the so-called *elf owls* of the American southwest desert areas; although only approximately five inches in length they are perfect little owls in appearance.

Alcohol manufacturing plants will be largely in private hands after the war because the government's investment in the industrial alcohol industry is relatively small compared to private investments.

Plastic foam, lighter in weight and lower in heat conductivity than cork, rock wool or glass, has been recently developed; in its manufacture a molasses-like mixture foams without heat to 30 times its volume.

Experiments with *silkworms* in Brazil indicate that 10 crops of cocoons can be produced annually through a process of artificial refrigeration to furnish the low temperatures necessary in the life cycle.

Steel parts for airplane engines and other equipment are toughened to double their life expectancy by heat-treatment in ovens containing an inexpensive protective gas made by heating illuminating gas and air together; this prevents decarbonization.



PROTECTION AGAINST MEASLES—Is the normal serum gamma globulin seen in the ampoule from which the hypodermic syringe is being filled. Photographs by Fremont Davis, Science Service staff photographer.

From Page 171

give temporary protection against other diseases may also be found in the blood fraction that yields the measles globulin.

Another blood plasma fraction contains fatty substances of the blood. This is called the alpha globulin fraction. Its usefulness has not yet been sufficiently explored for scientists to be ready to say what it can do in the way of healing.

Science News Letter, September 9, 1944

MEDICINE

Beeswax as Drug Base

➤ A WAY of prolonging the action of penicillin, so that gonorrhea can be cured by one dose, has been developed by Capt. Monroe J. Romansky, Army Medical Corps, and George E. Rittman, Army Medical Department technician. Their studies, made at Walter Reed General Hospital in Washington, are reported (*Science,* Sept. 1).

Instead of giving the penicillin in a salt solution, they mix it with U.S.P. bleached beeswax in peanut oil. The beeswax-peanut oil mixture delays absorption of the penicillin so that it stays in the blood stream for seven hours, as compared with three hours when penicillin is given in salt solution.

Gonorrhea was cured in 64 patients who got one dose each of the beeswax-peanut oil mixture containing penicillin. Fastest gonorrhea cures with penicillin heretofore reported were accomplished in one day but required five large doses for each patient. These one-day cures were recently reported by U.S. Public Health Service officers. The patients treated for gonorrhea at Walter Reed were under the supervision of Capt. Robert J. Murphy.

The penicillin in beeswax-peanut oil keeps its anti-germ power at room, incubator and refrigerator temperatures for 30 to 62 days.

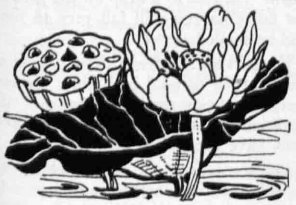
The new mixture should make penicillin treatment more convenient for both patients and doctors than the old style that required injections every three or four hours. It should also, it is indicated, make it easier to determine the optimum dose and the period of time necessary for treatment.

Science News Letter, September 9, 1944

BOTANY

NATURE RAMBLINGS

by Frank Thone



Flower Into Weed

SOME SENTENTIOUS botanist once defined a weed as "a flower that has got into the wrong place." That seems to fit very well the plight of the American lotus, one of the biggest and handsomest of water wildflowers, in the lakes behind the great Tennessee valley dams. There the lotus has become a weed because its dense masses of vegetation give protection to the breeding-places of malaria mosquitoes, so the lotus has to be kept down by wholesale mowing.

The story of the plants misadventures in the recently created lakes is told by Thomas F. Hall, TVA botanist, and Prof. William T. Penfound of Tulane University (*American Midland Naturalist*).

Lotus grew, on a relatively small scale, in the streams of the Tennessee valley before the dams were built. As the newly impounded lakes expanded, wide stretches of water of the most favorable depth opened up, and the lotus spread accordingly.

Two factors favored the rapid spread of the plant. First was the peculiar behavior of its big, acorn-like seeds as they ripen and germinate. When first shed, they sink to the bottom, but after a few hours they float to the top again and remain there for about half a day while sprouting goes on. Then they sink again. The twelve-hour floating period gives them a chance to drift into new areas to colonize.

Once established, a clump of lotus spreads very rapidly by means of the dense, fast-growing mat of rhizomes or rootstocks that forms in the muddy bottom. One small patch was observed to spread 45 feet during a single growing season—an average of nearly six inches a day.

Sudden changes in water level are unfavorable for lotus growth. A quick rise will submerge and drown the plants; a sharp fall collapses them and exposes them to death by drying.

However, since sudden changes in lake level do not occur at times most convenient for vegetation-control purposes, more direct means had to be sought. Most practicable has been an underwater mowing machine, which can cut from two to nine acres a day. Best time for cutting has been found to be just at the beginning of the blossoming season. The severed stems, leaves and flowers are either stranded or sink to the bottom in a few days.

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A ton a day of *citric-acid* crystals is the expected output of a new plant at Fazenda, Brazil.

A *chemical plant* to produce chlorine and caustic soda in Turkey will be in operation this year; another plant for making chrome chemicals is planned.

ASTRONOMY

Moon's Atmosphere

Cannot be greater than one-millionth that of earth, Soviet astronomer finds through use of a polaroid filter. May be entirely absent.

➤ IF ANY atmosphere exists on the moon, and most astronomers believe that the moon is completely devoid of atmosphere, it cannot have a mass greater than one-millionth that of the earth.

This upper limit for the amount of atmosphere which the moon could have is given by Dr. Otto Struve of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas (*Astrophysical Journal,* July). The estimate, he reports, was reached by Prof. V. G. Fessenkoff, director of the Astronomical Institute at Moscow University, after studying the light of the darkened portion of the moon through a piece of polaroid filter.

Some astronomers base their belief that the moon is without atmosphere on the absence of any obscuration or blurring of the formations seen near the edge of the moon. Others argue that tests up to the present time have not been sufficiently accurate to exclude the possibility of an atmosphere with a density at the surface of the moon less than about one ten-thousandth or one one-hundred-thousandth that of the earth.

Nor do other tests prove that a lunar atmosphere is impossible. Heavier gases could probably remain on the surface of the moon long enough for a very tenuous atmosphere to exist there at the present time.

Believing that the older methods of calculating were inaccurate, Prof. Fessenkoff attempted to develop a more refined method of estimating the amount of gas on the moon's surface by using a piece of polaroid filter. The new method is extremely simple, Dr. Struve points out.

With the filter Prof. Fessenkoff examined, at both first and last quarters, the faintly luminous area near the center of the moon, on the dark side of the dividing line between the illuminated and unilluminated parts of the moon's disk. There is considerable surface brightness in this area.

The light is caused mostly by an ordinary lunar halo, and perhaps by a small amount of light from the surface of the moon due to reflection of the sun's light from the earth. This background illumination should be almost completely unpolarized, states Dr. Struve.

Had the diffuse light been produced entirely by "twilight" in the lunar atmosphere, the polarization of the light should be complete. The Soviet astronomer found the surface brightness failed to decrease and increase as the polaroid was turned. The brightness varied, at most, only four per cent.

Assuming that the coefficients of scattering, per unit mass, in the atmosphere of the moon and in the atmosphere of the earth are the same, Prof. Fessenkoff found that the atmosphere of the moon cannot exceed 10^{-6} that of the earth.

Science News Letter, September 9, 1944

BOTANY

Milkweed Life Jackets Will Save Lives at Sea

See Front Cover

➤ TO KEEP 'em floating through the rest of the war in life jackets stuffed with 1,500,000 pounds of silky, white milkweed floss like that shown on the cover of this SCIENCE NEWS LETTER, gathered by Scouts, 4-H club members and other volunteers, is a wartime job for bands of picnicking school children this September.

Milkweed pod pickers can earn 40 cents and save a life by picking two bushel bagfuls of milkweed pods and turning them in, properly dried, to the state director of the campaign. The buoyant, waterproof floss in two bushel bags of pods, an hour's harvesting, is just enough to stuff one of the 1,200,000 life jackets the Navy needs to protect the lives of fathers, brothers and friends at sea. It will keep the survivor of a torpedoed ship afloat in a storm-tossed ocean for 140 hours.

When the seeds begin to turn brown, but before the pods have opened and the floss has been blown away, pod picking parties will be sweeping the country's fields and highways to fill up their brown mesh bushel bags with this year's crop of milkweed pods. Most groups will have to wait until the middle of September, whereas those in the far south are already beginning to harvest the crop.

For several weeks after the pickers have left, the fences for miles will be saddled with bags of the milkweed harvest hung out to dry. This must be done immediately after picking, the authorities warn. Thrown in a heap on the ground, the flossy harvest will fall prey to mold and be spoiled.

Farmers and highway departments are being urged to hold back their mowing machines from roadside stands of this traditional pesty weed until all the green pods have been harvested.

Before setting out, pod pickers will consult their local school authorities for further pointers on harvesting, and get the regulation bushel bags for their collection. The government will pay pickers 20 cents for a properly dried bag of pods.

The hollow, air-filled tube with a waxy coating, intended by nature to act as sail and parachute to spread the milkweed seeds far and wide, was recognized by Dr. Boris Berkman, a Chicago physician of Russian birth, as a sea-worthy substitute for Java kapok.

The substantial supply of Java kapok which we had on hand when the war started is dwindling to dangerous levels. Until the kapok plantations are wrested from Japanese hands, the common roadside milkweed must replace its botanical cousin from Java in the Navy's "Mae West" jackets.

Science News Letter, September 9, 1944

ENGINEERING

Wet Storage Batteries For Flashlights Perfected

➤ RECHARGEABLE miniature wet storage batteries for flashlights for industrial uses, recently developed and now thoroughly tested, are designed to replace the non-reusable dry cells, particularly where long continued and steady usage of flashlights is necessary. In actual use in a test period of 18 months by the B. F. Goodrich Company in large industrial plants, they are proved to have dependability, economy and long life.

The new wet battery requires a special type Mazda lamp, a 600 mil lamp in contrast with the 300 mil lamp used with dry cells. Actual wattage consumed with the wet battery is 50% more than with the dry type but a distinctly brighter light is given. The wet battery will outlast 400 dry cells, the Goodrich Company claims.

Science News Letter, September 9, 1944

• Books Off the Press •

AIR CONDITIONING AND REFRIGERATION—Burgess H. Jennings and Samuel R. Lewis —*Int. Textbook*, 517 p., illus., $4.50.

ARMORED WARFARE—An Annotated Edition of Lectures on F. S. R. 111., (Operations Between Mechanized Forces)—J. F. C. Fuller—*Military Service*, 89 p., illus., $1.

CHEMISTRY AND INDUSTRY OF STARCH, STARCH SUGARS AND RELATED COMPOUNDS—Ralph W. Kerr — *Academic Press*, 472 p., illus., $8.50.

FOURIER SERIES—G. H. Hardy and W. W. Rogosinski — *Cambridge*, 100 p., paper, $1.75. Cambridge Tracts in Mathematics and Mathematical Physics, No. 38.

GUIDE TO HIGHER AQUARIUM ANIMALS—Edward T. Boardman—*Cranbrook*, 107 p., illus., $2. Bulletin 21.

INFANTRY ATTACKS—Erwin Rommel— *Infantry Journal*, 265 p., illus., $3. Trans. from the German by G. E. Kidde.

A LIFE OF TRAVELS—C. S. Rafinesque—*Chronica Botanica*, 360 p., paper, $2.50. Vol. 8, No. 2.

MECHANICS VEST POCKET REFERENCE BOOK —John H. Wolfe and Everett R. Phelps—*Ziff-Davis*, 214 p., illus., $1.25.

PHOTOMICROGRAPHY IN THEORY AND PRACTICE—Charles P. Shillaber—*Wiley*, 773 p., illus., $10.

VOCATIONAL INTERESTS AND JOB ORIENTATION—A Ten-Year Review—Harold D. Carter—*Stanford Univ. Press*, 85 p., paper, $1.50.

Science News Letter, September 9, 1944

CHEMISTRY

Better, Cheaper Tires

May result from the development of a new process for mixing carbon black with rubber in liquid state. Cuts milling time by one-third.

➤ BETTER and cheaper tires are promised as a result of the development of a new process for mixing carbon black with synthetic rubber for the tire wearing surface.

The process was discovered and perfected by rubber chemists of the General Tire and Rubber Company. Essentially it is a method of mixing a carbon black slurry with the rubber in a liquid state.

It is a natural way of mixing rather than a mechanical way. In the older method of adding carbon black, rubber is made and then the black is ground into it in giant mills. The new process cuts milling time by one-third. In the finished rubber produced by this new method the carbon black is perfectly distributed throughout the material, it is claimed.

Tires made from the new homogenized rubber are superior to synthetic tires now being made because of this perfect mix. It will make possible continued, and perhaps increased, use of synthetic rubber even after natural rubber is available again because of decreased cost of production. Ultimately the process probably will be developed so that all milling will be eliminated. This is an expensive, time-consuming operation, and when no longer necessary the cost of production of tires should be considerably decreased.

In the new development the research men of the General Tire and Rubber Company collaborated with the chemistry department of the Carnegie Institute of Technology and with scientists of Purdue University.

Science News Letter, September 9, 1944

CHEMISTRY

New Cracking Unit For Small-Scale Refiners

➤ HIGH octane aviation fuels may be more plentiful after the war because of a new development in the design and operation of a smaller, less expensive unit for carrying out the necessary catalytic cracking process to obtain these fuels from petroleum products. Small refiners, who make up the greater part of the petroleum refining industry, will be able to use this new unit so that the production of 100-octane and other high-octane fuels will no longer be confined to big refiners with expensive plants.

The new development is a result of work by scientists of the Universal Oil Products Company, based on a fluid catalyst cracking process originated by the Standard Oil Company of New Jersey.

Two processes for cracking petroleum products to obtain high-quality fuels are catalytic cracking and thermal cracking. In either the original hydrocarbons are broken down to yield other products. A catalyst is a substance added to assist the process, but it itself remains stable and is recovered when the process is completed.

In catalytic cracking the relative yields of gases and the yields and types of hydrocarbons produced are different from those produced by thermal cracking. Higher percentages are obtained of those that contribute to superior anti-knock qualities.

The fluid catalyst cracking process employs an entirely new chemical technique. In it the catalyst is mixed with the hydrocarbon vapors as both pass to the reaction zone. In the older process the vapors are passed through a bed of catalyst. The fluid process is so flexible that it can operate at a great variety of cracking temperatures, giving the process the widest adaptability to produce aviation gasoline, toluene for TNT, or high grade motor fuel.

Science News Letter, September 9, 1944

Industrial music, continuous programs in factories during working hours, will require 26,000 musically trained broadcast directors, it is estimated; 80% of England's factories had such programs three years ago.

•New Machines and Gadgets•

❁ *SOUND RECORDINGS on film are made without processing and may be reproduced instantaneously by a new instrument that consists of an electromagnetic dual-purpose head, for recording and play-back, a sapphire stylus, motor and controls. The sound track is cut as in the ordinary wax record.*

Science News Letter, September 9, 1944

❁ *HARDWOOD plywood packboards are used by American soldiers to carry food and supplies to combat men where delivery by foot is the only possibility. The board is a shallow channel of plywood 24 inches long and 15 inches wide with a detachable shelf, and is carried by two adjustable straps over the shoulders.*

Science News Letter, September 9, 1944

❁ *DESK pencil holder is made of three sponge-rubber slabs with relatively stiff rubber skins between, all held together with cement. Tapering holes in the outer slabs end in a cylindrical hole in the center slab into which pencils may be inserted. Pens may be stuck directly into the rubber sponge.*

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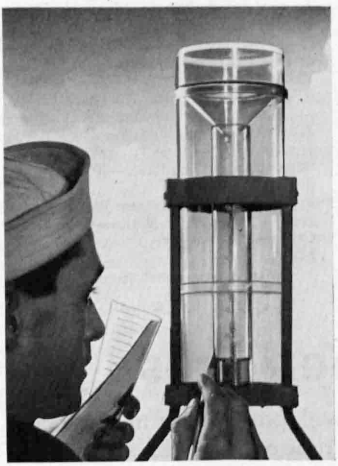
❁ *RAIN GAGES made of a shatter proof transparent plastic are used by the American Army. The 14-inch gage shown in the photograph, four inches in diameter, is easily read. The plastic, stable*



under varying temperatures, makes the gage accurate.

Science News Letter, September 9, 1944

❁ *SIMPLE STENCIL duplicator contains two hinged flat wooden plates, one to serve as a platen pad, the other as an ink pad. In use the letter paper is placed on the platen pad and the ink pad plate with attached stencil is pressed down against it.*

Science News Letter, September 9, 1944

❁ *GARDEN HOE with two opposite blades on the same handle may be used as the ordinary hoe and, turned over, as a scraper for leveling or for weeding and thinning row crops. A specially bent single piece of sheet metal forms both blades and the head for the handle attachment.*

Science News Letter, September 9, 1944

❁ *MEAT basting and skewering device, in an improved form, automatically sprinkles the flavored juices from the bottom of the roasting pan over the top of the roast, operating in a manner similar to the familiar coffee percolator. The meat is impaled on the skewer tube, which has a pointed top.*

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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 224.*

Question Box

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ASTRONOMY

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