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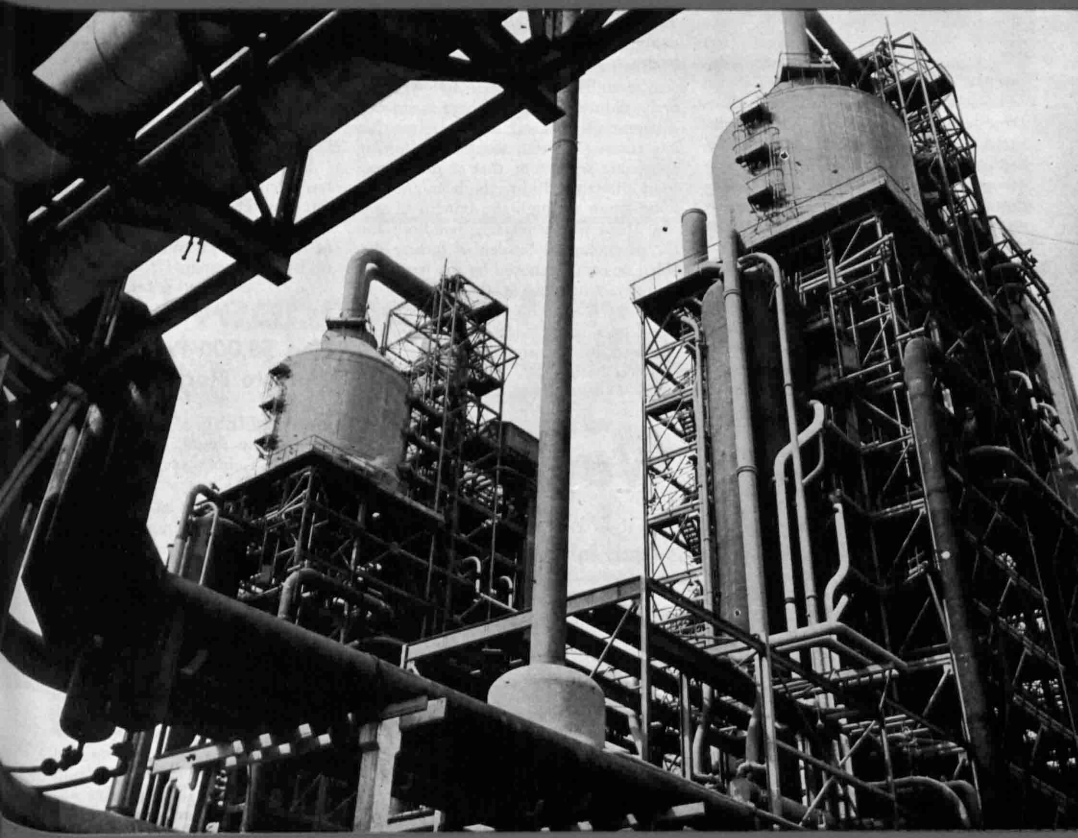
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 21, 1945



Catalytic Cracker

Page 252

A SCIENCE SERVICE PUBLICATION

MEDICINE

Brain Hemorrhage Cause

High blood pressure and blood vessel disease are what produce this commonest of "cerebral accidents." May occur quite suddenly.

➤ BRAIN hemorrhage, from which President Roosevelt died, is the commonest of what physicians call "cerebral accidents." The layman calls it a stroke of apoplexy or a paralytic stroke, since paralysis on one side of the body often persists in patients who do not die of the hemorrhage.

High blood pressure and blood vessel disease are the chief causes of the condition. The exact mechanism by which vascular and arterial conditions, such as those leading to death from brain hemorrhage or from coronary artery trouble, terminate is not known. These blood vessels are where the strain comes. Undoubtedly many physicians, knowing the strain President Roosevelt had been under and the effects of such stress on the blood vessels of heart and brain in a man of his age, had been wondering how his would stand the strain.

The immediate cause of brain hemorrhage is a rapid rise in blood pressure. This may result from severe muscular exertion or from coughing or sneezing. The immediate sequel of the hemorrhage into the brain is the apoplectic seizure, when the patient faints or loses consciousness. Most patients are said to have premonitory symptoms, as dizziness or a sense of pressure in the head. The patient may seem to be under low power. The seizure may, however, occur suddenly in a person in apparently perfect health.

Although paralysis often follows hemorrhage into the brain, there is no evidence at all that infantile paralysis has any connection with the kind following apoplectic seizure or that it predisposes to it directly. Indirectly it might add some strain through the burden of getting about with a physical handicap and the psychological burden of feeling disabled or being annoyed by the handicap. Counteracting this is the fact that in President Roosevelt's case much exertion could be avoided since people could understand his refusing to take part in many activities.

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PHYSICS

X-Rays Alter Wavelength

By irradiation with X-rays it is possible to regulate the frequency of quartz crystals used in radio. Changes reactivity also.

➤ PRACTICAL applications of a new basic discovery, in which X-rays and other radiations are used to alter the elastic constants and chemical properties of quartz and other crystalline substances employed in radio and radar oscillator-plates to regulate wavelength, were demonstrated to a group of scientists at the Reeves-Ely Laboratories by Dr. Clifford Frondel, head of the company's research division.

Another interesting application of X-ray found in the course of Dr. Frondel's work is its use in changing the color of many gem stones, and some colorless stones of little value may be given intense hues. Diamonds have been colored green and golden brown with deuterons, but the cost of the treatment is large and the results frequently unpredictable, so that the method is not yet of much commercial value.

Dr. Frondel discovered recently that X-rays, and certain other types of radiation cathode, or electronic, rays and deuteron beams from a cyclotron, when allowed to pass through plates cut from certain crystalline substances, alter the mechanical strength of the material. There are accompanying changes in the color of the crystals, and their chemical reactivity also may be altered.

The X-rays or other radiation cause an interchange of electrons, Dr. Frondel explained, between the atoms composing the crystal and, by thus altering the interatomic bonding forces, change the elastic constants of the material. The effect is similar to the action of visible light in blackening photographic emulsions.

The discovery is of great theoretical interest from the viewpoint of pure science, but has already been put to practical use in the war effort. Millions of tiny plates of crystalline quartz, the size and shape of postage stamps, are used by the armed services as oscillator-plates to control radio communications. The frequency at which the radio will transmit or receive, he reminded his hearers, is controlled, in common types of crystals, by the thickness of the plate. They are brought to proper thickness by mechanical means, and the process is an extremely delicate operation.

By using the new X-ray irradiation technic, oscillator-plates can now be adjusted rapidly and easily, he said, to a desired frequency with a precision hitherto impossible.

Irradiation with X-rays, he stated, also has been found to greatly modify the rate of solution and the chemical reactivity of crystals, and a whole new field of X-ray photochemistry is being opened up by his research.

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BIOCHEMISTRY

First $5,000 Passano Award Goes to Biochemist

➤ THE FIRST $5,000 cash award of the Passano Foundation will go to Dr. Edwin J. Cohn, professor of biochemistry at Harvard University.

Dr. Cohn's work on blood has resulted in isolation of five fractions now used in medicine and surgery. These are: albumin, now used to fight shock in the war wounded; immune globulin for protection against measles; fibrinogen from which is made fibrin film and fibrin foam used in surgery; isohemagglutinins for typing blood to be used in transfusions; and a fifth substance whose usefulness has not yet been fully exploited.

The Passano Foundation was established in 1944 by the Williams and Wilkins Company, medical publishers, to aid in any way possible the advancement of medical research, especially research that bears promise of clinical application. To encourage such research the award has been established as one of the Foundation's activities.

Choice of Dr. Cohn as first winner of the award resulted from a nationwide poll among leaders in medical science. Presentation will be made on May 16.

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Science For Peace--Roosevelt

No more timely pronouncement for the future has been written than these undelivered words of Franklin Delano Roosevelt, prepared for radio delivery on Jefferson Day, and released for publication after his death. This excerpt is printed in commemoration.

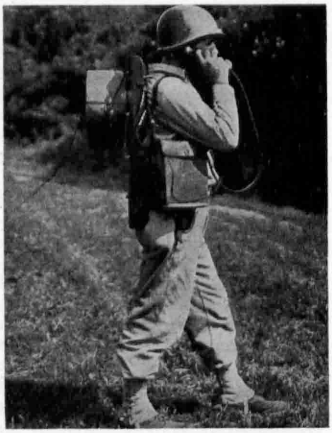
But the mere conquest of our enemies is not enough.

We must go on to do all in our power to conquer the doubts and the fears, the ignorance and the greed, which made this horror possible.

Thomas Jefferson, himself a distinguished scientist, once spoke of "the brotherly spirit of science, which unites into one family all votaries of whatever grade, and however widely dispersed throughout the different quarters of the globe."

Today, science has brought all the different quarters of the globe so close together that it is impossible to isolate them one from another.

Today we are faced with the pre-eminent fact that, if civilization is to survive—we must cultivate the science of human relationships—the ability of all peoples of all kinds, to live together and work together, in the same world, at peace.



WIRE DISPENSER—New equipment by which combat wire in coil form may be laid by airplane or vehicles or paid out by bazookas and rifle grenades without the use of reels, has been developed by the Signal Corps. An important advantage of the method is the fact that wire can be laid manually by mountain, ski or ground troops without the use of reels or auxiliary equipment.

MILITARY SCIENCE

New Weapons for May

That is when the Japs will feel the force of many new devices developed by the Army with the aid of OSRD and NIC. Mines are radio-controlled.

FOR THE little men of the Mikado's armies the expression "Beware of the Ides of March" might well be changed to "Watch out for new American weapons in May". It is in May that the Japs will begin to feel the full force of many new weapons, until now secret, to be used by the Army Service Forces. On Iwo Jima they got the first taste of 7.2-inch chemical rockets fired at intervals of 3/10 of a second from a new 24-tube rocket launcher that can be mounted on the back of a truck; soon the Nips' jet-propelled planes will be shot down with a new vibrationless computing gunsight that can direct gunfire on a plane moving 700 miles an hour and a new 105 millimeter gun, the biggest caliber gun using a completely assembled shell, will hit targets as far as 27,000 yards away at the rate of 20 shots a minute. The gun can be pointed by handlebar controls.

Enemy guns, well hidden by clumps of trees or behind bushes, can now be ferreted out by a new sound locator for enemy mortar and machine gun emplacements that can spot a gun in the undergrowth better than a good hunting dog can spot a partridge. Weighing only 45 pounds so that it can easily be carried, the self-contained direction finder consists of a highly directional microphone, that picks up the sound of gunfire anywhere within 1,500 yards and transmits the location of the gunfire to the screen of a cathode ray tube where an arrow-like line appears pointing to the location of the gun. To further assist gunners, the screen is graduated in mils, making possible precision shooting.

All of these devices were developed by the various divisions of the Army Service Forces, with the aid of industry, and such government agencies as the Office of Scientific Research and Development and the National Inventors Council.

Soldiers now just dial the enemy's number when the Axis attacks across one of our mine fields, using a new radio-controlled mine detonator that eliminates wire-connected devices. The system consists of a radio control panel on which a dial, similar to that used on telephones, is mounted. In the mine field itself, expendable radio receivers are attached to each of our mines, each set to electrically detonate the mine when a pre-determined number is dialed on the control panel. The whirling flail chains of enemy tanks can beat the earth over one of our land mine fields or they can shoot it full of rifle bullet holes without setting off one radio-controlled mine. Then when the Japs think the field is clear, and they send in their troops, the Corps of Engineers start dialing numbers that set off the mines, resulting in heavy enemy casualties. The same system can be used for mines in water.

Moving targets are no longer a problem to bazookiers, now that the bazooka has been equipped with a new type of sight that is larger and permits better vision than the type formerly used. The bazooka is lighter in weight, four pounds less than before, now that the tube is being made of aluminum alloy and designed for better balance. The weapon is split in two parts for easier carrying.

Still another rocket launcher will unleash 24 4.5-inch rockets in 12 seconds against an enemy as much as 5,250 yards away, hitting with a blast that is better than a 105-millimeter shell. Set off by an electric spark, the rockets can carry either

high explosives or chemicals. The launcher itself is mounted on a two-wheeled truck, and the rockets are muzzle-loaded into three banks of eight rockets each by a five-man crew. The rockets themselves are spinners, each having eight vents in the tail set at an angle so that when the hot gases escape they cause the rocket to spin. This spinning motion stabilizes the rocket in flight and takes the place of fins or rudders.

Completing the line of shells for use with the popular 105-millimeter gun, the Ordnance Department has developed a new flare for turning night into day. Shot high in the air, it automatically ignites a mixture of magnesium flakes in asphalt and suspended by a parachute contained in the shell, it descends at the rate of 35 feet a second. The flare burns brightly for 43 seconds.

So that airmen can easily see smoke signals which might otherwise be hidden by trees, a new smoke flare has been developed that can be shot from a standard rifle launcher above the tops of trees. When it falls the smoke grenade hooks onto the branches of tree-tops, where the smoke continues to pour forth, giving a signal that can readily be spotted from an airplane.

The Signal Corps has lifted the veil of secrecy from two of its electronics devices. The first is a lightweight mobile unit that controls the movement of anti-aircraft searchlights. Three operators, viewing as many meters, get the range in yards, altitude in feet and elevation in miles of any enemy airplane. The antennae, looking like an enlarged version of a cone-shaped portable electric heater used in homes and offices in winter, rotates at seven revolutions a minute on top of the movable detecting control box. The searchlight, which may be many feet from the set, is synchronized with the antennae so that when the set picks up the enemy plane the searchlight also spots it.

The waves that are sent out, hit the target, and bounce back to the receiver, revealing the location, are responsible for the detection of aircraft up to 110 miles away in a new portable electronic device for use on beachheads. Weighing only 450 pounds complete, and powered by a gas-driven generator that produces two kilowatts, the set is rigged up on a beach, and operators see planes on the calibrated screen as bright blobs of light. Once a plane is spotted, American guns shoot it down.

Not all the new equipment revealed for the first time is designed to deal death to our enemies. The ice cream "casket", for example, turns out 3,000 half-pints of rich ice cream in three hours to give our fighting men a refreshment they enjoy. It takes only six minutes to produce 2.5 gallons of ice cream. A completely self-contained unit, it not only manufactures ice cream but stores it in a big 40-gallon cabinet. Casket-like bars along the sides of the long box make it possible for 12 "pallbearers" to carry the unit.

Railroad locomotives are now shipped by air, boxed in nine packages and weighing 35,000 pounds. Already in use in Burma on the Mitchener to Rangoon rail line, the pint-size locomotives can pull seven standard freight cars at 12 miles an hour on level track. A four-cylinder gas engine develops 35 horsepower. There are four speeds to choose for operation.

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MEDICINE

Mites Carry Disease

➤ THE VIRUS of equine encephalomyelitis, popularly known as horse "sleeping sickness," has been isolated from chicken mites by Dr. S. Edward Sulkin, of Southwestern Medical College. The discovery helps solve some of the mystery of how this disease spreads. (*Science*, April 13)

Both Western and Eastern types of the horse encephalitis virus attack humans, sometimes fatally. Antibodies to these viruses and to that of St. Louis encephalitis, epidemic in the human population of that city some years ago, have been found in the blood of chickens. The presence of the antibodies shows that the fowl were infected by the virus.

Mosquitoes and ticks are known to be capable of carrying the virus and mosquitoes are believed to be the agents that spread the disease among humans. Barnyard fowl apparently constitute a reservoir of infection, but scientists have wondered what kept the infection going among the chickens between epidemic periods.

A blood-sucking vector which does not bite man, was the answer that occurred to Dr. Margaret G. Smith and associates of Washington University School of Medicine, St. Louis. So they sought for one and last fall they reported finding the virus of St. Louis encephalitis in mites collected from chickens in the St. Louis area.

Now Dr. Sulkin, following up that report, finds the Western equine encephalomyelitis virus in chicken mites. These blood-sucking relatives of spiders and ticks apparently pass the viruses of at least two kinds of encephalitis from chicken to chicken, to keep alive the dangerous reservoir of the disease.

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CHEMISTRY

Waterproof Matches

Developed for use of troops in tropics and on beachheads, they will light after being soaked in water for eight hours.

MATCHES which will light after being soaked in water for eight hours have been developed for the use of our troops in rain-plagued tropics and for beachhead operations.

The matches look like ordinary kitchen matches and, if the box in which they come is lost, will light when scratched on a stone or a shoe. The formula for the transparent, heat-resisting coat which makes the matches waterproof has not been made public, but both this and the manufacturing process, which makes it possible to produce cheaply these matches in large quantities, have been made available to the government by the Diamond Match Company for the use of competitors.

Announcement of the creation of successful waterproof matches has been withheld for more than a year for military reasons. Production began on the second anniversary of Pearl Harbor, and more than 10,000,000 matches are being manufactured each day at Oswego, N. Y. The new matches have been in use in the southwest Pacific and in India since early 1944.

Most of these matches, which can withstand innumerable drenchings, are shipped to the Army, Navy and Marines in the same size as ordinary strike-anywhere matches. Large quantities, however, have been made in midget size for emergency kits. Midget matches are one and one-sixteenth inches long, half the length of the kitchen match, and are intended as part of the equipment for life rafts and for airmen forced down at sea.

The search for a practical waterproof match has gone on intermittently for more than a century since the first waterproof match—which proved unsuccessful—was patented in 1837. Early attempts involved the use of varnish or Irish glue. While they succeeded in producing match heads which disintegrated more slowly in regions of high humidity, the matches could not be submerged in water for any length of time or repeatedly soaked without losing their efficiency.

The first real step toward the waterproof match came in 1911, when William A. Fairburn, then chief engineer and now president of the company, developed a formula which substituted sesquisulphide of phosphorus for the phosphorus which had been used for nearly 80 years in matchmaking.

The phosphorus was easily affected by moisture and was highly poisonous. The Fairburn formula, which Diamond gave to its competitors to protect the lives of workers and consumers, made the matchhead more resistant to water and to humidity.

This formula was revised about five years ago at the request of the U. S. Army to make matches for troops stationed in Panama where the long rainy season makes ordinary lights useless. While the Panama match was not waterproof, it had enough cohesiveness to keep it from falling apart in wet weather and it would light after soaking if carefully dried.

When it became apparent that a great part of the present war was to be fought in swamp or ocean, and from foxholes filled by rains, a request came from the Quartermaster General for a match that would survive drenchings when troops waded ashore from landing crafts and function after being stored in damp climates.

The formula for a waterproof coat was developed by Raymond D. Cady, chief chemist, but problems of manufacture arose. The coating was to be applied to kitchen matches, which are normally given five baths and dips during manufacture to prevent afterglow, insure ready ignition and put the bulb and eye on the splint of wood. Waterproofing meant an additional dip and necessitated revision of the giant machines that make matches on an endless chain.

It was also discovered that if the matches were dragged through a bath of waterproofing, as in other processes in the manufacture of matches, they were not really waterproof. The fluid was so thick that the wake created by passage of the matches would not close up in time to protect the rear of the matches. Hanging upside down from plates, the matches are now plunged vertically into the bath.

The ordinary kitchen match takes 60 minutes to manufacture, from block of wood to box, while 90 minutes are needed to make the waterproof match. The same number—over a million—are manufactured each hour.

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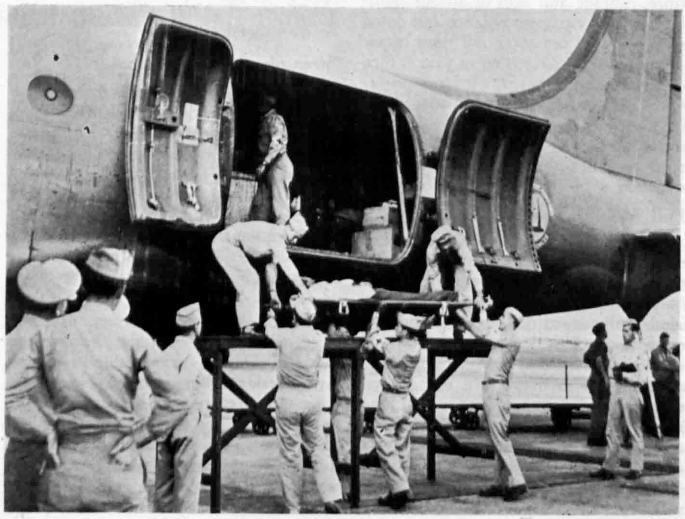

***SKY AMBULANCE**—American casualties are being unloaded from this C-47 after swift flight from Saipan to Hawaii. Air evacuation of wounded is described by military officials as one of the five greatest lifesaving measures of modern military medicine. Official U. S. Army Air Force photograph.*

GENERAL SCIENCE

Confidence Necessary

Civilization depends upon continued international trust and cooperation among scientists of all free nations after the war.

Sir Henry Dale, president of the Royal Society of London, and Dr. Frank Jewett, president of the National Academy of Sciences, joined voices on April 14, as guests of Watson Davis, director of Science Service, in international broadcast on the CBS program "Adventures in Science," discussing the future of science after the war when the policy of secrecy can be abolished. In his introduction Mr. Davis said:

"On this day of national mourning for a great President, it is altogether fitting that we look forward to the future and its problems—problems that Franklin Delano Roosevelt did so much to solve. It is a fitting day for scientists of nations united for freedom to plan to put science at the service of our future now being won so surely and with such cost—a future to which our late President gave his all."

By SIR HENRY DALE

President, Royal Society of London

➤ WITH VICTORY in both sides of the world now so clearly in prospect, we acknowledge first with sorrowing pride our measureless debt to the sacrifice, courage and skill of all our fighting forces of our great alliance, but doing so, we should not forget all their heroic devotion might have been in vain if men of science had found no effective answer to the preparations which enemies to our freedom had for years been making in secret, perverting science from its proper aims to build their plans for our destruction.

Full Mobilization

Our United Nations have been able to meet this menace only by full conscription of all our scientific resources for war in defense of our common hopes and ideals. All played their part. In the scientific and technical triumphs Soviet Russia vied with the Red Army's tremendous achievements in battle. We men of science in Britain can never forget that long before the United States came into open alliance with us at a time when we stood alone in desperate need and danger, your men of science already had joined hands with ours in brotherhood and intimate collaboration. This became ever closer and more fully organized as all the joint resources of the United States and the British Commonwealth were being devoted to the defeat of our common enemies. Some day it will be possible to make clear the details of the contribution which this scientific fellowship of the English speaking peoples made to defeat the German and Japanese attack on the world's freedom.

Now as we breathe again more freely, men of science may well begin to look beyond the end of the war and consider which of its lessons they can carry forward into peacetime in which science returns to its proper and beneficent aims. Many discoveries and inventions which war promoted will find ready and even startling applications in peacetime. Safety and speed of transport about the world; the idea of making machinery fit for man instead of expecting man to adapt himself to machinery; control of insect pests, treatment of tropical diseases, and wound infections, the uses of penicillin and its production for world needs—about all these, the collaborative effort stimulated by urgent demands of war have taught us more than we might have learned in decades of peace. And these are merely a selection of things which can already be mentioned.

Strengthen Cooperation

Is it not clear then, that there is one thing above all others which must carry forward from our wartime scientific experience into the times of peace—a spirit of close comradeship between the scientists of our two nations. Surely we must cherish and strengthen this with every influence we can bring to bear as one of the most beneficent by-products which war can offer in mitigation of the disasters it has inflicted.

I think we should beware of any tendency to perpetuate in peace the wartime restriction of this comradeship in science to English-speaking peoples. No special knowledge is needed or unusual gift of inspiration to see that the future of our civilization may well depend upon our success in spreading and establishing among scientists of all free nations a spirit of confidence and frank cooperation such as the urgency of war's demands have fostered between those of our own. Experience must show how much we can usefully retain, in peace, of the organizations which our nations evolved in war to facilitate our joint effort. But whatever we retain must be purged of the secrecy which for men of science has been among war's repulsive necessities. In any case it is not organization alone which will count for the future of the world, but rather the spirit and determination with which we strive to build a new world community of men of science working with a united purpose for the good of all mankind.

By DR. FRANK JEWETT

President, National Academy of Sciences

➤ ALL men of science, both fundamental and applied, in the United States will subscribe wholeheartedly to Sir Henry Dale's opening sentence. We do acknowledge with sorrowful pride our measureless debt to the sacrifice, courage, skill and devotion of our fighting forces of the far-flung battle fronts of land, sea and air. This is poignantly true today when we here in the United States are in deep mourning at the sudden death of President Roosevelt. He was not only the commander-in-chief of our armed forces but more was our most valiant leader in the fight for the preservation of all that we cherish of the things that go to make up a decent world in which free men and women can live decently and happily. He gave his life for a great cause just as truly as have the millions who have died for it in battle or by bombing; the horrors of prison camp or the inhuman cruelties of a depraved and degraded philosophy. Further, we are not unmindful of the fact that much which he and they have been able to accomplish by way of bringing this dreadful scourge toward a successful conclusion was made possible by the contributions of men of science. Many of these contributions and those who made them will never be widely known. Nor are they ever likely to be widely acclaimed. They lack the glamour of a flaming battle line and in most instances the appeal to sympathy and compassion which accompany death, and the suffering of wounded or stricken men.

To those of us who have been participants in the United Nations battle of science, several things stand out with crystal clarity and are a hopeful omen for the future of that peaceful way of life we have sought to preserve against the onslaught of the totalitarian powers which have sought to destroy it and us.

Adaptability Important

First is the unanimity with which men of science have rallied to its defense and their willingness to do whatever task

there was to be done and at whatever it entailed of personal inconvenience or sacrifice. Second, their adaptability to the urgent conditions of war—fundamental scientists abandoning for the time the quiet of their laboratories and their scholarly quest for new items of knowledge to become the most practical of industrial research men or engineers. Third, the evidence everywhere of the breadth and soundness of scientific training in a world of free intercourse in a society of free men—chemists becoming physicists; biologists taking on the creative work of chemists; mathematicians making great contributions in fields which yesterday were *terra incognita*. Finally we have had demonstrated as never before the power for achievement which resides in scientific teamwork when organized on a huge scale and with each participant intent on a single objective.

Sir Henry has mentioned some of these achievements. There are legion others. While, as he pointed out, much that has been done will benefit us in the years ahead, it is sad to contemplate how much we have been forced to do by way of destroying in order that we may insure a decent world for our children.

Our hope is that we of science in the postwar years can profit from what we have learned in war and make of science a far more powerful instrument for good living than we have ever known. We certainly can if we have the courage and will to do it; if we can find a way to preserve fruitful cooperation without retention of the shackling restraints of a wartime necessity. To do this, men must be free not only to act and speak but more, free to think.

The task ahead is a hard one. Whole sectors of fundamental science have been essentially neglected for more than half a decade. Advanced training has ceased and what is even worse, the stream of broad undergraduate instruction has practically ceased to flow. It will take time to rectify these deficiencies and insure to us a balanced harvest of scientific fruit.

It is not an impossible task, however. Rather it is a matter of the spirit and of belief in the value of science which will lead men of good will to work together in peace as they have in war.

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MEDICINE

Eye Bank Started

From ten to fifteen thousand blind persons may see again by drawing corneas deposited in this unique institution.

➤ FROM 10,000 to 15,000 blind persons in the United States may have a chance to see again through the activities of the Eye Bank for Sight Restoration, Inc., New York, the organization states in announcing its incorporation and officers.

Those who will benefit will be persons blind because of defects in the cornea of the eye. The cornea is the transparent tissue in front of the eye lens. As far back as 1789 surgeons have tried to relieve this type of blindness by substituting transparent material such as a piece of glass for the cornea that had become opaque.

In recent years successful methods of grafting corneas have been developed, but lack of corneas for grafting has been a handicap. The material may be taken from a living or a dead person but must be used within a short time after removal.

Efforts to obtain a supply of corneal tissue for the transplantation led in 1941 to formation of the Dawn Society under the sponsorship of the International Order of Good Templars. Members of the Society pledged their eyes at death to this society for the use of the blind.

An Eye Bank was established at the New York Hospital last year. The newly formed Eye Bank for Sight Restoration is national in scope and is affiliated with 22 leading New York hospitals.

"The purpose of the Eye Bank," its executive director, Mrs. Henry Breckinridge, states, "is to make available a supply of fresh or preserved corneal tissues wherever and whenever needed by hospitals and surgeons who are qualified to perform the corneal graft operation. We also plan to extend, through scholarships and fellowships, the knowledge and skill required.

"One of our most important objectives will be to discover a method for preservation of the corneal tissue over a longer period of time than is now possible. At the present time, the corneal tissue taken from a living or dead person may be stored for only three days before it is transplanted."

The 20 ophthalmologists who are serving in an advisory capacity are: Lt. Col. M. Elliott Randolph, Valley Forge, Pa.; Harry S. Gradle, Chicago, Ill.; Alan C. Woods, Baltimore, Md.; Theodore L. Terry, Boston, Mass.; William L. Benedict, Rochester, Minn.; Lawrence T. Post, St. Louis, Mo.; Col. Derrick Vail, Cincinnati, Ohio; Dohrmann K. Pischel, San Francisco, Calif.; Edmund Spaeth, Philadelphia, Pa.; Cecil S. O'Brien, Iowa City, Iowa; Purman Dorman, Seattle, Wash.; R. Townley Paton, David H. Webster, Herbert B. Wilcox, John M. McLean, John H. Dunnington, E. Clifford Place, Daniel B. Kirby, Conrad Berens, Ernest L. Stebbins, all of New York City.

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CHEMISTRY

Common Salt Used in Making Ethyl Chloride

➤ ETHYL CHLORIDE, the chemical used to make tetraethyl lead that takes the knock out of gasoline, will soon be in production by a new process in a plant under construction in Baton Rouge, La. The process, developed by the Ethyl Corporation, yields ethyl chloride by reacting chlorine with waste products from one of the corporation's other ethyl chloride plants, also located at Baton Rouge. The chemical has many uses in addition to its service in gasoline and in high-octane aviation fuel, several of which are connected with the war effort.

The chlorine for the new process is produced by breaking common salt electrically into its two parts, sodium and chlorine. The sodium produced is used in the manufacture of tetraethyl lead after it is combined with metallic lead to form a lead-sodium alloy.

The two previous processes for producing ethyl chloride are based on the hydrochlorination of alcohol, and on the hydrochlorination of ethylene. These materials are both in the shortage category because of the tremendous demand for them in making detonating powders, butadiene for synthetic rubber, and other war essentials.

Ethyl chloride is used in dentistry as an anesthetic on abscessed gums, and for general anesthesia in short operations, with the advantage of no after-effects. Chemical applications include production of ethyl cellulose, which is the basis for certain plastics, and catalyzing synthetic rubber. It is also used as a constituent of cognac essence, and sometimes in mechanical refrigerators as a refrigerant.

Science News Letter, April 21, 1945

BIOCHEMISTRY

Anti-Germ Activity Found For Anti-Clot Chemical

➤ DICUMAROL, anti-blood clotting substance, also possesses marked anti-germ activity, Dr. Andres Goth, of Southwestern Medical College, reports. (*Science,* April 13)

Growth of staphylococci, streptococci, anthrax bacilli, undulant fever germs and diphtheria bacilli was stopped by dicumarol.

The anti-germ activity was not stopped by chemicals with vitamin K activity which do block the effect dicumarol has in slowing blood clotting.

Dicumarol was first isolated from spoiled sweet clover. If it could be shown that the spoilage of sweet clover was due to the action of microorganisms, Dr. Goth points out, it would be possible to consider dicumarol one of the naturally occurring antibiotics, such as penicillin.

Science News Letter, April 21, 1945

PSYCHOLOGY

Research Aim to Find Way of Picking Officers

➤ A COMBINATION of Sir Galahad and General Lee who looks like Douglas MacArthur.

This is the picture of the ideal officer, as viewed by high-ranking military men, Prof. Henry E. Garrett, of Columbia University, told fellow psychologists in his presidential address at the meeting in New York of the Eastern Psychological Association. Occasionally, he said, an officer will recall an efficient company officer who was unprepossessing in appearance and not highly gifted in personality, but he was regarded as an exception.

Prof. Garrett has been testing this romantic picture against the hard reality of successful combat officers who have distinguished themselves in the field in this war, he reported. The following picture, the study shows to be nearer to an accurate portrait of officers selected by company commanders from 14 different divisions as "best."

He is between the ages of 23 and 29 (neither very young by Army standards nor very old). He has three years or more of college training and in civilian life was likely to have been a professional man or preparing for a professional career. His academic rating in school may have ranged anywhere from very good to poor, but in leadership ability he was in the first half of the class. He has been an officer for somewhat more than a year. He has a medium GCT (General Classification Test) score—between 120 and 140.

The worst combat officer—also as selected by company commanders on the basis of actual performance in the field—is likely to have attended only high school or grammar school. His GCT score may be low, medium or high, but he is more likely to have a score below 120 or above 140 than is the best officer. He may have had school marks anywhere from very good to very poor, but in rating on leadership he was in the low half of the class. He has been an officer less than a year.

Ratings by superior officers of both best and worst officers revealed some interesting differences between them. Best officers are rated very high or high in each of six traits. Worst officers are rated poor or very poor on the same traits.

Physical ability is the trait on which the greatest difference between best and worst occurs. Knowledge of the job, control over men were next best for distinguishing the two groups. Then followed relations with other officers and emotional steadiness in combat situations and finally personal habits such as irritating or pleasant ways.

Science News Letter, April 21, 1945

WILDLIFE

Bobcats Aid Farmers by Helping Control Rabbits

➤ BOBCATS aid farmers and sportsmen by helping control rabbits, porcupines and certain small mammals; they seldom harm deer or ruffed grouse, Clair T. Rollings, University of Minnesota zoologist, reports. (*Journal of Wildlife Management,* April)

Bobcats usually catch their prey either by creeping behind cover or by patient waiting, crouched atop a log, stump or other vantage point, until the prey chances to pass on a nearby trail.

The varying hare ranks first among the bobcat's food. Porcupines are also frequently eaten. Birds are seldom sought and deer only occasionally attacked. Most of the venison that bobcats get comes from animals that are already dead from other causes.

During the past 10 or 20 years, the northern limit of the region over which bobcats range has extended 100 to 200 miles to include southern Ontario. Bobcats used to range over almost the entire eastern half of the United States, from North Dakota to Maine and Georgia.

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IN SCIEN

ENGINEERING

Shape and Size of Cams Determined by New Method

➤ CAMS ARE machine parts now familiar to millions of workers in war plants. Those non-circular or eccentric rotating flat pieces of metal, which change rotary to reciprocating motion, need no longer be guess-pieces in design or developed by cut-and-try methods. An exact and mathematically correct method for determining their correct shapes and sizes is now available.

This mathematical method was worked out by two members of the faculty of Cornell University, W. B. Carver, professor of mathematics, and Bavard E. Quinn, instructor in machine design. It is exact to at least 1/100,000 inch.

Present methods of determining the shape and minimum size of the cam are based on drawings which involve a certain amount of the trial-and-error method. The new method consists of using mathematical equations to determine the minimum radius of the cam, and to find the closed curve which just touches the follower as the follower goes through all the desired positions during one revolution of the cam.

Science News Letter, April 21, 1945

PUBLIC HEALTH

Polio Cases Number Higher Than in Five Years

➤ INFANTILE PARALYSIS cases have been persistently higher so far this year than for any of the five past years at this season. The number reported to the U. S. Public Health Service from the first of the year to the week ending April 7 is 484. Highest figure for the same period during the last five years was 377 in 1940.

Although it is too early to predict what will happen when summer, the infantile paralysis season, arrives, the next few weeks may tell whether another epidemic is on the way.

Of the year's total so far, about one-fourth of the cases have been reported from New York State. The rest have been scattered throughout the country.

Science News Letter, April 21, 1945

E FIELDS

INVENTION

Push-Button Vacuum Jugs Used at High Altitudes

➤ A NEW airtight vacuum beverage jug for postwar airliners makes possible the serving of thick soups, carbonated beverages like ginger ale, and all kinds of fruit juices at high altitudes. This has not been possible up to now because present-day containers are not airtight and the spigots would not permit liquids heavier than coffee or broth to pass.

The new container which will enable an airline to serve liquids of any consistency, degree of temperature, or carbonation at altitudes of 20,000 feet and above was designed by Walter Y. Brown, assistant superintendent of ground service for Transcontinental and Western Air Lines, according to a report in *American Aviation*.

The airtight beverage jug assures the maintenance of constant pressure on the liquid content regardless of altitude change. Thick soups can be dispensed four times as fast as the present rate for other types of spigots by a special push-button spigot on the jug. Five of the new containers will replace the eight half-gallon and two one-gallon containers now carried on commercial airliners.

The interior of the new jug is made of stainless steel with a high luster finish that makes it easy to clean. All seams are electrically welded, for sanitation.

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AERONAUTICS

Light That Burns for Year Warns Planes of Peaks

➤ A NEW beacon light that will burn for a year without adjustment or refueling and that can be seen for about 12 miles has been developed by the Army Air Forces as a warning light for planes. It is to be placed on the peaks of high mountains and near other hazards located in isolated areas. It may be used as a civil airway marker after the war.

Known by the code name Type C-3, the new light is an acetylene-burning lantern designed for installation where electricity through power lines is not available. In operation a 400 candlepower beam is flashed for two-tenths of a second, 30 times a minute. Upper and lower lenses are fitted with red filters to throw the light in a complete 360-degree circle so that it can be observed by pilots from any direction.

The main burner has a three-cluster flame ignited by two constant pilot lights. Tiny holes in the base of the apparatus permit enough air to get in to keep the flame going. A baffle system prevents the light from being blown out by high winds.

The beacon is controlled by a sun-valve device which consists of four metal rods that are sensitive to light. These rods expand and contract when the outside light varies, and have a compensating device to take care of temperature changes. The expansion and contraction of the rods produces energy to operate the valve which governs the flow of fuel to the main burner.

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POPULATION

Nine Out of Ten Americans Now Born to Native Parents

➤ NINE out of every ten American babies are now born to native parents whereas a quarter century ago more than half of the children born in America had at least one foreign-born parent, according to a report issued by the Metropolitan Life Insurance Company.

Only 5% of the babies born in 1940 had both parents of foreign birth, the company statisticians report, while in 1915, the earliest year for which annual records are available, 41% of the births were to foreign-born parents.

Not quite half of the 1915 babies had both parents born in the United States whereas just prior to the war about four out of every five had such parents.

Throughout this period the number of new-borns who had one native-born and one foreign-born parent remained relatively small. The proportion of total births to such parents rose slowly from 12% in 1915 to a high of 15% in 1930, then fell again to 12% in 1940. These figures may be expected to fall still lower as the proportion of foreign-born in the population diminishes.

The chance that a small child would play with a child who has only one foreign-born parent is today much greater than that he will play with a child with both parents born outside the United States. Today only one out of every 20 children is born to two foreign parents whereas one in every eight has one native-born parent and one who was born in a foreign country.

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AERONAUTICS-METEOROLOGY

Weather Causes Many Civil Airplane Accidents

➤ A SURVEY of the causes and contributing factors to airplane accidents in which non-military planes were involved reveals that in 1943 weather was the primary cause of 131 accidents, a contributing cause in 313 accidents, and a factor in 446 accidents, declares Earl L. Smith, air safety investigator for the Civil Aeronautics Board.

Urging weather study upon private pilots, particularly those who fly infrequently and can devote only a minimum of time to instruction, Mr. Smith called attention to the CAB pilot's guide for interpretation of weather reports.

Briefly, the types of weather which private pilots should avoid were outlined by Mr. Smith. Pilots should avoid flying in low-pressure areas, since in these areas unfavorable weather may be brewing. If they must fly in low-pressure areas they should be on their guard for unfavorable changes.

High winds play havoc with light planes, and pilots should be careful to check wind velocity. High head winds, which the plane must buck, mean slower flying and in most cases frequent stops to refuel. Gusty winds around an airport, coupled with high velocity winds, make landing a plane dangerous and the control of the plane on the ground difficult for even an experienced pilot.

Local thunderstorms are often severe, and the knowledge of whether a thunderstorm is of either frontal or air-mass type is important to safe flight planning. If you fly through a thunderstorm the wind knocks you around, lightning often blinds you, and sometimes hail threatens to smash your windshield.

Fog, rain or snow may be expected when temperature and dewpoint approximate each other. Private flyers should compare hourly sequence reports to determine the trend of the temperature and dewpoint before taking off. There is no equipment to defog a plane, and most private planes do not carry deicing units. Fog, non-freezing rain, and snow are hazardous principally because they obscure obstructions around airports, and you can not land a plane with normal flight instruments unless you can see. Freezing rain forms ice on leading edges, wings, propeller blades and windshields, destroying their efficiency. Often ice will cover a windshild to such an extent that it is necessary to break the glass in order to land safely.

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CHEMISTRY

Weed-Killing Aids War

Weapon developed by chemist for use against crabgrass in his lawn serves also in attack on the enemy in Tokyo. Is deadly incendiary.

➤ BECAUSE he didn't like crabgrass on his front lawn, the professor of chemistry at Harvard University set fire to Tokyo.

The chemist, Dr. Louis F. Fieser, tried everything he knew of to destroy the crabgrass that made his front lawn look patched and moth-eaten. Like most home owners who are plagued with the weed, he invested in fancy lawnmowers and trick gadgets. They didn't work. So he got down and pulled the stuff out by hand until his knuckles were raw. He didn't keep that up very long. Thinking that fire might be the answer, Dr. Fieser took a plumber's blowtorch and went after it. That worked, but it also put a crimp in his back.

Next he tried kerosene, but without success. He tried gasoline and it burned off in a flash, leaving the crabgrass roots unharmed. Before he was ready to admit defeat, Dr. Fieser realized that if gasoline could be made to burn longer, say for several minutes, it might destroy the crabgrass.

Dr. Fieser went to work on the problem, and started research that has resulted in the development of a new white powder which transforms ordinary gasoline into a deadly incendiary compound that has gutted more than 17 square miles in the heart of Tokyo and destroyed much of Osaka and Nagoya.

Called U. S. Army Thickener by the Chemical Warfare Service, the powder mixed with gasoline produces a substance resembling orange gelatin which can be fired from flame throwers and used in incendiary bombs. Incendiaries made with USAT are so effective that they have all but replaced thermit and magnesium incendiaries.

When clusters of 38 bombs containing sacks of the incendiary gel explode, flaming gobs of jellied gasoline are hurled as far as 75 feet, and they stick to whatever surface they happen to strike. The gel generates a temperature of 3,000 degrees and will keep on burning as long as 10 minutes. Each bomb holds enough of the jelly to make a flaming flapjack one-quarter inch thick and a yard in diameter.

The first practical application of the incendiary gel was the "Harvard Candle," developed by Dr. Fieser and associates. It was produced for the Chemical Warfare Service as a campfire lighter. Packed in a three-inch celluloid cylinder, the gasoline jelly will produce a hot flame for six minutes and will ignite wood that has been drenched with several days' rain.

The idea of using USAT in incendiary bombs followed in due course. The research work was expanded until three CWS laboratories, eight National Defense Research Committee laboratories, and pilot plants were at work perfecting the gel. Although USAT has been manufactured for two years without change in formula at eight full-scale plants, it is still very difficult to produce and handle. Extremely sensitive to moisture, the white powder is ruined if exposed to humid air for more than a minute. It must be made under extremely careful conditions and shipped in airtight drums.

Further studies were made of the way the incendiary gel flows. As a result of these experiments as to what makes the powder-gasoline mixture viscous and gummy, and how it works, several new uses for the incendiary material have been discovered, but details are not disclosed at the present time.

USAT is just one of three incendiary petroleum compounds developed by American science since Pearl Harbor. The most recent is a synthetic lava known as "goop", a rubbery mixture containing magnesium paste coated with particles of asphalt, gasoline and other ingredients. It surpasses natural volcanic lava in heat intensity and is used in 500-pound M76 block-burner bombs. "Goop", developed by the Chemical Warfare Service at Edgewood Arsenal, Md., produces a spectacular white-hot glow. It laughs at water; foam extinguishers cannot put it out, and it is virtually unquenchable.

Another incendiary material, known as "Compound X," was developed by the ammonia department of the E. I. du Pont de Nemours & Company. This ingredient had previously been used as a hair lacquer but, after modification, proved to be an effective gasoline-thickening agent. It is being used in six-pound tail-ejection bombs and in 100-pound oil bombs.

The advantage which USAT has over "goop" and Compound X is that it can be shipped in powdered form to the battlefronts and mixed with gasoline in the field. The other mixtures must be produced at arsenals and industrial plants with special equipment.

One day, after the development of the incendiary gel, Dr. Fieser decided to see whether it would work against the crab grass pest on his front lawn. Using an old tomato can, he scattered the mixture on his lawn and touched a match to it. It blazed furiously for several minutes, and burned everything, including the doctor's prize bluegrass, to ashes. Would he never be able to destroy that crab grass?

The answer came a few days later. Green blades of grass began to show above the blackened lawn. They grew from the roots of the prize bluegrass which were unharmed by the incendiary gel, and soon the lawn was as good as new.

Thus crabgrass, and the Mikado's men, fell victims to heat and flame produced by American scientific ingenuity.

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BOTANY

NATURE RAMBLINGS

by Frank Thone

Frost and Flowers

APRIL SHOWERS are traditionally given credit for bringing forth May flowers, but as a matter of fact the frosts of December, January and February deserve the greater share of the credit. For practically all of our temperate-zone spring-blossoming plants, whether trees and shrubs or perennial herbs, will not break their winter sleep until they have gone through a definite period of low temperature.

This arrangement works as a kind of life insurance. Woody plants shed their leaves in autumn, and perennial herbs die down to ground level, without waiting for frost. The stimuli that cause them to become dormant are not primarily low-temperature responses. If the plants responded to the first warm rain that came along, they would be deceived into putting forth flowers and leaves by the Indian-summer weather that comes practically every autumn—and they would of course be caught and stripped when real cold weather began. However winter-land plants acquired this particular adaptation, it is certainly a good thing for them that they have it.

The biochemical mechanism involved is at least partly understood. Tree and shrub buds are stimulated to unfold, and underground bulbs, tubers and rootstocks to send up new shoots, by certain enzymes in their cells. These enzymes will not start the vital chemical reactions for which they are responsible unless they are first well chilled, then warmed.

The degree of chilling, and the length of time it must be continued, differ widely among plants. Some flowering shrubs have a very light dormancy: a few nights of frost suffice for their chilling requirements, and after that they are ready to break into bloom on the slightest provocation. Thus we see forsythia, ornamental quince and several kinds of honeysuckle putting forth at least a few flowers during a warm autumn, and sometimes even in a mild winter.

On the other hand, some species require a really stiff freezing before their enzyme combination will unlock itself. Common examples are lilac, snowball, most fruit trees, most bulb flowers and a great many of the other perennial herbs. Lily-of-the-valley is an especially tough customer about wanting to have its toes well frozen before it will wake up.

This phenomenon, of course, is limited mainly to plants that grow in regions where there are fairly well-marked temperature differences between summer and winter. Many tropical and sub-tropical species do have dormant periods, but these are governed by factors other than winter cold. Winter drought, for example, is important in the dormancy of plants from monsoon regions. And many tropical plants, from regions where year-long growth is possible, never become dormant at all.

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Do You Know?

An *ostrich egg* may weigh four pounds.

Lithium is successfully used as a deoxidizer for copper.

Yosemite Falls, in the park of that name, has a total fall of 2,425 feet.

Lactic acid is a normal constituent of sauerkraut and ensilage.

The *red deer* can clear a seven foot fence, and a twenty-foot chasm.

P-aminomethylbenzenesulfonamide, or *sulfamylon,* one of the newest of the sulfa drugs, is claimed to be particularly effective in the treatment of gas gangrene.

Two collared *peccaries* in the Philadelphia zoo learned to close and open the door to their house in cold weather; peccaries are New World tropical wild pigs.

A full-grown *kangaroo rat* can carry a teaspoonful of seeds in each cheek pouch, and at this rate would have to make 600 trips with loaded "packs" to accumulate one bushel.

A rich *lead deposit* has been discovered and opened seven miles west of the great Picher field in northeast Oklahoma; it is 100 feet deeper than the ore in the Picher field.

The western *burrowing owl,* that nests in deserted prairie-dog or ground-squirrel burrows, often comes out in the daylight and stands bobbing its head and bowing comically before backing down to wait for darkness.

GEOLOGY-ENGINEERING

Oil Restoration

Rehabilitation of refineries in Europe and the Far East is biggest postwar problem facing oil concerns. Destruction in Rumania great.

See Front Cover

➤ THE BIGGEST problem facing large oil companies after the war is the rehabilitation of their properties in Europe and the Far East, Eugene Holman, president of the Standard Oil Company (New Jersey) told a group of newspaper women meeting in New York. The total amount of damage caused by the war is as yet unknown, he pointed out.

The refineries in Rumania, for instance, have been pretty well knocked out, he stated, while oil fields only 40 or 50 miles away suffered relatively little damage.

Those concerned about the future of the oil industry after the war, Mr. Holman said, follow two schools of thought—of plenty and of scarcity. Standard Oil believes that in the United States there will be plenty of oil for several decades to come.

If substitutes are relied upon, there will be enough gasoline for 2,000 to 4,000 years, he estimated. Studies are being made on synthetic fuels—gasoline can be made from any carbohydrate such as wood or potatoes—to produce them economically.

Since we in the United States have been expanding to take care of war requirements, we will end the war with thoroughly modern and renovated plants. We actually gained a little in the known crude-oil reserves during the war, our reserves being a little larger now than before Pearl Harbor because of the finding of new fields.

The picture of the catalytic cracker, one of many which make possible the greatly increased production of 100-octane gas, shown on the cover of this week's SCIENCE NEWS LETTER, is from the company's new photographic library.

Within five years after the war, one out of every five civilians who travel by plane will do so in jet-propelled airplanes, Robert Russell, president of Standard Oil Development Company, predicted. Further research will be needed, however, to discover what types of fuel are best suited to get the most out of these devices.

The quality of gas has gone down during the war about 15 octane numbers so that today it is approximately the same as that used by motorists 12 years ago, said Robert Haslam, director of the Standard Oil Company (New Jersey). Now everyone notices the poor quality of gasoline, since the best is going into aviation gas.

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PHYSICS

Cosmic Rays Are Relics Of Primitive Radiation

➤ COSMIC RAYS, those extremely penetrating rays which reach the earth from outer space, are merely what is left of high-frequency radiation started on its way when the universe first came into being, Prof. E. A. Milne of Oxford states. (*Nature,* Feb. 24)

At the time of creation, Prof. Milne says, those tiny bundles of light energy called photons all had the same frequency. But throughout the centuries light "aged" and the wavelength steadily increased.

"The wavelength of a photon is proportional to the epoch at which it is observed, independent of the value of its mean free path," Prof. Milne concludes, and presents mathematical calculations to back up his statement.

A photon which left our galaxy ages ago may in due course encounter one of the receding galaxies and either be scattered or reflected, he points out. After traveling a fraction of the radius of the universe, it arrives back at our own galaxy. It is then either reflected outwards again or travels through our galaxy unimpeded. In either case its frequency is not changed. It moves out again into intergalactic space, there to be eventually reflected back to us again.

The red-shifts in the spectra of galaxies, usually interpreted as showing that a galaxy is moving away from us, and the "aging" of light with the passing of eons by which the wavelength of a photon steadily increases, are substantially the same, Prof. Milne says.

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who was

WHO WAS the bus rider who pushed the total number of passengers carried by America's buses since Pearl Harbor over the twenty-eight-billion mark?

Was it a war worker on the way to make guns, tanks or airplanes? A serviceman headed homeward on his last furlough before shipping out? A nurse going on duty at a hospital?

It might have been any of these —or any one of millions of other Americans who rely on buses for transportation, day and night, rain or shine. The bus industry is to be congratulated on its record in this war. Despite the limitations on skilled manpower, spare parts and new equipment, it is today carrying more than double the number of passengers it did in 1940 . . . and the country owes a debt of gratitude to the men of the bus industry for the job they have done.

The war has brought home how important a part gasoline plays in the transportation system of this nation. We, of Ethyl, are glad to have been able to contribute to the improvement of engines and fuels and look forward to continuing co-operation with both manufacturers and operators in the future.

BUS RIDER NUMBER 28,000,000,001

ETHYL CORPORATION

Chrysler Building, New York 17, N. Y.

ETHYL
BRAND OF ANTIKNOCK COMPOUND
— ETHYL — CORPORATION

NUTRITION

National Nutrition Clinic

➤ MANAGERS of industries in Birmingham, Ala., who have seen how the Nutrition Clinic at Hillman Hospital there has aided war production through rehabilitation of workers, hope that in the postwar period it will become a national clinic, Thomas Martin, president of the Alabama Power Company and chairman of the Southern Research Institute, declared at the meeting of the Spies Committee for Clinical Research, held in New York.

The Nutrition Clinic is maintained by the University of Cincinnati. Dr. Tom D. Spies, associate professor of medicine at the University and director and founder of the clinic, reported that 800 persons had been rehabilitated at the clinic solely by means of dietary vitamin and mineral treatment. Each had been so weakened by diet deficiency as to be unable to work for a long period.

"We are hoping for the rehabilitation of the individual and it is accomplished, not through treatment alone, but through education," Mr. Martin said.

"To accomplish this, research and education must overlap and intermingle as Dr. Spies has several times pointed out. We are here tonight in pursuance of that point of view.

"During the past year, over 2,000 physicians, nurses, chemists and nutritionists visited the clinic at Birmingham; and thus the educational functions of the clinic have served a wide purpose, much beyond that having to do with a single area.

"This may be called applied research in the sense that those in charge, under the able direction of Dr. Spies, present the clinical results to others; and better than any other group, they are in position to collaborate with scientists of other institutions, teaching physicians, nurses and nutritionists who cannot acquire from textbooks sufficient skill and judgment to apply the best therapeutic methods; and by so doing to cut down on the lag period between the time the discovery is made and its application to human nutrition.

"This in part is learned from the patients and partly from illustrated lectures to students, medical scientists and other scientific bodies; finally, in the words of Dr. Spies, those in charge of the research are in position to 'search for unusual and original persons who will be the nutrition stars of tomorrow.'

"And I can assure you on behalf of my friends in industry, and indeed the public generally in the Birmingham district, that we welcome the suggestion that the work of Dr. Spies be expanded in the postwar period, so that it will in truth and in fact, be a national clinic."

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The *thyroid* to some degree affects the action of all other endocrine glands.

● Just Off the Press ●

AIDS TO BOTANY—H. J. Bonham—*Baillière, Tindall and Cox,* 215 p., illus., $1.75, 2nd ed.

BRASSEY'S NAVAL ANNUAL, 1944—H. G. Thursfield, ed.—*Macmillan,* 303 p., illus., $5.

CONSCIENCE AND SOCIETY, a Study of the Psychological Prerequisites of Law and Order—Ranyard West—*Emerson Books,* 261 p., $3.

DOCTORS AT WAR—Morris Fishbein, ed.—*Dutton,* 418 p., illus., $5.

THE EXCAVATION OF LOS MUERTOS AND NEIGHBORING RUINS IN THE SALT RIVER VALLEY, SOUTHERN ARIZONA—Emil W. Haury—*Peabody Museum,* 223 p., paper, illus., $4.50.

EXPERIMENTAL STUDIES ON THE NATURE OF SPECIES, II. PLANT EVOLUTION THROUGH AMPHIPLOIDY AND AUTOPLOIDY, WITH EXAMPLES FROM THE MADIINAE—Jens Clausen and others—*Carnegie Inst.,* 174 p., paper, illus., $1.25.

FLAVOR—E. C. Crocker—*McGraw,* 172 p., illus., $2.50.

JANE'S ALL THE WORLD'S AIRCRAFT, 1943-44—Leonard Bridgman, ed.—*Macmillan,* illus., $19.

MASS RADIOGRAPHY OF THE CHEST—Herman E. Hilleboe and Russell H. Morgan—*Year Bk. Pubs., Inc.,* 288 p., illus., $3.50.

PHOTOGRAPHIC ENLARGING — Franklin I. Jordan—*Am. Photographic Pub.,* 252 p., illus., $3.50, 3rd ed.

PRINCIPIO TO WHEELING, 1715-1945, a Pageant of Iron and Steel—Earl Chapin May—*Harper,* 335 p., illus., $3.

PRINCIPLES OF PHYSICAL GEOLOGY—Arthur Holmes—*Ronald,* 532 p., illus., $4.

THE RECONSTRUCTION OF WORLD AGRICULTURE—Karl Brandt—*Norton,* 416 p., illus., $4.

SOME USEFUL TREES OF THE UNITED STATES—*U. S. Forest Service,* paper, illus., free upon request to The Forest Service, U. S. Dept. of Agric., Washington, D. C. A special compilation for members of Science Clubs of America.

THE TECHNIQUE OF BANDAGING AND SPLINTING, Including Sections on Slings and Adhesive Plaster Strappings—Arthur M. Tunick—*Essential Bks.,* 206 p., illus., $3.

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· New Machines and Gadgets ·

⚙ *DOUGHNUT CUTTER, cushioned to ease the effort of cutting, has a rubber padding between its domed top and its base-part which contains two circular cutting blades. The innermost blade, that cuts the hole in the doughnut, is attached directly to the domed top.*

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⚙ *DISPENSING BOTTLE delivers a measured drink through a side-neck at the top. An inside cup-like partition near the top is the measuring device and is filled through an opening opposite the neck when the bottle is laid on its side. When tilted to pour, the cupful only is released.*

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⚙ *CORRUGATED ROOFING, with corrugations or grooves running at a 10-degree angle with the long side of the metal strips, has overlapping joints less liable to leakage than the common design with grooves running lengthwise. The diagonal grooving directs the rainwater away from the joints.*

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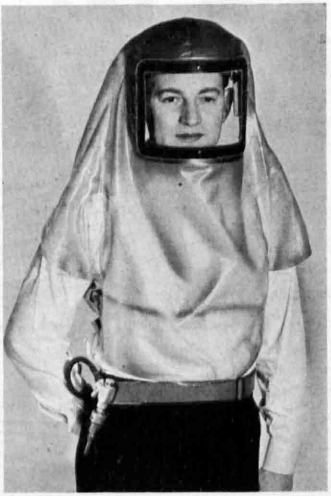
⚙ *ACID HOOD, that covers the head, shoulders, arms, chest and back of the wearer, protects laboratory workers against practically all acids. A clear window, shown in the picture, provides normal vision as well as protection. An air-feed unit and side vents give good air*



circulation. Hood and window are made of a new plastic.

Science News Letter, April 21, 1945

⚙ *OFFICE TELEPHONE, mounted on the end of a long arm attached to the top of a supporting stand, swings to any one of the neighboring desks when a button on the desk is pushed. As soon as the receiver is hung up, the phone returns to its neutral position. A tiny electric motor and proper wiring do the trick.*

Science News Letter, April 21, 1945

⚙ *INSULATION cutter, to strip electric cable covered with a woven-wire and rubber combination, is a plier-like tool with a crosswise holding groove in a fixed jaw, and an adjustable cutting edge in the other. A thumbscrew adjusts the depth of cut, and the cutting edge can be turned to cut lengthwise or crosswise.*

Science News Letter, April 21, 1945

⚙ *OIL STRAINER with large strainage area, for use on machine tools and other installations using flood oiling, is made of a unique combination of wire and cotton, interknitted into a mesh. No strainer housing is required. It is installed in the tank and the oil is piped direct from strainer to pump.*

Science News Letter, April 21, 1945

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 255.*

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Where published sources are used they are cited.

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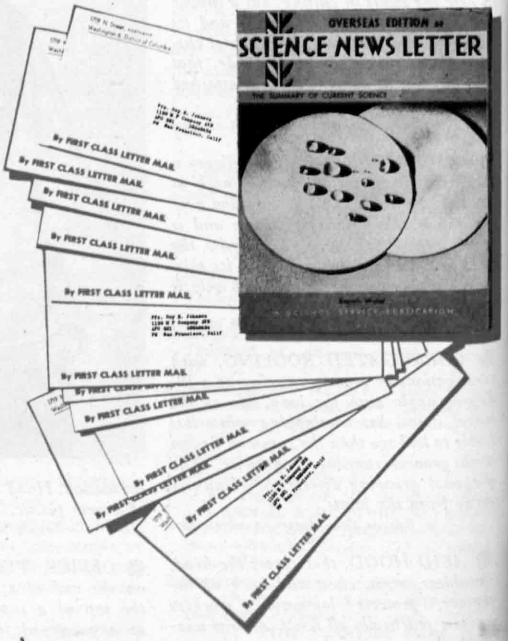

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