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# SCIENCE NEWS LETTER

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## **XB-36, Biggest Yet**

See Page 8

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## MEDICINE

# Phosphorus 32 for Cancer

Atomic research by-product successful for first time in treating superficial skin cancers and warts. Other cancer treatments by radioactive substances a possibility.

► **CANCER TREATMENT** by atomic research by-products is now a reality for two types of the disease, a University of California Medical School physician reported at the meeting of the American Radium Society in San Francisco.

Successful treatment was reported by Dr. Bertram V. Low-Beer, associate professor of radiology, who has been working quietly since 1941 with radioactive phosphorus produced in the University of California cyclotrons.

Dr. Low-Beer cautioned that the treatment is applicable only to superficial skin cancers and warts, and held no hope that it could be applied to deep-seated tumors in the near future.

The two types of skin cancer treated successfully are basal cell carcinoma and hyperkeratosis, which are not rapidly spreading, fatal types. In cases of basal cell carcinoma Dr. Low-Beer's treatment was 98% effective, tumors being removed in 51 of 52 patients; for hyperkeratosis, the treatment was 100% effective in 36 cases. A total of 301 patients with cancer and warts were treated. An additional 100 have been treated but have been observed only briefly.

Dr. Low-Beer refused to express an opinion whether the treatment is superior to X-rays, radium and surgery for the same afflictions, but did say it is as good as any to be had.

He observed that while the possibilities of cancer treatment with radioactive substances have been widely discussed as one of the major potential applications of atomic research, this was the first time actual treatment had been perfected and proved.

The treatment is an excellent illustration of the theory of possible treatment of cancer with artificially radioactive substances, and it brightens the future in this field.

For a number of years it has been thought that radioactive phosphorus, isotope 32, would prove ideal in treatment of skin cancer. This isotope emits only beta particles, which cannot penetrate tissue to greater depth than under layers of skin, about 8 millimeters. Therefore radiations from phosphorus placed

on the skin will destroy the skin cancer cells, but not the healthy body cells beneath.

On the other hand, both X-ray and radium, the latter emitting powerful gamma rays as well as beta particles, are deeply penetrating, and destroy some healthy tissue. Dr. Low-Beer proved the theory to be correct in the case of phosphorus, devising a method of treatment as simple as bandaging a skin cut. One of his first problems was to make radiation over the skin tumor uniform. After trying to apply radio phosphorus with absorbent cotton, vaseline, lanolin, gum acacia, and higher alcohols, he found that the most satisfactory technique is to put a liquid solution containing the isotope on ordinary blotting paper with an eyedropper.

The physician then cuts the blotting paper to fit the tumor, and it is applied like a bandage with adhesive tape. The blotting paper remains on the tumor up to five days, depending on the amount of radiation needed. At the end of that time an erythema, or red blotch appears, increases in intensity, and gradually disappears along with the tumor. The skin is clear, though sometimes a slight dimple remains as a souvenir.

Before treating human subjects, extensive experiments were conducted to determine dosage needs and effect on tissues of radiations.

*Science News Letter, July 6, 1946*

## CHEMISTRY

## Fluorine Makes Many Developments Possible

► **FLUORINE**, a chemical element discovered 133 years ago, has just gone on the market for the first time, with a promise of important new scientific developments ranging from more stable lubricants than any now known to wonder insecticides.

A gas, fluorine is now available in steel pressure cylinders for experimental use in industry and science, the Pennsylvania Salt Manufacturing Company announced.

One of the most chemically active of

the 96 known elements, fluorine combines rapidly with most other elements to form very stable compounds. Some of these compounds are in freons used as refrigerants, propellants for wartime insecticide "bombs" and dyes.

Here are some of the new products scientists predict will come from fluorine

1. Stable lubricating oil that will not break down under any present engine operations and may make possible "dream" engines that require more stable lubricants than any now available.

2. Non-burning, non-poisonous liquid to replace mercury in the present mercury vapor boiler, making the most efficient vapor engine practical and safe.

3. A gas now known that requires fluorine to manufacture and which is a nearly perfect insulator for high voltages used in X-ray and nuclear physics.

4. An insecticide developed in Germany but impractical because of the cost may become available.

Other possibilities for fluorine include heat transfer and dielectric media, other insecticides, fungicides, fumigant, germicides, stable solvents, anesthetics, fire extinguishers and fireproofing materials, resins and plastics and weed killers.

*Science News Letter, July 6, 1946*

## MARINE BIOLOGY

## South Pacific Seas May Be Rich Food Source

► **THE WATERS** of the South Pacific ocean may become one of the great food producing areas of the world as soon as scientific exploration gives enough facts about unexpected hints as to their possible productivity.

As a result of the recent Pacific Science Conference held by the National Research Council in Washington, D. C., scientists are expecting to send expeditions to tropical sea areas traditionally considered less rich in fish and other life than the cooler waters of the world's oceans.

Below the surface where tropic waters are cooler there may be found great layers of "pasture" consisting of plankton, minute plants that make good food for fishes and crustaceans.

Great stretches of the sea around Sumatra, Java and Borneo may be as good shrimp fishing grounds as the Gulf of Mexico. Properly developed, these could play a major part in providing food to peoples that often do not have enough to eat.

*Science News Letter, July 6, 1946*

BIOLOGY—ATOMIC ENERGY

# Atomic Effects at Bikini

Science Service writer at Bikini radios observations on bomb explosion and its probable effects on the targets and surrounding life.

By DR. FRANK THONE

Science Service Crossroads Correspondent

A GLOW ALMOST as bright as the face of the sun and very much larger. Then a yellowish-pink cloud rising fast from the sea. Then around it a wall of what appeared to be spray thrown very high. That was the beginning of the explosion of the first test atomic bomb over Bikini Atoll, the moment for which the world has been waiting all summer.

The wall of spray subsided, but the glowing cloud climbed higher and higher. In a couple of minutes it had reached the flat base of a cumulus cloud that stood between it and us, who were watching from all possible points of vantage on the Appalachian. It kept on climbing, thrusting out tight cauliflower heads all the time, showing how the enormous energy was still boiling within it.

At the end of nine minutes it was 24,000 feet high and half that in diameter. At 15 minutes it had broken in half, with the upper part drifting away. A little longer, and the parts were lost in the rolling cumulus, that covered that part of the sky.

Awesome prophecies all failed of fulfillment. There was no tidal wave, no earthquake shock, no "setting the sea afire." The sound, when it reached us at our distance of 18 miles, was no louder than a battleship's broadside at that range.

For scarehead folks, a very "tame" show.

The explosion of an atomic bomb has been likened to what goes on in the interior of the sun. It has also been suggested that the end of the world or at least of the solar system might have been like such an explosion.

It strikes me that what we have just seen might be taken as a miniature picture of the beginning of the universe. Many scientists, especially astronomers, take seriously the theory of the expanding universe, because all the great star masses or galaxies appear to be rushing away from each other. It might well be called the exploding universe for the calculated speeds are the order of the leap of the first flame-jet from detonating TNT.

Especially significant contributions to this view have been made by Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service. An American-educated, Belgian scientist, Canon Georges Lemaître, not long ago completed the picture by running the figures back to a time before the universe started to expand. He calculated that time was not much more than two billion years ago. The matter and energy now distributed throughout the universe were all jammed into one superatom.

That atom exploded, and the universe began to be. The explosion is still going on, flinging enormous star masses out to frontiers hundreds of millions of light-years from that primordial center of creation.

The tremendous explosions of matter that cause the sun and all the stars to give forth light and heat are mere sec-

ondary cracklings of this unimaginably immense cosmic detonation. Once in a while, a star will burst forth with many times its normal explosive power, and we have a nova.

Part of the explosive potential that was packed into what eventually became the element uranium was what we witnessed, from a safe distance, lest we be temporarily blinded by the flash. It was just a minor spark, unnoticeable on a cosmic scale, in the long story of an exploding universe.

The atom bomb's effect on Bikini's ecology will have a blurred record because DDT was sprayed wholesale over the atoll islands before Seabee forces went to work there weeks ago. This was done to abate the plague of flies that wrecked comfort and threatened health. Biologists making the "before-B day" survey objected but Navy authorities decided in favor of the Seabees.

DDT, as is well known, plays no favorites. It kills flies, mosquitoes and other pests, but also knocks down butterflies, moths, beetles, wild bees and almost all other insects that live above ground. Unable to capture native insects, entomologists will have to turn in an incomplete record. It is wholly possible that some of the victims of this necessary massacre are species unknown to science. Now they never can be known.

But this is only the beginning of the story. Services of some of these insects are needed by some species of plants to make the fertilizing transfer of pollen. If these species die out after the bombings or are sharply reduced in abundance, the scientists cannot be sure when they make their "after-B day" survey whether the change is due to the bomb's radioactive spraying or to the DDT spraying.

There may be effects on animal life too. Some birds and almost all lizards depend mainly on insects for food. Recent experiments indicate that DDT-poisoned insects do not kill birds and fishes that eat them but if the insects are killed off, where will the birds find food?

Thus this one monkey-wrench, thrown into this atoll's ecology, sprinkles question marks all over the biological record.

## Biology Effects Local

Biological effects of the atomic bombings at Bikini were strictly local. These were predicted: The enormous but concentrated heat will flash the water into steam over an unknown but not large area in the lagoon, will heat the water above the level life can tolerate over a



Joint Army-Navy Task Force One radio telephoto, through Aeme

**BIKINI**—A few seconds after burst of the atomic bomb dropped from B-29, "Dave's Dream," atomic cloud boiled up over Bikini. This photo taken from sky bridge of Vice-Admiral W. H. Blandy's flagship, USS Mt. McKinley, on July 6.

somewhat greater space; fish in those areas will die, and so will lower forms of life. Concussion will probably do more damage than the heat.

One thing that certainly will happen, at least on the second explosion, will be the stirring up of a great cloud of bottom silt. The water in the atoll may remain turbid for days. Fish that survive it can swim away; but the fixed forms of life like coral animals, and others like crabs and sea-cucumbers and bottom-burrowing worms will have to stay and take it. Silt can smother if it drifts down thickly enough; if it has been made radioactive it can do worse.

The second explosion will probably throw much radioactive spray and perhaps a wave of silt-bearing radioactive water over the low islands, strung like scattered beads on the atoll's ring of reefs. Possible effects on land life are hard to estimate in advance.

### Weird Evolution Unleashed

Expectations that radiations from the atom will cause a lot of weird evolutionary changes among the plants and animals of Bikini atoll are somewhat over sanguine. Enough is already known, from experiments with radium, X-ray and other forms of radiation in the breeding of animals and plants, to justify this assertion.

Radiations from the bombs are essentially the same in nature, differing only in intensity. But the effect of overdoses of X-rays or radium is already known. They simply kill. The effect of lesser but still excessive doses is also known. They permit the production and fertilization of eggs, but these fail to hatch. "Radiation in moderation" might well be the watchword for the experimental breeder.

There is another angle; to know whether you are getting new varieties of plants or animal life, you have to know a good deal about the ancestral stock. That is known, with considerable thoroughness, about the package of seeds and mold spores that will be exposed to the atom-bomb radiations. But it is not known about the fish and other sea creatures in the lagoon, or about the coconut and pandanus trees and other plants on the shore, among them. If biologists, coming ashore at Bikini in the years after the blasts, find new plant and animal varieties they will be hard put to judge whether these are results of atomic radiations or chance-occurring mutations that would have turned up anyway.

It would be much more profitable if

biologists having access to plant and animal stocks of known ancestry could get even a little uranium 235 or plutonium to use under controlled conditions in their own laboratories and greenhouses. It is to be hoped that, say, enough to blow up in one bomb may be made available before long for such constructive purposes.

### May Aid Cancer Research

Cancer research may get some help from the atomic bomb explosions at Bikini.

Some of the 400 rats and 120 mice exposed are of hereditary types known to be susceptible to cancer. Those that survive will be watched closely, and their cancer records compared with those of similar animals that have not experienced atomic bombing.

Some of the goats aboard the target vessels had their hair clipped to simulate human haircuts. Others wore flash-proof clothing, and still others were under flash screens.

Blood counts and examinations for blast effects will be made as promptly as possible after the first explosion to see what has happened to them.

### Radioactive Water Feared

After uranium 235 and plutonium become available in sufficient quantities for civilian power plants, there will be a new worry for conservationists, Dr. Paul S. Galtsoff, veteran marine biologist of the U. S. Fish and Wildlife Service, says.

Dr. Galtsoff is one of a group of scientists representing the National Academy of Sciences at Bikini.

Power plants operating on radioactive piles will require great quantities of water for cooling purposes. The easiest way to get rid of this water after it has served its purpose is to let it run into the nearest river. But such water will be radioactive as well as hot, and both conditions can be very bad for fish and also for the small aquatic plant and animal forms that serve as natural fish foods.

Present atomic plants use elaborate safeguards to prevent spent cooling water from causing such trouble. These are expensive, of course, and the natural thing for commercial plants to do is keep costs as low as possible. So the old conflict over stream pollution may be re-enacted in a new field.

### Coral to Cover Ships

I have been letting my imagination run ahead of the tests at Bikini—years ahead.

What is going to happen to the ships

after they are sent to the bottom by the two bomb blasts, one in the air above them, one in the water a little below?

Lie there and rust in the still salt water, until nothing is left but heaps of iron oxide—that might be the first idea to strike one.

But that notion reckons with the sea containing nothing but dead salt water. Nothing could be farther from fact. The sea is a living thing especially the part of it that are shallow and warm as in the lagoon of an atoll.

All manner of living creatures will swarm aboard the sunken ships, as soon as quiet is restored in the lagoon and the deadly radioactivity has diminished to a life-tolerable level. (Turn to page 13)

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ALLERGY

# Horse Has Skin Allergy

► THE FIRST case on record of allergic skin disease in a horse, such as some humans get from dyes in clothing or from cosmetics, was reported by Dr. Lester Reddin, of Pearl River, N. Y., and Dr. Donald W. Stever, of Hollidaysburg, Pa., at the meeting of the American College of Allergists.

The horse had been suffering for three years from a skin irritation of the head, neck and saddle region. Analysis and skin tests showed it was due to contact with a saddle soap and leather conditioner used on the saddlery.

The ingredients responsible were "wool yellow dye" in the saddle soap and sulfonated neatsfoot oil in the leather conditioner. Each of these was harmless when used alone, but when combined and applied to the horse's skin, tests were strongly positive.

Contact dermatitis has been produced experimentally in laboratory animals,

but so far as the doctors know, this is the first occurring otherwise.

The reason some persons develop allergies is that something goes wrong with the body's mechanism for forming antibodies, in the opinion of Dr. Hyman Miller and Dr. Dan H. Campbell of the California Institute of Technology.

Antibodies are most familiar to the layman as substances formed in the blood to fight invading disease germs. They may, however, also be formed to react with foreign proteins other than those from germs. People with allergies produce in their blood something similar to an antibody which is called a reagin. From experiments reported at the meeting, the California scientists are "inclined to speculate that reagin represents the result of a distorted or incomplete antibody-forming mechanism" and that the reagin is probably a unipolar antibody.

*Science News Letter, July 6, 1946*

BIOCHEMISTRY

# Body Changes in Fasting

► FROM A MAN who voluntarily fasted for 45 days has come new knowledge of how the chemical composition of the body is changed during such prolonged periods without food. Reporting to the meeting of the American Society of Clinical Pathologists, Dr. William Sunderman of the University of Pennsylvania called the studies "unique."

"We can find no record of similar ones having been undertaken toward the end of such a prolonged fasting period," he stated.

The faster, a 54-year-old man, was a religious zealot who had previously undertaken several shorter fasts. The idea of undergoing special examinations of scientific interest appealed to him but he would not enter the hospital for such studies until the last two days of his fast.

On the 45th and last day of the fast, his weight had dropped from a pre-fasting 137½ pounds to 97 pounds. Except for the last week he had lost no time from his work as silk twister. He claimed that he felt hungry all during the fast but that the hunger was greatest during the first week. He had no night blind-

ness and no numbness or tingling in feet and hands. He took water but no food.

The human body deprived of salt during prolonged fasting or in starvation can substitute bicarbonate for chloride. This is one of the significant findings reported by Dr. Sunderman. The body gets the bicarbonate from breakdown products in the course of using up body reserves.

The fasting man was able to remain active although the amount of chloride in his blood serum was reduced to almost half the normal. Such decreases are usually found in critical conditions such as the last stages of fatal cases of lobar pneumonia, intestinal obstruction with vomiting or in severe Addison's disease.

This man was compared with a patient suffering from anorexia nervosa. This is a nervous disorder in which the patient loses appetite and systematically eats little or no food. Finding an increase in the concentration of magnesium in the blood serum of both these interested the scientists because such an increase is seen in persons with injury to part of the brain called the hypothalamus

and in hibernating animals during hibernation.

Neither the anorexia nervosa patient nor the fasting man developed dropsy, and the total proteins in their blood remained normal. However, five days after he had broken fast there was a drop in protein concentration in his blood serum and he complained of a "tight" feeling over his knees, though no sign of dropsy could be seen.

*Science News Letter, July 6, 1946*

ENGINEERING

# Asphalt in Concrete Gives Floor Elasticity

► HARD FLOORS, particularly concrete, are hard on the feet, everybody knows, but how they can be made springy or resilient is not common knowledge. It can be done, however, by the addition of asphalt to the cement mix before it is applied to the floor.

How the concrete-asphalt mix is made and applied was explained at the meeting of the American Society for Testing Materials at Buffalo by F. O. Anderegg of the John B. Pierce Foundation. The mix was developed by the foundation in its program of reducing costs and improving quality in building materials and methods.

"It has been found," he said, "that a combination of portland cement, asphalt and aggregate could be used in laying a floor which resists indentation much better than an asphalt floor, while markedly reducing the spine jarring impact of the straight cement concrete floor."

After experimenting with various mixtures of asphalt emulsions, it was found that concretes of satisfactory strength have been obtained in the range of 7½% to 12½% cement and with 2% to 3% emulsion.

The mix developed results in a system in which the asphalt is present as a "discontinuous phase," he explained. "The particles of asphalt as observed under the microscope are dispersed in the concrete in the same state of subdivision as in the emulsion added."

Several other emulsions besides asphalt were tried out in the experiments, Mr. Anderegg said. These included clay emulsions, protein emulsifiers, vinsol resin emulsions and others. "Emulsions made from high-penetration asphalts," he asserted, "are easily handled and seem to produce better workability and cushioning action."

*Science News Letter, July 6, 1946*

## ENGINEERING

# Doomed Wells Yield Again

► OIL WELLS suffering from the intrusion of natural gas can be returned to normal production with a "plastic plug" that seals the wells.

Sixty-six marginal or non-productive wells in west Texas have been tested with the "plug" and most of the doomed wells are now yielding about \$1,000 worth of oil each month, the Monsanto Chemical Company, St. Louis, and Oilwell Chemical Service Company, Fort Worth, Texas, have announced.

Used for sealing the wells from the unwelcome gas, a resin phenolic resin has been successfully employed in wells as deep as 11,500 feet. The resin goes into the well as liquid and hardens after it permeates the porous rock through which the gas had been coming, it was explained.

State laws setting the amount of natural gas that can be taken from a well with each barrel of oil make the problem of keeping the gas quantity under control an important economic consideration in operating oil wells. As wells get older, a producer may find that he is getting all the gas allowed with fewer barrels of oil. Thus the new sealing plastic promises better returns from wells

that are plagued by a high ratio of natural gas to oil.

Of the 66 wells tested with the new "plug," only a few failed to respond with greater allowed oil production, and these few failures were attributed to experimenting and peculiar geological or mechanical conditions.

In the west Texas field alone it is estimated that between 4,000 and 5,000 wells have become marginal or non-productive because of an increased ratio of natural gas.

The remedial operation of sealing a well can be completed in 36 hours by a seven-man crew, it is reported.

"Plastic plugging" was developed by Fred R. Holland of the Oilwell Chemical Service Company and Monsanto's plastic division, Springfield, Mass.

*Science News Letter, July 6, 1946*

## PETROLEUM CHEMISTRY

## "Cat Cracker" Gives More Gas

► A "CAT CRACKER" that has nothing to do with cats or crackers squeezes an average of two gallons more gasoline out of every barrel of crude oil at the Texaco refinery at Lockport, Ill.

Developed to process high octane gas-

oline components for aircraft, the new multi-million dollar catalytic cracking unit has the largest fractionating tower ever used on a "cat cracker."

Fifty-two men are required to operate the 12-story unit that now turns out 13,000 barrels of high octane automobile gasoline each day. Officials predict that the production rate can be upped to 20,000 gallons a day.

*Science News Letter, July 6, 1946*

## MEDICINE

## Ringworm Remedy May Be Good for Athlete's Foot

► A NEW REMEDY for ringworm of the scalp which may also be good for athlete's foot made its medical debut at the meeting of the American Medical Association in San Francisco.

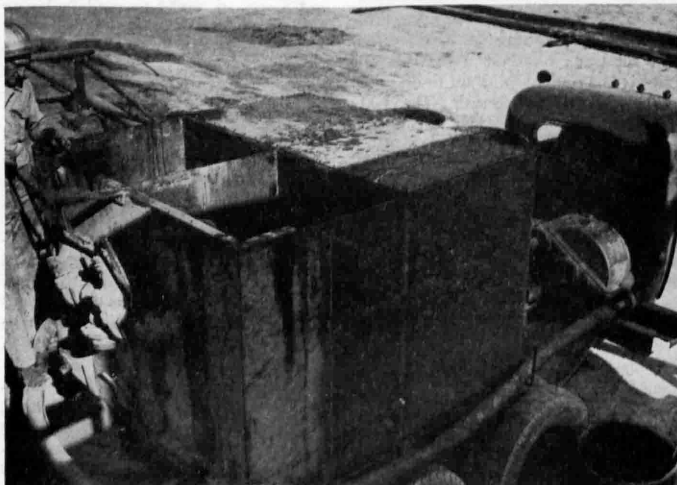
Copper undecylenate is the chemical that may prove to be a double-barreled weapon against fungi that cause itching heads and bald spots on school children and itching, sore feet in children and adults.

Use as ringworm remedies of this chemical and of another, salicylanilide, used previously in industry for mildew-proofing, was developed by Dr. Louis Schwartz of the U. S. Public Health Service. Working with Dr. Schwartz in development of new treatments for ringworm and in their successful trials among school children at Hagerstown, Md., were Drs. Samuel M. Peck, Iadore Botvinick and Armond Leo Leibovitz and Miss Elizabeth S. Frasier, associate statistician of the Public Health Service.

Besides working out chemicals for successful treatment of ringworm of the scalp in children, these scientists showed in the Hagerstown trials that children need not be barred from school or the movies while their scalp infection is being treated. On the contrary, the Public Health Service scientists encouraged school attendance in order to have the children treated regularly and effectively every day. The treatments were given at the school. The hair is clipped short before treatment and the child wears a cap at school to prevent stray hairs falling and carrying the infection to others.

Success with copper undecylenate in clearing up scalp ringworm led the Crooks Laboratories, which manufacture the chemical, to inaugurate trials of it for ringworm of the feet. There is no reason, in Dr. Schwartz' opinion, why it should not succeed.

*Science News Letter, July 6, 1946*



**PLASTIC PLUG**—From the rig floor the truck can be seen pumping Resin into the well. The pump (immediately behind the cab) is operated by a power take-off from the truck motor. Valves on the displacement truck measure the water pumped in after the resin to assure its being pumped to the bottom.

ENGINEERING

# Wood and Metal Fatigue

► METALS and wood construction materials can get tired, too. Fatigue in metals and wood, an important engineering problem, was described to the American Society for Testing Materials.

Fatigue is the technical term applied to a gradual weakening in materials in use, even under ordinary working conditions, that may result in failure or breakage. When a sample is broken in a testing machine, breakage results when a sufficient load is applied. However, the same material will fail in use under a much smaller load if the load is applied and removed many times. A rail in a railway track, for example, is subjected to rapidly changing loads as the wheels of a train pass over it. Fatigue and fatigue limits are important factors that mechanical engineers must take into consideration in all designs.

Fatigue properties of several alloy steels as a function of hardness were discussed by Henry Hermann ZurBurg of the Chrysler Corporation. The smooth bar results of tests made by him, he said, show that the relationship between the endurance limit and hardness depends on the carbon analyses of the steel and is independent of the alloy content of the materials tested.

R. S. Jensen and H. F. Moore, of the University of Illinois, reported on fa-

tigue tests made on T-shaped specimens cut from a rail web under cycles of stress varying from compression stress to tensile stress 20% as great as the compression stress. The testing device used was a vibratory machine. The fractures for such specimens started on the compression side of the specimen and the compressive stresses were about 78% higher than the stresses in specimens subjected to completely reversed bending stresses.

J. A. Bennett of the National Bureau of Standards reported on a group of tests with smooth specimens in which a method was developed of expressing damage independent of stress. This permitted the direct addition of damage occurring at different stresses. The reliability of the methods was checked by testing specimens after fatigue loading at two or more different stresses.

An understanding of the fatigue behavior of wood and glued wood construction has required the development of proper testing machines and testing procedures. W. C. Lewis of the U. S. Forest Products Laboratory stated. Some of the techniques and test methods have been perfected, he said, and a significant number of tests have been made in bending, tension parallel to the grain, and shear, on specimens of wood, plywood, and wood with glued joints.

*Science News Letter, July 6, 1946*

NUTRITION

## Nutrient X, New Vitamin Makes Diet Palatable

► A PALATABILITY vitamin was reported by A. M. Hartman and C. A. Cary, of the U. S. Department of Agriculture, at the meeting of the American Dairy Science Association. The new vitamin's only name, so far, is Nutrient X, signifying that scientists do not yet know its chemical nature.

It is found in several milk products, lettuce, egg yolk, beef and pork muscle, alfalfa and blue grass and alfalfa and timothy hays. It is not present in whole wheat flour, white flour, enriched white flour, yeast, cornmeal, soybean oil meal, linseed oil meal or heat coagulated egg white. Liver extract used in treatment of pernicious anemia is a rich source of Nutrient X.

The palatability which it confers on diets is not just a matter of taste of food items but of the body's needs for the particular food and the use the body makes of it. The substance is so essential, the scientists report, that rats on a relatively high protein diet usually died if Nutrient X was lacking but lived and grew 85% of normal if the same diet was supplemented with X.

*Science News Letter, July 6, 1946*

METALLURGY

## Copper and Zinc Reserves Very Low

► COPPER PENNIES, now rapidly replacing the wartime substitutes, may not be the common coins a generation from now. The reason is that the U. S. may run out of copper by then.

Elmer Pehrson, chief of the economics and statistics service of the Bureau of Mines, estimates that, on the basis of the country's rate of consumption of copper for the five years before the war, copper reserves will only last another 33 years. If there aren't enough copper pennies then, the zinc-coated coins that were used during the war won't be the answer, because the life of zinc reserves is listed as only 18 years.

Urging stockpiles of our metal reserves, Mr. Pehrson warns that some other metals are going to run out before copper and zinc. Bureau of Mines estimates place reserves of mercury at only two years; tungsten and antimony, three years; vanadium, six years; and lead, 11 years.

*Science News Letter, July 6, 1946*

MEDICINE

## Ultraviolet Rays Kill TB Germs in Air

► IF HUMAN BEINGS react like rabbits, they can be protected from tuberculosis germs in the air by an anti-germ barrage of ultraviolet rays.

These rays kill tuberculosis germs suspended in the air, Dr. Max B. Lurie, of the Henry Phipps Institute, Philadelphia, reported at the meeting of the National Tuberculosis Association.

Suitable ultraviolet irradiation of the air, he further reported, completely protected rabbits from an airborne contagion of tuberculosis so severe that it killed 73% of rabbits of the same ancestry exposed to the same tuberculosis contagion within the same period of one year.

The ancestry of rabbits plays a part in their getting or not getting tuberculosis. Some bunny families have no resistance to attack by the germs but con-

siderable resistance against the progress of the ensuing disease. Another family has considerable resistance against attack by germs in the air but little resistance against the engrafted tuberculosis.

Increasing the concentration of tuberculosis germs in the air increases proportionately the number of cases, speeds the onset of the disease and affects its essential character in rabbits of high genetic resistance. For rabbits of families of low resistance, increasing the germ concentration in the air increases the number of cases but the disease is always uniformly, rapidly progressive in animals of these families.

Normal guinea pigs placed in a room housing tuberculous animals get severe tuberculosis. The contagion is uniformly distributed by the air in the room without regard to the location of the animals that are the sources of the infection.

*Science News Letter, July 6, 1946*

## MILITARY SCIENCE

**Most Chemical Casualties Occurred During Tests**

► **POISON GAS** casualties among American troops during the war were not numerous and those that did occur were all far from any fighting front and were caused by our own chemical weapons. These casualties occurred on the proving grounds where chemical warfare equipment was being tested.

Dugway Proving Ground, out on the barren salt flats of Utah, had a unique record in that respect. While chemical casualties were fairly frequent, most of the small number of fatalities that occurred there might have happened to civilians anywhere—they were due to automobile accidents.

Most of the injuries from phosgene, mustard gases and flying bomb fragments were incurred by scientists and soldiers in the course of necessary tests. One scientist was wounded when 11 half-ton phosgene bombs were exploded only 60 yards from where he was operating his testing equipment. Another caught a bomb blast on his left side so severely that his skin bore the imprint of his buttons and metal insignia for days afterwards, and he lost the hearing in his left ear.

One incidental discovery in zoology was made in the course of the tests: poison gases have no effect on rattlesnakes.

*Science News Letter, July 6, 1946*

## AERONAUTICS

**XB-36, Giant Army Bomber, Undergoing Ground Tests****See Front Cover**

► **IN SIZE** the new Army giant land-based bomber, the XB-36, is roughly 40% larger than the famous B-29 Superfortress that did so much in bringing Japan to her knees. Its engines deliver more than twice as much power. In performance much is expected, but little is known because this super-super plane is still on the ground.

Construction of the new giant is completed and the plane is now under ground and taxi tests. Its first flight is scheduled for later in the summer. It was built at the Fort Worth, Texas, plant of the Consolidated-Vultee Aircraft Corporation. It was designed and constructed under Army supervision.

The picture on the front of this

SCIENCE NEWS LETTER shows the XB-36 on the testing field at the Consolidated-Vultee Corporation.

For comparison, the XB-36 has a wing span of 230 feet, and the B-29 a span of 141 feet. The fuselage of the new giant is 163 feet long; that of the superfortress, 98 feet. The new plane is powered with six Pratt-Whitney 3,000 horsepower engines; the older plane, with four engines delivering together 8,800 maximum horsepower thrust. The XB-36 is equipped with pusher-type propellers, set in the after part of the wings. It needs 15 men in its crew.

In comparison with the mighty Navy Mars, for long the largest flying boat, the XB-36 has a wing span 30 feet greater, and is 46 feet longer. The Glenn L. Martin cargo boat, now retired, was powered by four Curtiss-Wright engines. It was launched Nov. 8, 1941, and after severe tests went on active duty with the Navy Air Transport Service two years later. Its 15 months on the Pacific, crossing and recrossing from California to Hawaii, was a notable war service. On a trip from Brazil to Trinidad it carried a total cargo of 35,000 pounds.

It is predicted that the new Army bomber will be considerably faster than the B-29, or the Mars, have a much greater range, and be able to carry heavier loads of men or bombs.

*Science News Letter, July 6, 1946*

## ARCHAEOLOGY

**Pre-Inca Empire Being Dug From Viru Valley**

► **THE STORY OF** people that lived in northern Peru centuries before the Inca Empire that the Spaniards overthrew is being literally dug out of the Viru Valley as archaeologists embark on the most intensive studies yet made in South America.

A group from Columbia University, New York, has already discovered an important link between the pre-pottery people of the valley and the Chavin. The Chavin layer of pottery is estimated to date back to 500 A.D., while the pre-pottery people were even earlier.

Dr. William Duncan Strong, chairman of the Institute of Andean Research that is conducting the work in the Viru Valley with seven cooperating institutions, declares that the excavations "promise startling results."

*Science News Letter, July 6, 1946*

**IN SCIENCE**

## DERMATOLOGY

**Reflected Rays Can Cause Sunburn and Freckles**

► **PEOPLE SITTING** in the shade can get a sunburn if near the water. Water reflects the invisible, unfelt ultraviolet rays of the sun. A person lying in the noonday sun can get more sunburn than if standing or walking because the rays fall directly on his body. Sun should be taken in small doses, not more than ten minutes at first, the Indiana State Medical Association points out.

*Science News Letter, July 6, 1946*

## GEOPHYSICS

**Electric Charges in Snow Affect Flying**

► **ALL SNOW** particles carry electric charges, but there is a considerable difference in the amount of electricity carried by different-sized snowflakes. Lowest charges are carried by the small, smooth-edged, dry snow crystals that fall from lofty cirrus clouds during or just before severely cold weather. Highest charges are carried by large, lacy, wet snowflakes, often matted together, that fall when the mercury is just a few degrees below freezing-point.

These and other facts about electric charges on snow particles were presented before the meeting of the American Geophysical Union by Dr. Vincent G. Schaefer, research physicist with the General Electric Company.

Study of snowflake electricity is no mere pastime or hobby; although the electric charge on an individual snow crystal is very minute, an airplane flying through a snow-cloud brushes against myriads of them and the aggregate charges become really troublesome static.

Plane flights through snowstorms were used in part of Dr. Schaefer's study. Snow crystals are too perishable to keep after capture, so he used a method for getting permanent prints of their shapes which he originated several years ago. It consists simply in letting the crystals fall on a plastic solution having the consistency of syrup or glue. The plastic subsequently hardens, preserving the outline of the vanished crystal as long as desired.

*Science News Letter, July 6, 1946*



# E FIELDS

## ELECTRICITY

### Giant Lightning Arrester Now Being Constructed

➤ CAPABLE of taming the most powerful thunderbolts is a 40-foot-tall lightning arrester, the largest ever built. An experimental model is nearing completion in the Laboratory of the Westinghouse Electric Corporation. With two others of different design, it will be installed on the new 500,000 volt test transmission line being built by the American Gas & Electric Company near Steubenville, Ohio, and will help engineers to find information on the best type of protection for such lines. This sentinel will run harmlessly to the ground heavy power surges that travel along the wires after a lightning hit, thus assuring uninterrupted service to factories and homes.

*Science News Letter, July 6, 1946*

## AERONAUTICS

### Navy's Nylon Vest Will Save Air Crash Victims

➤ NYLON airplane crash harnesses that can absorb more than 10,000 pounds of impact may save the lives of future air crash victims as experiments continue at the Naval Medical Research Institute on a new safety vest.

Called a "deceleration harness," the new device is made of undrawn nylon that stretches but has no elastic recoil. Ordinary safety belts now used in military and passenger planes were found to break beyond 3,100 pounds of pressure, while making the belt stronger would send the force of impact from the belt to the abdomen of the person wearing it with the prospect of serious injury.

The lightweight, nylon vest covers 156 square inches of the upper part of the body, spreading the strain, and there is no recoil impact because of the nonelastic quality of the undrawn nylon.

Terming the harness "still in the experimental stage," Navy officials declare tests have demonstrated the practical value of the new type of safety vest, but more work on design and development are needed.

More than 2,000 tests on conventional safety belts and the new harness have been made using the impact decelerator, a 14-foot platform with a weight suspension rig and recording instruments.

To test the harness with the impact decelerator, the subject lies on his back on the platform wearing the vest, while a 500-pound weight is attached to a slide on a steel rod leading down from the back of the harness. The equivalent of 10,000 pounds of impact is transmitted to the harness when the weight falls five feet.

Work on the crash harness is under the direction of Comdr. Howard R. Bierman, U. S. N. R., with 30 officers and enlisted men participating in the tests on a volunteer basis.

The harness, which is shaped like a fencer's vest, is made of three-ply, undrawn nylon, developed and treated by All-American Aviation, Inc., Wilmington, Del. Tests show that up to 3,300 pounds of pressure the new harness reacts much like a safety belt, but as the stress increases, the stretch of the nylon absorbs more shock.

Many airplane pilots and passengers in crashes are killed by being thrown against the cabin walls and ceilings and other obstacles, and the new harness is expected to prove equally valuable to military and commercial flying.

*Science News Letter, July 6, 1946*

## CHEMISTRY

### Vacuum Methods of Dehydrating Foodstuffs

➤ VACUUM dehydrated fruits and vegetables, which scientists claim are superior dried foods that people will really like, have recently been patented. Seven separate patents were granted Robert M. Schaffner of Chicago for vacuum methods of dehydrating foodstuffs.

In dehydrating green peas, for example, the peas are blanched promptly after picking, then cooled and held so until put in the vacuum chamber. The drying in the chamber is done at low pressure in an atmosphere of superheated steam with the contents exposed to radiant heat giving a temperature of 228 to 338 degrees Fahrenheit. The moisture content of the peas is reduced to about 10%.

Other methods patented are for green beans, navy beans, soybeans, corn, beets, carrots and pork. The patents have been assigned to Guardite Corporation.

*Science News Letter, July 6, 1946*

## MEDICINE

### Anti-Blood Clotting Drug Helps Sclerosis Patients

➤ AN ANTI-BLOOD clotting drug, first discovered in spoiled sweet clover, is helping patients with multiple sclerosis, Dr. Tracy J. Putnam of New York and associates, Drs. Ludwig V. Chivavacci, Hans Hoff and Hyman G. Weitzen, reported at the meeting of the American Neurological Association in San Francisco.

The disease is one in which hardened, thickened spots occur throughout the brain or spinal cord or both. Weakness, incoordination, strong jerking movements of legs and arms, abnormal mental exaltation, speech difficulty and nystagmus are among the symptoms. The disease is incurable.

Taking the view that the hardened patches result from blood clots in the veins, Dr. Putnam and associates tried the anti-blood-clotting chemical, dicoumarin.

Symptoms already present are not changed, but 23 of 26 patients who had been having attacks off and on were free from new attacks while taking the drug. In one case, a relapse occurred when the patient became refractory to the drug. In three others, the drug was temporarily stopped. Acute relapses occurred at once in two.

Symptoms have slowly progressed in 10 out of 16 patients with a chronic, progressive form of the disease, but none has shown acute new symptoms.

*Science News Letter, July 6, 1946*

## CHEMISTRY

### Shrinkproof Rayon Can Be Produced

➤ RAYON THAT will not shrink has been developed using a new chemical treatment in making the fabric, Dr. R. L. Bateman, manager of the fine chemicals division, Carbide and Carbon Chemicals Corporation of New York, told the Kalamazoo section of the American Chemical Society.

Predicting a vast expansion of the rayon market, Dr. Bateman reported that spun rayon can now be made shrinkproof by using a chemical new to industrial applications, glyoxal. Controlling rayon shrinkage by chemical means will lead to greater use of rayon clothing fabric, he explained.

*Science News Letter, July 6, 1946*

CHEMISTRY-ENGINEERING

# Plastics Invade Printing

Lightweight synthetic resins replace usual type metals for making printing plates. Used for rushing duplicate advertisements to printers.

By MARTHA G. MORROW

► THE PLASTICS age has invaded the printing industry. Illustrations and type such as are used by this magazine can be printed from plates of synthetic resin instead of conventional type metal.

One of the war developments of our overseas propaganda warfare was the use of feather-weight plastic halftone plates to carry pictures to such out-of-the-way places as Arabia and China.

Plates of resin also proved useful closer to home. The Government Printing Office, Uncle Sam's immense factory of printing, employed them to speed delivery of stories and illustrations to South America for use in local newspapers.

They are now being used at a number of centers throughout the country in printing notices about housing for veterans, blanks for change of address, and life insurance applications. Duplicate advertisements, to be inserted in home-town newspapers, are rushed to printers in the form of plastic plates that can be incorporated directly in the type forms from which the newspaper mats are made.

Metal plates are then cast from the mats and sent to press.

## Light in Weight

Duplicate printing plates of plastic, which weigh only about one-eighth as much as similar plates of metal, came into prominence during the war both because they eliminate the use of metal, a critical material, and because they are light in weight for shipping or storing. Carefully selected and directed publicity material ready for printing was furnished Latin-American countries in order to create good will through better understanding of our country and allied nations. The plastic surface is so durable that there is little chance of their being damaged in shipment or in storage.

## Originals Always Metal

The original plate is not of plastic but of metal. Plastics are used in making duplicate printing plates from both halftone and linecut metal originals, in addition to molding plates from type forms and electrotype patterns. The originals may themselves be used in printing di-

rectly on paper, and the idea is to make a plastic printing plate that will be an exact duplicate.

There are two steps in making duplicate printing plates. First, it is necessary to make a matrix or reverse plate from the original photo-engraving, zinc etching or type form. Then a printing plate is molded in resin from this matrix.

The original pattern, such as a type form or printing plate, is placed in a molding press and covered with a sheet of plastic. Bakelite, a thermosetting plastic, is most frequently used. This differs from thermoplastic material in that it does not lose its shape when reheated.

The molding press lightly squeezes the plastic sheet and the metal pattern together. After a few seconds the resin softens sufficiently to permit the form of the metal pattern to be pressed into it. To do this, the pressure on the plastic is increased slightly. The press is held closed for ten minutes, during which time the resin polymerizes or "sets," fixing a sharp, reverse impression of the original pattern in the smooth, hard plastic surface. The matrix has by then become permanently hard and is ready for use.

## Granulated Plastic

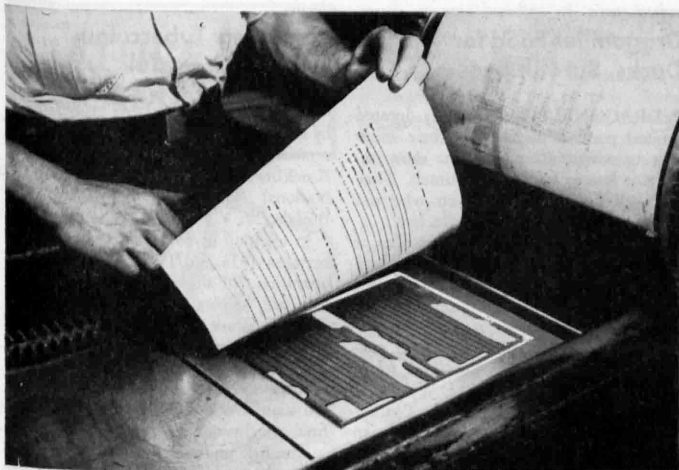
The plastic from which the printing plate itself is made comes in the form of a granular powder. First the matrix face is coated with a special lubricant, then the powdered plastic is spread on it. The thermoplastic vinylite is usually employed. The matrix and powder are together placed in the forming press.

The press is closed to firm contact and held in position for three minutes while being heated to 260 degrees Fahrenheit. About 1,200 pounds per square inch of pressure is applied. The heat softens the powder and the pressure squeezes it into a solid form similar to a soft rubber sheet which flows into the cavities of the matrix. In this way the plate is made to assume the form of the original metal printing plate or type form.

The thickness of the finished plate is governed by thickness bearers placed between the metal platens of the press. When the printing plate is formed, the press is opened immediately and the entire assembly transferred to a chilling



**PLASTIC GRANULES**—These are spread on the matrix before it is inserted into the press, where it is heated and squeezed to take the form of the original printing plate.



**PROOF**—After the matrix is cooled and the resin has "set," proofs are pulled to be sure the plate gives an exact duplicate of the original metal printing form.

press where cool water absorbs the heat from the plate, hardening it.

The printing plate is stripped from the matrix and the rough edges sliced off. The plate is then trimmed to the desired thickness, around 0.152 of an inch, by shaving off excess material from the back. All excess plastic is next routed out from non-printing surfaces on the plate side, chips removed and rough edges smoothed off. Then a proof is pulled to be sure the plate is ready for use.

A number of duplicate printing plates of plastic can be made from one master plate. This method of making duplicate plates is faster as well as cheaper than conventional methods. From original pattern to plastic duplicate, only about 45 minutes is needed to make a plate ready to be printed. As many as 250,000 sheets can be printed from one type or line plate without showing signs of fuzziness or other imperfections in the letters.

Plastics have been used experimentally for printing for several decades. It was during the war, however, that they proved their value for making duplicate copies. The Government Printing Office pioneered in research on the use of plastics in making duplicate plates.

Experiments are also being conducted to perfect printing type in plastic that will wear as well and produce as sharp an outline as the metal type in use today.

This is still in the experimental stage, however.

### Book Bindings in Color

Today plastic book bindings are popular for catalogues, calendars, check books, notebooks and pamphlets. First used in this country about a decade ago, a variety of types are employed at present. Some are spiral in shape, some comb-like with the teeth curled, while others lock into place. These bindings enable every page to swing freely and lie flat. Colored plastic bindings, lighter in weight than the metal they replace, are colorfast and durable.

Many of us have probably often seen boxes of candy beautified with transparent sheeting and fruit protected with it, or vegetables and meats wrapped in it, without stopping to think that it is made of plastic. Cellophane is made from the same viscose used in manufacturing rayon.

### Special Inks Needed

When cellophane was first introduced as a protective wrapper for foods, it presented an entirely new set of problems to the printing industry. Paper absorbs ink rapidly; cellophane does not. Because of this difference, none of the inks then in use could be employed, and none of the usual methods of printing on paper were satisfactory. Inks did not dry

properly upon cellophane. They were too transparent to show up well on the transparent paper. They invariably ran or smeared.

To overcome these difficulties, new inks were made and tested in the hope of developing those that would give greater depth of color, faster drying time, and, above all, better anchorage to the slick surface. Some inks in use today dry themselves with a speed unknown a few years ago. Others are dried rapidly by passing the printed cellophane over heated rolls or hot air.

The use of plastics in printing today is of particular interest as the plastics industry owes its origin to a printer. About 75 years ago there was a scarcity of elephant ivory for billiard balls and a cash prize of \$10,000 was offered for a substitute. A young American printer, John Wesley Hyatt, won the award by mixing cellulose nitrate, formed by the action of nitric acid on cotton cellulose, with camphor and treating them with heat and pressure. Thus was created celluloid, the world's first plastic.

If you would like to have samples of Plastic Printing Plate, Plastic Sheeting and Plastic Book Binding, you can secure the Plastics in Printing Unit of THINGS of science, a kit prepared by Science Service, by sending 50 cents to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and asking for THINGS Unit No. 68.

Science News Letter, July 6, 1946

### MEDICINE

## Seaweed Chemical Stops Bleeding in Surgery

➤ SOON TO BE added to other aids for stopping bleeding during surgical operations is a gauze-like material from seaweed developed under the direction of Dr. James J. Eberl and Dr. John Henderson of the Johnson and Johnson Research Laboratories.

To be sold under the name of Hemo-Pak, the new material can be sterilized just as ordinary surgical dressings are and can be safely left in the wound when that is sewed up. Ultimately it is absorbed and carried away by body fluids.

The material owes its ability to stop bleeding to alginic acid extracted from seaweed. The anti-hemorrhage action of this seaweed chemical in powdered form has long been known. Converting it into the gauze-like material the surgeon can use readily was achieved through several years of intensive research.

Science News Letter, July 6, 1946

## Do You Know?

World records of lifting heavy loads to great heights by airplanes have been recently broken by B-29 Army planes; one lifted a 2,200-pound load to 45,000 feet altitude and another 11,000 pounds to 42,780 feet.

*Beechwood pulp* is the source of 90% of Germany's rayon production; it is preferred in that country to birch or poplar because of its low methanol-benzene extract.

All centipedes feed upon insects and other small animals, and all inject a poison into their victims as they bite which anesthetizes the prey so that it can be eaten at leisure.

The United States, the United Kingdom, France, Germany and Japan were the principal users of natural rubber in prewar days.

*Silica sand* in the Florida belt from Miami to West Palm Beach is thought by some experts to be suitable for the manufacture of high-grade glass.

Eggplants are suggested for meatless days; they have high nutritive value.

More than half the cotton grown in the United States is sold abroad.

### ENTOMOLOGY

## Dragonflies Food for Ducks, But Kill Bees

➤ DRAGONFLIES, frequently located around ponds and lakes by their shimmering wings, are among the most important lesser carnivorous animals. They are well known to fishermen who use them in the immature stage for bait.

Many species of fish eat dragonflies in their nymphal or immature stage. These nymphs, found sprawling on the bottoms of ponds or climbing among aquatic plants, often constitute as much as one-half or three-quarters of the food consumed by such fish as bass and freshwater trout, states Dr. Mike Wright of Tusculum College, Greeneville, Tenn.

Fish that eat adult dragonflies can catch them only when they are depositing eggs. Species of dragonflies that back down beneath the surface of the water to deposit their eggs in plant tissues stand a greater chance of being seized than those that broadcast their eggs while in flight by dipping the tip of the abdomen into the water, Dr. Wright reports.

Dragonflies in the immature stage form an important part of the diet of ducks, particularly the diving species that forage in marshy or aquatic areas where dragonfly nymphs are present. They compose almost a quarter of the total food consumed by young ring-necked ducks.

Flies, mosquitoes and gnats are eaten by practically all species of dragonflies, especially when the pests occur in large numbers. Yet it seems that although large numbers of the insect pests are destroyed by dragonflies, little or no actual control is effected by these predators.

But dragonflies aren't always man's friend. They are particularly notorious bee-killers, for example. Two species in the South have been found to destroy both queen and worker bees. In regions where there are a large number of dragonflies, the damage is sometimes so great as actually to keep queens and package bees from being produced for market.

Whereas large fish feed on the nymphs, the larger nymphs in turn cause considerable destruction among the smaller fish, particularly in hatchery ponds. Sometimes half or more of the fish are lost in this way.

Dragonfly nymphs and adults serve as intermediate hosts for a large number of flukes, spreading these parasitic worms where they can do much harm among poultry, frogs and other animals.

### SURGERY

## Removing Tuberculous Lung is Successful

➤ SUCCESS IN treating tuberculosis by surgical removal of an entire lung was reported by Dr. Richard H. Overholt, of Brookline, Mass., at the meeting of the National Tuberculosis Association in Buffalo, N. Y.

In a group of 88 patients operated on between 1934 and 1944, 76 survived the operation. Of these 80% are living and 67% are "clinically well," he reported.

The operation of removing a lung is becoming a progressively safer form of treatment due to improved technic which reduces serious complications. It is still too soon, Dr. Overholt stressed, to draw final conclusions as to its value.

The risk in removing an entire tuberculous lung is now about 10% and of a lobe of a lung less than 5%. The operation, Dr. Overholt emphasized, should be used to supplement, not to compete with, other established methods of treatment. It is not a substitute for thoracoplasty, by which parts of the ribs are removed to collapse the tuberculous lung.

The patients Dr. Overholt reported had all been treated unsuccessfully by other methods or had such extensive disease that collapse of the lung would obviously not help them.

Science News Letter, July 6, 1946

### YOUR

# HAIR

## AND ITS CARE

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

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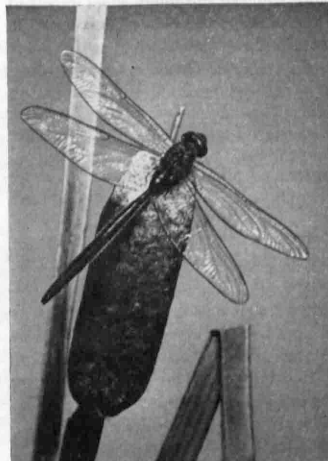
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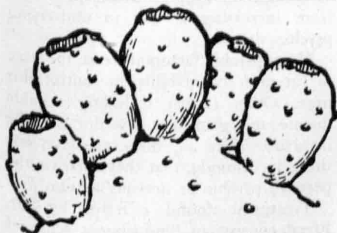
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FOOD FOR DUCKS—Dragonfly resting on a cattail. Picture by George A. Smith, Quarryville, Pa.



Fruit of the Desert

► THE FRUIT of the prickly-pear cactus is almost literally a contradiction of the proverbial impossibility of gathering figs from thistles. Even on Eastern markets, prickly-pear fruit is often offered in little boxes or baskets, like fresh figs. Its clientele is relatively small, but devoted.

Tourists in the Southwest, seeing clumps of prickly-pear cactus with clusters of ripe fruit, are often tempted to gather a few for themselves. If inexperienced, they had best beware: there are no long spines on the fruit as there are on the flat joints of the plant, but in the seemingly innocuous little spots that sprinkle their surfaces are something

much worse—bundles of tiny barbed prickles that get into the tongue and the cheek linings and make them sore for days afterwards. With sufficient skill, it is possible to impale one of these "pears" on a sharp stick and peel it with a pocket-knife—but the penalty for overlooking even one of these prickle-clusters is severe.

The un-prickled prickly pears that you find on the market are harvested from cultivated cacti, most of them probably descended from the spineless cactus introduced by Luther Burbank a generation or so ago. Nearly spineless cacti are often found growing wild, but Burbank apparently took one or more of these natural variants and by selection for freedom from spines succeeded in improving on the original forms. His spineless cactus did not prove the boon to the Western stock-raising industry that he hoped, but as a source of a pleasantly tart fruit novelty it has done very well. There are some who carp at the number of angular seeds in a cactus "pear"; but if you have patience enough to eat a pomegranate you will appreciate cactus fruit.

For unknown generations, cactus fruits have been a regular part of the diet of some Southwestern Indian groups. They, however, do not confine themselves to the use of prickly-pear; in fact, their principal source is the giant sahuaro or tree cactus, which, of course, yields bigger harvests.

*Science News Letter, July 6, 1946*

Dr. Rhoads states. In one kind of cancer of the lung, limited experience with one of the nitrogen mustards has been favorable enough to encourage further trials.

*Science News Letter, July 6, 1946*

## From Page 4

First, marine bacteria will form films on the steel plates; these films will give foothold to later comers. Soon the decks, upper works, masts, funnels, everything will carry a mixed population of barnacles, sponges, sea anemones, mollusks and other "rooted" animals. Brilliant fishes will swim in and out of the observation towers and the ack-ack positions. Crabs will sidle across the sloping decks, octopuses will lurk in the gun-ports.

But this will not be forever. The coral will come. Coral is not the first thing to grow on newly available sites in the warm seas, but it is almost always the last. It will appear among the myriad other animal forms, gradually spreading and growing higher and thicker, until the entire wreck is encrusted. Nothing about the sunken ships "but undergoes a slow sea-change into something rich and strange."

After centuries, nothing will be discoverable about the once proud vessels of war but masses of coral. Oceanographers of that day may wonder a little over their somewhat atypical shape.

*Science News Letter, July 6, 1946*

## MEDICINE

# Gas Aids Cancer Study

► ONE OF THE nitrogen mustard gas now under trial as a possible remedy for some kinds of cancer and cancer-like diseases will be distributed free to qualified institutions for scientific investigations through the committee on growth of the National Research Council, Dr. Cornelius P. Rhoads, chairman, announces in a report. (*Journal, American Medical Association*, June 22).

So far, 160 patients suffering from cancer and cancer-like diseases have been treated with one or the other of two nitrogen mustards, Dr. Rhoads reports. The compounds have been studied at Yale, the University of Chicago, the University of Utah and Memorial Hospital in New York City with the cooperation of the Chemical Warfare Service.

The nitrogen mustards are not a cure for such cancerous diseases as have been

studied, Dr. Rhoads states.

They are injurious to many kinds of body tissue when given in large enough doses. Chief poisonous effect is on blood formation.

Tumors or cancers grow smaller when these chemicals are used in treatment but the change is temporary and rarely lasts more than several months. Patients with Hodgkin's disease improve but relapse within two weeks to a few months. Further treatment may again bring improvement but for a shorter period.

Results in leukemia are disappointing, it appears. In one kind of lymphosarcoma the nitrogen mustards seem to help but so does radiation treatment.

In any active, extensive cancerous condition which has not been controlled by other treatment, experimental use of the nitrogen mustards is probably justified,



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## CHEMISTRY

# New Materials in Paints

► PAINTS ARE NOT what they used to be. They are better, thanks to chemists and technical men who have found new constituents for them and better methods of preparation, Dr. J. J. Mattiello, of the Hilo Varnish Corporation, told the American Society for Testing Materials in the annual Marburg lecture.

Dehydrated castor oil is used as a substitute for imported tung oil, chemically treated natural oils are included as drying oils, and titanium dioxide, as a pigment, is replacing lead in part. Other new materials have come into use in the past decade.

In outside house paint, the pigmentation trend seems well established toward lower lead and increased titanium dioxide, and the trend will continue.

The formulation of outside house paint, Dr. Mattiello said, over the past 20 years has seen many changes in the composition of the pigment, but the vehicle has remained practically unchanged, being about 90% binder and 10% thin-

ners and driers.

The earliest historical use of coatings was for decoration. Other uses are protection of structural and technical materials, and to obtain better distribution of light or greater illumination of objects.

Shortages during the war of long-used materials, and the need for protective coatings for war equipment under every sort of climatic condition, forced manufacturers to use different materials and to develop new coatings.

Drying oils, he stated, presented a particular problem. Tung oil, the king of driers, was available only in small quantities. One solution was the development of additives that speeded up the bodying of domestic and other natural oils, making them usable.

Dehydrated castor oil was the first chemically treated oil extensively used as a replacement for tung oil. By dehydration, the castor oil is chemically converted into a drying oil.

Science News Letter, July 6, 1946

## MEDICINE

## Re-Educate Appetite To Lose Weight

► DON'T COUNT your calories but re-educate your appetite.

This advice to fat people who want to lose weight will surprise many, but it gives good results as shown by records of patients who lost up to 100 pounds, reported by Dr. M. M. Kunde, of Northwestern University Medical School and the Out-patient Endocrine Clinic of Cook County Hospital, at the meeting of the Association for the Study of Internal Secretions.

The patients he reported had all previously been told by physicians that their excess weight was due to glandular disorder and some of them did show evidence of specific sex gland, thyroid or other disorder.

They lost weight through treatment which did not include any glandular products or hormones. Nor were the advice and services of dietitians used.

"Weight reduction in these patients," Dr. Kunde stated, "was handled as any other major medical problem and patients reported directly to the physician.

The importance of mental and emotional factors in overweight was stressed

by Dr. S. Charles Freed, of San Francisco.

Overweight, he declared, is not a glandular disturbance except in rare cases. It results from the patient expending fewer calories in energy than he takes in his food. The inability to control the intake of food to the level which keeps weight from increasing is due to underlying psychic drives.

Many psychic factors increase the urge to eat and the inability to control this urge. Other factors including organic disease and glandular disorder may be involved. They all, however, have one thing in common, that they increase the person's psychic or nervous tension.

Treatment found effective by Dr. Freed consists in "inducing a sense of well-being in the patient" by correcting any organic, glandular or psychic disorder. In addition benzedrine sulphate, popularly known as "pep pills," is used to curb appetite and establish "a high morale so that the patient is encouraged to continue depriving himself of the pleasure of eating."

Science News Letter, July 6, 1946



**CHAINED**—This punch press operator is happy to be chained to his machine at SKF Industries, Inc. This safety device synchronizes movements of the operator's hands with those of the machine, and snatches his hands out of the way if he fails to move fast enough.

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# Books of the Week

**ALCOHOLISM IS A SICKNESS**—Herbert Yahraes—*Public Affairs Committee*, 32 p., illus., paper, 10 cents. Up-to-date, scientific facts about alcoholism the disease, recommending rational and humane steps of the public needs to take on this social problem.

**ATOMIC ENERGY IN COSMIC AND HUMAN LIFE: Fifty Years of Radioactivity**—George Gamow—*Macmillan*, 161 p., illus., \$3. A picture of the problem of atomic energy, answering the question: What is it? Where did it come from? And how can it be used for better or worse?

**A COLLEGE PROGRAM IN ACTION: A Review of Working Principles at Columbia College**—*Columbia Univ. Press*, 175 p., \$2. A record of the experience of 25 years of general education in Columbia College, describing how such a program has been carried out and how it has developed and changed.

**THE GULF STREAM**—Ruth Brindze—*Vanguard*, 63 p., illus., \$2.50. A story for children of the river which flows through the ocean. Attractive and instructive illustrations by Helene Carter.

**HANDBOOK OF SOUTH AMERICAN INDIANS: Vol. 1, The Marginal Tribes**—Julian H. Steward, Ed.—*Government Printing Office*, 624 p., maps and illus., \$2.75. The archeology and ethnology of the primitive hunting and gathering tribes of eastern Brazil, the Gran Chaco, the Pampas, Patagonia, Southern Chile, and Tierra del Fuego. Smithsonian Institution, Bureau of American Ethnology, Bull. 143.

**HANDBOOK OF SOUTH AMERICAN INDIANS: Vol. 2, The Andean Civilizations**—Julian H. Steward, Ed.—*Government Printing Office*, 1035 p., maps, tables, and illus., \$4.25. The high-culture, farming peoples of the Andean Highlands and the Pacific Coast from Columbia to Central Chile. Smithsonian Institution, Bureau of American Ethnology, Bull. 143.

**INTRODUCTION TO ATOMIC PHYSICS**—Henry Semat—*Rinehart*, 412 p., tables and illus., \$4.50, rev. ed. A textbook for a one-semester's course in which the students have had one year of general college physics and a course in calculus. This revised edition contains new information on the betatron, the nucleus, etc.

**THE LAND RENEWED: The Story of Soil Conservation**—William R. Van Dersal and Edward H. Graham—*Oxford Univ. Press*, 109 p., illus., \$2. A vivid story of how our land can be saved for ourselves and for future generations.

**LORAN HANDBOOK: For Shipboard Operators (Ships 278)**—*Government Printing Office*, 68 p., diags. and illus., paper, 30 cents.

**MODERN ORGANIC FINISHES: Their Application to Industrial Products**—Rollin H. Wampler—*Chemical Publishing Co.*, 452 p., illus., \$8.50. A presentation of practical commercial methods of preparing surfaces for finishing, applying organic protective and decorative finishes, and drying these finishes.

**THE MOSQUITOS OF THE SOUTHERN**

**UNITED STATES EAST OF OKLAHOMA AND TEXAS**—Stanley J. Carpenter, Woodrow W. Middlekauff, Roy W. Chamberlain—*Notre Dame Univ. Press*, 292 p., illus., \$4.00. Specific descriptions and illustrations showing diagnostic features of adult females, male terminalia, and larvae; distribution records for each species and data about medical importance and biometrics.

**PAPER BULLETS: A Brief Story of Psychological Warfare in World War II**—Leo J. Margolin—*Froben Press*, 149 p., illus., \$2.50. An outline of both Allied and enemy propaganda in this war.

**PEOPLE IN QUANDARIES: The Semantics of Personal Adjustment**—Wendell Johnson—*Harper*, 532 p., \$5. A book about the problems people encounter in living in a world where there are other people and a discussion of these problems and of ways of dealing with them in terms of general semantics—a point of view which emphasizes those aspects of scientific method which are useful in daily living.

**REVIEW OF THE NEW WORLD SPECIES OF HIPPODAMIA DEJEAN (COLEOPTERA: COCCINELLIDAE)**—Edward A. Chapin—*Smithsonian Institution*, 62 p., illus., paper, 35 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 11.

**SCIENCE FOR DEMOCRACY**—Jerome Nathanson, Ed.—*King's Crown Press*, 170 p., \$2.50. Essays and discussions by scientists on the general topics: Science in the National Economy; The Challenge of Science to Social Thinking; Does Private Industry Threaten Freedom? The Role of Science

in the Determination of Democratic Policy.

**SMALL BOATS FOR SMALL BUDGETS**—Jerold Oakley—*Cornell Maritime Press*, 146 p., diags. and illus., \$2.50. Advice on how to buy a good boat and how to take care of it, written for those with \$50 to \$1,000 to spend.

**VOCATIONAL EDUCATION IN THE YEARS AHEAD: A Report of a Committee to Study Postwar Problems in Vocational Education**—*Government Printing Office*, 329 p., tables and illus., paper 50 cents. A survey of the fields of agricultural, business, homemaking, trade and industrial education, and public service training; and data on occupational information and guidance.

**VOLCANOES: New and Old**—Satis N. Coleman—*John Day*, 222 p., illus., \$3.75. A book written to satisfy a growing interest in volcanoes, written not for the scientist, but for the general reader, and discussing the causes of volcanic activity, volcanic materials, varieties of volcanoes, and their geographical distribution.

*Science News Letter*, July 6, 1946

The chemical weed killer, 2,4-D, is hardest on broad-leaved plants and easiest on grasses; it will kill dandelion and plantain in the lawn, and may attack clover.

*Malaria* is an 18th century Italian word meaning "bad air."

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# • New Machines And Gadgets •

❁ **RADAR UNIT**, for school or home demonstration, resembles a large flashlight, weighs four pounds, and operates on ordinary house current. It converts the current into five-inch electromagnetic waves which can be focused into a beam, and reflected from metal objects as radar waves are reflected from a ship or plane.

Science News Letter, July 6, 1946

❁ **CEMENTED carbide "lead"** replaces the ordinary lead in any automatic pencil to make a tool for writing on metal, glass or other hard surfaces. Though it looks like pencil lead, it will not write on paper. A silicon carbide stone is used to sharpen this tiny rod of the hardest metal known.

Science News Letter, July 6, 1946

❁ **PRESSUREGRAPH**, with a cathode-ray oscillograph, provides a linear pressure-time curve on the screen which indicates the performance of any engine, pump or other device subject to pressure variations. It shows instantly the erratic operation of devices that can not be observed otherwise.

Science News Letter, July 6, 1946

❁ **MAGNESIUM RUNGS** for ladders are hollow, slightly square in cross-section, and have a corrugated surface that insures firmer footing. Lighter in weight than those made of wood, the ladder is easier to handle.

Science News Letter, July 6, 1946

❁ **ENVELOPE OPENER** slices off the crease in the envelope and in no way in-



dures the contents or the postmark. It is a simple device, as the picture shows, operated with an easy pull on a lever. With it, 30 to 40 letters can be opened in a minute.

Science News Letter, July 6, 1946

❁ **NON-DRIP faucets** for household and other uses turn off easily because the shut-off of the valve mechanism operates in the same direction as the water flow, thus water pressure aids in closing the valve. If left open enough to drip, the water pressure closes the faucet completely.

Science News Letter, July 6, 1946

❁ **FISHING DEVICE**, to help keep a hooked game fish from pulling away, is a small parachute-like attachment inserted into the fish-line; it opens when

the fish is running away and makes a drag. When the fisherman pulls harder than the fish, the chute closes.

Science News Letter, July 6, 1946

❁ **COLD CATHODE fluorescent lighting fixture** for commercial use is instant starting and carries either two or four lamps, nearly eight feet long, whose operating life is claimed to be normally 10,000 hours. Safety features prevent possibility of shock when changing lamps.

Science News Letter, July 6, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 318.

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## Question Box

### AERONAUTICS

What new device will save air crash victims? p. 9.  
What new army bomber is larger than the B-29? p. 8.

### ALLERGY

What caused the first case of skin allergy found on a horse? p. 5.

### BIOCHEMISTRY

How does the chemical composition of the body change during prolonged fasting periods? p. 5.

### CHEMISTRY

Name some of the new products scientists predict will come from fluorine. p. 2.

### ECOLOGY-ATOMIC ENERGY

What insecticide has preceded the atomic bomb at Bikini and may have some effect on the record made by the bomb? p. 3.  
In what way will cancer research benefit from the atomic explosion? p. 3.

Where published sources are used they are cited.

### ENGINEERING

How can doomed oil wells be made to produce again? p. 6.  
How can concrete floors be made resilient and easy on the feet? p. 5.

### ENTOMOLOGY

What important service does the dragon fly give? p. 12.

### MEDICINE

By what means can TB germs in the air be killed? p. 7.

What chemical may prove to be a remedy for athlete's foot as well as ringworm? p. 6.  
What latest medical discovery helps sclerosis patients? p. 9.

What chemical has proved successful in treating two kinds of cancer? p. 2.  
What of the war gases aids in cancer research? p. 13.

### NUTRITION

What new vitamin is essential to the body's needs as well as the diet? p. 7.

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