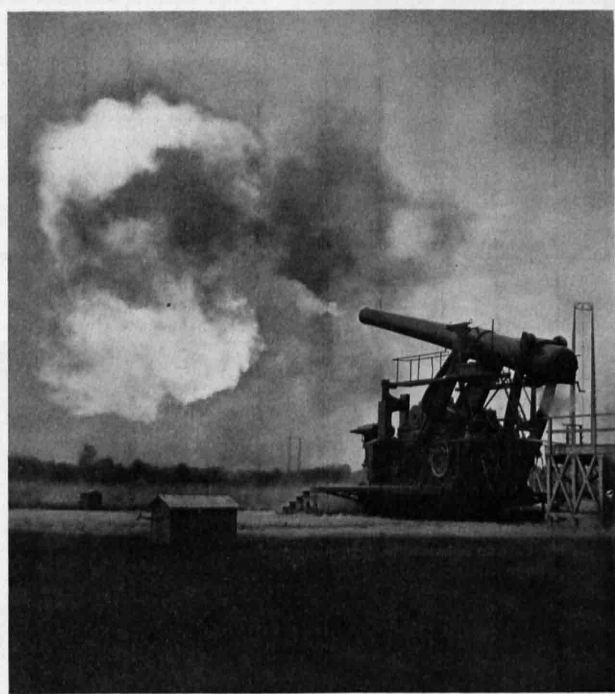


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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



November 4, 1939

Ten-Mile Fist

See Page 303

A SCIENCE SERVICE PUBLICATION

Do You Know?

Textile fibers from fish skin are new in Italy.

A tuna weighing 890 pounds was caught in September off Nova Scotia, with a 54-thread line.

Girls with keen eyesight have proved better than men at the job of spotting flaws in tin plate, in the steel industry.

André Maginot, who planned France's Maginot Line, fought with distinction in the World War and died of typhoid fever in 1932.

Growing buttercups contain an acrid, caustic juice which makes cattle and horses avoid them, but dried as hay the buttercups make good fodder.

Because Chinese writing is not alphabetic, type is set in separate words and a typesetter may walk three miles to hand-set a single newspaper page.

The new Bird Island sewage treatment plant built at Buffalo at a cost of \$15,000,000 is intended to "put an end once and for all to the pollution of the Niagara River" blamed for "marring the friendship of two great and friendly nations."

In his "History of Plymouth Plantation," Governor Bradford described an infestation of seventeen-year cicadas, calling them a "great sorte of flies, like (for bignes) to wasps or bumble-bees, which came out of holes in the ground . . . and made such a constante yelling noyes, as made all the woods ring of them."

SCIENCE NEWS LETTER

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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.

AERONAUTICS

How can crashing pilots be protected against broken necks? p. 291.

How many blind landing systems are now in use in the United States? p. 295.

BOTANY

What chemical can be used to kill plant tumors? p. 296.

CHEMISTRY

How has the war handicapped Japan chemically? p. 300.

What is the basis for the prejudice against gas warfare? p. 298.

GENERAL SCIENCE

How can scientists map a single area of the brain? p. 293.

How does a one-eyed catfish change color? p. 294.

How much oxygen is consumed by animals before birth? p. 302.

In what country is a Ministry of Science being urged? p. 297.

What has your body build to do with the date of your death? p. 293.

What sets the pace for brain activity? p. 293.

MARINE BIOLOGY

How do scientists hope to trace the migration of shrimp? p. 303.

MEDICINE

For what research was the 1938 Nobel Prize in medicine awarded? p. 291.

How is double stomach cured? p. 302.

What new instrument will aid surgeons in removing bullets from men's abdomens? p. 301.

What new weapon is being tried against tuberculosis? p. 291.

Who discovered the life-saving dye Pron-tisol? p. 291.

Why are ingrowing toenails placed on the must list for urgent treatment in England? p. 296.

METALLURGY

What metals are being tested as possible substitutes for tin in can coating? p. 297.

MINERALOGY

How large is the world's biggest topaz? p. 296.

PHYSICS

Where has a new super-microscope been invented? p. 297.

PUBLIC HEALTH

In what vitamin do scientists see a possible cure for cooties? p. 296.

What is the difference between diphtheria germs in the North and in the South? p. 292.

To save nickel, Italy has decided to replace nickel coins with a stainless steel alloy called acmonital.

Chemists frequently can calculate—without experimenting—whether a certain product can be produced from new and untried raw materials.

A sugar pine tree sprouted 15 or 20 years ago in the top of one of the sequoia trees in Sequoia National Park, California, and is now eight feet tall.

Some of the Arctic's water animals, such as the seal and whale, have normal temperatures as high as 104 degrees.

The statue of a sixth century B.C. soldier found near Capestrano, Italy, had a dinner-plate helmet over two feet across.

On a normal day in peace time, there are about 145 British ships at sea, counting all naval and trade vessels of more than 3,000 tons.

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MEDICINE

Thousands Will Cheer Nobel Prize Award for Prontosil

Award in Medicine This Year Goes for Discovery Of Life-Saving Dye; 1938 Prize for Respiration Research

TENS of thousands of people who have been snatched from the jaws of death by sulfanilamide or one of its healing chemical relatives will cheer the 1939 Nobel prize award in medicine and physiology because it went to the man who is chiefly responsible for saving their lives. He is Dr. Gerhard Domagk, of the I. G. Farbenindustrie, Germany's famous chemical and dye combine.

Sulfanilamide, Prontosil, sulfapyridine, have become household words the world over. They are hailed as life-saving remedies for childbed fever and other deadly streptococcus infections, pneumonia, meningitis, gonorrhea and a host of other ailments. Not so well known is the name of the modest scientist who first told the world, on Feb. 15, 1935, that Prontosil, a relatively non-poisonous red dye, when given by mouth, pro-

tected mice from deadly streptococcus infection.

The dye itself was made by two other German scientists, Drs. Fritz Mietsch and Joseph Klarer, also of the I. G. Farbenindustrie. Probably a score of other chemists and medical scientists, including some Americans, worked with closely similar compounds, searching for a germ-killing chemical that could be given to cure sick people.

But Dr. Domagk's report of his work with mice started French and German and English and American doctors to giving it to their patients—women all but dying in childbirth; children delirious and desperately sick with meningitis; men, women and children gasping in an almost fatal struggle with the great killer, pneumonia.

The red dye Dr. Domagk used in his

epochal experiments has been superseded by other, simpler and cheaper, because non-patentable, chemicals. But the life-saving work he started continues at an amazing and thrilling pace as the sulfanilamide group of chemical remedies conquers more and more of mankind's disease foes.

Science News Letter, November 4, 1939

1938 Prize to Heymans

PROF. C. Heymans of the University of Ghent, Belgium, was given the 1938 Nobel prize in physiology and medicine, postponed from last year, for discovery of one of the mechanisms that regulate respiration. Breathing is changed by a reflex mechanism when the nerve endings in the carotid sinus, located at the base of the skull, are stimulated by severe oxygen lack.

Science News Letter, November 4, 1939

MEDICINE

Sulfapyridine Is Tried As Tuberculosis Remedy

SULFAPYRIDINE, chemical remedy that has been saving lives threatened by pneumonia, has been given to seven patients with tuberculosis in the hope that it would be equally useful as a remedy for this ailment. Hope that it might be was aroused by reports of previous use of the chemical for treating guinea pigs with tuberculosis. Unfortunately, the remedy failed to help any of the human patients, Drs. Stanton T. Allison and Robert Myers, of New York, report. (*Journal, American Medical Association*, Oct. 28)

Both sulfapyridine and its chemical relative, sulfanilamide, are proving useful in treating another condition, the usually fatal blood poisoning due to staphylococcus infection. Cases in which these drugs are believed to have helped patients recover are reported in the same issue of the *A.M.A. Journal* by Drs. William A. Thornhill, Jr., Howard A. Swart and Clifton Reel, of Charleston, W. Va., and Samuel L. Goldberg and Allan Sachs of Chicago.

Science News Letter, November 4, 1939

AERONAUTICS

Shoulder Straps to Aid Air Safety in Crashes

THE ARMY Air Corps' new "shoulder" safety straps have successfully passed their experimental tests at Wright Field. The new aerial safety aid is de-



LIFE-SAVING RESEARCH

This is a prize-winning photograph of the Nobel-prize-winning research—a dish of sulfanilamide resting on the original publication by Dr. Gerhard Domagk of his discovery. The photograph was awarded a prize last spring by Editor and Publisher. (See SNL, March 11.)

signed to prevent and minimize the large number of head and neck injuries received by pilots in crashes. The present safety belts keep the pilot's body in the seat but terrific "jackknifing" occurs. The head is thrown forward and hits controls and instrument panel.

The new straps, designed under the direction of Capt. Harry G. Armstrong, director of the Physiological Research Laboratory at Wright Field, are essentially like suspenders.

The straps fasten to the usual safety belt in the front and are anchored to the seat by springs at the rear. The tension on the belt and shoulder straps is adjustable by a button on the side of the seat which changes the tension on the coiled springs.

Capt. Armstrong himself made the tests on the belt. Strapped into a pilot's seat in horizontal, instead of the usual vertical position, he was dropped from an overhead beam for predetermined distances and then jerked up short by a heavy chain.

At a deceleration of eight G's (eight times the acceleration of gravity) Capt. Armstrong's body jackknifed when the usual safety belt was used alone. With both the belt and shoulder straps there was no jackknifing at 15 G's.

On the basis of the tests it is estimated that a pilot in a crash could stand a deceleration of 30 G's without serious injury.

At the highest deceleration there was no tendency of the head alone to jackknife forward. This shows there is little possibility of snapping the neck.

Pilots who have worn the device in aerial acrobatic maneuvers say it gives them a highly desirable extra steadiness. Landings on aircraft carriers, too, are helped because, there again, fast deceleration is needed to stay on the landing deck.

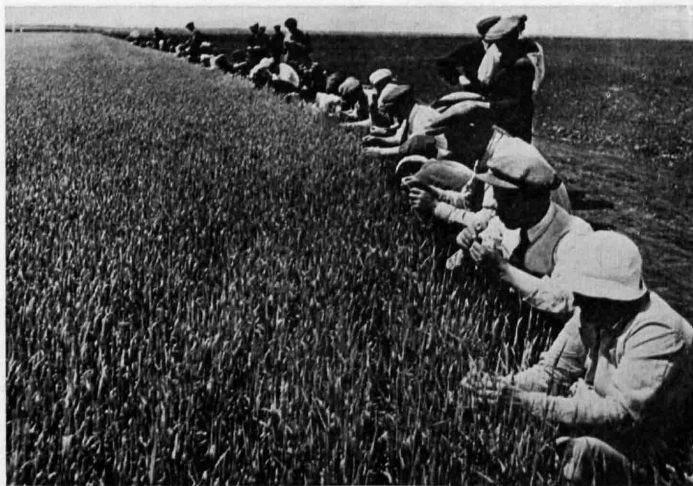
Science News Letter, November 3, 1939

PHYSIOLOGY

Female Sex Hormone Stimulates Male Opossums

SEX-physiological responses in male as well as female animals can be produced by the injection of the female sex hormone progesterone, it has been discovered by Drs. A. Bolliger and A. Carrodus of the University of Sydney, Australia. The two physiologists, who performed their experiments on young male Australian opossums, report their results in the science journal, *Nature*. (Oct. 14.)

Science News Letter, November 4, 1939



FIGHTERS AGAINST FAMINE

Plowshares are swords in the world's newer wars, wherein nation pits all its resources against other nations. This a line of Soviet soldiers of science—a class being instructed in the technique of plant breeding, at the edge of a wheat field on one of the U. S. R. R.'s enormous agricultural experiment stations. If Russia is to get off the list of lands where famines recur periodically, let alone have a surplus of grain for export and exchange, it is necessary to produce, quickly and abundantly, seed of wheat strains resistant to drought and disease.

PUBLIC HEALTH

Diphtheria Severe In South, May Also Invade North

Germes Found in Different Localities Have Varying Virulence, But Mild Kind May Change to Dangerous

DIPHtheria threatens to become widespread and severe in the South and there is no assurance that it will not do the same in the North.

Diphtheria germs found in different parts of the country vary considerably in their disease-causing ability, Dr. Martin Frobisher, of Johns Hopkins University, Baltimore, reported to the American Public Health Association. In the South, particularly in Virginia and Alabama, a more virulent, dangerous kind of germ has been prevalent within the last two years, surveys showed. During this same period there have been more cases of diphtheria. In the North, where diphtheria cases have declined enormously in the past ten years, a different type of germ is found.

These facts suggest that health authorities, by studying the kind of germs in their locality, can predict the coming of an epidemic or of more severe cases of diphtheria. Not enough information is available yet, Dr. Frobisher said, to be sure whether such predictions can be made accurately, but he stressed the need for further studies along these lines.

The mild kind of diphtheria germs prevalent in the North, which do not cause much sickness, may change into more virulent forms. This point needs investigation, Dr. Frobisher said, and so does the question of whether these mild germs that do not make people sick nevertheless give them immunity to the disease.

Science News Letter, November 4, 1939

GENERAL SCIENCE

Chemical Pacemaker for Brain Aids Mental Disease Study

National Academy of Sciences at Fall Meeting Hears of Mapping Brain; Lifetime Linked With Build

NEW UNDERSTANDING of paresis, or brain syphilis, one of mankind's major mental diseases, may result from the discovery that "breathing" of your brain cells sets the pace for your mental activity, Dr. Hudson Hoagland, Clark University physiologist, told the National Academy of Sciences at Brown University.

Electric waves from the brain itself signal to scientists the nature of this chemical control.

Each cell in your brain, as a by-product of respiration, builds up electric potential, Dr. Hoagland explained. The cell walls have electric resistance. The electricity is discharged whenever the respiration process builds up potential and loads the capacities of the cell walls to their critical firing point. This electrical discharge forms the brain waves—electrical signals direct from the brain. Brain cell respiration creates the brain waves.

First constructing this theory from what was already known of other body cells, Dr. Hoagland put the idea to laboratory test by changing chemically the rate of cellular respiration and discovering that parallel changes occurred in the brain wave frequencies.

Thyroxin, powerful secretion of the thyroid and well-known speeder of the body processes, increases the frequencies of the brain waves. So also does the metabolic stimulant dinitrophenol.

Opposite effects in slowing the brain waves were obtained through lowering the blood sugar, thus depriving the brain of its principal fuel, and by markedly lowering the brain's oxygen consumption.

Study of the effects of temperature on brain wave frequencies has furnished information as to how one or the other of the links in the chemical chain that constitutes cortical cellular respiration may act as the pacemaker governing the brain waves, Dr. Hoagland said. This work has been applied specifically to the analysis of chemical pacemaker changes in advanced brain syphilis.

The effect of temperature on specific

enzyme system involved in cellular respiration is also being studied by Dr. Hoagland.

Science News Letter, November 4, 1939

Sensory Area Mapped

SCIENCE'S inquiring finger can now point more accurately to the parts of the cortex of the brain that discriminate sensation, or feeling, in various parts of the body, an achievement reported by Dr. J. G. Dusser de Barenne of Yale University to the academicians.

Electrical brain waves, generated in the brain itself, signal the location and the extent of the area of the sensory cortex in a research technique devised by Dr. Dusser de Barenne in collaboration with Dr. W. S. McCulloch.

Precise localization of this area is possible because a little strychnine applied to the cortex of an anesthetized chimpanzee creates a special kind of brain wave, one with "spikes" of large and rapid voltage fluctuations.

The distribution of these spikes appearing in the electrogram of the sensory cortex is quite typical.

By this method it was found that the chimpanzee's sensory cortex is a very large region with major subdivisions serving sensation in the face, the arms and the legs separately.

Science News Letter, November 4, 1939

Body Shape Hints at Death

THE SHAPE and proportions of a man's body, while he is still in good health and a long way from his funeral, give fairly definite indication of how and when he may be expected to die, Prof. Raymond Pearl and Dr. W. Edwin Moffett of the Johns Hopkins University reported.

Prof. Pearl made a study of the histories of 2332 men, all dead, representing the longest-lived and shortest-lived groups out of a much larger number. Information about their bodily constitution had been placed on file years be-

fore, when they were all in good health, with no indications of onset of the various diseases that finally killed them. He divided them into two classifications, long-lived and short-lived.

Among the results of his study, as reported to the Academy, were the following points:

Short-lived men who died of heart and kidney ailments were bigger around the body, in both chest and abdominal girth, than long-lived men who died of the same groups of diseases.

This condition was reversed in the case of men who later died of cancer and pneumonia: the skinny (asthenic) men were shorter-lived than the stouter (pyknic) type.

In those eventually dying from cancer and from diabetes the average body weight was also greater in the short-lived than in the long-lived group. The difference here, however, was too small to justify any very definite conclusions.

Height apparently had nothing to do with length of life. Talls and shorts were scattered at random through all the disease groups, among both long-lived and short-lived.

Pulse rate was more rapid among all groups of short-lived than it was among the long-lived groups.

Among the men who eventually died of heart disease, the longer-lived ones showed higher blood pressures than the shorter-lived, although the blood pressures of both groups were within normal range at the time they were taken. Analysis of other disease groups has not yet yielded definite data on this point.

Science News Letter, November 4, 1939

Extra Ribs Hereditary

EXTRA ribs, as well as other supernumerary internal parts, have been shown to be an hereditary trait, in breeding experiments reported by Prof. Paul B. Sawin of Brown University.

Prof. Sawin used three inbred families of rabbits, in which a thirteenth rib, instead of the usual twelve, was a very frequent occurrence. By continuing the mating of extra-ribbed animals, he was able to build the occurrence of the thirteenth rib in two of his rabbit families from 86.6% and 84.7% to 94.7% and 97.7%, respectively.

A cross between one of the thirteen-ribbed families and the twelve-ribbed individuals of the unselected family has produced 40 young, 66% of which are thirteen-ribbed, and which continue to breed as thirteen-ribbed.

Results similar to those obtained on rib counts were also obtained on extra numbers in other bones and in branches of certain blood vessels.

Science News Letter, November 4, 1939

100,000,000-Volt Missiles

PRODUCTION of atomic projectiles of more than 100,000,000 electron-volts energy was forecast when Prof. E. O. Lawrence of the University of California, inventor of the atom smashing cyclotron, reported that building of a 120-inch, 2,000-ton, cyclotron, double the size of his world's largest, is entirely feasible.

Gratifying results from the new 60-inch cyclotron, weighing over 220 tons, which has just gone into service, caused Prof. Lawrence to look forward to a still more powerful machine for impressing large energies upon tiny fragments of matter.

By bombarding bismuth and lead with 32,000,000-volt helium ions, Prof. Lawrence announced that he had obtained large yields of new radioactive substances that produce alpha particles, which are also emitted from natural radium.

These, or other cyclotron radiations, may prove useful in treatment of cancer and for other medical purposes.

Only 50 kilowatts ordinary electrical input to the cyclotron gives 50 microamperes of 16,000,000-volt deuterons (hearts of heavy hydrogen atoms) or one microampere of 32,000,000-volt helium ions. Such higher voltages greatly speed the production of particles and radioactive substances used in medicine and in atomic research. The neutron yield per microampere of deuterons is reported by Prof. Lawrence to be five times greater at 16,000,000 volts than at 8,000,000 volts, while the yield of radioactive iodine is 20 times greater.

Science News Letter, November 4, 1939

Corona Seen by Television

TELEVISION has come to the aid of astronomers studying the sun and may soon help communication engineers to forecast radio blackouts on transatlantic transmissions, Dr. A. M. Skellett of the Bell Telephone Laboratories, New York City, reported.

Special television apparatus has been devised for use with telescopes to scan the sky around the sun at any time without waiting for a total solar eclipse. Only at times of total eclipses have astronomers previously been able to investigate

the solar flares and prominences. Expeditions have travelled thousands of miles in the past for a brief, fleeting look at the eclipsed sun.

What radio engineers hope is that by daily inspections of the solar activity in the corona they may be able to forecast better the disruptions in transatlantic radio transmission. While a few years ago transatlantic radio was little known to the public, the growing demands for European broadcasts of the war have brought its merits, and upon occasion its trouble with blackouts, to the listening public.

The new apparatus, tested successfully at the Cook Observatory at Wynnwood, Pa., is used in connection with a horizontal telescope which throws its image against a screen. A mirror on this screen, just the size of the image of the sun's disk, reflects this useless glare down into a light trap. The desired image of the corona and its features passes on and is caught by a television camera which is sensitive only to the alternating current component that originates in the corona. The direct-current component, found in the glaring disk, is rejected.

The television apparatus amplifies the alternating-current component and reproduces from it an image of the corona. The televised image appears on the screen of a cathode ray tube.

Many images of the solar prominences have been obtained, Dr. Skellett indicated, and a number of other features which are apparently of coronal origin have been seen.

"On one particularly clear day," he said, "a bright jet or flare in the corona was photographed over a period of several hours. This feature turned about the optic axis of the telescope with time at the correct rate for a coronal feature."

Science News Letter, November 4, 1939

Formulae Explain Drawings

A NEW way of drawing pictures, composed of extremely narrow strokes of pen or pencil, explained mathematically by complex integral equations, was presented by Prof. G. D. Birkhoff, Harvard mathematician.

Explaining that it is well known that any drawing can be rendered by a stippling process of point strokes, Prof. Birkhoff put this problem to the academicians:

"What kinds of drawings are possible when only extremely narrow, unlimited rectilinear (straight) strokes are allowed?"

As an amusing curiosity Prof. Birk-

hoff exhibited such a linear drawing, suggesting a human face, made by David Middleton of Harvard.

Then he explained that the density of the deposited lead or ink determines the depth of blackness, varying from black through gray to white. "For example," said Prof. Birkhoff, "if the linear strokes are symmetrically distributed through a common point, the depth of blackness varies inversely as the distance from the point.

"Now if the nature of the drawing is specified, as in this example, it is easy to determine the depth of blackness which results."

The converse problem — given the depth, to find out if the drawing can be made by such linear strokes or not, and if it can, just how it may be accomplished—admits of explicit mathematical solution worked out by Dr. Birkhoff. The mathematics involved leads to a generalization of a celebrated integral equation due to the mathematician, Abel.

Science News Letter, November 4, 1939

One-Eyed Fish Turn Color

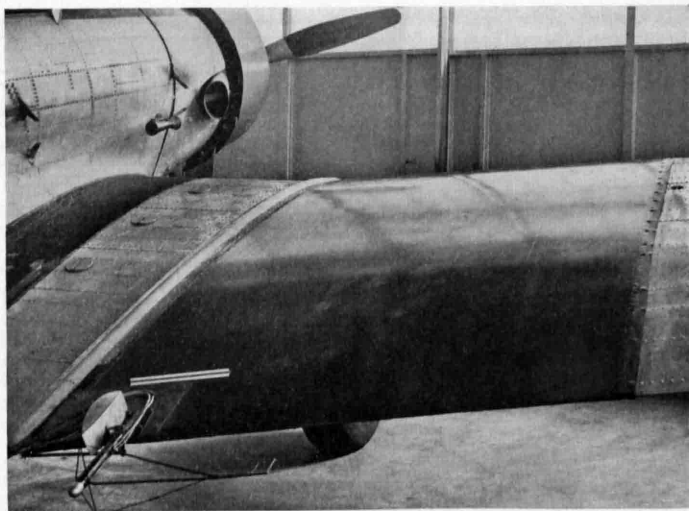
FISHES change color, chameleon-wise, to match the shade of their surroundings, especially the bottom over which they are swimming. These color changes depend on stimuli received through the eyes: blind fishes turn dark and do not change. How one-eyed fishes respond was described by Prof. G. H. Parker of Harvard University.

One-eyed fishes of most species continue to adapt to environmental color changes as if they still had both eyes, Prof. Parker reported. If a trout loses one eye, the opposite side of its body turns dark, as in a blind fish, while the same side continues to adapt normally. If a catfish suffers the same loss, it first turns dark all over as if it were totally blind. Then it will go through the normal color changes, but always quite slowly, and it never becomes fully pale.

These color changes are due to the expansion and contraction of special pigmented cells in the skin, controlled partly by nerve action, partly by internal gland secretions. The unusual mode of reaction on the part of the catfish was credited by Dr. Parker to the greater importance, in its color physiology, of one of the secretions of the pituitary gland. In other fish species studied, the pigment-cell reactions are more directly controlled by nerve action.

Science News Letter, November 4, 1939

(Turn to page 302)



WORLD'S SMOOTHEST WING

AERONAUTICS

Scientists Try to Select Best Blind Landing System

Group of Eight Experts Selected to Comply With Request of President; Over Seven Systems Now in Use

EXTREMELY difficult is the decision facing the committee of the National Academy of Sciences assigned to select a standard American system of blind landing for airplanes. In the interests of economy, efficiency and national defense, President Roosevelt has asked the NAS for this decision.

This committee must choose from at least seven different blind landing systems which have been developed over the last ten years since that now historic day in aviation when Maj. James H. Doolittle, then a young Lieutenant, made the first blind instrument landing at Mitchell Field, L. I., on Sept. 24, 1929.

Among the systems which have gone beyond the paper stage of development into actual airport installations are those of Air Track, Army, Bendix, I. T. D., Lorentz, M. I. T-Metcalf and the Navy.

Headed by Dr. Vannevar Bush, engineer and president of the Carnegie In-

stitution of Washington, the group has already interviewed representatives of the Army, Navy and the Civil Aeronautics Authority on these various types of blind landing systems now in use.

The group of eight experts, all members of the National Academy and well-known in engineering and scientific circles, are exploring the merits of all the modern instrument landing systems for President Roosevelt seeking, if possible, to determine the present "best bet" for prompt standardization.

Following meetings with aeronautical experts of the various Federal agencies the scientists' group will continue to study the merits of other systems developed by commercial companies.

Personnel of the group at the recent closed hearings at the building of the National Academy of Sciences included: Dr. Vannevar Bush, Dr. Bancroft Gherardi, engineer and vice-president of the American Telephone and Telegraph

AERONAUTICS

World's Smoothest Wing Made at Langley Field

THE shiny, black airplane wing shown on this page is probably one of the smoothest ever built by man in his efforts to make airplanes fly faster and better.

It was produced at the laboratories of the National Advisory Committee for Aeronautics at Langley Field, Va., to study what decrease in wind drag would be secured by ridding the wing section of rivets and other irregularities.

Test apparatus at the wing's trailing edge of this Army Northrop A-17A attack monoplane showed a 50% decrease in drag over that of the original wing.

The research, one of the few with military planes to come from behind Langley Field's wall of military secrecy in recent months, confirms in real flight tests the prior findings on models in wing tunnel tests.

The results lend engineering confidence to tests now believed to be under way on a super airplane wing designed for 500 mile-an-hour speeds that would keep Uncle Sam in the forefront of military aviation. (See *SNL*, Oct. 28)

Science News Letter, November 4, 1939

Company; Dr. O. E. Buckley, director of research, Bell Telephone Laboratories; Gano Dunn, noted engineer and president of the J. G. White Engineering Corporation; Prof. W. F. Durand, aeronautical expert of Stanford University and a member of the National Advisory Committee for Aeronautics; Prof. L. J. Henderson, physiologist of Harvard University, and Dr. Joseph Erlanger, physiologist of Washington University School of Medicine, St. Louis.

Also invited but unable to attend was Dr. Max Mason, mathematician and former president of the University of Chicago, and now vice-chairman of the committee at California Institute of Technology charged with the construction of Mt. Palomar Observatory.

With no testing facilities of its own the scientists are basing their decision on information already available and by oral interviews with interested parties who have made contributions to the field of instrument blind landing systems.

Science News Letter, November 4, 1939

The United States owns half the known coal in the world.

BOTANY

Colchicine Solution Kills Plant Tumors

COLCHICINE, science's newest elixir to make plants produce giant offspring and go through other sudden and startling evolutionary changes, can also be the finger of death to the abnormal tissue growths known as plant tumors.

At the great U. S. Department of Agriculture laboratories near Beltsville, Md., Dr. Nellie A. Brown has been experimenting with colchicine solutions as a means for getting rid of plant tumors without killing the plants. Using a wide range of experimental material, including tomato, bean, wild tobacco, four-o'clock, Paris daisy and French marigold, she has demonstrated that simply brushing on a solution of the drug (usually of 2% strength) will kill nine-tenths or more of all tumors treated. Injecting an even weaker solution into the tumor tissue with a hypodermic needle produces similar results.

Plant tumors, unlike the animal growths which they resemble, are caused by a microscopically visible germ, known as *Bacterium tumefaciens*. Colchicine does not kill this germ. The effect of the drug seems to be directly on the tissues themselves. Colchicine appears to be deadly to the plant tumor cells, but not to healthy cells in the plant's normal tissues.

Science News Letter, November 4, 1939

INVENTION

Two New Plant Patents And Wrist Watch for Blind

KEY PATENTS among those issued by the U. S. Patent Office recently were:

Two new plant patents Nos. 336 and 337, for a new variety of poinsettia and a new kind of tea rose.

A wrist watch with scalloped rim with marking for use by the blind. (No. 2,168,314)

A dull finish cellulose coating for fabrics so that they will simulate leather. (No. 2,169,199)

A new type of hypodermic needle in which the medicine is ejected by a charge of compressed air. (No. 2,168,437)

A cast type of resin that has an integral sheen caused by light-reflecting, tiny specks of materials imbedded within it. (No. 2,168,331)

A new type of ice cube tray from which the cubes can be easily removed. (No. 2,168,678)

A compact gas turbine adapted for use in airplanes. (No. 2,168,726)

From Germany, a method of producing metallic magnesium. (No. 2,168,750)

A semi-frozen food product like ice cream but prevented from freezing solid at low temperatures by the addition of glycerine. (No. 2,168,934)

An attachment for a camera making it impossible to take double exposures. (No. 2,168,974)

A new type of pneumatic automobile tire which contains no inner tube. (No. 2,169,037)

A motor driven skinning knife having two blades arranged side by side and given small relative motions. (No. 2,168,703)

A circular loom for weaving hats and similar objects. (No. 2,168,385)

An anti-skid device for motor cars running on icy pavements consisting of a sharp-edged wheel pressed against the ground by a stout spring fixed downward from the under side of the car's running board. (No. 2,168,440)

Science News Letter, November 4, 1939

GENERAL SCIENCE

Madame Curie, Edison To Live Again on Screen

TO join the successful epics of science that have paraded on the motion picture screen in recent months, there are other picturizations with a dominant scientific motif in the making.

Thousands have thrilled to "The Story of Louis Pasteur," "Alexander Graham Bell," and "Stanley and Livingston," which are historical photoplays as human and entertaining as those involving any cinema Queen who caused a camera to turn.

Now Greta Garbo will do "Madame Curie" and Spencer Tracy will portray "Thomas Edison" in Metro-Goldwyn-Mayer productions. These two pictures will tell stories of important scientists who have had major effects upon our world of today.

"The Story of Dr. Ehrlich" will star Edward G. Robinson for Warner Brothers, telling German accomplishments very different from those of today.

A picture telling of the discovery of anesthesia is also on the M-G-M list under the title "Triumph Over Pain," which, no doubt, will heighten the ether controversy between Georgia and Boston.

There are also rumors that Goldberger, fighter for the U. S. Public Health Service against pellagra, will live again on the screen.

Science News Letter, November 4, 1939

IN SCIENCE

CHEMISTRY

Transparent Plastic Resin Has New Artistic Job

LATEST job for transparent plastic resin: It converts a line of standard print into odd shapes and sizes that delight the eye of advertising and layout men. Rods of methyl methacrylate resin (lucite) of different diameters and shapes are halved and used to distort the lettering over which they are placed. The twisted lettering produced is captured by a photograph.

Science News Letter, November 4, 1939

MINERALOGY

World's Biggest Topaz Now at Smithsonian

ONE OF the biggest jewels in the world, a 153-pound topaz, has recently been added to the collection of the Smithsonian Institution. This single crystal is about 70,000 times larger than the topazes commonly worn as jewelry, which seldom exceed five carats in weight. The huge gem was found in the province of Minas Geraes, Brazil, in the course of mining for other precious stones.

Science News Letter, November 4, 1939

MEDICINE

Minor Foot Ailments Put On Urgent List in England

INGROWING toenails, hammer toes and other minor foot maladies may get on the "urgent list" of cases admitted to London hospitals that are closed, because of war, to all non-urgent cases. The reason, given in the *Lancet*, (Sept. 30) English medical weekly: These minor foot troubles "become increasingly urgent as limitation of transport compels the population to resort to its legs." On the other hand, tonsil snatching among children may well be deferred until spring, it is suggested. Another transportation footnote: England is experiencing a back to the bicycle movement. Gasoline, petrol to Britisshers, is scarcer and more costly. And it is easier to cycle two miles than to walk one.

Science News Letter, November 4, 1939

E FIELDS

PHYSICS

New Super-Microscope Perfected in Germany

A NEW and simplified electron microscope, suitable for use in research institutions, was perfected in Germany by the great electrical firm Siemens and Halske A. G. shortly before the outbreak of war, it has been learned in the United States.

Earlier models of this instrument, which uses streams of electrons in a vacuum tube to make visible minute structures and details not detectable by any microscope using beams of light, required the services of technicians specially trained in the handling of high vacuum and electrical instruments, which made operation too expensive for most research purposes. The new instrument obviates the necessity for these extra attendants.

Science News Letter, November 4, 1939

ARCHAEOLOGY

Rules For Survival Gaged From Dead Civilizations

TO survive, a civilization apparently must not make certain mistakes. What those mistakes are, can be inferred from the sad experience of civilizations that have failed.

This is the warning of a British archaeologist, Stanley Casson of Oxford University. He draws provisional conclusions from the downfall of "astonishingly gifted" Crete; from the brief day in the sun of Mycenae's "too confident and too stupid" heroes; from the humane, but unimportant Hittites; and the superficially dominant Romans.

Summed up, here are three lessons which Mr. Casson expounded recently in a lecture before the Royal Institution of Great Britain:

To survive a civilization must be fully defended, if it stands any chance of being challenged by entirely different brands of culture. Cretans and Hittites dallied, and were attacked disastrously.

Militarism can be dispensed with only where civilizations are of equal development and status; and never in history have neighbor powers been thus delicate-

ly balanced except possibly in the case of Babylonia and Egypt.

And most important of all, if a civilization is to last, it must have enough spiritual vitality and enough survival value to transform less civilized peoples who intrude into it. To prevent decline or fall, urges Mr. Casson, "you must offer the barbarian a way of life that is infinitely better than his own." The Greeks alone in antiquity counter-attacked the barbarians, giving Hellenism to distant barbarian lands. Rome, as this archaeologist sees it, offered only a shell of Roman culture to its alien colonists, and its distant possessions fell prey to more barbarous barbarians.

Cautiously maintaining that analogies are dangerous, and that there is no repeating pattern in history, Mr. Casson nevertheless advises the modern world to pocket its pride and complacency and consider the failures of the past.

Science News Letter, November 4, 1939

METALLURGY

Tin Best Can Coating; But Substitutes Sought

TIN is one of the most essential materials for peace or war because our millions of cans for foods are coated with it. Since tin is one of the things that the U. S. A. does not produce in any significant quantity, there has been a considerable amount of worry over a shortage in time of war, due to interruption of supplies from British controlled Malay Straits and from Bolivia.

Great hopes have been raised that one of the many plastic resins used so widely would prove capable of replacing tin on food cans, but so far no completely satisfactory substitute has been made available commercially. Any can coating must stand up under heat sterilization, contact with salt, oil and acids, stopping rusting of the iron or steel body of the can.

Other coatings tested include aluminum alloys and silver. A layer of stainless steel about a tenth of the thickness of can also gives promise, but it is more expensive. What the can manufacturers have been hoping to develop is a coating as good or better than tin that is less expensive in peace as well as war.

If tin prices rise due to the war, plants for recovering the thin layers of this metal on discarded tin cans will go into operation as a conservation measure. And out of a shortage there may come some satisfactory substitute for regular use on the cans so essential to our kitchens.

Science News Letter, November 4, 1939

GENERAL SCIENCE

England's Scientific Work Is Disorganized by War

CONSIDERABLE disorganization of scientific work has occurred in England since the war began according to a survey issued by the Association of Scientific Workers, organized during the last war to protect the interests of scientists and those of science as a whole.

Many research scientists in British universities and industrial laboratories have lost their positions. Industries are dropping long term research. Many technical colleges are closed, along with their laboratories, especially in London.

The Ministry of Labor has compiled a Central Register of persons with scientific, professional and administrative qualifications, of 86,000 names, of which 7,000 could carry out scientific research. But there is no promise that any particular person registered will be pressed into service, either at the job he can do best or at all. The creation of a Ministry of Science, such as exists in France, to coordinate the scientific resources of the country is urged.

Significant suggestions: "Scientists should be utilized in scientific work. Organization and control should be in the hands of scientists. Machinery should be provided whereby scientists may exercise a right of criticism on purely scientific and technical matters. Scientific and technical as well as medical education should be maintained in time of war." All of which has lessons for the U. S. A.

Science News Letter, November 4, 1939

PSYCHOLOGY

Jokes About Stuttering May Be Very Dangerous

DON'T joke about stuttering. It is no joke to those who stutter, and it may infect those who have a tendency to this emotional handicap.

A new phonograph record that exploits the stutterer's affliction, just as real as a game leg, is condemned by Dr. James Sonnett Greene, director of the National Hospital for Speech Disorders, New York. Such a record may harm thousands of little children whose nervous constitution predisposes them to stuttering and who only need some stimulus to set them off. Dr. Greene says we are only now beginning to live down the popular World War song: "K . . . K . . . K . . . Katy."

Science News Letter, November 4, 1939

CHEMISTRY

Why Not Gas Warfare?

Inventor of Lewisite Says It Is Prevented Only By World Prejudice, Lack of Chemical Industrialization

By DR. W. LEE LEWIS

In secret research during the World War, Dr. Lewis, then a captain in the U. S. Chemical Warfare Service, invented the deadliest war gas then known, called Lewisite. Because he is an authority on gas warfare, Science Service asked him to write this timely article.

WHY is it that in the recent wars and in the opening phases of the war in Europe poison gases were not used?

This is the question I am asked to answer.

There are three principal reasons why a warring nation might not use war gases.

1. Because of the opprobrium among nations attached to gas warfare.
2. Because of a lack of national chemical industrialization.
3. Because gas weapons do not fit into the particular military campaign.

It must be remembered that while all efforts to do away with gas warfare by international agreement have failed for one reason or another, yet in the course of these efforts many nations have gone on record as opposed to this mode of warfare.

For example, at the International Conference held at the Hague prior to the World War of 1914-18, many nations signed an agreement not to use these weapons. It is true that when the World War came, this agreement was just another one of the several scraps of paper which characterized that world catastrophe, but the overwhelming expression at the Hague Conference against the use of chemical poisons still affects the consciousness of nations.

Signed by 39 Nations

At least 39 nations signed the Geneva protocol banning gas warfare. While it is true that many of these signatories were small nations of no particular chemical prowess, which were obviously making a virtue of necessity, nevertheless their attitude again affects the moral consciousness of other nations.

There is a widespread feeling that gas warfare is unfair and unsportsmanlike. While the utmost logic can be piled up against this viewpoint, nevertheless the sentiment prevails.

It is interesting to note that the United States never committed itself to any of these expressions against the use of toxic gases. This is not due to any particular bloodthirstiness on the part of our country, but rather is it due to a thorough insight into the difficulties involved.

For example, most warfare is chemical warfare in a broad sense of the word. Therefore, chemical warfare as such cannot be banned. Again, some gases are toxic and others are merely irritant. That is, some are like mustard gas and some are like sneeze gas. Where should the line be drawn in differentiating between chemical weapons permissible, Christian and sportsmanlike, and those of the contrary character?

The regulation of chemical weapons is made still more difficult by the fact that the irritating gases of the sneeze and lachrymatory type are used now quite generally in times of peace to quell mobs and riots. It would be absurd to permit their peacetime use and forbid their wartime use.

Explosives Give Off Gas

Again, certain explosive shells give off poison gases when they burst. When is a shell a chemical shell and when is a shell an explosive shell? This particular angle of the problem illustrates how easy it would be for a country at war to claim that an enemy was using poison gas and that, therefore, they were justified in retaliating one over one.

The fact that the Germans during the last war—an aggressive and defeated enemy—used poison gases first and that the allies at best but trailed their activities in this respect, is not without its contribution to the opprobrium attached to this particular weapon.

This sketches briefly the history and difficulties involved in officially banning gas warfare, but it does show that there is rather a broad feeling against it for what are probably ill-defined and illogical reasons.

The whole picture simply illustrates how difficult it is to be rational when dealing with a subject so absolutely irrational in its entirety as war. It borders on the ridiculous to embrace classical

weapons and reject more modern weapons when it can be proven from the records of the last war that the latter are more humane than the former. It is very interesting to note also that of the new military agencies introduced in the World War, namely, military airplanes, tanks, submarines, and poison gas, that only the last named is in bad odor among nations.

The development of a country's chemical industry has a very real bearing on its disposition to use or not to use chemical weapons.

It has been frequently pointed out by students of this general subject that a country with a strong chemical industry has a tremendous advantage in a conflict involving the use of chemical weapons. The statement scarcely needs elaboration as the reasons are obvious.

Preparedness Needed

Chemists, chemical knowledge, chemicals and chemical plants are needed to produce chemical weapons. These resources cannot be developed overnight in the face of the needs of military emergency. It takes time to train chemists, to develop a body of chemical knowledge, to acquire chemicals and chemical plants.

Another aspect of this phase of the subject has not been sufficiently stressed, namely, chemical weapons are not to be bungled. Most nations have an army trained in infantry and artillery requirements, but few have long experience with chemical weapons. If not handled skillfully, chemical weapons may turn and bite their own host.

Chemical industries make in their everyday work the very chemicals needed for poison gas manufacture. Many intermediates for fine chemicals are intermediates also for gas weapons. Many chemical plants, particularly in the organic industries, may be easily and quickly converted in times of war to the production of military chemicals.

Thus it becomes apparent with but brief analysis of the subject that the advantage in this mode of warfare goes to that country which is more highly developed in the chemical industries.

An important factor in the present situation is that gas weapons may not be used because they do not fit into the particular military program. It must be borne in mind that the agents of chemical warfare represent but one type of



DR. W. LEE LEWIS

During the World War, he invented Lewisite. Although this is the deadliest war gas, he regards it as more "humane" than high explosives.

weapon. Moreover, poison gas has lost two of its sources of value—the element of surprise and the element of use against defenseless troops. Much of the value of gas warfare in the World War was due to the surprise element and the corresponding fear among troops. Similarly, defense has gone forward hand in hand with offense in chemical warfare so that as with other weapons much of the effect is now neutralized.

Power Exaggerated

The very novelty of gas warfare and its appealing sensationalism has brought it unusual publicity. In consequence, the layman often believes that gas weapons are more powerful than all other weapons and that in the future wars will be ended quickly by the application of some powerful gas. This simply is not true and is born of a lack of knowledge of the subject.

A consideration of the three fundamental principles laid down above will answer many questions regarding the present status of chemical weapons.

For example, during the Italian-Ethiopian war in 1935-36, the Ethiopians did not use more chemistry in their defense because they had no chemical industry. They simply did not have poison gas. From the best information that is available, the Italians did use mustard gas on the Ethiopians, but not extensively, no doubt because of the general opposition

towards its use. With all the great powers standing by watching the fight, it would not have been good public relations for Italy to have deluged the defenseless Ethiopians with war gases. It is an interesting fact that both these nations signed the Geneva Protocol of 1925.

The principal reason why neither the Chinese nor the Japanese use gaseous weapons is because their industrialization has never taken a turn in the direction of chemicals. They simply are not qualified for this mode of warfare.

It is said that the Spanish did not use any chemical weapons in the specific sense. Spain is not a country highly advanced in chemical arts and sciences. Possibly the fact that this was a civil war acted as a deterrent in the application of what is generally believed to be cruel weapons.

Public Relations Important

As to the present war between Germany and the British and French allies, or whoever is participating in this war, I believe Germany has been influenced largely by the opprobrium attached to gas warfare and the military situation in not using gases during the current campaigns. The German attitude toward the family of nations in this conflict has been a tentative experimental attitude. Public relations has been a factor of importance, particularly in a military campaign that has been more than 50% diplomatic. In subjugating Poland, apparently the German high military command decided on a quick dash with an intensely mechanized army. It would seem that their decision in this respect was sound from a military standpoint. This is what I mean by saying that gas warfare is not the only mode of warfare and that it may or may not fit into the plans of a particular campaign. Apparently it has not fitted into the German campaign against the Poles.

What is ahead we cannot say except that desperate measures attend the close of a war more frequently than the beginning. If and when the present conflict in Central Europe ceases to be diplomatic and becomes a fight to the finish, gas weapons will certainly be used. Their efficiency and economy were demonstrated during the World War.

The opinions and views expressed by Dr. Lewis in this article are his own and do not necessarily reflect the ideas of organizations with which he is connected. Dr. Lewis holds a commission as colonel in the Chemical Warfare Service Reserve of the U. S. Army. He is director of the

RADIO

Dr. W. Lee Lewis, inventor of Lewisite, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, November 13, 4:30 p.m., EST, 3:30 CST, 2:30 MST, 1:30 PST. Listen in on your local station. Listen in each Monday.

department of scientific research of the Institute of American Meat Packers, Chicago, and he was formerly professor and head of the department of chemistry at Northwestern University.

Lewisite, the gas he invented, known chemically as chloro-vinyl-dichloro-arsine, has all blistering properties of mustard gas, but is more effective because it has ability to penetrate the skin. It is a powerful respiratory irritant and produces violent sneezing. The World War ended just too soon to permit combat use of Lewisite.

Science News Letter, November 4, 1939

ARCHAEOLOGY

New Home for Treasures Of Anglo-Saxon King

A CORONER'S jury in England was lately called upon to render a verdict in a strange case: Who owns the burial treasures of a long-departed Anglo-Saxon king?

The ship in which this ruler was interred more than a thousand years ago is a recent, very stirring archaeological find. Disclosed inside a mound near the Deben River in Suffolk, the royal galley itself is little more than an imprint 82 by 16 feet in the soil. Yet badly rotted as the timbers are, even the roofed cabin in which the king lay can be made out.

The most likely guess is that here lay Redwald, first royalty of the East Angles to become High King of Britain. He died about 620 A.D.

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LANGUAGES

More enduring and more exciting to behold than the ship itself are the rich possessions which courtiers buried with their king.

His sword pommel richly ornamented in gold and jewels has been found, although the trusty blade has vanished. The king's purse—or traces of it with some coins—lay there. And what seems to have been his scepter is a curious object with bearded faces carved at each end. Gold belt studs and a handsome buckle and other trimmings are all that remains of his costume.

Then, there are six beautiful silver bowls and a platter with Byzantine designs on them. The 28-inch platter is right for holding the hearty servings a Saxon king would desire. The platter came to him from Constantinople, and is marked as having been made in the reign of Roman Emperor Anastasius I, who died 518 A.D.

Arguing that these royal goods were not buried secretly with intent to resume possession, which is the English interpretation of "treasure-trove" that can be claimed by the state, the coroner's inquest decided that the goods belong legally to the owner of the land. But the owner, Mrs. E. M. Pretty, has generously presented them to the British Museum.

Science News Letter, November 4, 1939

PUBLIC HEALTH

Occupational Skin Ills Increasing Each Year

OCCUPATIONAL skin diseases are increasing. At a conservative estimate, one out of every 100 industrial workers in the United States, not including clerical workers, is affected each year. The annual loss, covering time lost from work, compensation and cost of medical care, is estimated at \$4,000,000.

Medical and public health scientists

have been busy at the problem, as witness the 800-page textbook, *Occupational Diseases of the Skin*, just published (Lea and Febiger). The authors are Drs. Louis Schwartz, of the U. S. Public Health Service, and Louis Tulipan, of New York University College of Medicine. The book is intended for physicians and other scientists concerned with treating and preventing these diseases.

Some people are more predisposed than others to develop skin trouble from irritating chemicals and the like, it ap-

pears. The dry skin of women is more susceptible than men's skins, for example.

The danger of occupational skin disease is not limited to workers in chemical and other industrial plants. Agricultural laborers, artists and sculptors, bakers, and even physicians themselves have their special skin disease hazards.

Listed in the Schwartz-Tulipan book are close to 300 chemicals which are known to be or which can be skin irritants.

Science News Letter, November 4, 1939

CHEMISTRY

Europe's War Caught Japan Without Dyes For Textiles

THE PICTURE of Japan trapped by the European War for lack of dyestuffs for its large textile industry, just as the United States was in 1914, is told in reports to the American Chemical Society by its correspondent in Japan.

Relying for its dyestuffs on Germany, Japan has its last shipment tied up, even now, in the Dutch East Indies. America and Switzerland are expected to reap new commercial sales, for Japan has no reserves for these essential chemicals.

Japan, known the world over as the great "copyist" among industrial nations—so realistic that there is the old joke about putting the squeak into a pair of shoes—is experiencing difficulty in obtaining some of the newest research developments of other nations.

According to the American Chemical Society report, Japanese efforts to buy the processes for du Pont synthetic rubber and German Buna rubber have failed.

A Swiss propellant for high-velocity firearms is still being imported because the secret details cannot be bought.

The German Krupp-Renn process for iron concentration cost Japan 10,000,000 yen (a yen is 23.6 cents), probably about three times the entire cost of the original research development.

Synthetic gasoline in Japan are made by the uneconomical Fischer-Tropsch method because the newer hydrogenation methods of Germany and the United States are available only for sums that "would have eaten up one-third of Japan's specie reserve before the Japanese had even seen the blueprints."

Du Pont's nylon, striking directly at

Japan's silk exports, is a matter of greatest concern. All synthetic fibers in Japan come from cellulose and a vast amount of money has been put into rayon and allied plants. With few forests, Japan uses such oddities as beanstalks, mulberry leaves, bagasse and rice straw as the cellulose sources.

What the Department of Commerce and Industry at Tokyo wants to know is why Japan too could not develop a fiber like nylon. Lack of research, they found, was the answer. To remedy the condition the one- and two-man research laboratories of the fiber manufacturing plants are soon to be merged into one large research institute to which the government will contribute 5,000,000 yen (\$1,180,000) yearly.

Science News Letter, November 4, 1939

MEDICINE

Physician Found Worth Less than a Bricklayer

WHAT'S a doctor worth? Less than an iron and steel worker or a bricklayer, the *Journal of the American Medical Association* concludes (with thermometer in cheek, no doubt), citing the prevailing wage rates adopted by the Philadelphia County Assistance Board. A physician is paid \$1.51 per hour, the same rate as lawyer, architect, statistician, and operators of air compressor, dredge, power shovel, and pump. Higher wages: bricklayer foreman at \$1.79, iron and steel worker at \$1.65, ordinary bricklayer at \$1.62. Lowest wage paid: 50 cents.

Science News Letter, November 4, 1939

FIELD GUIDE TO LOWER AQUARIUM ANIMALS

by
Edward T. Boardman

Designed to aid aquarists, fishermen, and nature students; includes information on how to keep common freshwater invertebrates. About two thirds is devoted to insects.

Illustrated

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The Cranbrook Institute of Science
Bloomfield Hills, Michigan

MEDICINE

New Surgical Instrument Fishes Bullets From Abdomen

Peritoneoscope, Valuable in Peace and War, Reported To College of Surgeons; Personnel Classified for War

A LIFE-SAVING instrument that surgeons may take to war with them attracted attention at the American College of Surgeons meeting in Philadelphia. Soldiers or other patients in such desperate shape from a bullet wound of the abdomen, for example, that they cannot be operated on may be saved by this new instrument.

Called a peritoneoscope, it gives the surgeon in effect an eye at the end of his knife. It is a long slender instrument, carrying a telescope and tiny electric light at its end and is equipped with a forceps for grasping a piece of bullet or piece of shell or clamping shut a bleeding artery. The instrument can be passed through the bullet wound or a stab wound made by a knife, saving the need of cutting open the abdomen, an operation which might prove fatal to desperately sick men. Once the bleeding is stopped, the patient's condition may improve so that he can withstand operation if necessary.

If there is no bullet wound, a needle is used to make a hole through skin and muscles for the peritoneoscope to go through. Air is first blown into the hole, to make a space between the tissues and internal organs, so that the instrument will not pierce these when inserted.

Peacetime uses of the instrument are many. At Harlem Hospital, New York City, it is saving patients brought in with near-fatal stab wounds made by a four-

inch long, quarter-inch wide knife popular in local fights there. Though the wound is so small, the victim may be dying from internal bleeding when brought to the hospital. If the surgeon had to cut open the abdomen to find the bleeding artery, the patient would probably die. With this instrument, the bleeding point can be found and the bleeding stopped without opening the abdomen.

In the war on cancer, the instrument does its part by enabling surgeons to remove a bit of tissue for diagnosis. It diagnoses more accurately than any other method the dangerous condition called ectopic pregnancy, when the embryo starts forming in the slender fallopian tubes instead of in the womb. With a needle instead of a forceps at its end it may be used to drain a liver abscess. The hole made by the instrument in such cases is so small it usually does not even need a stitch to hold it together while healing. For this and diagnostic purposes, the patient is not only spared shock of an abdominal operation but need be in the hospital only 24 hours. The wartime usefulness of the instrument was pointed out by the manufacturers, the American Cystoscope Makers, during the demonstrations to surgeons.

Science News Letter, November 4, 1939

Classified For War

THE SURGEON GENERALS of the U. S. Army and Navy, working on war mobilization plans even though America is not at war and hopes not to be drawn into any war, can count among their war resources more than 10,000 active practising surgeons, of whom 1,178 are especially qualified in the care of broken bones and 1,236 are especially trained in caring for the injuries and wounds of peacetime traffic and industrial accidents such as duplicate casualties of war.

These figures represent in part the war resources of the American College of Surgeons. Not a surgeon in the group, it is safe to say, wants to see America

go to war. But many of them remember the dark days of 1917-1918, when unpreparedness seriously handicapped their life-saving and healing work among the war wounded. No one wants to see repeated such mistakes as assignment of men to work for which they were not fitted, for example, putting a nose and throat surgeon to operating on men with serious abdominal wounds which would require entirely different training and experience.

Such mistakes need not be repeated because officials of the College of Surgeons know and are ready to tell the Surgeon Generals of the Army and Navy just where to find surgeons trained and experienced in the different branches of surgery.

At headquarters of the College there are 20,000 biographies of active surgeons in the United States. These show the 65 men specially qualified to restore war-shattered ears, noses, jaws and even whole faces, the eight skilled chest surgeons and 84 brain and head surgeons, the nearly 500 bone and joint surgeons, besides nearly 6,000 general surgeons.

Now in training in hospitals surveyed by the College of Surgeons are 12,600 more young surgeons. This army is augmented by nearly 200,000 nurses, most of them already trained to follow in Florence Nightingale's footsteps.

Besides the figures showing surgical and nursing man power, the nation's medical war resources can be measured in terms of new knowledge and ad-

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SCIENCE NEWS LETTER

2101 Constitution Ave. Washington, D. C.

vances in surgical technic. During the World War, Dr. Malcolm T. MacEachern, associate director of the College of Surgeons, said, surgeons were afraid to probe within the chest for bullets and bits of shrapnel. Today doctors specializing in chest surgery dare to cut open the chest and not only probe but remove an entire lung. Their success with such operations means that a soldier with a chest wound has a far better chance of surviving now than in 1918. Equal skill has been gained in operating on the head and brain and in repairing broken bones.

Science News Letter, November 4, 1939

New "Hanging Cast"

A NEW device, the "hanging cast," for repairing broken upper arm bones was announced by Dr. John A. Caldwell, of the University of Cincinnati College of Medicine.

The hanging cast gives as good results, Dr. Caldwell has found, as the picturesquely named but cumbersome and uncomfortable airplane splint which is frequently used for upper arm fractures. The patient with his arm in a hanging cast, unlike the one with an airplane splint, can wear street clothes and so is not confined to his home. He only has the cast on for six weeks, following which he wears a sling for about two weeks. During this period he is allowed to use his arm lightly, and takes several swinging exercises each day. At the end of eight weeks, he should be able to flex his elbow to 40 degrees, extend it to 135 degrees, move the upper arm away from the body to an angle of 60 degrees, and be able to turn it fully. In three months he should have the complete use of his arm again.

The hanging cast actually hangs from the patient's neck. It consists of a cast from shoulder to hand. The elbow is bent to an angle of 90 degrees with the hand turned toward the body. Just above the base of the thumb a wire loop is inserted in the cast. Through this is threaded a piece of bandage which goes around the patient's neck. The weight of the forearm plus cast furnishes the downward pull or traction necessary to keep the broken ends of the upper arm bone in proper alignment while they are knitting or uniting. With this type of cast, the upper arm is in the downswinging position it normally takes when a person is standing. Older methods of treating upper arm bone fractures followed the same principle, but the cast was applied only to the elbow. The fore-

arm was hung in a sling from the neck and extra weight for the downward pull was secured by hanging a tobacco bag of shot far up on the forearm. The objectionable feature of this was the swaying, dangling weight which was difficult to keep in position and constantly caught and struck on objects which the patient walked past.

Science News Letter, November 4, 1939

Double Stomach Cured

"DOUBLE stomach" is what the layman would call the amazing condition reported by Drs. William E. Ladd and Robert E. Gross, of Children's Hospital, Boston.

"Duplications of the alimentary tract" is what the Boston surgeons term the condition. It is usually seen in children. But it is by no means, as might be facetiously supposed, an explanation for the voracious appetites parents are apt to explain by reference to "hollow legs."

The duplications of the alimentary tract may occur anywhere along the digestive tract from the tongue on down. They are hollow structures with a muscular coat and a lining similar to that of part of the gastrointestinal tract. They are always in close contact or proximity to some part of the alimentary tube and in all but one of the 18 cases reported they were strongly adherent to it. The size of these hollow tubes or cysts depends on how much room they have for expansion.

The children afflicted with these "double stomachs" may have pain, difficulty in swallowing if they are at the base of the tongue, signs of obstruction to the passage of food, or hemorrhage. One seven-year-old girl had two- to three-day attacks of pain and vomiting every two or three weeks. Her digestive tract duplication was right by her stomach. A five-weeks-old baby, who seemed to nurse well but failed to thrive, had hemorrhages, and vomited from the time she was born. Her "double stomach" was located below the stomach, on the first portion of the small intestine.

Operation, at which the cyst is removed and suitable repairs made if necessary to the digestive tract, is the treatment for the condition.

The babies and children are born with these double stomach structures. The condition is produced, the Boston surgeons and other authorities believe, by "pinching off a small bud from the gut wall with development of this segregated tissue into a cystic structure adjacent to the normal intestine."

Science News Letter, November 4, 1939

New Eyelids from Grafts

SUCCESS in giving new eyelids with their linings to five eyes by an intricate skin grafting operation was reported by Dr. Vilray P. Blair, of Washington University School of Medicine, St. Louis.

The operation was resorted to when scars from chemical burns, such as lye in children and thrown or splattered acid in adults, made it impossible for the patient to close his eyes normally or to move his eyeballs normally. Either of these conditions can "compromise normal vision," Dr. Blair pointed out. He treats the condition by removing the scar and building up a new eyelid with its lining out of skin from the patient's own body. All the patients "made a good recovery," he reported, and while the ultimate outcome is not certain, experience with similar skin graft operations on the inside of the eyelid for another condition indicates that the grafted skin will not give the patients any trouble in the future.

Science News Letter, November 4, 1939

From Page 294

Egg Respiration

ABABY or any young animal, is usually said to draw its first breath a moment after it is born. In a literal sense this is true, yet respiration starts long before that—at the moment of conception. Experiments in which measurements were made of the respiration of newly fertilized mammalian ova were described by Dr. Edgar J. Boell and Prof. John S. Nicholas of Yale University.

Using a new and exceedingly sensitive apparatus, the two physiologists found that fertilized rat ova, during their first three cell divisions, consumed 0.00973 cubic millimeters each per hour. During these three divisions the number of cells increases but there is no change in the total volume of the mass.

(How little oxygen is used by an ovum may be gauged by the fact that a medium-sized pinhead has a volume of one cubic millimeter.)

When the embryo begins to grow, Dr. Boell continued, "the oxygen consumed accurately reflects the increase in embryonic mass. On the eighth day of development, the oxygen used per embryo amounts to approximately 0.01 cubic millimeter per hour, and in the next two days, during which embryonic organization occurs, this figure is increased twenty times."

Science News Letter, November 4, 1939

Scientists Face Dilemma

THE HIGH tide of increased intermeshing of social forces and increased centralization of control in human affairs has not yet been reached, Dr. Frank B. Jewett, president of the National Academy of Sciences and head of Bell Telephone research activities, told the Academy in discussing science's aid to the nation and the world.

Scientists are faced with a dilemma. They favor untrammelled liberty for fundamental and applied research, but in the interest of increased service of science to the nation they may be forced to make suggestions to the government, Dr. Jewett said, that might urge on the present drift in the direction of socialization.

We live, and what is perhaps even more important, we fight in the midst of science and with the tools and weapons which applied science has given us, Dr. Jewett said. This is certainly not the fault of science, neither does the responsibility for correcting the situation lie solely at the door of science. It is a problem as broad as society itself, and while the scientist very assuredly ought to have helpful suggestions which he can offer, he ought for his own sake to be cautious in delivering himself of panaceas.

Science News Letter, November 4, 1939

ORDNANCE

Shore Guns Worth More Than Guns on Battleships

See Front Cover

ONE GUN on a harbor-defense mount is rated as having several times the combat value of a gun of equal caliber mounted on shipboard. This is because the shore gun is better protected and better concealed, because it is on an absolutely steady firing platform instead of the rolling deck, and because its range-finders can have bases a mile or more long if desired, insuring far greater accuracy.

The gun shown on the cover of this number of THE SCIENCE NEWS LETTER was snapped at the instant of firing, at the recent demonstration at the Army Proving Ground, Aberdeen, Md. It is a 14-inch coast defense piece, mounted on the now obsolescent disappearing carriage. Even so, it can hurl its three-quarter-ton projectile ten miles.

The photograph is by Fremont Davis, Science Service staff photographer.

Science News Letter, November 4, 1939



Grass vs. Man

RECENT acquisition by the Smithsonian Institution of the first steel plow, made in 1837 by John Deere for the express purpose of breaking the tough prairie sod, gives emphasis to the role of grass, and especially of grass roots, in the history of this continent.

The Indians that lived on the Prairies and Plains never had their villages and corn-patches on the uplands. They were always to be found near streams. This was partly because they used the rivers as highways and because they gained part of their living as fishermen and wild-fowl hunters.

However, the grass of the uplands had something to do with it, too. Before white men came, Indians lived at a Late Stone Age culture level. Their only farming implements were hoes, made of wood and sometimes bladed with clamshells or flat stones. Obviously with feeble tools like these they could not contend with the tough, interlaced roots and rhizomes of the upland grasses. Easier to stay near the rivers, where the vegetation along the banks, at least in places, could be cleared and the soil farmed by primitive means. The deep-grassed uplands were left to the bison, pronghorn antelope and other game herds.

When white men displaced the Indians, they lived at first where the Indians had lived. They also used the rivers for travel and transport, though their horses and wagons made them less dependent on water highways than the Indians had been. But for some time the settlers were under the spell of Eastern and European tradition, that timber-free land was not good for farming. So for a time they laboriously cleared the lowland timber and left the grasslands fallow.

As their numbers increased and new farms had to be found, some venture-

some souls tried the soil of the grasslands on the hills and found it even better for corn than the alluvial bottom lands. Upland farms were then taken up in a hurry.

But the relatively feeble iron-shod wooden plows of the seaboard agriculture, which they had brought with them, could not cope with the tangled roots of the grasses. The whites were up against the same problem that had baffled the hoe-wielding Indian squaws.

So Blacksmith John Deere took an old sawmill saw, the only piece of good steel he could get hold of, and forged the first sod-breaking plow. And the Corn Belt was born.

Science News Letter, November 4, 1939

MARINE BIOLOGY

Government Attempts To Trace Migration of Shrimp

ODD but useful: Two thousand shrimps have been tagged in Louisiana waters by U. S. Bureau of Fisheries to trace the migrations of these tasty creatures so that enough will raise their kind to end up in cans for our tables.

Science News Letter, November 4, 1939

DISCOVERY

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• First Glances at New Books

Physics

TERRESTRIAL MAGNETISM AND ELECTRICITY (Physics of the Earth—VIII)—J. A. Fleming, ed.—*McGraw-Hill*, 794 p., \$8. The head of Carnegie Institution's Department of Terrestrial Magnetism edits this book by 14 internationally known experts. As the eighth volume in the significant "Physics of the Earth" series sponsored by the National Research Council, the book fulfills the original aim of these monographs: "to give the reader, presumably a scientist but not a specialist in the subject, an idea of its present status together with a forward-looking summary of its outstanding problems." An exact, comprehensive and completely documented treatise.

Science News Letter, November 4, 1939

Technology

RUBBER RED BOOK, Directory of the Rubber Industry, 1939 edition—Rubber Age—420 p., \$4 paper, \$5 cloth.

Science News Letter, November 4, 1939

Radio

THE A. R. R. L. ANTENNA BOOK—George Grammer and Byron Goodman—American Radio Relay League, 139 p., 50c. The last few years have seen a remarkable improvement in the performance of amateur radio receivers and transmitters, and the operator has sometimes found himself using several hundred dollars worth of apparatus with a one dollar antenna. Believing that improved antenna systems represent one of the greatest means of further advance, the A. R. R. L. has prepared this excellent handbook.

Science News Letter, November 4, 1939

Geometry

DESCRIPTIVE GEOMETRY—James T. Larkins, Jr.—Prentice-Hall, 317 p., \$2.50. A new kind of text which seeks to teach the fundamentals with special appeal and understanding, facing with realism the knowledge that all courses compete for a student's interest and that those presented most attractively may well make the most lasting impressions.

Science News Letter, November 4, 1939

Biology

SYLLABUS AND HANDBOOK FOR BIOLOGY, for Use of Teachers and Pupils—T. R. Stemen and W. Stanley Myers—W. C. Bonney, 69 p., 35c.

Science News Letter, November 4, 1939

Geology

RECENT MARINE SEDIMENTS, A Symposium—Parker D. Trask, ed.—American Association of Petroleum Geologists,

736 p., \$5. The story of earth's immediate yesterdays is written in deposits as yet unconsolidated, or but little consolidated. Geologists are becoming increasingly aware of their importance, but have needed more well-collated information than has been readily available. This book will do much to remedy the lack.

Science News Letter, November 4, 1939

Photography

PHOTOGRAPHY FOR COMMERCE—C. G. Holme, ed.—Studio, 15 p., 147 plates, \$3. The fact that this collection of photographs was taken with a view to selling merchandise detracts not one bit from their human interest and appeal; it may add somewhat to the faithfulness of reproduction of detail in textures and surfaces.

Science News Letter, November 4, 1939

Chemistry

QUALITATIVE ORGANIC CHEMISTRY—Neil Campbell—Van Nostrand, 213 p., \$2.60. The lecturer in organic chemistry at the University of Edinburgh presents a new text that is essentially a comprehensive laboratory guide. Expensive reagents and apparatus have been omitted from use. Special attention is given to organic derivatives.

Science News Letter, November 4, 1939

Photography

PHOTOGRAVURE, A Text Book on the Machine and Hand-Printed Processes (2d. ed., rev. and enl.)—H. Mills Cartwright—American Photographic Pub., 202 p., \$3.50. A technical work for photographers, artists, and those interested in commercial duplication processes.

Science News Letter, November 4, 1939

Geography—Juvenile

TWO SAILORS AND THEIR VOYAGE AROUND CAPE HORN—Warwick M. Tompkins—Viking, 192 p., \$2.50. Around the Cape in a sailing ship, rare these days, went Ann and "Commodore" with their skipper-father and their mother. Their father's story of the adventure is told with just the salty details, we should think, to make young fireside readers yearn for the sea.

Science News Letter, November 4, 1939

Technology

INDUSTRIAL PLASTICS—Herbert R. Simonds—Pitman, 371 p., \$4.50. Practical information about the innumerable new developments in the field of plastics and their applications in industry.

Science News Letter, November 4, 1939

Physics

MODERN PHYSICS (Rev.)—Charles E. Dull—Holt, 615 p., \$1.80. One of the best of high school physics texts gets a revision that makes it even better. The author uses the inductive approach linking fundamental principles with everyday experience and then going on to supply further applications.

Science News Letter, November 4, 1939

Geography

KENTUCKY, A Guide to the Bluegrass State—Federal Writers' Project—Harcourt, Brace, 489 p., \$2.50. Another good job of making a state guide book useful and interesting is done by the Federal Writers'. It gives encyclopedic data about Kentucky's specialties, from thoroughbreds to folklore; describes twenty tours; gives a chronology of Kentucky dates; and ends up with a good index.

Science News Letter, November 4, 1939

Engineering

STEAM AND HOT WATER FITTING—William T. Walters—American Technical Soc., 184 p., \$2. Heating for the engineering student, the steamfitter, draftsman or designer. Practical details for the practicing experts.

Science News Letter, November 4, 1939

Mathematics

THE TECHNIQUE OF THEORY CONSTRUCTION—J. H. Woodger—Univ. of Chicago Press, 81 p., \$1. (International Encyclopedia of Unified Science, Vol. II, No. 5.) There are made available to the scientific reader "some of the results reached by the logical and metalogical investigations of the last 30 years from the point of view of their utilization in the construction of clearer, more concise, better organized and so more controllable theories."

Science News Letter, November 4, 1939

Medicine

A TEXT-BOOK OF OCCUPATIONAL DISEASES OF THE SKIN—Louis Schwartz and Louis Tulipan—Lea & Febiger, 799 p., \$10. See p. 300.

Science News Letter, November 4, 1939

Engineering

ARC WELDING IN DESIGN, MANUFACTURE AND CONSTRUCTION—James F. Lincoln Arc Welding Co., 1408 p., \$1.50. This contains 109 leading papers submitted in the \$200,000 award program of the James F. Lincoln Arc Welding Foundation. Material is arranged by subject: Automotive, Aircraft, etc.

Science News Letter, November 4, 1939