

AERONAUTICS

New Flying Fortress Finished Every Four Days

See Front Cover

ROW upon row of wing panels for the 4-engine B-17B bombers, ready for the final assembly line are shown on the front cover of this week's SCIENCE NEWS LETTER.

This is the first picture released by the U. S. Army Air Corps showing the construction of these giant bombers.

The wings are complete with landing gear, engine nacelles and virtually all installation except the engines themselves. Great overhead cranes gently lift the wings on end and carry them to another building where they are joined to the fuselage and where engines are installed.

Every four days a new 22-ton flying fortress is completed at this Seattle plant of the Boeing Aircraft Company

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PSYCHOLOGY

Listening Will Bring Out A Child's Individuality

A RECIPE for drawing out the secret individuality in children and in adults as well, is offered by the chairman of the department of creative education at New York University.

"Move and speak with exaggerated slowness," urges Prof. Hughes Mearns. "Listen without comment. Ask no questions at all until you have learned to inquire without implying accusation of sin. Remove every vibration of superiority from eyes, voice tones and even from posture. Receive without the intrusion of instruction and with surely never a show of surprise."

Little children, when you are at last received into their confidence, reveal a most amazingly individual and true understanding of adults and the world about them.

Their comments when off their guard are deliciously refreshing.

"Grandma, Grandma's mad again, mad, but—she'll get over it."

"'Pretty soon' means 'never'; it means you won't get it—never."

"Santa comes only to good children. He came to me just the same. So!"

Adults seldom are fortunate enough to penetrate to the child's individuality, because grown-up eyes see only the thick sugar-coating of sentimentality with which the adult imagination surrounds childhood.

But despite suppression this individu-

ality will survive, Prof. Mearns believes, and needs only proper encouragement to emerge in adults. Escape is possible from the conventional, from clichés, from the "iterated wisdom of radio, screen and stage, all the tags of familiar quotation, all the trite observations that clutter colloquial speech." He describes the way in a new book, *The Creative Adult* (Doubleday, Doran).

The reward is a new poise, confidence, and serenity.

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ANATOMY

War Has Brought Shortage Of Good Human Skulls

IT MIGHT be guessed, offhand, that it would be the other way around, but the war has made human skulls scarcer. Skulls and skeletons seen in schools and doctors' offices are seldom home-grown, mostly imported, and war conditions in Europe and the Orient combined with greatly curtailed shipping facilities threaten a shortage.

Even so the finest quality skulls, perfect with natural teeth, cost only \$32. Second rate skulls with slight defects but entirely suitable for general study are \$15.

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PALEONTOLOGY—BOTANY

Puzzling Fossil Leaves Traced to Oriental Trees

FOSSIL leaf prints that look like poplar leaves but are not, which have been riddles to scientists for many years, have been traced to a family of trees now known only in Japan and China, by Dr. Roland W. Brown of the U. S. Geological Survey and the Smithsonian Institution.

The fossils have been found in rocks all the way from Greenland to Tennessee, and have been assigned to poplar, fig, and other plant families; but Dr. Brown was not satisfied. For many years he carried on patient scientific sleuthing, and finally was able to prove their true relationship by means of their association with fossil pods and seeds of the type of tree now known by its Japanese name, katsura.

In Washington, there is now one imported katsura tree, a young specimen growing on the grounds of the National Academy of Sciences. The last native katsura-relatives in this country died 70 or 80 million years ago, while dinosaurs still roamed the earth.

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IN SCIENCE

ORNITHOLOGY

Ducks Dive for Food To Depth of Ten Feet

BLACK DUCKS can dive for food on the bottom of water as much as ten feet deep, it has been demonstrated by Harry Leon Kutz, Cornell University zoologist. (*Journal of Wildlife Management*)

The feat of this common wild duck species is all the more remarkable because as a rule black ducks do not dive for their food at all, preferring to gather their food ashore. However, when Mr. Kutz dropped corn in water at depths of five, seven and ten feet, the black ducks competed successfully for it with mallards at the two shallower depths, and monopolized it at the ten-foot level.

That such a dive was not easy for the black ducks is evident from Mr. Kutz's description: "Preceding each dive a bird would assume a definite stance with neck fully extended upward and muscles tensed. Then with a powerful kick from both feet it would disappear beneath the surface of the water, the kick causing a splash of no inconsiderable proportions."

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ENGINEERING—BIOLOGY

Firefly's "Cold Light" Not Practical for Man

THE INTRIGUING glow of the firefly can be duplicated in scientific laboratories but the practical use of this "cold light" cannot now be considered because of its cost, Dr. N. S. Rustum Maluf of the Osborn Zoological Laboratory, Yale University, points out in the annual report of the Smithsonian Institution.

The firefly's light is produced by the oxidation — that is, burning — of the chemical substance, luciferin. Considering the amount of oxygen needed to produce the light, it is a wasteful process. It is far less efficient than most means of producing artificial light known to man: 1% compared with 4.54% for a carbon filament lamp, 17.17% for an acetylene flame, or 60% for the new sodium arc lights.

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CE FIELDS

CHEMISTRY

Old and New Plastics Are Helping To Fight Wars

PLASTIC materials are helping to fight wars, present and future. The armed forces of every nation, according to Dr. W. A. Hamor, Mellon Institute of Industrial Research, Pittsburgh, Pa., have turned to new and old synthetic resins, chemical-born substances called plastics because, although hard when finished, they are plastic during manufacture.

Some military applications of plastics: Laminated materials in airplane construction. Cast resins in guide lines on airplane carriers. Luminescent resins in various military devices. Tinted cellulose acetate windows for air-raid protection. Gun stocks from cellulose acetate and from fabric-filled phenolic resins. Shaped cellulose acetate sheet as a chute for conveying ammunition belts from ammunition boxes to machine guns in airplanes. The molding of mouthpieces and containers for gas masks from phenolic resins. The use of such a plastic as "koro-seal" in gas masks for protection against mustard gas. The application of cellulose acetate in soldiers' goggles. The use of phenolics in the construction of the noses of anti-aircraft shells. The possible application of nylon as a parachute material.

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PHYSICS—BIOLOGY

Simplified Glass Heart Made from Flat Pieces

ANEW and simplified "glass heart" has been invented by Dr. J. A. Long, University of California zoologist. It differs from other circulation apparatus in that it contains no intricately shaped parts of blown glass, but consists entirely of flat pieces of plate glass or pyrex, with passageways and chambers cut and bored.

Pulsations to drive the fluid are set up in a short piece of rubber tubing, squeezed by an electro-magnet at intervals determined by the swing of an adjustable pendulum. Two simple valves consisting of small glass disks keep the flow going in the right direction.

Because of its flat shape, the "heart" can be mounted on a microscope for the

study of eggs, embryos or other small living objects enclosed in its specimen chamber. Connections can also be made with larger organs or entire animals by means of canulas.

Another advantage due to flat shape and simplicity of construction is ease in cleaning and sterilization.

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ENGINEERING

Air Conditioning Aids in Munitions Production

AIR conditioning is playing a vital role in munitions manufacturing, in Europe's warring nations, in the production of time fuses for shells. These fuses explode the shell at a predetermined time after it leaves the gun and their timing is varied by artillery battery at will to meet a given range and trajectory.

Such fuses, to be useful, require extremely high precision in production. Air conditioning aids in securing such precision. Writing in *Refrigerating Engineering*, H. B. Matzen of New York describes America's World War practices on time fuse construction, which are still being followed, in many cases, today.

Air conditioning, he points out, assures constant temperature and humidity which means precision tooling of the metal parts of the fuse. Just as important, the powder trains, that burn to determine the interval of time the fuse will use up, can be packed with precise moisture content and thus retain uniformity.

By maintaining a comparatively high relative humidity, the danger of sparks in the plants was reduced. Excess perspiration on a worker's hands, that might unintentionally add moisture to a fuse, was decreased by stabilizing conditions of temperature and humidity.

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ZOOLOGY

War Causes Distress in London's Kensington Zoo

LONDON's world-famed Kensington zoo is a war victim. A sharp drop in donations, on which it relies for support, has caused the zoo's directors to appeal to the public to "adopt" animals and other specimens and to feed them.

A generous fish dealer, in particular, is being sought, to take care of the sea lions and penguins by supplying the fish that form their diets. The penguins and sea lions eat up a large part of the zoo's food appropriation.

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ORNITHOLOGY

Innocent Wandering Bird Causes Submarine Scare

A PEACEFUL and innocent bird, a common tern, caused a Nazi submarine scare in San Salvador.

The U. S. Biological Survey got the story because it was a band around the leg of the bird "with strange markings and ciphers" that was excuse for the excitement. San Salvadoreans not biologically inclined thought the bird was a messenger pigeon from a Nazi submarine. Actually the tern was an immigrant, having been banded last June at Ram Island, Mattapoisett, Mass.

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CHEMISTRY

Newest Synthetic Resin Is Plastic Worth Watching

MOST recent of chemical materials in the quickening parade of useful synthetic resins or plastics is methyl cellulose. Unlike its chemical cousin, ethyl cellulose, it is soluble in water. Like its cousin, it is highly versatile with a wide range of applications predicted for it in paper manufacture, textiles, cosmetics and food products. Odorless, colorless, completely non-toxic, methyl cellulose coatings are grease-proof, tough and highly flexible. It is a new material worth watching.

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AERONAUTICS

Wins Prize for Measuring Stresses During Flight

FOR a method of measuring vibration stresses of propellers, engines and other airplane parts during flight, a 25-year-old research engineer has been awarded the 1939 Lawrence Sperry award and \$250 prize of the Institute of the Aeronautical Sciences. He is Charles M. Kearns, Jr., of the Hamilton Standard Propellers division of United Aircraft Corporation.

Tiny graphite strips are cemented to the blades or other parts studied. Wires connect with an audio frequency amplifier similar to those used in radio sets. Vibrations set up fluctuations in an electric current passed through the plates. These electrical variations, recorded photographically by an oscillograph, allow computation of actual strains in the part being tested.

Mr. Kearns is only three years out of Pennsylvania State College.

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