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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JANUARY 1, 1944

Into the Future

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A SCIENCE SERVICE PUBLICATION

MEDICINE

Paralysis Patients Saved

Operation which cuts an opening through the throat into the windpipe saves two suffering from bulbar type of disease in which breathing was affected.

➤ NEW HOPE that an operation for saving lives of infantile paralysis patients suffering the serious bulbar type of the disease in which breathing is affected, appears in a report by Dr. T. C. Galloway, of Evanston, Ill. (*Journal, American Medical Association,* Dec. 25, 1943)

The operation, called tracheotomy, consists in cutting an opening through the throat into the windpipe. This operation, Dr. Galloway reports, "undoubtedly saved" the lives of two patients who were dying because of the breathing difficulty caused by infantile paralysis. A third patient might have been saved, he believes, if it had been possible to operate 10 minutes earlier.

Penicillin, the report shows incidentally, may not be effective in this disease. One of the patients was given 60,000 units in 36 hours with no lowering of the temperature; nor did sulfadiazine help when subsequently tried for one week.

Most infantile paralysis patients with breathing difficulty will recover without operation if seen by a physician early, and well treated during the acute stage, Dr. Galloway states.

With the breathing difficulty, he points out, these patients also have difficulty in swallowing or coughing up saliva and mucus. About a quart of saliva is normally secreted during 24 hours and this may be increased during a nervous disease.

The acutely ill infantile paralysis patient who can barely breathe may be totally unable to get rid of this amount of saliva and is in danger of drowning in it. It will, Dr. Galloway explains, find its gravity level in the throat where it will lie in a pool over and in the airway and cut off the air for which the patient is gasping. Some may be sucked into the lungs and cause trouble there.

Putting the patient in a position such that some of this fluid can drip out of his mouth, and using tubes to suck out some of it, plus a respirator or iron lung to help the breathing muscles, will save many patients. If these measures do not succeed, the operation may save the patient's life and should, Dr. Galloway suggests, be performed before the critical stage, instead of being reserved as a desperate last resort.

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CHEMISTRY

Plastic From Sawdust

Newly developed, black, opaque substance uses less resin than most other plastics and has high tensile strength and moisture resistance.

➤ WASTE SAWDUST and shavings from sawmills and lumber manufacturing plants may be used successfully to make a new black opaque plastic of high tensile strength and high resistance to moisture absorption. Dr. Robert A. Hardin, chairman of the industrial education department of the University of Oklahoma, has developed the plastic after 18 months of experimentation.

Dr. Hardin, a Nebraska farm boy who lived in a sod house for the first 16 years of his life, found that 76% of this country's forest products go to waste before the remaining 24% reaches the consumer. So he set forth on an experimental program in which his university laboratory was transformed into a model manufacturing plant. There he not only produced a new plastic, but also molded the raw substance into useful finished products.

His new plastic development, he discovered, has a tensile strength of 9,000 pounds per square inch, which makes it compare favorably with the best of plastics now in use. The new product is highly resistant to moisture and absorption, and to the action of acids. It is not inflammable.

A disadvantage of the new product, he reports, is that its color must be black. This is because the lignin in the wood turns black in his process of treatment.

To offset this handicap, however, Dr. Hardin's research disclosed that the new opaque plastic can be manufactured at a much lower cost than prevailing plastics. He points out that resin accounts for the greater part of the cost of manufacturing plastics. His formula calls for only 25% of resin, whereas most plastics require a much larger part of the costly material.

In order that his discovery may be utilized, Dr. Hardin has thoroughly investigated costs of necessary equipment for manufacture of the new product. The cost of a plant capable of producing two tons of the plastic daily is estimated at $133,000, including plant location building and total expenses for one year's operation. On this investment, his figures indicate an annual net profit of $14,430—almost 11% annual return on the capital investment.

In view of the difficulty of salvaging diseased and splintered logs at present, Dr. Hardin says it would not be possible to salvage all of the timber that is going to waste, but that the waste which occurs at the sawmills could easily be reclaimed.

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ASTRONOMY

Star in "Water Carrier" Discovered To Be Binary

➤ TWO STARS have been found to compose AE Aquarii, a faint star in the constellation of the Water Carrier, where only one was believed to exist before. This star is of the eleventh magnitude and therefore invisible to the naked eye.

Examination of photographs of the star by Dr. A. H. Joy of the Mt. Wilson Observatory revealed the presence of a close companion revolving around the main star, with a period of less than two days. This is the first time that the binary character of these particular stars has ever been recognized.

The photographs also show the presence of bright clouds of hydrogen, helium and calcium gas surrounding one or possibly both of the stars.

Seven photographs of the spectrum of the star taken during September and October of last year were studied by Dr. Joy. His work introduces a new line of attack in the study of certain variable stars that in their sudden outbursts of luminosity resemble novae.

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GENERAL SCIENCE

Russia Rehabilitates

Ukrainian metallurgists are aiding in the restoration of Donetz Basin iron and steel plants which have been greatly damaged by retreating Germans.

By wireless from Moscow

➤ RETREATING under blows of the Soviet troops, the German armies are destroying everything in their way and have caused tremendous damage to the iron and steel plants of the Donetz Basin. Today Soviet people are working strenuously to restore what the Germans have destroyed and in this program the Ukrainian scientists are playing an active part.

The work of these scientists was described by Ivan Frantsevitch, associate member of the Ukrainian Academy of Sciences, in a report prepared by the Soviet Scientists' Anti-Fascist Committee.

Despite wartime difficulties, outstanding specialists of the Iron and Steel Institute of the Ukrainian Academy of Sciences and all other scientists working in metallurgy have pooled their efforts and are working out practical and theoretical problems of the industry.

Academician Maxim Lugovtsev, director of the Iron and Steel Institute, is working on a thermo-dynamic theory of blast furnace processes. Problems connected with the development of new iron and steel industrial sites of the Kazakh Soviet Socialist Republic of the Urals and distant Siberian regions are being studied under his guidance.

Academician Dobrokhotov and his associates succeeded in improving the production of special chromium alloys, such as chromium manganese and nickel chromium steels.

Pavel Emelyanenko, associate member of the Ukrainian Academy of Sciences, worked out new methods of tube rolling; for this he was awarded the Stalin Prize and decorated with the Order of the Red Banner of Labor.

Academician Georgi Kurdyumov is completing his research work of many years on the phenomena of heat treatment of steel.

Specialists in rolling submitted a reconstruction plan for the tube industry, and Soviet scientists are now working on details such as type and location of plants to be restored.

Restoration of factory laboratories will require a great deal of work. Many Ukrainian iron and steel plants had excellent laboratories, several of which could rival research institutions. One of these was the laboratory of the Makeyevka plant which was equipped with delicate devices for testing the structure of metals. All these laboratories were destroyed by the Germans.

Now workers have been organized to aid in rebuilding the laboratories, and a special organization is being created in the Ukraine for restoring up-to-date factory methods. A group of scientists, including Academician Lugovtsev, is preparing to leave for the Donetz Basin to help organize the work of reconstruction.

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MINERALOGY

Bolivian Tin for Allies

Ore is a number one war essential to the Allies. Recent governmental overturn in Bolivia should not affect the supply of tin exported to the United States.

➤ BOLIVIA'S TIN is a number one war essential to the United States and the United Nations generally. The overturn of the Bolivian government, just effected, should not decrease the supply of tin ore, since Bolivia recently declared war on Germany, but directly or indirectly it may.

Bolivia is primarily a mining country. In pre-war days it produced about one-sixth of the world's annual supply of tin ore. It produced many other metals; but tin became the all-important metal after sources in British Malaya, the East Netherlands, Thailand, China and other places in the Far East were cut off by the Japs. The large tin smelter constructed as a war measure in Texas by the United States government uses Bolivian ore. Bolivia has no smelters of its own.

Bolivia, located at high elevation on the Andean plateau, has no seaport. Between it and the Pacific ocean lie Peru and Chile. On its north and east is Brazil, on its southeast and south are Paraguay and Argentina. Some of its drainage is into the Paraguay river (called Parana south of the Paraguayan border) but most of it is by tributaries of the Amazon.

The principal railroad of Bolivia connects its capital, La Paz, which is near the Peruvian boundary, with Arica on the coast of Chile. The road, from 250 to 300 miles in length, runs southwesterly from La Paz without touching Peru. About one-third of its mileage is in Chilean territory. Nearly 100 miles of Chile separates Bolivia from the Pacific.

In size Bolivia is nearly as large as Arkansas, Louisiana, Oklahoma and Texas combined. It contains 416,000 square miles, less than 60% of its area in 1900. Its population in 1940 was approximately 3,500,000, three-fourths of which was Indian or mixed bloods.

Bolivia and Paraguay are the only South American countries without sea-

***FOR THE SHIPWRECKED**—This new navigation instrument for life-raft use can be located easily if it falls overboard. Made of Plexiglas, it weighs only about a pound, floats and can be seen even at night for 25 feet. If a shipwrecked sailor has this instrument he doen't need a nautical almanac, sextant or compass. It was invented by F. H. Hagner of San Antonio.*

coasts. Paraguay has river transportation down the Parana to the La Plata and the South Atlantic. Bolivia's desire for a little of northern Chile, or a little of southern Peru, has been the cause of interior trouble in the past and is reported to be one of the factors in the present situation. Wages for miners is another source of dissatisfaction and caused conflicts, resulting in bloodshed, in 1942 between the miners and the government.

One result of this conflict was an investigation by a special United States commission, as interruption to mining would make impossible the delivery of tin and tungsten ore for which the United States had previously entered into contract with Bolivia. Under this contract the United States agreed to buy 18,000 tons of tin annually for five years, and 3,000 tons of tungsten for three years.

In July, 1942, the American government agreed to increase the amount of both tin and tungsten to be purchased. Also it loaned Bolivia $25,000,000 for the construction of four major highways, the establishment of a national sugar industry, the stimulation of petroleum production and other economic purposes.

Tin ore constitutes over 75% of Bolivia's export trade. Tungsten, antimony, copper, silver, lead, zinc and bismuth are other important mining products. Prior to the war Bolivia was producing approximately 240,000 barrels of petroleum annually. In 1942 the Bolivian government agreed to pay the Standard Oil Company of New Jersey $1,750,000 for oil property expropriated in 1937.

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MEDICINE

Draft Boards 80% Correct

Reexaminations by specialists prove that local examiners of men slated for induction into the Army were right in most of heart defect rejections.

➤ LOCAL examining boards and induction stations which rejected about 100,000 of the first 2,000,000 men for Army service because of disorders of the heart and circulation were more than 80% correct, it appears from a report by Dr. Robert L. Levy, of New York, Dr. William D. Stroud, of Philadelphia, and Dr. Paul D. White, of Boston. (*Journal, American Medical Association,* Dec. 18, 1943)

When a sample group of 4,994 of these 4F's were reexamined by specialists in heart and blood vessel disorders, less than one-fifth (17.3%) were resubmitted as 1A's.

The rejections for heart and circulation disorders, including high blood pressure, accounted for about 10% of all rejectees, which seemed excessively high for men between 18 and 38 years old. Because of this, a committee of the National Research Council recommended reexamination of 1,000 4F's in each of five cities: Boston, Chicago, New York, Philadelphia and San Francisco. These cities were chosen because of the availability of specialists in each to make the reexaminations. Costs of the study were met by the Selective Service System and a grant from the Office of Scientific Research and Development.

Extending these reexaminations in order to salvage more men for the Army is not considered wise in view of the relatively small percentage that could be reclassified as 1A, the time involved and the few expert examiners available.

Chicago yielded the lowest salvage (3.8%), apparently because specialists had already been used there to help decide on doubtful cases. This procedure might profitably be followed throughout the country, the report states.

The chief cause for rejection in the sample group reexamined was rheumatic heart disease, which accounted for about half the rejections.

High blood pressure came second, neurocirculatory asthenia third, sinus tachycardia fourth, and congenital heart disease fifth.

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CERAMICS

Glazed Earthenware May Be Used for Bathtubs

➤ DIRT-GATHERING cracks in bathtubs, sinks, laundry trays and other large plumbing fixtures customarily made of porcelain will not mar the appearance of these fixtures when they are made of newly developed vitreous glazed earthenware, similar in make-up to glazed china tableware. Production of the vitreous glazed earthenware is now governed by a standard recently issued by the National Bureau of Standards.

Greater strength and durability of earthenware products are assured because of stringent tests written into the standard, some of which are not required in the production of porcelain fixtures.

Tests for thermal shock guarantee greater resistance of the earthenware products to sudden applications of extremely hot or cold water. A test for the tendency of the material to develop minute cracks or flaws, technically called

SCIENCE NEWS LETTER
Vol. 45 JANUARY 1, 1944 No. 1

The weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C. NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

Entered as second class matter at the postoffice at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566; and 360 N. Michigan Ave., Chicago, STAte 4439.

crazing, has also been written into the standard. Neither of these tests is required in the production of the porcelain counterparts.

White in color, the new earthenware products are not as heavy as the older types of porcelain plumbing fixtures. Because of their greater resistance to surface imperfections, the glassy-finished earthenware products will probably replace in due course the customary porcelain fixtures, the National Bureau of Standards predicts.

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ASTRONOMY

Orion and Relativity

Constellation's famous Trapezium stars may have the combination of large mass and small size required to produce an observable Einstein shift.

➤ EVERY AMATEUR astronomer who possesses even the smallest of telescopes has turned it to the great nebula in the sword of Orion and discovered the four brilliant, blue stars buried in the nebulosity which form the Trapezium.

It is on his spectrographic study of these four stars that Dr. Otto Struve, director of Yerkes and McDonald Observatories, reported to the American Astronomical Society in Cincinnati. Dr. Struve and Dr. John Titus, a Yerkes astronomer, jointly observed the Trapezium stars in March and April of last year, but they found the spectra of the stars difficult to measure because the bright, emission lines of the nebula itself were superimposed over the stellar spectrum in each case. They were, however, able to determine that the lines of the Trapezium stars were displaced toward the red end of their spectra more than the emission lines from the Orion nebula.

The usual interpretation of the shift of lines in a spectrum, other factors being accounted for, is that the star is approaching us if the lines are shifted toward the violet and receding from us if the shift is to the red. The average velocity of recession for the nebula is about 10 miles a second, but the Trapezium stars show red shifts indicating that they are going away from us nearly twice this fast. They have always been thought to have been closely associated with the nebula, so it is surprising to find that they are apparently moving as a group through it, and will some day be out of its vicinity.

An alternative explanation was suggested by Dr. Struve, however, for he called attention to the probable large masses of these stars. As they are blue stars with very hot surfaces, they can be ordinary stars and still shine as brightly as red giant stars many times their size. This combination of large mass and small size is just what is required to produce an observable Einstein or relativity shift in the spectrum of a star. The large mass produces a strong gravitational field, particularly strong in a small star because its surface is close to its center. Light escaping from such a field loses some of its energy on the way out and appears redder than normal.

It was in the white dwarf stars, such as the companion of Sirius, which has a density 50,000 times that of water, that the relativity shift predicted by Einstein was first actually observed, helping to prove his theory. Dr. Struve's extension of observations to more ordinary stars such as those in the Trapezium represents a triumph of observational astronomy. This is, however, only proposed by Dr. Struve as a substitute to considering that the four stars are moving through the nebula, and that it is not known now which alternative is the true one.

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ORDNANCE

New Lightweight Gas Mask Has Canister on Cheek

➤ A NEW TYPE of lightweight "assault service mask," sporting a new profile, has been developed by the Chemical Warfare Service.

Designed to protect the wearer against all known war gases, the new mask has the air-purifying canister attached to the left cheek of the facepiece. This provides minimum interference with vision and rifle firing. Formerly, a hose vaguely resembling an elephant's trunk connected the facepiece with the canister which was carried at waist level.

The improved carrying case is made

NEW TYPE—This lightweight "assault service" gas mask has recently been developed by the Chemical Warfare Service. Most striking difference in its appearance compared to the old type mask is the air-purifying canister protruding from the cheek of the mask.

of an impermeable coated duck material. It contains a full-length cape for protection against blister-producing gases, lotions for burns received from contact with these gases, and a cleaning preparation for the mask.

Straps on the new carrying case are arranged so that the mask may be carried conveniently in the normal carry position (at the left side and to the rear), on the chest for use when driving, in a knapsack position, or in a leg carry position. The latter is especially desirable in hot climates, where men strip to the waist while working.

Including facepiece, canister and carrier, the assault service mask is smaller than a briefcase, weighs only 2.8 pounds, and can float in water. This gives considerable advantage over the former type of gas mask which weighed approximately six pounds and could not float, thus providing an additional burden to soldiers fording a stream or evacuating a ship.

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FIERY MISSILE—With Nazi propagandists busily spreading dark hints about "secret" super-rockets intended to soar across the Channel and blast Britain, unusual interest attaches to this picture taken in Sicily by the U. S. Army Signal Corps. It is of a captured German incendiary rocket of 32 centimeter (12.6 inch) caliber. The framework in which it rests serves both as shipping crate and launching cradle. It is shown here in firing position.

NUTRITION

No Nutritional Crisis

Though many may not like wartime diet, Americans are eating more nourishing meals than before the war. Nutritional status of the people is improved.

➤ AMERICAN civilians are better fed and better nourished today than they were during pre-war years, though many may not like their wartime diets, Dr. Frank L. Gunderson, executive secretary of the National Research Council's Food and Nutrition Board, reported at the meeting of the Institute of Medicine of Chicago.

"There is no nutritional crisis and the probabilities are there will be none," he declared.

Measuring food supplies against the National Research Council's diet yardstick shows, he stated, that "despite partial shortages of certain foods which are particular favorites, the over-all dietetic quality of foods, not only available but actually being consumed by the civilians in 1943, is considerably better than it was in the pre-war period.

"Clinical nutrition experts," Dr. Gunderson continued, "report an improved nutritional status of the people in their territories as compared to the same people in pre-war years."

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Malnutrition in Draftees

➤ AN IDEAL opportunity for learning exactly what proportion of the population suffers from poor nutrition is afforded by Selective Service and Army induction examinations, Col. Leonard G. Rowntree, chief of the medical division of Selective Service, declared.

Peacetime Selective Service examinations showed that 3.2% of the registrants had specific nutritional defects such as beriberi, scurvy, pellagra, malnutrition, rickets, night blindness and underweight. However, 14 times as many, 43%, had defects of eyes, teeth, blood vessels and so on which may have been partly due to nutritional deficiency

To learn more exactly how many men rejected for other physical and mental defects may also be suffering from nutritional defects, Colonel Rowntree suggests "setting up in several selected areas of the country special boards of expert clinicians specially qualified to detect clinical manifestations of nutritional defects in their own specialties."

Eye doctors, dentists, skin specialists and so on would, according to this plan, observe registrants as they are examined by Selective Service or at Army induction stations and pass on evidences of nutritional deficiency from the standpoint of the eyes, teeth, skin and the like.

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RESOURCES

Food From The Allies To Feed Italy This Winter

➤ THE ALLIES are reported to be helping feed the Italian population now in areas from which the Germans have been driven, and will have to continue to do so until 1944 crops are harvested. Last year's surplus olive oil, citrus products and sulfur may be used in payment, in part at least.

Italy's crops last year are reported good. The season has been favorable. Fertilizers were available. Manpower shortages were overcome. The wheat crop is estimated by the U. S. Department of Agriculture to be the highest ever produced in that country. How much of it will be available to Italians is a question. Their wheat areas are in the Po valley and to the north, where the country is now infested with the German forces. The winter fruit and nut country is also in the north.

Fish food from the Mediterranean can supply much of the need if fishing experts show the way and equipment is furnished. Italy, surrounded by water, has never developed an extensive fishing industry. Sardines from Sardinian waters and tuna from Sicilian seas have constituted the principal export catch. Much other fish may be taken and the Mediterranean is now safe for activities.

"Agricultural production in Italy during the 1943-44 crop year is not expected to be handicapped by any serious lack of commercial fertilizers," states the U. S. Department of Agriculture in a recent release, "unless the Nazis damage or requisition the output of domestic plants which in recent years have supplied

most of the country's nitrogenous fertilizer requirements.

"Adequate phosphate should be available from North Africa. Potash, heretofore supplied almost entirely by Germany, constitutes a very minor part of Italy's annual fertilizer consumption."

The productivity of Italian soil is dependent on commercial fertilizers. The amount used in the past dozen years or so is considerably greater than in previous years. Italy was cut off from North African phosphates for only a short while so that the soil has not been impoverished by war conditions.

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NUTRITION

Retaining Vitamin A

Addition of a small amount of wheat germ oil during preparation of spray-dried egg powder prevents loss of the vitamin.

➤ A SMALL amount of wheat germ oil sharply increases the retention of vitamin A in spray-dried eggs. When treated egg powder is compressed, almost 100% of the vitamin A is retained, whereas the vitamin is largely lost in ordinary egg powder.

These facts have just been discovered at the Western Regional Research Laboratory of the Department of Agriculture. Dr. Harry L. Fevold and Dr. Howard D. Lightbody of the Laboratory report that they found virtually no vitamin A lost in spray-drying eggs, but at each temperature studied, the vitamin was lost in storage. At 15 degrees Fahrenheit this loss occurred in nine months, and at 98.6 degrees within three months.

This vitamin loss could not be checked materially by drying the powder to a very low moisture content such as 1%, nor was it hastened appreciably by a 10% water content.

Various anti-oxidants were tried in an attempt to check the vitamin loss, among them the potent chemical, hydroquinone. None had any significant effect except wheat germ oil, and the vitamin E it contains. In samples treated with wheat germ oil, the vitamin retention was almost doubled in many cases, and in all cases the increased retention of vitamin A was very marked.

Although ordinary egg powder kept only 34% of its vitamin A over the period studied, 56% was held when two per cent of wheat germ oil was added to the liquid egg during the drying. Compressed ordinary dried eggs retained 48% of the vitamin A, but when egg powder treated with wheat germ oil was compressed at 1,200 pounds per square inch, 100% of the vitamin was retained for six weeks at a temperature of 98.7 degrees Fahrenheit.

After the egg powder was compressed to form cylinders weighing about four ounces, these cylinders showed a strong tendency to lateral cracking, apparently due to the expansion of trapped air inside, when the outside pressure was released. This disintegration of blocks of egg into usable powder facilitates their use, of course, by our armed forces.

Lend-Lease shipped overseas 3,000 pounds of compressed eggs early in 1943, and more recently has bought 70,000 pounds for experimental shipment. The Army has used about 10,000 pounds in field tests. In view of the new findings that compression saves vitamin A, which is needed to avert night-blindness in our fighting forces, a sharp expansion in production of compressed egg powder may be justified.

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ENGINEERING

Glass Fibers Used In Alcohol Manufacturing

➤ GLASS FIBERS are helping the production of industrial alcohol needed by the new synthetic rubber industry and for other war uses in a relatively new application described by Dr. Joseph H. Koffolt of the Ohio State University at the annual meeting of the American Institute of Chemical Engineers, in Pittsburgh.

The glass fibers are used to pack columns employed for the distillation of industrial alcohol, replacing tinned-copper bubble plates generally used for this purpose before the war. Tests in commercial production have now been running for a year or so with the glass fiber and prove that the material is satisfactory.

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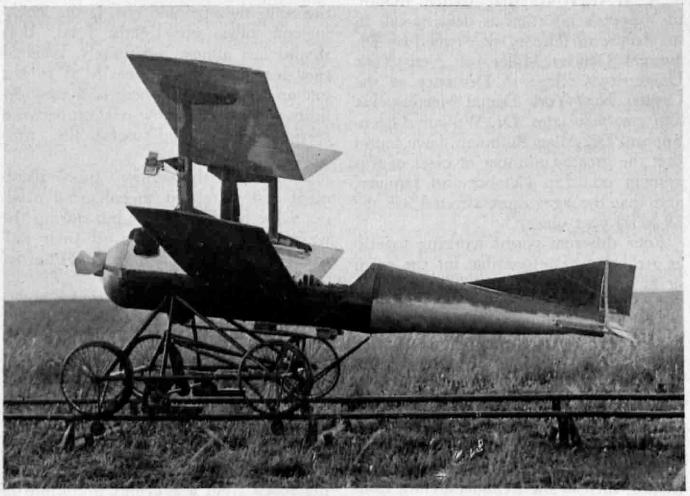

EARLY EXPERIMENT—The German bomb-bearing models are not as novel as claimed. This unmanned, gyroscope-steered, bomb-carrying plane was tried out about 20 years ago at Wright Field by the Army Air Forces, at the direction of the then Assistant Chief of Air Corps, Brig. Gen. William E. Mitchell. The development as a whole was successful but due to the plane's inaccuracy in reaching specific targets, the experiment was discontinued.

GEOLOGY

New Oil-Finding Method Is Based on Fluorescence

➤ A NEW MEANS for seeking hidden pools of oil has just been added to the long list of detection methods already in use. It is based on the fact that petroleum and its products are fluorescent, that is, shine with a light of their own when irradiated with invisible ultraviolet rays.

The method consists essentially in collecting soil samples above suspected oil-bearing areas and turning ultraviolet radiation on them. If petroleum gases have been seeping upward through the soil, the characteristic glow will appear. The inventor, Ludwig W. Blau of Houston, Texas, considers his method valuable only in preliminary reconnaissance of suspected oil-bearing areas; more critical tests are needed for confirmation. He has assigned his patent rights on No. 2,337,443 to the Standard Oil Development Company.

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PUBLIC HEALTH

Trench Mouth Warning Issued for First of Year

➤ A WARNING that trench mouth, or Vincent's infection as dentists call it, may come in January was issued by Dr. Samuel Charles Miller, of New York University College of Dentistry at the Greater New York Dental Meeting. He and two associates, Dr. William Greenhut and Dr. Allan Rothman, have found that the greatest number of cases of this ailment occur in October and January, and that the ages most affected are the 19 to 30 year olds.

Four different germs working together are believed responsible for the germ or bacterial phase of trench mouth, the American Dental Association recently stated. Besides these four germs, there are at least six other conditions which predispose to it. These are: vitamin deficiencies, diseases of the blood and blood-forming organs, allergies, dietary and drink indiscretions, certain feverish and debilitating diseases, and the effects of certain drugs. Conditions in the mouth, such as the irritants arising from lack of proper cleansing and care of the teeth and from defects of the teeth may also predispose to an attack of trench mouth. Many dentists and doctors believe that tobacco smoking also plays a role.

The question of whether trench mouth is "catching" is still debated among dentists and physicians. Contagion, or transmission of the disease in man, has never been scientifically demonstrated, the dental association declared in its statement. Instances of large numbers of cases occurring among soldiers or persons living in institutions may just as well be due to a poor diet eaten by all the people involved or to some other debilitating condition they all experience as to contagion. Inability to cleanse the teeth properly may also account for outbreaks among soldiers in the field.

Patients suffering from the disease, especially in the acute form, however, should take simple sanitary precautions against its spread.

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ENGINEERING

Materials Needed To Make Gasoline Can Be Salvaged

➤ MORE of the materials badly needed for making aviation gasoline can be made at once by "punishing" or overstressing existing production equipment, P. J. Harrington, M.S. Northup and C. O. Rhys, Sr., of Standard Oil Development Co., told the American Petroleum Institute at the meeting in Chicago.

The cracking furnace often has been the bottleneck of production for the entire unit, they pointed out. If the cracking-coil tubes are lightly fired, they should last almost indefinitely, whereas they may be fired so heavily as to last but an hour or so. There is a very definite and unchangeable relation between service severity and useful life, they stated.

Under normal conditions tube-replacement cost is related to enhanced product value by cost figures, but during the war the plants can "live off their fat" so far as equipment is concerned in order to "Keep 'em flying."

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ENGINEERING

Foods Can Now Be Frozen In Two to Four Minutes

➤ THE FLASH-FREEZE machine, developed in the University of Texas laboratories, has reduced the time for freezing foods from a previous minimum of 30 minutes to a matter of two to four minutes, Luis Bartlett, test engineer in the university's bureau of engineering research, states. The rapidity of this method prevents the formation of large ice crystals within the food and the destruction of food cells.

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IN SCIEN

PUBLIC HEALTH

Experts on Alert for Signs Of More-Severe Flu

➤ CAREFUL watch is being kept by influenza experts throughout the nation for any sign that the disease is becoming more severe, Dr. Thomas Francis, Jr., Director, Commission on Influenza, Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army, indicated in an exclusive statement to Science Service.

Since the summer of 1943, Dr. Francis stated, members of the commission, comprised of physicians and scientists in different parts of the country, have maintained a constant watch for the early indication of an epidemic of influenza.

Through this agency, the first indication that influenza was occurring was obtained about the middle of November. Influenza A was identified in the middle west in the states of Missouri, Minnesota and Michigan. Since that time it has spread more widely and members of the commission in other parts of the country have also succeeded in identifying the disease.

At the present time the infection has been essentially mild and no prominent number of important complications has been noted.

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AVIATION

New Type Propeller Blade Eliminates Droning Noise

➤ TO ELIMINATE the snoring propeller drone that constitutes nearly half of an airplane's noise, E. J. Prucha of Convent Station, N. J., has devised a radically new type of propeller blade, much more complex in structure than the type now in use, on which he has received patent No. 2,333,555. Over a metal core for the blade, two layers of rubber are mounted, the inner of sponge rubber, the outer semi-hard. In addition, the greater part of the sides of the blade are covered with a pair of slotted light-metal plates. Openings in these plates, and through the rubber structure beneath, are so arranged that air blasts passing through neutralize propeller noise, the inventor claims.

Science News Letter, January 1, 1944

E FIELDS

CHEMISTRY

Nylon Rope Will Be Widely Used After World War

➤ NYLON ROPE will find extensive peacetime use because of its unusual elasticity, strength, lightness and durability, it is predicted by du Pont scientists who have made large quantities of it available for towing invasion gliders.

Rope made of nylon has a slow, gentle bounce in recovering from a stretch, although it gives rapidly under a sudden pull. It is called an almost perfect shock absorber for the glider towing task. Moreover, it is about twice as strong as manila rope of the same diameter and only half to two-thirds as heavy. Nylon also resists mildew and damage from salt water.

Foreseeing that most of the small cities and towns of America in post-war years will have non-stop air mail pick-up services, it is expected that this use alone will consume considerable quantities of nylon rope. An airplane picks up mail on the fly in somewhat the way a big fish is caught with rod and reel.

Science News Letter, January 1, 1944

RESOURCES

Rules for Conserving America's Rope Supplies

➤ TO KEEP us from getting to the end of our rope, literally, the U. S. Maritime Commission is distributing to each merchant seaman and cadet a collection of 37 rules for conserving our limited rope supplies.

"Virtually the entire world supply of hard fiber was cut off from Allied Nations with the fall of the Philippines," the U. S. Maritime Commission states, in announcing the conservation program.

Here are a few of the 37 rules, which civilians as well as seamen will find helpful in prolonging the life of rope:

1. Be careful to read the instructions on the tag when opening new coils of rope. They are important. To uncoil rope, set the coil on end with the fag ends on top, start coiling with the fag end inside of the coil. By this method, the direction of uncoiling is counter to the direction of the turn and kinking is avoided.

2. Examine blocks (pulleys) for rusty, frozen or broken sheaves at regular intervals. Repair or replace damaged ones immediately.

3. Remove all kinks before putting any strain on rope. The matter of kinking in large ropes is serious because, when a kink has once formed, it is not possible to restore the distorted strands to their correct position.

4. Be careful not to drag rope over sharp edges.

5. Avoid dragging rope over dirty decks, docks or on the ground. Particles of sand, coal, fertilizer and other bulk cargo find their way into the inner sides of the strands and cut the fiber when the rope is being worked.

6. Stow rope away dry. Always examine strands to see that they are dry.

7. Ropes should not be stowed in wet or damp holds or compartments.

8. Taut dry ropes should be immediately slacked off when wet by rain.

Science News Letter, January 1, 1944

INVENTION

Individual Ferry-Boat Devised for Automobiles

➤ AN INDIVIDUAL ferry-boat for automobiles, driven by the car's own power, is the ingenious invention on which patent No. 2,334,932 has been obtained by Dmitri A. Kaloshin of San Francisco. It is a wide-beamed, bluff-bowed vessel, with a gangplank aft over which the car enters. Once aboard, the rear wheels rest on paired rollers through which power is transmitted to a propeller. The front wheels are secured in recesses in a short turntable connected to the rudder with cords; there is play enough to permit steering by means of the car's steering-wheel.

Science News Letter, January 1, 1944

AGRICULTURE

New Cotton-Picker Has Tiers of Spindles

➤ A SOUTHERN inventor, A. W. Weems of Meridian, Miss., presents a new cottonpicking machine as subject for patent No. 2,333,965. It has an array of spindles that pluck the bolls from the plants, but instead of mounting them on a traveling belt or chain it has several tiers of them projecting radially from rotating drums. Within the machine, another series of mechanical fingers strip the cotton off and drop it into a conveyor.

Science News Letter, January 1, 1944

CHEMISTRY

Three New Chemical Analysis Methods Found

➤ THREE NEW and sensitive methods of chemical analysis useful to wartime chemistry were described by Prof. John H. Yoe, University of Virginia chemist, at section meetings of the American Chemical Society in New York State.

Two are based on the formation of highly colored compounds with palladium and iron, while the other involves the formation of a slightly soluble precipitate with tungsten.

The new reagent for tungsten is important at this time because it will replace war-scarce cinchonine, an anti-malarial compound closely related to quinine. Dr. Yoe was assisted by Dr. A. L. Jones, now at Cornell University.

The new reaction for palladium developed by Dr. Yoe and Dr. L. G. Overholser is so sensitive that it is possible to measure one part of the element in 300,000,000 parts of solution.

For iron a new reagent which permits iron determination at concentration as low as one in 200,000,000 parts of solution, was developed by Dr. Yoe, assisted by Dr. Jones.

Science News Letter, January 1, 1944

ASTRONOMY—PSYCHOLOGY

Sun Appears Rose-Colored When Seen Through Smoke

➤ THE SUN can actually appear rose-colored instead of golden, and this isn't just a trick of the imagination. When a large cloud of nearly transparent dissipating smoke comes between the sun and observer, it may take on a rosy tint, declares Dr. C. C. Wylie, University of Iowa astronomer.

"Through dust, the sun's image appears colorless or yellowish, and through haze, the sun's image may even appear bluish," Dr. Wylie reports. (*Popular Astronomy*)

When projecting an image of the sun on a piece of white cardboard with a 5¼-inch refracting telescope, Dr. Wylie and a group of students were surprised to see the entire image of the sun turn to a distinct rose color, the entire disk being uniformly colored.

At the time nothing was visible in the sky which would account for the change in hue. A large cloud of nearly transparent dissipating smoke, invisible at the time, is believed to have produced the color by absorption and scattering.

Science News Letter, January 1, 1944

GENERAL SCIENCE

Science Views for 1944

Forecast shows continued aid to war and post-war activities. Bigger bombers, gas turbines, large scale penicillin production among things predicted.

By WATSON DAVIS

➤ SCIENCE at the beginning of 1944 is still working hard to supply new methods, machines and materials to our fighting forces and to industry. But time is being stolen for a few hopeful glances at the post-war possibilities that science and technology can remodel the future and set the world to rights.

What has already been done in three years of intensive war research since the fall of France is kept largely under the wraps of official secrecy. It is a good guess that just as during the past year the tank-busting bazooka rocket was allowed to appear in public, so the next 12 months may hear of other war-useful achievements of our scientists.

As the air war steps up on both sides of the globe, bombers larger than the Flying Fortress and Liberator will go into service. Planes will ride higher and go farther with greater loads of explosives. Fighter planes, too, will travel faster, shoot more and harder, and more nearly pace the bombers on their forays.

With gigantic invasion pushes in the making on land and sea as well as in the air, we shall learn of any new scientific tricks that may be up the bloody sleeves of our enemies. In this grim poker game of war the chances are that "secret weapons" are largely bluffing and loud talk.

Secret War Research

Scientists cannot and should not talk about secret war research, but many scientists at vantage points in science's march forward have cooperated with Science Service to give their informal opinions as to what important events and progress are likely to occur in 1944. These are blended into a scientific forecast of the future.

Combustion gas turbines applicable to airplanes, vessels and locomotives are foreseen by one of America's top aeronautical engineers. These new type engines, smaller and more efficient than those now fighting the war, may not be ready to get into this war in large numbers but they may well be the engine of the future.

The dream of a helicopter in every backyard may be too optimistic, but there probably soon will be utility type helicopters suitable for private owners.

To provide high-altitude flyers as well as for other uses there is in the offing cheap portable apparatus to make liquid oxygen.

America's rubber independence will be achieved by the end of 1944 when capacity for producing 850,000 long tons of synthetic rubber will have been achieved. This building of a synthetic rubber industry almost from scratch during the war is chemistry's greatest war achievement. The great production of high octane gasoline for our air power ranks close to it.

This is a short wave or high frequency war on the radio front and many new developments in the generation, transmission and utilization of radio in the centimeter region should be expected when the military situation allows announcement.

In the field of industrial electronics the three most promising developments at the moment, a research leader in that field believes, are electronic heating, electronic welding and electronic motor control.

In one branch of science, astronomy, positive predictions can be made. There will be a total eclipse of the sun on Jan. 25 cutting across Brazil and Peru, but it will not be widely observed due to the war.

More Penicillin

Increasing large scale production of the germ-fighter from green mold, penicillin, will be an outstanding medical aid to our armed forces in the new year, and some of this drug may later in the year be available for the general public. It is hinted by research men that the making of penicillin synthetically from chemicals instead of growing it in cultures is not far distant. Determination of

FROM FLASK TO FACTORY—The coming months will see the production of penicillin expanded from preciously small quantities harvested from a few small bottles to mass output on factory scale.

its chemical structure would be a necessary first step.

Other medically-useful substances from the microscopic living things in the soil are likely to be found and used. Some of these may be more useful than penicillin just as penicillin is more effective than the sulfa drugs for many purposes. Diseases hitherto not known to be susceptible to these new chemical germ-fighters will probably be found to succumb to them.

Except for the accident of a major epidemic we can look forward to a continuance of a good U. S. A. health record. Medical authorities are worried because a number of diseases previously of small consequence in this country will be imported by returning troops and probably will be brought into areas where insects that carry them are ready to spread them.

Study Tropical Diseases

Countering this internal danger is the marked progress noted by another expert in the study of tropical diseases and their cause, spread and control, which has resulted from the entrance of American forces into tropical areas. Medical outposts have been established that promise to aid mightily in overcoming these obstacles to the human conquest of the tropics.

The fight on cancer promises to be more successful as the head of a large research program believes that the underlying principles in the genesis of cancer will be made known within the next year or two. This would be a step toward possible prevention or cure.

Millions of Americans are giving blood to be used in saving lives of wounded soldiers and this great service must be continued. Meanwhile scientists are working on animal and synthetic substitutes for human blood. Some of their efforts may begin to be successful in the coming months.

Dental Decay Prevention

Prevention of dental decay through various methods, including fluorides in the drinking water and the use of bone flour, may come closer to realization in the near future.

As the war increases in tempo, the treatment of psychiatric casualties, or what used to be called shell-shock, becomes more important. Mental wounds are often more difficult to heal and more disabling than physical ones. There will be much effort and progress in this field.

How to pick the right man for the right job is extremely important in the military services and in industry, especially during the war. As a result of the stimulation of research on personnel selection, one psychologist believes that this war will do as much for the field of measurement of personality characteristics, such as emotional stability, as the First World War did for intelligence measured by the familiar I. Q. tests.

Psychologists have played a big part in the placement of men inducted into the services, and the coming year should see the beginnings of conversion of that machine in the opposite direction for the training and placement of discharged men in industry.

A new chapter in engineering will be opened, in the opinion of another leading psychologist, when psychologists as well as engineers consult on the building of new automobiles as they have on new war weapons. The "human factor"—how the machines can best be built so that people can run them—is being taken into consideration in designing special war devices. The post-war cars likewise should be designed with the

aid of experimental physiologists and psychologists to best meet human senses and human reactions.

As a by-product of war, new facts about the human past may be dug up, literally. Military excavations, one archaeologist suggests, may expose new archaeological sites and important specimens. Even the anthropologist may have new data on the broad biological make-up of the population of our earth if, as was done at the close of the First World War, there is opportunity for the scientific measurement of groups of soldiers.

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Camera Looks at Future

See Front Cover

➤ THE PICTURE on the cover of this SCIENCE NEWS LETTER is a composition by Fremont Davis, Science Service staff photographer, who made this symbolic view of the future by combining two negatives.

Science News Letter, January 1, 1944

MEDICINE

Penicillin Warning

Home-made chemical from mold may be dangerous to use for medicinal purposes. It is hard to tell right mold and keep it non-poisonous.

➤ A WARNING against certain dangers in "home-made" penicillin and directions on where to get the right strains of the mold that produces this potent weapon against germs are issued by Dr. Kenneth B. Raper and Dr. Robert D. Coghill, U. S. Department of Agriculture mold experts. (*Journal, American Medical Association,* Dec. 25, 1943)

Efforts to produce penicillin for external use in small laboratories or the doctor's kitchen "may constitute noteworthy contributions to the field of penicillin therapy," they state, adding that they do not want in any way to lessen the possible importance of work along this line.

First pitfall that may lead the uninitiated home penicillin producer into dangerous trouble, however, is the matter of selecting the right mold, the scientists warn. *Penicillium notatum,* the mold that produces penicillin, is only one of scores of blue-green molds that grow on bread, cheese or other foods. Some of the blue green molds that look so much like the penicillin-producer are known to be poisonous to laboratory animals. Distinguishing the right mold can only be done by "painstaking laboratory cultivation and microscopic examination."

Not one out of 50 blue-green molds examined by these scientists belonged to the *Penicillium notatum* group. Not more than one out of 100 belonged to the *Penicillium notatum* species, and only a few of these of the right species produced appreciable amounts of penicillin, they state. They cannot, because of pressure of work, check all the molds that may be used in attempts at home production of penicillin. They have, however, deposited two of the strains of *Penicillium notatum* which are being used almost universally for industrial production of penicillin with the American Type Culture Collection at 3900 Reservoir Road, Washington, D. C. These are available on request for a nominal charge.

Even if the home or small laboratory producer of penicillin starts with one of these known good strains of the mold, he may get into trouble through contamination of his mold by other molds that may produce chemicals dangerous to man. This has happened to experienced workers recently.

Third pitfall in the use of home-made penicillin is that the crude forms produced by home methods contain protein material to which the patient may become sensitized. This may result in severe illness and the danger is particularly great, the scientists warn, if these protein-containing penicillin solutions are put on an extensive burned area.

Commercial preparations of penicillin are free from protein and are checked carefully to make sure they do not contain harmful bacteria, fever-inducing substances or poisonous materials.

The scientists who issue this warning on the dangers of home-made penicillin are senior microbiologist and chief, respectively, of the Department of Agriculture's Northern Regional Research Laboratory at Peoria, Ill. This laboratory has been extensively engaged in research on penicillin since July, 1941, and has been responsible for developing new strains of mold that have a high yield of penicillin, for improving methods of growing the mold, and for isolation and purification of penicillin itself. Much of the present commercial production of penicillin which is now getting into large-scale operation is the result of fundamental research at this laboratory.

Science News Letter, January 1, 1944

NUTRITION

New Angles on Butter Vs. Other Fats in Diet

➤ THE CONTROVERSY over whether vegetable oils and other fats when suitably fortified with vitamins can safely be substituted for butter may be settled in the future by consideration of the other foods in the diet, it appears from a report by Dr. R. P. Geyer, Dr. R. K. Boutwell, Prof. C. A. Elvehjem and Prof. E. B. Hart, of the University of Wisconsin. (*Science,* Dec. 3, 1943)

Young rats, they found, do not grow as well, as measured by gain in weight, when corn oil is substituted for butter fat in an otherwise adequate diet. The difference is particularly marked when the amount of lactose (milk sugar) in the diet is increased. (*See SNL,* Aug. 21, for another report on the nutritive value of butter fat)

"It is apparent that lactose," they state, "has an as yet unknown effect on intestinal conditions which is counteracted by butter but not by corn oil."

The unknown effect might be to stop production of vitamins by intestinal bacteria. There is growing evidence that intestinal bacteria perform this function for humans as well as for rats and ruminant animals. Humans, moreover, are using increasing amounts of skim milk which would add lactose to their diet at the same time that some, at least, are using less butter.

The Wisconsin scientists do not in the present report refer to any implications of their studies for human nutrition except to say that because of the present great interest in the nutritional value of fats, they feel their data would be of aid to workers in the field.

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A total of 1,878 persons were killed by accidents in 1942 in the *minerals industry* and 97,232 injured severely enough to prevent their working again, the same day at least; approximately 812,000 persons were employed in these industries.

GENERAL SCIENCE

China Turns To Science

➤ CHINA, only recently thought of as the stronghold of conservative literary classicism, is becoming increasingly science-minded. Evidences to this effect are presented by Chung Yu Wang, counselor of the Chinese Academy and technical expert to his government's Ministry of Economic Affairs, in a communication to *Science*.

In Chinese colleges and universities, Mr. Chung points out, the proportion of students specializing in the fundamental sciences increased from 7.6% in 1928 to 13% in 1936. During the same period the enrollment of students in both pure and applied sciences increased from 27% to 43%.

"The same trend of increase," Mr. Chung continues, "can be discerned in the number of Chinese students studying in the United States and Canada. The percentage of Chinese students studying both pure and applied sciences increased from 30 in 1934 to 50 in 1942, while that of Chinese students studying only pure sciences increased from 3 in 1934 to 10 in 1942."

The attack of Japanese imperialism on all Chinese culture has not been without its effects on scientific research and teaching in China. Yet despite the havoc of war Chinese universities have managed to survive and maintain a working program.

Mr. Chung summarizes: "Before the present Sino-Japanese War, there were 108 institutions of higher learning, 42 of which were universities, 34 independent colleges and 32 technological and professional schools. Since the war began in 1937, 56 Chinese universities and colleges have been moved into Free China, 17 have been suspended, while the remaining 35 institutions in occupied China have led a precarious existence and certainly not a few of them have been closed.

"Less than 50 years ago there did not exist in China any institutions of learning worthy of the name of a university. In fact the first government university, wherein sciences were taught, of necessity, in a mediocre manner, was established in 1895.

"It is indeed remarkable that within this short span of years China has almost caught up with the other nations in the pursuit of sciences which has taken the United States about a century and the European countries about three centuries to reach the position in which they stand today.

"This urge on the part of the Chinese to take up science at such an accelerating rate has been in a large measure due to the catalytic action of both American and European scientific thoughts on the Chinese mind."

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CHEMISTRY

Synthetic Rubber Program Causes Liquor Shortage

➤ THE OPERATION of Koppers' Inc. butadiene and styrene plant in the Pittsburgh industrial area is a major reason for the shortage of holiday liquor.

About 320,000 gallons of 200 proof alcohol goes through the plant each day, producing about 350 tons of butadiene and 110 tons of styrene.

These chemicals are shipped to polymerization plants which produce the actual synthetic rubber, Buna-S, for the war rubber program. The plant produces chemicals for more than one-seventh of the entire program when working at its rated capacity, but is now producing butadiene at 150% of its rated capacity.

Col. Bradley Dewey, rubber director of W. P. B., says that during wartime it has become necessary to use the alcohol made from grain in distilleries which would otherwise be producing whiskey for future holiday seasons. In normal times probably enough alcohol to fill the rubber plant's requirements can be made from petroleum and black molasses.

Because of the need for butadiene it is hoped that the plant will produce more of this compound in January than it has in any previous month.

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CHEMISTRY

Sugar Industry, MIT Join In Years' Research Program

➤ SUGAR will be the research subject of a group of scientists at the Massachusetts Institute of Technology during the next five years as the result of a long-range $125,000 program entered into by MIT and the newly established Sugar Research Foundation of New York. The investigations are expected to lead to new and important uses for sugar and its numerous relatives.

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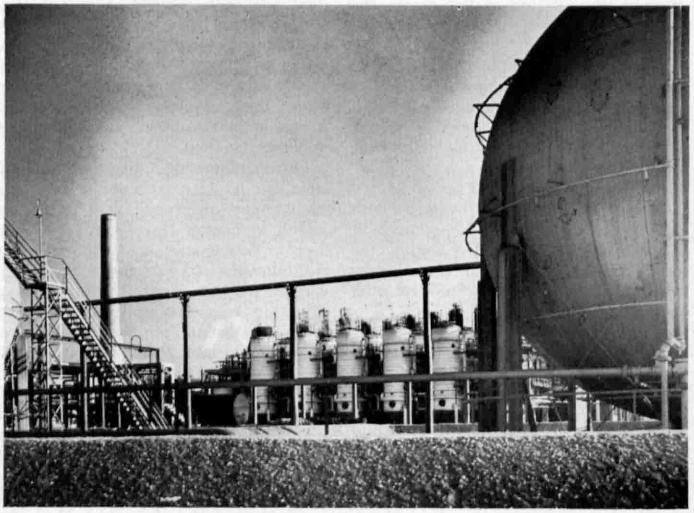

TO MAKE SYNTHETIC RUBBER—Butadiene made from grain alcohol is produced in the columns and stored in the global tank at the right of the photograph. The Kobuta plant, built by Koppers Incorporated in the Pittsburgh industrial area, produces styrene also and ships the two materials to copolymer plants, which produce the actual synthetic rubber.

Do You Know?

Soybean glue is widely used in making plywood.

Rabbit-raising for food is a more developed industry in California than elsewhere in the United States.

New *farm machinery* will be more plentiful in 1944 because of action by the War Production Board.

Portable *X-ray* equipment was successfully used recently to locate an unexploded 20-millimeter shell in the hip of a sailor; the shell was removed.

Eliminating the bright reflection of the skin and obscuring the pattern of the face, blotches of *camouflage paint* skillfully applied have saved countless soldiers' lives.

In the first 10 months of 1943 there were eight major *coal mine* disasters, costing 174 lives; in 1942 there were five disasters only, with 120 fatalities.

The United States is now approaching freedom from *cattle ticks,* which once caused an annual loss of $50,000,000 through the ravages of tick fever; the eradication program began in 1906.

New rust- and smut-resistant varieties of *oats* developed by the U. S. Department of Agriculture in collaboration with state agricultural stations almost double the yield in bad rust years over old varieties.

Methyl bromide, used by soldiers to kill cooties or body *lice,* is packaged in a glass vial which is placed with the clothes in a special bag; a blow breaks the vial and releases death-to-cooties fumes.

Fluorescein, a material used to discover leaks in water pipes, is now used by airmen shot down over the ocean; small packages attached to life jackets when opened let the material spread and light up the water.

All-purpose, all-weather *gasoline* standardized at 80 octane, has been developed for the year-round combat requirements of army ground vehicles; vapor lock in hot weather is eliminated and good starting in cold weather is provided.

ASTRONOMY

Stars in Six Colors

New equipment on the 100-inch Mt. Wilson Observatory telescope permits astronomers to see three to six times as many colors in stars as previously.

➤ THE LAW of diminishing returns, so well known by its applications to agriculture and economics, applies to astronomy too, according to Dr. Joel Stebbins, director of Washburn Observatory of the University of Wisconsin.

In his address as retiring president of the American Astronomical Society meeting, Dr. Stebbins said that many methods of astronomical observation and research had reached the limit of their practicability, and were fast being replaced by simpler and more effective approaches to the job of finding out what makes stars "tick."

As telescopes are made larger and larger, there is much less than a proportionate increase in power, and even this is offset by such factors as the enormous size required for mountings and observatories to house the instruments. With the famous 40-inch Yerkes refractor, the practical limit of size for telescopes employing a lens to focus the light has been reached, and that telescope is already nearly 50 years old. The 200-inch telescope, now nearly completed on Mount Palomar in California, will undoubtedly be the largest telescope of any kind for a long time to come, and it may be that no larger such instrument will ever be built.

Disregarding the mechanical problems, the larger a telescope, the greater its light-gathering power, the greater its ability to resolve close points of light, such as double stars, and the greater its magnification (if its focal length increases with its size). But more than offsetting resolution and magnification are the vagaries of the atmosphere, through which all light from sun, moon and stars must pass. High magnification is used with large instruments only rarely, when "seeing" conditions are perfect. Light-gathering power is the prime purpose in building such an instrument as the 200-inch giant. However, the compensating feature is the comparatively small part of the sky which this telescope will be able to photograph at one time. In reflectors, particularly, the usable field of view is small, which is one of the reasons the newer type of telescope known as the Schmidt camera is so important. It has great light-gathering power combined with a large usable field.

"In astronomy as elsewhere," said Dr. Stebbins, "it is important to look for new methods before a given field is worked out. The modern photoelectric cell and amplifier are a million times as sensitive as similar equipment of a generation ago. But here again the precision with which the light of a star can be measured is limited by the twinkling of the star caused by atmospheric disturbances. An accuracy of one tenth of one per cent is about the best obtainable at the present time."

With new equipment on the 100-inch telescope at the Mount Wilson Observatory, Dr. Stebbins and his colleagues have secured observations of stars in six colors, compared with previous work in only one or two colors. These studies have been applied to stars, nebulae, and especially to the dark nebulae between the stars. Dr. Stebbins pointed out that a large part of his own work in the past 10 years has already become out of date because of improvements by these same investigators in the last year or two.

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METALLURGY

Strength of Spotwelds Being Checked by X-Rays

➤ X-RAYS are being used to test the strength of welded joints in warplanes without destroying the weld, by a method described to the Pasadena meeting of the American Physical Society by Dr. R. C. McMaster of the California Institute of Technology.

The method is adaptable to the mass production system of aircraft construction and tests both the quality and the strength of the joints made when aluminum alloys are welded together. The test doesn't weaken the weld or destroy it. X-rays of thousands of spotwelds have already been taken and reveal any weaknesses invisible to the naked eye. In this way the strength of the welds that hold a plane together may be checked.

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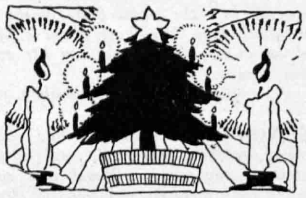
DENDROLOGY

NATURE RAMBLINGS
by Frank Thone



Permanent Christmas Trees

➤ CHRISTMAS TREE shortages, during the holiday season just closing, with another one likely to occur at the end of 1944, have doubtless made many an anxious parent of small children wish for a Christmas tree that could be taken down and put away in a box, with the strings of tinsel and the colored electric lights, ready for use when next Yuletide comes. The idea of a permanent Christmas tree must seem most appealing, though unattainable.

As a matter of fact, however, it is quite possible and practicable to have a permanent Christmas tree. Some people regularly have them, although the idea has not caught on to the extent that its first proponents hoped it would. Perhaps the difficulties with supplies of conventional trees may provide an impetus for its wider adoption.

All that is required is a small evergreen, well rooted in a tub of soil, such as one sees by the doors of many apartment houses and private homes. Such trees can be obtained from nurserymen and dealers in quite a wide choice of varieties, including numerous conifer types never available in the ordinary Christmas-tree market. With reasonable care, a potted evergreen will live indefinitely. Moved indoors and decorated for the holiday season, it can be carried outdoors again when the last flame of the Yule-log has flickered out. It can even be potsunk as part of the regular yard planting if desired.

There is a certain sentimental appeal about having a living Christmas tree, that can come indoors each Yuletide season, like a privileged dog, for a romp with the children. Children who know such trees often come to regard them as pets, and develop real affection for them and solicitude for their well-being.

There are practical advantages about rooted Christmas trees, as well as sentimental considerations. Being alive, they hang onto their needles much better and don't litter up the place as do the ordinary Christmas trees, especially the spruces and Douglas firs that constitute the bulk of the market offerings in most American cities. Also, being alive and not dried out, they are much less of a fire hazard than the ordinary trees, which become more inflammable the longer they are kept. Finally, though they cost considerably more to start with, the first purchase price is practically the only outlay.

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NUTRITION

New Canned Meat for Army Consists of Large Chunks

➤ CANNED roast beef and gravy, canned pork and gravy, canned Swiss steak and frozen vinegar are among the new foods developed for troops overseas, Dr. Bernard E. Proctor, director of subsistence and packaging research in the Office of the Quartermaster General, announced at the meeting of the American Society of Refrigerating Engineers in Philadelphia.

The three new canned meat items were developed because the men soon tired of the finely ground or chopped and highly seasoned canned meats previously supplied. The new items, developed with the cooperation of the meat industry, have a mild flavor and consist of large chunks of meat, which makes them more appetizing.

The frozen vinegar was developed as a matter of space-saving. The vinegar is debulked, for overseas shipment, by removing a considerable part of its water by freezing and separation of the ice crystals by use of centrifuges.

Overseas requirements for frozen foods, such as meats and poultry, will probably increase, Dr. Proctor declared. "For many years the United States has been a fresh-meat-eating nation," he pointed out. "We can hardly expect our soldiers to change their food habits completely and subsist largely on processed foods for longer periods than are absolutely essential.

"This tendency toward fresh frozen foods will result in greater problems for the food industry and food research workers, because our present knowledge of frozen foods does not cover all of the problems now arising in their preparation and handling for overseas shipment under Army conditions."

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Hibernating species of *fish* eat voraciously in the fall to store up winter fat, and again in spring when they come out of their stupor.

• Books Off Press •

CERAMIC SEQUENCES AT TRES ZAPOTES, VERACRUZ, MEXICO—Philip Drucker—*Gov. Print. Off.*, 155 p., illus. 50c.

THE CHILD WITH A CLEFT PALATE—Ollie L. Backus and others—*Univ. of Mich.*, 33 p., illus. paper. Single copies are free.

EDUCATION AND HEALTH OF THE PARTIALLY SEEING CHILD—Winifred Hathaway—*Columbia Univ.*, 216 p., illus., $2.50.

OUT OF THE TEST TUBE — Harry N. Holmes — *Emerson*, 311 p., illus., $3., 4th ed., rev.

A PICTORIAL HISTORY OF THE MOVIES—Deems Taylor, Marcelene Peterson and Bryant Hale—*Simon & Schuster*, 350 p., illus., $3.95. Photographers will be interested in the technical features of this book.

THE PROBLEM OF CHANGING FOOD HABITS: Report of the Committee on Food Habits 1941-1943 — *Nat. Res. Council*, 177 p., paper, Bulletin No. 108, October, 1943. Limited copies available to those interested in the field.

PSYCHOSOMATIC DIAGNOSIS—Flanders Dunbar—*Hoeber*, 741 p., illus., $7.50.

THE RIGHTS OF INFANTS: Early Psychological Needs and Their Satisfaction—Margaret A. Ribble — *Columbia Univ.*, 118 p., $1.75.

SHIP MODEL BUILDING—Gene Johnson—*Cornell Maritime Press.*, 242 p., illus., $2.50.

•New Machines and Gadgets•

⚙ *A HANDBAG with flashlight built in the bottom may prove helpful on dark streets. The flap over the lens can be buttoned up out of the way, to give unobstructed light. A switch on the side of the bag turns on the light in this recently patented device.*

Science News Letter, January 1, 1944

⚙ *ELECTRIC room heater, recently patented, looks like an electric oscillating fan. The motor that causes it to swing from side to side also operates a mechanism to draw air into the heater and force it out across the room.*

Science News Letter, January 1, 1944

⚙ *IMPROVED folding umbrellas may be available soon, following a design just patented. Collapsible hinged ribs and a telescoping handle permit the new umbrella to be reduced to a length and size that will fit easily into a small traveling bag or pocket.*

Science News Letter, January 1, 1944

⚙ *DESK STANDS with a combined pencil holder and abrasive sharpener are particularly suitable for use by draftsmen. A rotary movement of the pencil with one hand quickly puts the point in proper condition. The filings are kept in the stand.*

Science News Letter, January 1, 1944

⚙ *CARRYING fire extinguishers to aircraft on fire is speeded up by having the apparatus mounted on wooden wheels, an axle and a handlebar. The device was developed by the Royal Canadian Air Force for use on the flying field, but is equally suitable for factory or farm.*

Science News Letter, January 1, 1944

⚙ *MIDGET electro-magnets are successfully used to remove from stomachs metal objects swallowed unintentionally. Made of a special alloy, they are lowered into the stomach by means of a rubber tube. Weighing about a fifth of an ounce, the magnet can lift over five ounces.*

Science News Letter, January 1, 1944

⚙ *NON-CORROSIVE carbine cartridges, recently developed, leave no deposit in the carbine barrel and save much time formerly required for cleaning. A new primer leaves a protective deposit in the bore. The bullet is sheathed with a copper-clad steel made by rolling a copper alloy on both sides of a hot sheet of special drawing steel.*

Science News Letter, January 1, 1944

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 188.*

Question Box

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