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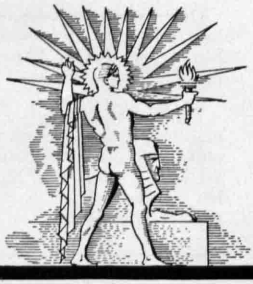
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



March 2, 1940

65-Foot Atom Smasher

See Page 140

A SCIENCE SERVICE PUBLICATION

Do You Know?

Running acutely short of linseed oil, Germany is increasingly using synthetic materials in paint.

An opium factory may be started in Denmark, since a poppy suited to that climate has been developed.

Gothic art got its name because medieval critics who disliked the style attributed its origin to the Goths.

After food, clothing, and housing, the largest claim on the family pocketbook of city residents is the automobile.

In 1939, about 10,000 bills introduced into state legislatures were concerned with highways and motor vehicle transportation.

A new apple developed at the government's experimental farm at Arlington, Va., ripens in early summer with a pleasing red color.

Only four states now require motorists to renew license plates on Jan. 1, others having advanced renewal date toward spring months.

Only two gold mummy cases have been found in Egypt—that of Tutankhamen and that of Pharaoh Sheshonk found at Tanis last year.

Fish liver oil, says a physiologist, probably contains so much vitamin A because this vitamin is abundant in the fish's food, rather than because the fish has any great metabolic demand for this vitamin in its tissues.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

BOTANY

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ENGINEERING

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GEOGRAPHY

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ORNITHOLOGY

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PHYSIOLOGY

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POPULATION

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Why does a nation go to war? p. 139.

PUBLIC HEALTH

How do mice aid in the battle against cancer? p. 134.

RADIO

How has the fuzziness in television pictures been reduced? p. 142.

The Shah of Iran recently dedicated a new highway which has 200 bridges in its 126-mile length.

When the United States forces served in France during the World War, one division was composed entirely of foresters and lumbermen to supply lumber and firewood.

Japan is striving to produce a fiber similar to American nylon but the product thus far is reported weak in some respects.

At a recent opera performance in Milan, lighting and color effects played over the scene, accompanying the psychological development of the drama.

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PHYSICS

New Explanation Evolved For Sun's Flaming Corona

Experiments Show That an Intense Light Will Divert Particles Falling Slowly in a Magnetic Field

A NEW suggestion that the sun's corona is formed by the motion of matter driven out under the action of the sun's intense light was presented at the meeting of the American Physical Society in New York by Prof. Felix Ehrenhaft, now of New York City and formerly head of the department of physics at the University of Vienna.

Prof. Ehrenhaft reported experiments in which material particles were allowed to fall slowly in a magnetic field. When bright light was shone on these particles they moved quickly sideways along the magnetic lines of force in the field. When the direction of the magnetic field was reversed, the motion was reversed. When either the light or the magnetic field was shut off the sideward motion stopped and only the pure motion of fall continued to affect the particles.

These experiments, Prof. Ehrenhaft declared, explain the sun's corona by indicating that particles in the sun move outward along magnetic lines of force due to the action of the sun's own light.

Prof. Ehrenhaft pointed out that the late Dr. George Ellery Hale, distinguished astronomer of Mt. Wilson Observatory, long ago called attention, without explanation, to the similarity between the solar corona and the lines of force of a magnetized sphere.

Prof. Ehrenhaft also discussed measurements which cast doubt on the long-held postulate of physics that the charge on the electron is the smallest unit in which electricity occurs.

It was for his careful and distinguished work on the measurement of this "fundamental" charge on the electron that Prof. Robert A. Millikan of California Institute of Technology was awarded the Nobel Prize of 1923. Prof. Ehrenhaft reported electrical charges on tiny spheres which are smaller than the electron's charge.

Still a third research announcement by Prof. Ehrenhaft was that light can, under certain conditions, exert an attractive force on matter in contrast to its commonly-recognized repulsive effect. This effect may have applications in explaining phototropism, that property of plants to lean and turn so that they face the light.

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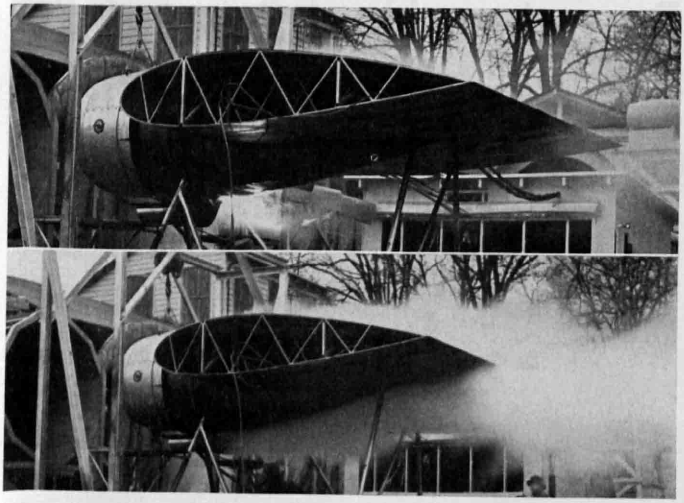


FOR FLYING SAFETY

This test at the National Bureau of Standards may lead to a reduction in the fire hazard of the flyer. When a fire starts in the vicinity of the airplane engine, a warning signals the pilot who may then apply carbon dioxide gas to extinguish the fire. The upper picture shows a test fire blazing in the 70 mile-per-hour wind of the wind tunnel, simulating flying conditions. The lower view shows the fire-extinguishing cloud of gas.

Atom Smasher Yardstick

A NEW means of measuring accurately the voltage generated by the new, giant electrostatic atom smashers was described by the four-man research team from the Westinghouse Electric and Manufacturing Company, Drs. W. H. Wells, R. O. Haxby, W. E. Shoupp and W. E. Stephens to the American Physical Society meeting in New York.

The new calibration point is at 2,010,000 electron-volts of energy at which beryllium begins to give off neutrons when it is bombarded with protons (cores of hydrogen atoms). The work extends and makes more accurate previous studies at the University of Rochester.

Similar success with proton bombardment of boron carbide, lithium and carbon atoms was also reported by Dr. Wells and his colleagues. "All of these reactions, or thresholds, occur at a very sharp and definable voltage," Dr. Wells explained, "and will consequently serve as a good interlaboratory voltage standardization table."

The new results fit in with many other observations made at the Carnegie Institution of Washington and at the University of Wisconsin on the gamma rays emitted from lithium and from fluorine. These findings, too, serve as valuable calibration points for the giant electrostatic generators with which scientists smash atoms in these laboratories.

Science News Letter, March 2, 1940

Atom's Energy Measured

A NEW check on the enormous amount of atomic energy released when uranium atoms are split by neutrons was described at the meeting of the American Physical Society in New York by two Princeton research men,

M. H. Kanner and H. H. Barschall.

As heavy uranium splits it gives off two fragments. The energy of these splitter products has been measured at Princeton and found to be equivalent to 159,000,000 units of atomic energy. Units of atomic energy are expressed in electron-volts. This value, reported Kanner and Barschall, is in good agreement with measurements made by Dr. Malcolm Henderson, also of Princeton, on the heating effect of uranium's fission. Dr. Henderson has previously reported 175,000,000 energy units liberated.

Other reports to the physicists' meeting concerned uranium fission; one of the most intriguing of all problems in science today because it offers at least the remote possibility that some day and somehow it may be possible to utilize the vast amount of atomic energy thus liberated in some practical way.

Dr. Herbert L. Anderson of Columbia University described measurements on the resonance capture of neutrons by uranium. This is an important matter because the ease with which a neutron can be captured by a uranium atom determines how easily a splitting of uranium atoms can be secured. His studies show that neutrons having only 5 electron-volts energy are involved in liberating energies which, for each uranium fission, amount to over 150,000,000 electron-volts.

Science News Letter, March 2, 1940

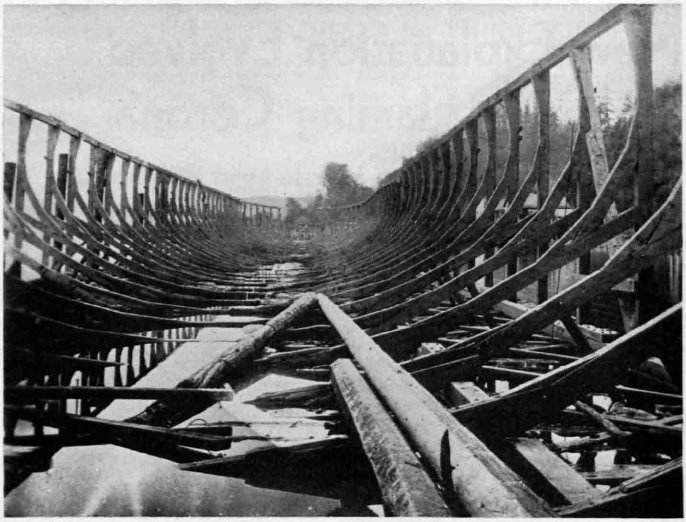
PHYSIOLOGY

Chickens Need Riboflavin For Hatchable Eggs

MAN can be interested in this health note for chickens because his principal interest in poultry is as a source of eggs and meat. Experiments at Cornell's Department of Poultry Husbandry by A. E. Schumacher and G. F. Heuser show that chickens must have riboflavin, known also as vitamin G, one of the many food factors in the old vitamin B complex, in order that they may produce eggs that may be most readily hatched. No short cut is possible, for injections of riboflavin into the hens or the eggs did not increase the hatchability.

Science News Letter, March 2, 1940

Orchard owners used to think that codling moths did not roam much, but entomologists found a way of marking these moths and proved that they fly nearly half a mile.



CRADLE FOR LOGS

Into this are floated logs for the famed seagoing log rafts of the Pacific Northwest. When the cradle is filled, chains are placed to hold the logs together.

PSYCHIATRY—CHILD CARE

Benzedrine Used Successfully In Treating Problem Children

Wake-Up Remedy Quiets Noisy Quarrelsome Children But Is Stimulating to Seclusive, Underactive Ones

BENZEDRINE, the wake-up remedy also used in inhalers for stuffy noses, has a new use: treatment of problem children.

Success with this remedy in the majority of 100 such children under observation at a children's neuropsychiatric hospital was announced by Dr. Charles Bradley and Miss Margaret Bowen, of East Providence, R. I., at the meeting in Boston of the American Orthopsychiatric Association.

On 54 noisy, quarrelsome, over-boisterous children the medicine had a subduing effect in direct contrast to its stimulating effect on adult patients. But it was stimulating to 19 seclusive, underactive children, making them appear more alert and interested and able to accomplish their daily tasks with more initiative and dispatch. Both groups of children showed improvement in their school work while taking the medicine.

The effects of the medicine show up within an hour after taking it and gradually wear off after the third hour. It does not, of course, constitute a cure nor does it do what psychotherapy does, give the child the insight into his difficulties which enables him to handle them competently. Apparently its effect is to make the child feel better and more comfortable so that conflicts which are still present are no longer so irritating and distressing that they drive the child into abnormal seclusiveness or equally abnormal and noisy activity.

Treating problem children with doses of medicine is a relatively new and untried idea. It does not offer as much assurance for his mental health and future happiness as other methods, such as psy-

chotherapy or modifying the child's surroundings to remove sources of conflict.

"However," Dr. Bradley and Miss Bowen pointed out, "distressing surroundings cannot always be altered and lack of facilities frequently make effective psychotherapy impossible. In such situations the simple administration of a drug that produces an improved social adjustment or accelerated school progress may offer considerable assistance to some children."

Science News Letter, March 2, 1940

Pre-Kindergartens Urged

RX: Pre-kindergarten school, to be taken during most of the waking hours by children from the age of three years up who come from a socially "sick" environment.

This remedy for preventing juvenile delinquency and crime was presented by Dr. Joseph Lander, of the Hawthorne-Cedar Knolls, N. Y., School, at the Boston meeting of the American Orthopsychiatric Association.

Very little success can be expected, Dr. Lander pointed out, from efforts to deal with the problem of juvenile delinquency after the child has developed fixed feelings of resentment and a habit of deriving emotional satisfaction from playing truant, running with the street gang, stealing and other such delinquent acts.

Prophylaxis, or prevention, is what is needed, he emphasized. The time spent in the special type of pre-kindergarten schools Dr. Lander urges could be considered as a sort of vaccination against delinquency and crime. As vaccination produces immunity to disease, the proper type of pre-kindergarten school would confer on children from a socially "sick" environment immunity against it in the form of a conscience to act as a restraining force.

Neither slums, "inadequate" parents, failure to individualize the school program, nor any one of a number of other factors is the sole cause of delinquency, Dr. Lander pointed out.

"In the vast majority of cases there has been for years a whole series of hostile influences at work on the child before he becomes delinquent."

One such injurious influence which may prevent the child from developing a normal character structure is the presence of "disturbing emotional problems in the home during the child's infancy and very early childhood years."

Very severe parental cruelty, indifference of the parents to the child, and parents who were themselves criminal, delinquent, or suffering from mental disease caused such emotional injury to 99 out of 116 boys who were sufficiently delinquent to warrent commitment to an institution for handling such problems, Dr. Lander reported.

Merely removing the children from such injurious influences for a few hours a day is not enough to prevent their becoming delinquent, Dr. Lander believes. Such children need not only to be protected during all their waking hours from the injurious influences of the home but also be provided with more adequate adult personalities after whom they can pattern their own developing characters. For this reason Dr. Lander emphasized that the teachers for the pre-kindergarten schools for such children must be selected with even more regard to personality and character than to number of college credits.

Science News Letter, March 2, 1940

Institutions Harm Infants

EXPERIENCES with children from three infants' homes which should help communities use their resources for child care to best advantage for both child and community were presented by Dr. Lawson G. Lowrey, of New York City, to the Boston meeting of the American Orthopsychiatric Association.

Infants, that is, children under two and one-half to three years of age, should not be reared in institutions or children's homes, Dr. Lowrey said. If they must be placed in institutions at such an early age, it should be for the shortest possible period of time, and they should have much intimate, personal contact from one adult, in an effort to substitute for the routine, and lack of it, of the home. No three-year-old or four-year-old child should be taken directly from an institution to the home of foster parents.

Children who have spent their infancy in institutions suffer from "isolation factors" and are unprepared for and unequal to the demands of family life. If they are taken from such institutions at the age of three or four, when the "I won't" attitude is at its peak, and placed in a boarding home or with foster parents, serious difficulties develop. On the other hand, a child placed in an institution after the age of three or three and one-half years does not develop the isolated type of personality.

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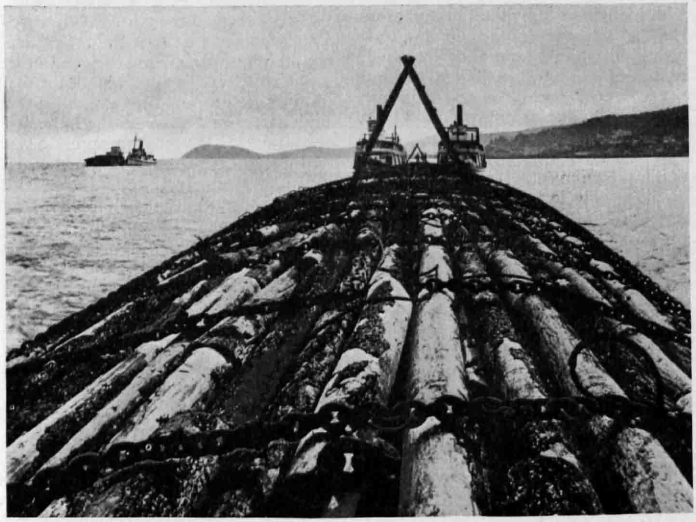
England is raising more wheat, but lacks the broad land needed for self-sufficiency in this crop: an acre of wheat supplies six to seven persons a year, whereas an acre of potatoes will feed 70 to 75.



COMPLETED RAFT

This seagoing raft was made in the cradle shown on the facing page. When the logs were ready, one side of the cradle was pulled away and the raft floated off to sea.

PUBLIC HEALTH

Battle Against Cancer

Men, Mice and Machines Are Mobilized Against Disease At New National Cancer Institute Near Washington

By JANE STAFFORD

WHILE European nations last fall were mobilizing men and guns to protect their borders from invading enemy forces, America was also mobilizing her forces. An army of men, mice and machines were moving into permanent quarters on a Maryland hillside near the nation's capital. They expect to remain there for the duration of the war. And the war they are waging is against that arch enemy of mankind, cancer.

Redoubtable cancer fighters are to be found in other parts of the country as well. The force that has dug itself in on that Maryland hillside, however, is as much a part of the national defense as the Army and Navy, because its men, mice and machines make up the National Cancer Institute, a division of the U. S. Public Health Service and, like the Service, supported by the Federal Government.

With the completion and occupation of the National Cancer Institute, in a Washington, D. C., suburb, the national capital area becomes probably the best equipped site in the world for the search for cancer-conquering knowledge. Besides the expert staff, machines and 10,000 mice of the National Cancer Institute, there is its supply of radium, much of it being loaned to hospitals throughout the country for free cancer treatment, but plenty of it still on hand for research.

Building New Cyclotron

Also within the national capital area is being built, by the Carnegie Institution of Washington, a giant atom-smashing cyclotron. Neutron rays from such a cyclotron at the University of California are being used for treatment of cancer patients.

The Carnegie cyclotron will probably not be used for treating patients but for furthering research on neutron rays and their possible aid in conquering cancer. Two other aids available to cancer fighters in the national capital area are the Carnegie's 1,000,000-volt and 5,000,000-volt electrostatic atom-smashing machines for making the radioactive tracer elements that can show scientists the path through the body of chemicals they hope may prove cancer-killing.

When you enter the National Cancer Institute building you are struck by the fact that it is a product of the streamlined machine age. You feel that the fight to conquer cancer is being pushed with such relentless efficiency that it is bound to succeed.

There is an old tradition that success in scientific research does not require fine buildings and the last word in chromium plated equipment. Men with ideas, and plenty of animals for observation and investigation, were all that mattered, according to this notion. The gleaming tiled walls, the air-conditioning apparatus of the Institute might have been scorned by the sturdy pioneers in disease-fighting who worked in any attic they could get with mostly homemade equipment—laboriously made by themselves and their assistants, often enough.

Ideas Plus Equipment

The National Cancer Institute has men with ideas, headed by the director, astute Dr. Carl Voegtlin. It has animals—10,000 pedigreed white, brown and black mice. It has shining new equipment which is not a sign of any softening on the part of the staff, nor of any lack of ability on their part to work under more rigorous, difficult conditions. The air-conditioning equipment, for example, was installed, only incidentally, for the comfort of the men and women who otherwise would have to toil through the long, sweltering heat of Washington summers.

It was put there primarily for the mice. These tiny animals, vitally important agents in man's fight against cancer because of their own cancerous tendencies, are extremely delicate creatures. They are extremely susceptible to pneumonia. They do not thrive well unless temperature and moisture of the air is exactly right. Cancer and other disease-fighting research all over the world has been handicapped by lack of proper atmospheric conditions for the well-being of the laboratory mice.

So when the National Cancer Institute was planned, efficient conditioning equipment was installed, to keep its mice healthy. It is probably, with the sister buildings of the National Institute of Health, the only completely air-conditioned research institute in the world.

The mice are fed on dog food, which is the standard diet for cancer research mice all over the world. And although there are four or five whole generations of new mice born in the laboratories every year, there are no mouse baby mix-ups. Each mouse can be identified and its complete pedigree told for at least 20 generations, by certain notches and holes in its ears.

One of the problems being investigated with the aid of the mice is the response of different inbred mice to different cancer-causing chemicals. Another study is the effect of foster-nursing.

From such studies it is hoped will come knowledge of cancer genetics. Mice from a certain family strain—gray mice, these—almost always get breast cancer. The black mouse strain almost never gets cancer. What causes the inborn, inherited difference between these mice? Scientists hope that, in finding the answer to this question, they may find knowledge that can be applied to the human cancer problem.

Part of the cancer fight is being waged with mice and part with the ray-producing machines of modern physics and part of the attack is chemical. One of the first discoveries announced from the Institute since its staff took over the gleaming new laboratories was a chemical one. It started with a search for an important chemical difference between cancer and normal tissue. Such a difference has been found, according to reports from abroad.

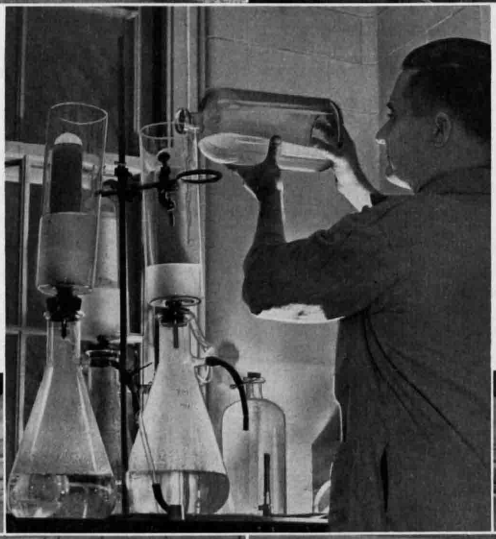
Learned New Chemical Fact

Dr. J. M. Johnson, repeating these experiments at the National Cancer Institute according to scientific custom which demands independent experiments to confirm a reported discovery, found no such difference, but instead a brand-new chemical fact which scientists the world over had overlooked for nearly 50 years.

The newly-found fact is that glutamic acid, one of the building blocks of proteins—meats and muscles to you—occurs naturally in both a "left-handed" and "right-handed" form. General belief that it occurred only in the "right-handed" form misled eminent scientists who believed they had *(Turn to Page 138)*

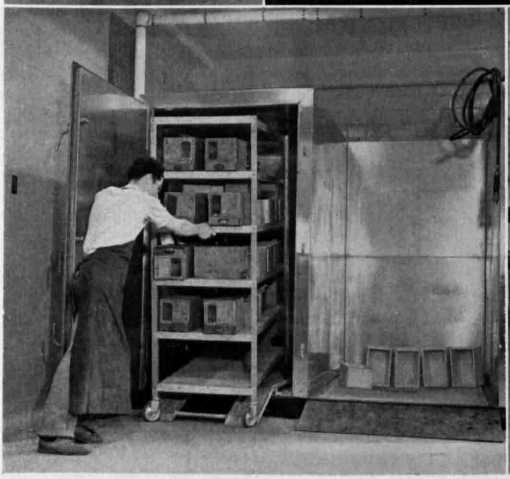
MICE AND MEN

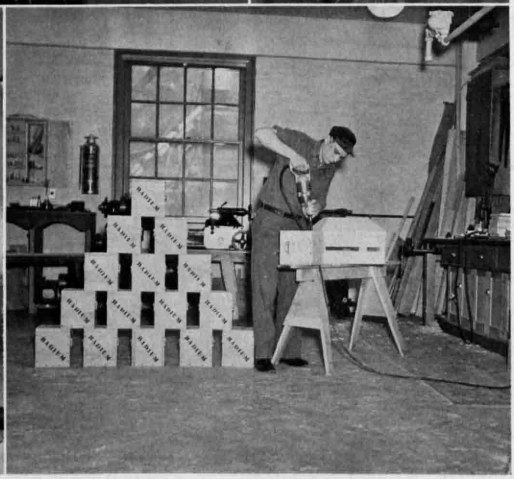
All forces are mobilized at the National Cancer Institute (above) for the battle against a serious disease. Below, an attendant is preparing a carefully selected diet for a guinea pig participant in the research. Bottom left, another worker is busy sterilizing some of the many animal cages.



IDEAS

The battle against cancer demands plans as well as fighting equipment. Dr. Carl Voegtlin, director, National Cancer Institute (top left) is going over plans with Dr. M. J. Shear. Quantities of fluid containing germs are poured through the giant filters used by Dr. Floyd C. Taylor (center). The pathetic mouse below is suffering with cancer that human victims may be spared. The boxes (bottom) contain radium for loan to hospitals.





CHEMISTRY—PHYSIOLOGY

Radioactive Phosphorus Traces Brain Activity

RADIOACTIVE phosphorus is the detective being used to reveal to scientists the brain's activity as a chemical laboratory.

Different parts of the brain not only have different functions in mental activity, it has been found, they differ also in the way they handle the chemicals that are necessary to all life. Giving animals phosphorus made radioactive by bombardment in the cyclotron, Dr. I. L. Chaikoff, of the University of California, with B. A. Fries and G. W. Changus, traced this detector chemical in the forebrain, cerebellum, medulla and spinal cord. Soon after birth, they found, the chemical activity involving phosphorus in these parts of the brain and nervous system declined at a similar rate. Later, however, the rate of drop was no longer uniform, but was much more precipitous in the spinal column.

It is hoped that this study of the brain's chemical activity may lead to discovery of the interrelationships between the chemical and mental functioning of the brain.

Science News Letter, March 2, 1940

GENERAL SCIENCE

Science Plays Major Role In Tomorrow of Mr. Wells

FOR all who hope for a successful peace to set aright a chaotic, warring world, *The New World Order* (Knopf), by H. G. Wells is encouraging reading. Science plays a major role in the tomorrow outlined by Mr. Wells. Instead of the couple of hundred thousands now comprising the little army of research workers, this "scientific world" of today, there would be in the new world order a science force of millions, better equipped, amply coordinated, free to question, able to demand opportunity. He visualizes, after the constructive revolution he advocates, a development of scientific research that "will make the laboratories of today seem half-way back to the alchemist's den."

The problem is vastly larger than the mere technicalities of science, although the method and facts of science are fundamental. Mr. Wells tells why the world must be different from what it was, why there must be a change or revolution in the way of living if we are to avoid "the disastrous extinction of mankind." He stresses the need of the open conference in settling our world affairs of peace or war. Class war, unsated youth, socialism, world federation and politics are discussed. A new declaration of the rights of man is formulated. Important, too, is his observation that there will be no day of days when a new world order comes into being. "Step by step and here and there it will arrive, and even as it comes into being it will develop fresh perspectives, discover unsuspected problems, and go on to new adventures. . . . World order will be, like science, like most inventions, a social product; an innumerable number of personalities will have lived fine lives, pouring their best into the collective achievement."

Science News Letter, March 2, 1940

PLANT PHYSIOLOGY

Alcohol from Plant Tissues Deprived of Oxygen

ALCOHOL can be produced by any normal plant tissues, and will be found in them if they are deprived of oxygen. If the plants receive adequate supplies of oxygen, they break down the sugars in their food, (as well as alcohol if any is present) completely to water and carbon dioxide.

These results of respiration experiments on plant roots, and on the bacterium-inhabited nodules of legume roots, are reported by a four-man research team of the U. S. Department of Agriculture: Drs. C. A. Ludwig, Franklin E. Allison, Sam R. Hoover and Francis W. Minor. (*Science*, Feb. 16)

Earlier experiments by other workers had given some indication that plants break down sugars into alcohol and then use up the alcohol as energy-producing fuel, but some doubts have been cast on the probability of this particular chain of physiological events. The new results, the four experimenters state, "do not prove the hypothesis, but they do seem to remove one weighty objection to it."

Science News Letter, March 2, 1940

GENERAL SCIENCE

431 World Science Meetings Held in Last Ten Years

IN the past decade 431 separate and distinct international scientific congresses have been held one or more times, some of them as many as ten times, according to a compilation by the National Research Council. Over 40 are scheduled for 1940. But many of them probably never will be held, including a dozen announced to convene in Germany.

Science News Letter, March 2, 1940

IN SCIEN

BOTANY

Pigmented Pollen Nucleus Believed First on Record

BELIEVED to be the first pigmented cell nuclei ever observed, pollen tube nuclei with a red-brown color have been studied by Drs. William A. Beck and Russell A. Joly at the Institutum Divi Thomae laboratories in Cincinnati. All previously known cell nuclei have been colorless.

The significance of the new-found phenomenon has not yet been discovered but in the meantime it has proved of considerable convenience in biological studies on effects of growth-promoting substances, because the position and movements of the colored nuclei are so much easier to trace than those of the commoner colorless kinds.

The pigmented nuclei were discovered in the pollen tubes of one of the ornamental spider lilies, known botanically as *Hymenocallis tubiflora*.

Science News Letter, March 2, 1940

CHEMISTRY

Fabrics of Future May Be "Starched" with Resins

THE FABRICS that we wear in the days to come are likely to be "starched" with the new synthetic resins that have been produced in such variety during the past few years. Crystal clear, insoluble in soap and water, stable in dry cleaning solvents, these new resins or plastics contrast with the older finishing materials such as starches, oils, and softeners which are gone with the first laundering.

It is possible to soften or stiffen textiles. They can be made more resilient, or resistant to crushing and creasing. They can be made proof against slipping and fraying, or strengthened or stabilized.

Some of the new fabrics are being finished with plastics, but many of the methods are so new that manufacturers are watchfully waiting to see how the all-important consumer likes these novelties in fabrics which science has furnished.

Science News Letter, March 2, 1940

FIELDS

ORNITHOLOGY

New Warbler Species Found in West Virginia

A NEW species of warbler, first new bird species to be found in the United States in 21 years, has been discovered in the "panhandle" region of West Virginia by Karl W. Haller, Bethany College ornithologist. It has been named *Dendroica Potomac,* or Sutton's Warbler.

Mr. Haller first found a male, then, at a point 18 miles away, a female. The birds are small, like all warblers, and their song is similar to that of a related species, the parula warbler. The song is described as "a rapid buzzing trill, ascending the scale and dropping off at the end, repeated quickly twice in succession."

The bird was discovered to be a new species when examination of study collections at the Smithsonian Institution, and in other museums in this country, failed to disclose any duplicate of the specimens collected by Mr. Haller.

Science News Letter, March 2, 1940

POPULATION—ANTHROPOLOGY

Here's Census Problem: Population in 1492?

SPEAKING of censuses, as people frequently are this year, how many Indians were there when Columbus got here?

Latest estimate advanced by Dr. A. L. Kroeber, noted anthropologist of the University of California, is that only 8,400,000 Indians inhabited all of North and South America in those days. Past estimates have ranged all the way up to 45,000,000.

Dr. Kroeber thinks his figure may be too low—or too high. He allows 6,000,000 Indians to all Mexico and Peru, where the famous Aztec, Mayan and Incan civilizations flourished. Maybe, he says, that figure should be doubled. Maybe it should be halved.

The point is, nobody knows how many Indians there were in 1492.

Dr. Kroeber hopes his estimate may challenge scientists to dig out available facts. Documents from early America do provide records, such as Indian tribute payers, and local estimates by men known to be conservative, and these would fill many a gap.

"It is only a matter of labor and fair judgment," declares Dr. Kroeber, "to extract these data from the documentary sources and thus give us reasonably reliable knowledge."

It sounds like a harder job in some ways than taking the United States 1940 Census, but it also sounds like a timely hint for science in a Census year.

Science News Letter, March 2, 1940

CHEMISTRY

New Printer's Ink Comes In Lumps Like Coal

A NEW kind of printer's ink that is sold in chunks, looks like coal when broken up for use, and may revolutionize printing by speeding up the process and turning out clearer print for reading, was described recently.

A "cold setting" ink, the new printing material dries instantly on paper as it comes through the presses, Frank B. Breyer, New York chemical engineer, told the Technical Association of the Pulp and Paper Industry. Cold setting, he explained, reverses usual tactics of heating the paper, in order to dry the ink when the printed sheet runs over high speed rotary presses. Instead, the ink is first melted and applied to type which is heated, and when hot ink touches cold paper, it freezes and remains as a solid deposit in relief on the fiber.

"The faster the paper goes through the press, the greater is the setting effect," said Mr. Breyer, adding that the only limitations on speed of commercial presses would appear to be those of the machinery itself.

Science News Letter, March 2, 1940

ENGINEERING

School for Skidding Founded by Science

A SCHOOL for skidding has been established by scientists on a frozen lake near Cadillac, Mich., to enable accurate studies to be made of the factors which cause skidding in motor vehicles and an investigation of methods by which skidding can be overcome or partially prevented. Six passenger cars and a truck skidded and slid for the ten days of the school "session."

Science News Letter, March 2, 1940

PLANT PHYSIOLOGY

Root-Producing Substances Inhibit Formation of Buds

A SEARCH for substances that make plant cuttings produce new buds, as indole acetic acid and a considerable number of other chemicals induce them to form new roots, is being conducted by scientists of the Boyce Thompson Institute for Plant Research.

There seems to be an actual antagonism between these root-inducing chemicals and the natural shoot-producing hormones within the plant itself. Cuttings of the hibiscus species commonly known as Rose of Sharon will produce buds where no buds were before, if their naturally-occurring buds are carefully cut away. This will occur on cuttings kept moist but given no special chemical treatment. The bud-inducing substances, or hormones, appear to be of a regulatory nature.

When similar cuttings, likewise disbudded, were treated with vaporized root-inducing chemicals, formation of wound callus and new roots was strongly promoted but there were very few buds formed. One of the effects of the chemical treatment was the formation of roots all over the cuttings, instead of principally near the basal portions; this seems to indicate a disturbance in the polarity which normally results in the greater concentration of the bud-producing hormones in the upper parts, and the consequent production of new buds in that region.

Science News Letter, March 2, 1940

PHYSIOLOGY

Calcium Needs of Teeth Found with Tagged Atoms

THE EXACT amounts of calcium needed for normal, strong teeth and bones and the speed with which calcium eaten in food travels through the body are being determined in experiments with tagged atoms of radioactive calcium at the University of California.

Results of this first biological study with radioactive calcium were announced. No clinical experiments, however, have as yet been attempted. The radioactive calcium of sufficient long life for this type of experiment was discovered with the University of California's famous atom-smashing cyclotron by the late Dr. Harold Walke, University of Liverpool physicist who was accidentally electrocuted in his British laboratory when he fell on an exposed wire.

Science News Letter, March 2, 1940

PHYSICS

Friction May Cause 'Loading' Of Even Honestly Made Dice

Braking Effect of Rolling Dice Is in Proportion To Number of Spots; Ace Side is Heavier Than Six

EVEN "honest" dice may be loaded, unintentionally, by the way the spots are cut into their faces, Prof. F. P. Worley of Auckland University College, New Zealand, points out (*Nature*, Oct. 21, 1939). Prof. Worley, who is head of the chemistry department at Auckland, was intrigued into his excursion into the science of cubical chance by the widely held belief among gamblers that certain numbers on the dice are more likely to turn up than others.

Most obvious possibility of unintentional loading of dice would come from differing weights of material cut out of the six faces of each die in making the spots. For example, six times as much material is removed in making the six-face as in making the single spot that marks the ace.

Since six and ace are on opposite sides, and the ace side is slightly the heavier, six should turn up a little more often than ace. Similarly, five should turn up oftener than the heavier deuce, and even four oftener than the very slightly heavier trey, although there is only one spot's weight difference between the latter pair of numbers.

(It might be explained, for the sake of the uninitiated, that opposite faces of a die always add up to seven; also, that six, five and four are grouped around one corner, with ace, deuce and trey around the diametrically opposite corner.)

The theory of differential weights, however, did not entirely satisfy Prof. Worley. It occurred to him that the amount of friction applied by the face of a die might make the difference between its simply sliding along the surface on which it is thrown, and tumbling over for just one more turn and thereby changing the number facing up.

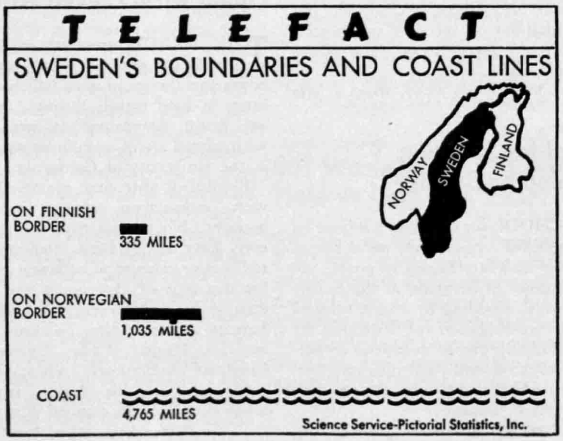
He tested out his friction theory by deliberately "doping" a pair of dice, coating three of their faces with a light varnish, which would increase the amount of friction presented by those faces as the dice were cast on the level, slightly fuzzy surface of a billiard table. The system worked beautifully. Making hundreds of test throws, he found that the roughened, "doped" faces turned up nearly twice as often as the smooth, untreated ones.

Even a slight difference in hardness of the varnish made a difference in the results of the throws. While the varnish was still fairly fresh and therefore still slightly sticky, the ratio in favor of the "doped" faces was higher than it became 24 hours later, when it had become harder and smoother.

Prof. Worley believes that even without "doping," dice faces are likely to possess larger or smaller braking properties in proportion to the number of edges presented by the spots that have been cut into them. The braking effect of course would be greater with fresh, new dice having sharp edges around their spots than in old dice with the edges worn down smooth.

Incidentally, the research discloses a possible new trap for the unwary sporting citizen, for Prof. Worley says of his "doped" dice: "When the varnish had hardened sufficiently, a slight difference of touch was detectable, though not obvious."

Science News Letter, March 2, 1940



From Page 134

found an important chemical difference between cancer and normal tissue, might have misled other scientists in studies of nutrition.

Chemists at the National Cancer Institute are analyzing quantities of a germ poison or toxin in an effort to solve a puzzle that is nearly 50 years old. Back in 1891 a doctor by the name of Coley reported that some of his patients who had cancer recovered from the cancer after an attack of erysipelas. Since erysipelas is caused by a germ of the streptococcus family, the next logical step was to make up a fluid of the toxin of poison of these germs and test their cancer-healing property.

The fluid has been modified somewhat in the last 40-odd years, and it has never been entirely accepted as a cancer remedy. Occasionally, however, good results in certain types of malignant growths have been obtained with this fluid. Drs. M. J. Shear, Floyd C. Turner and others of the National Cancer Institute staff, looked into the problem and found that a fluid (filtrate, to be scientific) from another germ, not a streptococcus, produced hemorrhage of transplanted cancers in mice. The fluid did not cure the cancers, but it did have an effect on the tumors. So now these scientists are analyzing the fluid to find out what there is in it that affects cancers and—perhaps—how this effect can be turned to practical use.

Science News Letter, March 2, 1940

GEOGRAPHY

Celebrate a Hundred Years Of Antarctic Exploration

American Philosophical Society and Philadelphia Academy of Natural Sciences Join in Commemoration

A CENTURY of American leadership in Antarctic exploration was celebrated in Philadelphia on Feb. 23 and Feb. 24, at the hall of the American Philosophical Society. The expedition being memorialized was that led by Lieut. Charles Wilkes of the U. S. Navy, who gathered geographic, meteorological and other scientific data along 1500 miles of Antarctica's desolate shores during the years 1838-1840.

The expedition was authorized by Congress, largely in response to demands from whaling industry for better maps and navigational information, Capt. G. S. Bryan, U.S.N., told the meeting. There was Congressional opposition, then as now, to spending money for scientific research. Funds were cut, unsuitable ships had to be used, clothing and other stores were inadequate. Fortunately, however, the scientific instruments carried were excellent, and the nine scientists who constituted the technical personnel of the expedition did their work well, so that most of the results obtained are still considered valid.

Worthy of note also is the fact that the government sought the advice of the then existing scientific organizations in planning the expedition. Particularly active were the American Philosophical Society, which had been founded by Benjamin Franklin in pre-Revolutionary days, and the Academy of Natural Sciences of Philadelphia. An account of this phase of the expedition was given by Dr. Edwin G. Conklin, vice-president and executive officer of the American Philosophical Society, and Dr. James A. G. Rehn, corresponding secretary of the Philadelphia Academy.

Although the Wilkes expedition was the first to conduct long exploration in the Antarctic region, and to prove the continental nature of the South Polar land mass, it was not the first to find land in the region. Honors for that accomplishment go to another American, Nathaniel Brown Palmer, a Connecticut sealer, who found that part of Antarctica nearest South America on Nov. 18, 1820, and explored some 450 miles of the frozen coast during the following January. The work of this "Columbus of Antarctica" was described by Col. Lawrence Martin, chief of the division of maps, Library of Congress.

Although it was long before the era of daily weather reports, the meteorology of Antarctica was intensively studied and minutely reported by Lieut. Wilkes, declared Comdr. F. W. Reichelderfer, chief of the U. S. Weather Bureau. Comdr. Reichelderfer also told of the expedition's permanent contributions to science, in the form of geomagnetic and gravitational data.

The expedition did not confine its work entirely to the Far South. After the work along the coast of Antarctica was completed, Lieut. Wilkes took his ships far up into the Pacific, as far as the Puget Sound region and the coasts of British Columbia. Various phases of this part of the long voyage were the subjects of papers by Mary E. Cooley of Mount Holyoke College, Henry W. Fowler of the Academy of Natural Sciences of Philadelphia, and Prof. John E. Hoffmeister of the University of Rochester. The fishes brought back by the expedition, Mr. Fowler stated, are still preserved in the U. S. National Museum.

Science News Letter, March 2, 1940

PSYCHOLOGY

Nations Fight Because Individuals Build Hates

A FATHER who tells his boy he can't go to the circus and then spanks him if he "sasses" back or bangs the door in a sulky rage, may be unwittingly planting the seeds for future international wars.

Such a warning may be derived from a new study of *Personal Aggressiveness and War*, by E. F. M. Durbin, lecturer at the London School of Economics and Dr. John Bowlby, practicing psychoanalyst, just published by Columbia University Press.

Nations will fight for the same reasons that cause children or apes to fight. They will fight for possession of something desired by both, or sometimes only by one of the quarrelers. They will fight because of intrusion of a stranger. Or when they are frustrated or opposed in an attempt to do or have something desired.

The fighting because of frustration may not be directed against the opposing power. The child who is deprived of his toy may kick the nurse. But, especially if he is afraid of the nurse, he may pull his sister's hair.

These are termed the primary causes of fighting.

Men and nations also fight because of what is known as "transformed aggression." A certain amount of frustration is inevitable and a certain amount of external repression is essential. But parents could, these authors point out, at least permit the child to express the natural resentment he feels at such denials. Take the child away from the fire, yes, but permit him the scream of rage, they urge. It prevents hates.

It is by identification with the nation that most individuals give vent to their

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aggressiveness, these days, and this is a fundamental cause of war.

Although nations do fight for all sorts of reasons, they can fight only because by this means they are able to release the explosive stores of transformed aggression among their peoples.

Science News Letter, March 2, 1940

PHYSICS

65-Foot Atom Smasher Built for Research

See Front Cover

A 90-TON atomic "cannon" is mounted in a 65-foot atom smasher for a new attack on the physical secrets locked in the heart of the atom at the East Pittsburgh laboratories of the Westinghouse Electric and Manufacturing Co.

The illustration on the front cover of this week's SCIENCE NEWS LETTER shows workmen mounting the porcelin supports for the giant electrode from which comes the force to send the invisible bullets of ionized atoms down the vacuum tube "barrel" of the gun.

Science News Letter, March 2, 1940

ENTOMOLOGY

Cold Winter Kills Northern Honey Bees

THE SEVERE northern winter is killing many bees in their hives, according to bee specialist E. J. Anderson of Pennsylvania State College.

Even though there is plenty of food in the hives, the chilling winter has made the bees so sluggish for so long a time that many of them will be unable to reach it in the spring. Beekeepers are now ordering new bees from the South in packages which run 1,000 bees to the pound.

Science News Letter, March 2, 1940

PHYSICS

Optical Device for Research May Have Military Use

Gadget Fitting in Pilot's Eye Would Tell Him When He Could Drop Toward Objective, Obscured by Sun

THE narrow borderline between science for peace and for war was emphasized anew at the meeting of the Optical Society of America in New York.

Prof. Brian O'Brien, director of the Institute of Optics, University of Rochester, described a new tiny optical device which he has been using to help in determining the absorption of sunlight in the earth's atmosphere. The same device, slightly changed, might have usefulness for pilots of bombing planes to make their work more deadly, in the opinion of officers of the U. S. Army Air Corps in Washington with whom a member of the staff of Science Service discussed the new scientific advance.

Prof. O'Brien's little optical instrument fits over one eye of the pilot as would a jeweler's eyepiece and leaves the other eye to guide the plane. By looking into the little instrument a pilot can determine when his plane is exactly on the line between the sun and some object on the ground which he may select.

Prof. O'Brien invented the tiny apparatus to determine the absorption of sunlight in the earth's atmosphere. To do this he needed a measurement of solar intensity from his ground station and another observation from an airplane on the line joining the ground station and the sun. Any difference in these two observations is caused by the intervening amount of air and water vapor; an amount of atmosphere accurately known.

The interest of Army Air Corps officers is that they see in it a better way to help a pilot determine when the sun is exactly at his back so that he may swoop down from great altitudes and be concealed in the brilliant light of the sun's flaming disk. It is very effective if the bombing pilot can only get approximately in this line between the sun and his ground objective. If the O'Brien device can make this operation more certain, and easy to carry out, then its military usefulness might be great.

Army Air Corps pilots point out that suitable calibrations of the O'Brien device might be needed and that, in the end, it might only be a complication and would do a job better than might be needed. But they do feel that potentially the instrument has merits which should be explored.

The device of Prof. O'Brien, yet unnamed, consists of a transparent triple mirror formed by cementing three glass flats perpendicular to each other. This combination is viewed through a fourth, half-reflecting mirror.

So tiny it is mounted into a little eyepiece, the device is placed to the pilot's eye. He sees in it two distant objects which he may select to right and left. As he approaches the line between these objects their images begin to move together and at the instant the plane passes the line the images pass through one another. One of these distant objects can be the sun and the other a chosen ground station; or the chosen military objective for the aerial bombing case.

Science News Letter, March 2, 1940

Italy has settled 20,000 emigrants on farms in Libya in recent months, and plans ahead for 60,000 more to follow within three years.

A firm making paraffine products in this country has developed a synthetic substitute for each of its important raw materials for use whenever material costs soar.

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PSYCHOLOGY

Among American Students Half Blame Germany for War

Those Suspending Judgment As To Most Guilty Nation Are Less Likely To Be Warlike in Their Attitudes

This authoritative report of research now being conducted on war is one of a series being issued by the Society for the Psychological Study of Social Issues for release through Science Service.

HALF of a group of 1,200 Dartmouth men who, during the war excitement of last September, voted on policies for the United States in relation to the European war, held Germany responsible for the war. Ten per cent blamed the Allies, and 40% blamed "no one nation in particular."

The Administration's cash-and-carry bill was favored by a bare majority.

Those who suspended judgment concerning the nation which should be held responsible were less likely to be warlike in their opinions than those who blamed a specific nation.

The poll was conducted by Dr. Ross Stagner of Dartmouth. He found that "permanent neutrality" was approved as a national policy by those blaming the Allies or "no one nation," but rejected by those blaming Germany. The arms embargo (since repealed) was favored by 32% of those blaming Germany, 38% of those blaming the Allies, and 39% of those blaming no nation.

The men were also asked to choose grounds for going to war. Of those blaming the Allies, 45% did not answer this question: they did not consider any of the grounds which were proposed as good enough to induce them to go to war. Just 29% of the "no one nation" group but only 21% of the group blaming Germany failed to answer the same question. Statistically, the difference between the anti-Allies and the anti-German group could occur by chance about one in ten thousand.

When asked whether they considered war inevitable, 35% of the anti-German group, 25% of the anti-Allies group, and only 21% of the group blaming neither side answered affirmatively.

Individuals were asked whether they were absolute pacifists by determining whether they felt there was no "cause" for which they would die. Only 15% of the anti-German group said "yes" to this question in contrast with 26% for the anti-Allies group. Those who blamed neither side were intermediate with 20%.

In all of these instances, the tendency is for the group which had not come to a decision concerning responsibility for the European war to be less favorably disposed toward war in general and toward this country's participation in the present conflict; the most belligerent group seems to be that blaming Germany.

"We need to approach the conflicts of European nations with suspended judgment, rather than to decide which one nation is completely guilty," Dr. Stagner suggests. "In this study it is apparent that particularly those persons blaming Germany are much closer to being ready to fight than the other groups. Those blaming the Allies probably know that there is little likelihood of this country's fighting for Germany and so are less belligerent. The most consistently neutral and peaceful attitudes, however, are those of men who refuse to put all the blame on one nation in the European war."

Science News Letter, March 2, 1940

ENGINEERING

War on Weight Waged In All Industrial Lines

ENGINEERS are waging a successful war on weight. Parasitic pounds, whether they be in airplanes, on railroad cars, in machines, buildings, packages, are being banished.

Prize weight reduction incident told by James L. Walsh, New York engineer, in a report to the American Society of Mechanical Engineers, concerns such a seemingly minor thing as the paint on an airplane. A one-coat finish of lightweight lacquer for metal surfaces of aircraft has been developed. Forty pounds was set by an aircraft manufacturer as the weight allowance for paint beyond which he could not go and compete successfully. After two years of research the lacquer manufacturers devised a complete coating which weighs only 15 pounds. The result is five miles per hour higher speed for the airplane.

Liberty aircraft engines of World War days weighed two and one-half pounds per horsepower. Now a new engine actually weighs only half that per horsepower. A railroad boxcar now being tested weighs approximately six or seven tons less than practically any of the boxcars of like capacity in service today.

Fifty-mile-per-hour tanks for the army have resulted largely from the elimination of needless weight.

One manufacturer by designing a lighter shipping box saved $54,000 per year in freight charges alone.

Even such a prosaic activity as milk delivery is being speeded and cheapened by pruning of unnecessary weight. The use of paper milk containers instead of bottles cuts the burden of an average milk wagon driver from 25,000 pounds to 10,000 pounds per week. And the householder pays for his milk one and one-half cents less per quart.

The old idea that an article must be heavy to be substantial is gradually losing its reputation. American engineers are enlisted in a serious, dollar-saving war on weight.

Science News Letter, March 2, 1940

● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by U. S. Coast and Geodetic Survey of the following preliminary epicenter:

Monday, Feb. 19, 9:18.2 p.m., EST

Queen Charlotte Islands at eastern edge of Coral Sea. Latitude, 12 degrees south. Longitude, 167 degrees east. Strong shock.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL Feb. 24.

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RADIO

New Television Advance Improves Detail of Pictures

Fine Screen Takes Out Fuzziness and Is Step on Way Toward Display of Television Pictures to Audiences

TELEVISION of the future, giving 30% more detail than present 441-line television pictures, was demonstrated in a tour of the homes of Philco Radio & Television Corporation engineers.

The new television advance uses 605-line screens to secure details in the televised images. The new research progress takes much of the fuzziness out of the pictures and is a step on the way to the display of television to large audiences on large sized screens, said William H. Grimditch, vice-president in charge of Philco's engineering laboratories.

"A comparison which may give an idea of this improvement," said Mr. Grimditch, "is the difference between the coarse screen reproduction of a picture on ordinary newsprint and the fine screen reproduction of the same picture on slick paper.

"The coarse screen newspaper reproduction may be likened to the 441-line television picture in use at present while the fine screen reproduction on slick paper is comparable to what one sees on a television screen with a 605-line picture."

Demonstrated by Philco engineers, at the same time, is a new type of small, vertical loop antenna built into television receivers. This loop allows real "plug-in" receivers in contrast to the specially built dipole antennas which now must be mounted on roof tops.

To make feasible the use of these new loop antennas, however, it would be necessary to transmit television signals with their waves polarized vertically instead of in a horizontal plane as is done at present.

The built-in loop antenna is especially recommended to help cut out interference from the ultra-short wave diathermy machines which are now coming into use in physicians' offices and in hospitals. Interference from these medical devices —which act as short wave transmitters— is one of television's major problems. By easily rotating the new built-in loop many cases of diathermy interference can be minimized. There is nothing much one can do, however, if the diathermy machine happens to lie in the same line as the television transmitter.

The big problem of presenting television pictures to a large audience, in a fashion following motion picture practise, is to improve the viewing distance and viewing conditions. With 441-line screens and large sized pictures one cannot get too near or else the picture takes on a fuzziness and "graininess" that is objectionable. Anything that can be done to increase the fineness of the television picture and improve detail permits the audience to be placed nearer to the screen and still see a picture without the coarseness and graininess. This is a major claim of merit for the new 605-line television pictures.

Behind the demonstration is a big business skirmish. The Radio Corporation of America, with good 441-line television receivers, urges "freezing" television on that standard and selling it to the public. The Radio Manufacturers Association backs RCA and urges such standardization. The Federal Communications Commission in Washington has a difficult decision to make. The current plan of Philco, Du Mont laboratories and other television research centers is to attempt to show strikingly that 441-line television is nearer the beginning than the end of research advance in this highly specialized art. Hence 605-line television by Philco with much publicity and a private, and never mentioned, showing of 750-line television to FCC by Du Mont labs. In engineering conversations 1,200-line television is mentioned as a possibility achievable in a few years.

Science News Letter, March 2, 1940

ENGINEERING

Builds Lightning Machine To Test Power Lines

A 2,000,000-volt artificial "lightning" machine has been constructed at the Ryan High Voltage Laboratory at Stanford University. By sending its crashing shocks into power lines, insulators and other electrical equipment scientists expect to use the "tame" lightning to test equipment and learn more about how to protect transmission lines and accessory electrical apparatus from shocks to natural lightning.

Financed by electrical companies on the west coast, the new apparatus is the most modern of its kind, although its peak voltage of 2,000,000 is less than that of apparatus previously developed. In tests at Pittsfield, Mass., 10,000,000 volts have been used.

Science News Letter, March 2, 1940

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BOTANY

NATURE RAMBLINGS

by Frank Thone

Spring's Pioneers

SPRING flowers, to almost everybody, mean such dainty things as violets, buttercups, trilliums and hepaticas. Yet lovely as they are, these are not the real harbingers of spring.

Spring's actual pioneers are of rougher, humbler sort, and sometimes a bit disagreeable, as pioneers may have to be. They are flowers that face the world when frost is still a nightly occurrence, when even hard freezes are common. The earliest spring flowers come while the calendar says it is still winter.

Perhaps the hardiest of all of these early adventurers is the skunk cabbage. It is nothing unusual to find these gnomish blossoms pushing their abrupt purplish noses up through a thin drift of snow, or even cracking ice that has formed over the bog-water in which they dwell. Feeding on thick, fleshy roots, the skunk cabbage has ample energy at its command to shoulder its way successfully into a world that gives it at best a cold welcome.

Early spring flowers, too, are those of several genera of shrubs and trees, notably alder, willow and silver maple. The first two of these, at least, are plants of Arctic affiliations; they must be ready, in the northern edges of their range at least, to burst into bloom and fruition as soon as the cold abates and the sun gives permission, to take advantage of the short growing season, and they seem to have kept the same precocious tendency in more southern lands.

The silver maple or soft maple is the earliest-flowering of its large tribe. Most of the other maples, indeed, wait until their leaves are well grown before they put forth their flowers, but the soft maple for some reason prefers to hang out its abundant fringes of unpetaled bloom for the benefit of the earliest-venturing bees.

Even earlier than these is a flower that can hardly be counted as a spring flower at all. The witch-hazel shrub has the strangest of all blossoming habits: its four stringy yellow petals are apt to be uncurled at any time from November until March. Properly speaking, therefore, witch hazel should be considered a winter-flowering plant.

Science News Letter, March 2, 1940

●RADIO

Dr. Michael Levine of Montefiore Hospital for Chronic Diseases will discuss plant cancer as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, March 7, 4:15 p.m., EST, 3:15 CST, 2:15 MST, 1:15 PST.

Listen in on your local station. Listen in each Thursday.

PHYSICS

Power House for Neutrons Seen in Atom Splitting

A POWER house for potent neutron particles—a laboratory piece of equipment for the generation of these neutral atomic particles that are perhaps the best of all weapons with which to bombard the elements and produce artificial radioactivity and transmutations—is what Prof. Enrico Fermi, Nobel Prize scientist at Columbia University, sees in the new atomic process of uranium splitting.

Discussing for the American Society of Mechanical Engineers uranium's fission and its possible application as a source of atomic power, Prof. Fermi went on to add:

"The large release of energy by the reaction . . . is indeed probably only one and very likely not the most important aspect of the problem. Far more important might eventually prove the production of radioactive materials and of neutrons in practically unlimited amounts, for medical, biological, and physical investigations. . . . Although there is only a chance of success on these lines the stake appears large enough to justify some gambling on the part of scientists."

The "gamble" of which Prof. Fermi speaks is the success or failure of experiments testing whether uranium, in its splitting, gives off other neutrons which can split other uranium atoms and so on in a chain reaction. If this self-perpetuating kind of chain-reaction can be created and kept under control in scientific laboratories, then one may expect all top-flight physical laboratories of the future to have uranium-fission neutron sources. All that would be needed would be a small supply of radium placed in a mixture of beryllium. This radium-beryllium source would supply the initial neutrons for starting the uranium fission just as the pilot flame on a gas stove starts the gas to burning.

Surrounding the radium-beryllium neutron source would be water or paraffin to slow the neutrons and also the "fuel" of the process, cheap uranium oxide ore. To start the neutron generator one would place the radium-beryllium source at the center of a container of the uranium. Once the chain reaction started this original source would be removed. The uranium would undergo splitting with the liberation of the desired neutrons. To stop the process would require only the insertion, by mechanical means, of sheets of cadmium metal which has the ability to capture and stop the low-energy neutrons strongly.

Science News Letter, March 2, 1940

The world has nearly twice as much wheat now as in 1914, and world granaries are described as "overflowing."

When the first census was taken in the United States, Virginia had the largest population.

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First Glances at New Books

ANTHROPOLOGY

INDIANS OF THE UNITED STATES—Clark Wissler — *Doubleday, Doran,* 319 p., $3.75. Indians since 1492 and their experiences in sharing the New World with white men are described in this fine book. Dr. Wissler knows what the general public asks about Indians, and he knows how to make the Indian position understandable.

Science News Letter, March 2, 1940

ORNITHOLOGY

BIRDS IN THE GARDEN, and How to Attract Them — Margaret McKenny — *Reynal and Hitchcock,* 349 p., $5. All about birds, especially songbirds, and how to induce them to make their homes on your premises. The bulkiest chapter in the book (99 pages!) is a list of plants that attract birds, accompanied by lists of birds known to frequent them. The many excellent illustrations, most of them color plates by eminent bird artists, will aid greatly in making identifications. All in all, just about as good a one-volume library on birds as the garden-making suburban or "subrural" dweller can desire.

Science News Letter, March 2, 1940

PSYCHOLOGY—PHYSIOLOGY

SPEECH CORRECTION, Principles and Methods—C. Van Riper—*Prentice-Hall,* 434 p., $2.50. A textbook by the director of the speech clinic of Western State Teachers College.

Science News Letter, March 2, 1940

PHYSICS

VECTOR ANALYSIS, With an Introduction to Tensor Analysis—James Henry Taylor—*Prentice-Hall,* 180 p., $2.85. Vector analysis for students who have had calculus and who have the earnestness to extend their studies by additional reading from the literature where needed. Numerous problems and examples of vector solutions are provided but the emphasis of this fine book is on the mathematics rather than the applications.

Science News Letter, March 2, 1940

ANTHROPOLOGY

CONTRIBUTIONS TO THE ANTHROPOLOGY OF IRAN—Henry Field—*Field Museum of Natural History,* 706 p., 144 plates, $7.75. MAP A. Distribution of Tribes in Iraq. MAP B. Distribution of Tribes in Western Iran—*Field Museum,* 25 c. for the two maps, and List of Tribal Names. Physical types of ancient, as well as modern, peoples of Iran are described in this comprehensive study, and Dr. Field reports that a new and fundamental division of the white race can be distinguished in this region, to supplement the well-known Nordic, Mediterranean, and Alpine divisions. To make the study as useful as possible, he has cited over 100 pages of reference material from historic sources, provided a special index of tribes and racial groups, and included numerous profile and full-face pictures of modern Iranians.

Science News Letter, March 2, 1940

POLITICAL SCIENCE

THE NEW WORLD ORDER — H. G. Wells—*Knopf,* 145 p., $1.50. See p. 136.

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MATHEMATICS

ASPECTS OF THE CALCULUS OF VARIATIONS—Notes by J. W. Green after Lectures by Hans Lewy—*Univ. of Calif. Press,* 96 p., 75c. As the author says, this little book is intended only to give the reader a "skeleton of methods" such as are encountered in the calculus of variations. For those with an adequate training in mathematics it will provide a most interesting approach to its subject.

Science News Letter, March 2, 1940

CHEMISTRY

PRINCIPLES OF CHEMISTRY (4th ed.)—Joel H. Hildebrand—*Macmillan,* 359 p., $2.50. One of America's best introductory chemistry texts goes into still another edition revised and brought up to date in the new advances of chemistry and physics. One innovation for this much-used text is the introduction of small type passages designed for the precocious student.

Science News Letter, March 2, 1940

SCIENCE

REPORT ON THE PROGRESS AND CONDITION OF THE UNITED STATES NATIONAL MUSEUM FOR THE YEAR ENDED JUNE 30, 1939—*Govt. Print. Off.,* 128 p., 15c.

Science News Letter, March 2, 1940

CHEMISTRY

INTRODUCTORY COLLEGE CHEMISTRY (2d ed.)—Neil E. Gordon and William E. Trout, Jr.—*Wiley,* 753 p., $3.50. No dry text is this revision of a popular elementary chemistry book. Copious use of pictures, a continual consideration of new advances in science which increase interest, liberal problems and supplementary reading lists all combine to make this book exceedingly attractive.

Science News Letter, March 2, 1940

EXPLORATION

TWO MEN IN THE ANTARCTIC, An Expedition to Graham Land, 1920-1922—Thomas Wyatt Bagshawe — *Cambridge (Macmillan),* 292 p., $3.75. Highly readable is this account of two young and cheerful explorers who wintered in the Antarctic "in a disused boat, with a handful of instruments and a scanty stock of provisions." Their devotion to scientific logs and records went to such lengths that they resisted eating the first penguin eggs (to break a long diet of seal stew) until making sure there were enough for observation purposes. Appendices contain their scientific reports.

Science News Letter, March 2, 1940

GENERAL SCIENCE

SCIENCE MARCHES ON—Walter Shepherd—*Harcourt, Brace,* 420 p., $3. The broad field of science is covered with attention to beginnings and history, "particular discoveries being cited more by way of illustration than for their own sakes." First American edition of a British book.

Science News Letter, March 2, 1940

GENERAL SCIENCE

INTERNATIONAL SCIENTIFIC CONGRESSES HELD SINCE 1930, OR ANNOUNCED FOR 1940 OR LATER—*National Research Council,* 45 p., 25c. See page 136.

Science News Letter, March 2, 1940

MATHEMATICS

MODERN ELEMENTARY THEORY OF NUMBERS—Leonard Eugene Dickson—*Univ. of Chicago Press,* 309 p., $3. The University of Chicago's emeritus professor of mathematics offers the introductory theory of numbers in a form which has much merit for graduate students and others sufficiently grounded in prior mathematics.

Science News Letter, March 2, 1940

PSYCHOLOGY

PERSONAL AGGRESSIVENESS AND WAR—E. F. M. Durbin and John Bowlby—*Columbia Univ. Press,* 154 p., $1.50. See page 139.

Science News Letter, March 2, 1940

GEOGRAPHY

SOUTHWARD HO! A Treasure Hunter in South America—William La Varre—*Doubleday, Doran,* 301 p., $3. Bright and breezy narrative of adventures, starting in Yucatan and working southward to Patagonia. Very colorful and often exciting.

Science News Letter, March 2, 1940