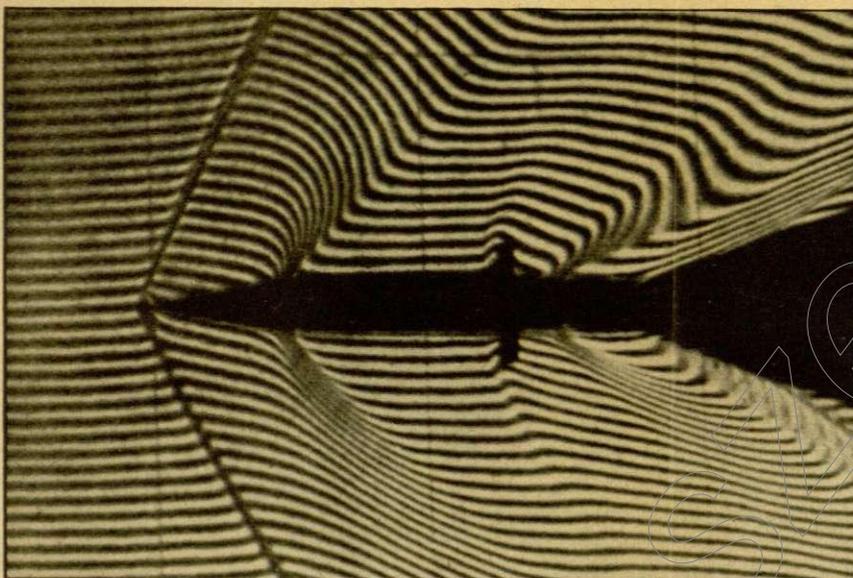


SCIENCE



The California Institute of Technology

Beyond the sound barrier: Patterns in a wind tunnel

The Air Age's Genius of Speed

Theodore von Kármán, the great aerodynamicist, is almost always on the move, riding in aircraft that stay aloft for the simple reason that his scientific principles have been properly applied. For all his genius, however, he has never learned to fly a plane himself. Instead, as he hops about the world, he has the disconcerting habit of seating himself beside the plane's pilot, flipping switches and knobs on the control panel, and asking, with insatiable curiosity: "What's this one for? What does that one do?"

This week Dr. von Kármán, born 73 years ago in Budapest, was on the move again. He had just left his book-cluttered Left Bank apartment in Paris to come back to his adopted country, the United States. In Washington on Dec. 17 he would be told by the big shots of American flying that "no other man has had a greater influence on the development of high-speed aircraft in the United States." The occasion: The award to von Kármán of the 1954 Wright Brothers Memorial Trophy, a lofty honor previously won by such men as Lindbergh and Doolittle.

Whirlpools: A shadowy figure to the general public, von Kármán is aviation's closest thing to an Einstein. First in Germany, and since 1930 in California, he has been unraveling many of the knots that once tied up the art and science of aerodynamics. His greatest work: Making mathematical sense out of the fantastically complex whirlpools and eddies, shock waves and surface turbulences that build up the faster an object moves through the air. The Kármán Vortex Trail, which produces tricky drag effects on high-speed aircraft, is only one of the

subtle von Kármán theories that plane designers must master.

Up at 6 a.m. and regularly working through midnight—even at table or in the tub—von Kármán has found time to be much more than a fine man on theory. At the Technical University of Aachen after the first world war, he developed one of the earliest aeronautical laboratories into one of the world's finest. From 1930 to 1949, he was the spark plug and director of the ever multiplying Guggenheim Aeronautical Laboratory at the California Institute of Technology.

Students Everywhere: A multilingual teacher, he carried the latest word on aerodynamics from Germany to many universities in the U.S. As a visiting professor, he has taught his blend of mathematics, physics, and mechanics in India, Japan, prewar China, Britain, France, and Italy. He could land in almost any major city outside Russia and be surrounded by ex-students, now leading aviation engineers, in a matter of hours.

As a consultant he has been in on the design and building of many of the important wind tunnels in the world. He has served on countless committees—to study municipal water pumping in Los Angeles, to design hydrodynamics systems for the Grand Coulee Dam, and to solve innumerable problems of the Army, Navy, and Air Force on jet propulsion, guided missiles, and ballistics. He was called in to find out why the Tacoma Bridge crumpled in the wind in 1941. The trouble here, it turned out, was that the bridge builder had neglected to allow for the Kármán Vortex Trail.

While serving as a lieutenant in the

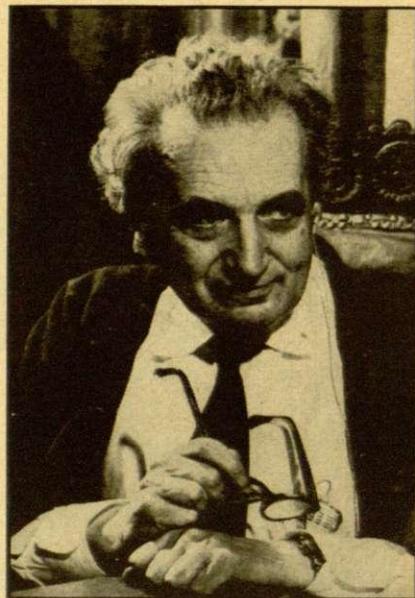
Austro-Hungarian Army in the first world war, he invented a helicopter with two counterrotating propellers. He maintains this approach is "better than ones they are making today" and will win out in the end. In 1943, his sketches on a Wright Field tablecloth started the thinking on the Bell X-1, which four years later became the first plane to break the sound barrier.

Big Business: His one flyer in business has been a success from the start. In 1941, quite aware of what Axis scientists were up to in rockets, he tried to interest the U.S. in getting something started. No sale. With four scientific friends and less than \$10,000, he went ahead anyway. They formed the Aerojet Engineering Corp., and within a year and a half were selling JATO rockets (for speedy jet-assisted take-offs on short runways) to the Air Force and Navy. Aerojet now is a major rocket producer. Von Kármán stepped down from its presidency some years ago but still is Aerojet's chief scientific counselor.

His two big jobs at the moment are (1) chairman of the scientific advisory board of the Air Force, an influential post he has held since 1944, and (2) the bird-dogging of military aviation development in Western Europe as chairman of the NATO aeronautical research and development group.

This keeps him hopping in and out of Paris for much of the year. For a couple of months, though, he gets back to his home in Pasadena, where, in a cloud of cigar smoke, he likes to tell parables, including one about his role as an advanced thinker at the Pentagon:

A centipede, it seems, went to the wise old owl and complained of the gout. Each of its hundred legs hurt. What



Ben Olander

Von Kármán: Flier's scientist . . .



John Florea

Winners: Kindelberger, Heinemann

could it do? The owl thoughtfully advised the centipede to become a mouse. With four legs it would have only 1/25 of its former amount of pain. The centipede concurred but wanted to know how he could get to be a mouse. "Don't bother me with that," said the owl, "I only create policy around here."

►A few hours before von Kármán receives the Wright Brothers' trophy, President Eisenhower will present an equally lofty aeronautical honor, the Collier Trophy, to two engineer-executives. Their achievement is one that von Kármán dared, almost twenty years ago, to predict: Flight by aircraft on the other side of the sound barrier.

To be cited for the first U.S. supersonic jets to go into service are J.H. (Dutch)

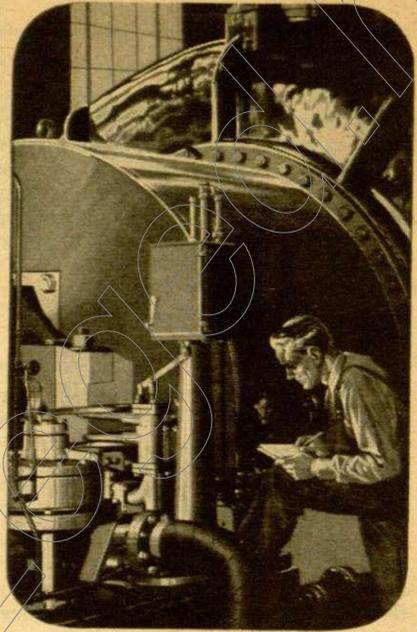
Kindelberger, peppery board chairman and chief executive officer of North American Aviation, Inc., and Edward H. Heinemann, chief engineer of El Segundo Division of the Douglas Aircraft Co. Heinemann's product is the Navy's new F4D delta-winged Skyray (top speed 753 mph near sea level). Kindelberger's is the slightly more orthodox-looking F-100 Super Sabre, which holds the world speed record at 755 mph. A formula for these two planes: Von Kármán plus 3,000,000 engineering man-hours—the fastest.

Thickening Flock

If the 8,500 members of an obscure Protestant sect living in the Dakotas, Montana, and nearby Canada continue to multiply at their present pace, there should be nearly 500,000 Hutterites by the year 2054. They may be the world's most prolific people, according to the Population Reference Bureau.

The Hutterites originated in Switzerland and Bohemia in 1528. To avoid religious persecution, a group packed up and escaped to Russia in 1762. In 1874, Russian religious bigotry drove 443 Hutterites to farming in South Dakota.

Population experts, who point to India and Africa as population "explosion" areas, didn't give the Hutterites a thought until two Wayne University anthropologists, Drs. Joseph W. Eaton and Albert J. Mayer, presented some statistics. The Hutterites' birth rate is 45.9 for each thousand people each year—and the death rate is only 4.4. This leaves a net gain of 41.5. For example, the United States, as a whole, gains an average of only 13.9 people a year, not counting immigration. The Population Reference



His notes show

safety or danger in your power plant

He is a welcome visitor in the power plants of Hartford Steam Boiler policyholders. He brings to his job a special skill in uncovering conditions which, uncorrected, might result in failure and costly shutdown. His recommendations often lessen the chance of accidents occurring, and prolong the life of boilers and power machinery.

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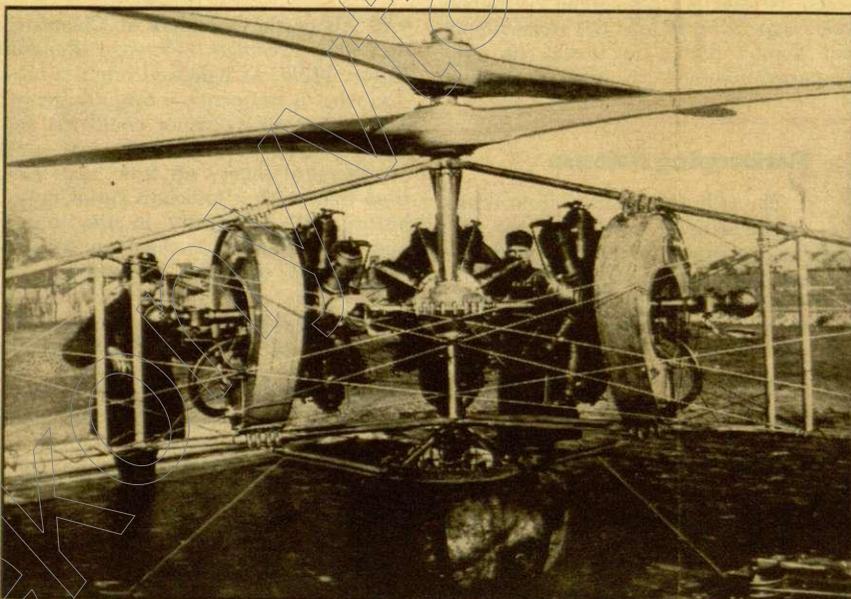
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INSPECTION
is our
middle
name

The
**HARTFORD STEAM BOILER
INSPECTION
and INSURANCE COMPANY**

Hartford 2, Connecticut



... invented this helicopter in first world war

1954

SCIENCE

Bureau's bulletin said: "Phenomenal."

The Hutterites have some other impressive records. Since the first settlement, only ten illegitimate babies have been born—despite a ban on teen-age marriages. Once they marry, the Hutterites stay married. Since 1874, they have had only one divorce, four desertions, and one separation.

Wonderland, 1954

Many a modern scientist and engineer was first attracted to his field by Tom Swift's interminable adventures, by a family encyclopedia, or by an older brother's battered textbook. The American child today has brighter stuff with which to discover his scientific bent. Since the war there has been a veritable flood of postwar books, simple, straightforward, sometimes brilliant, revealing the basic whys and wherefores of almost every scientific category.

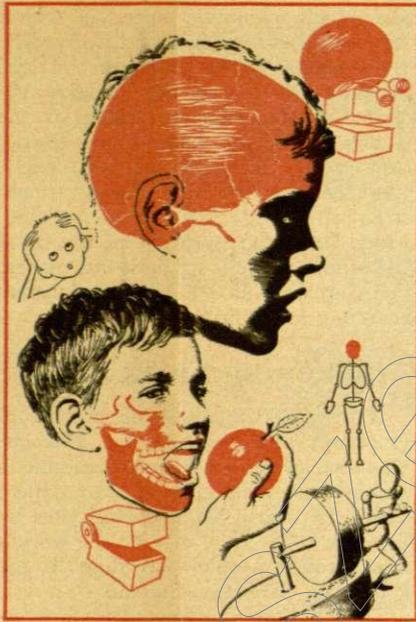
Scientists, deeply concerned about the quality and quantity of future talent for their fields, are generally pleased with the trend in children's science books. More and more, scientists themselves are writing and illustrating books for children. Below are some of the best of the 1954 crop (with books for teen-agers listed toward the end):

►Snow. By Thelma Harrington Bell, drawings by Corydon Bell. 56 pages. Viking. \$2.50. As delicately perfect as a snow crystal itself, the Bells' rhapsody on snow should delight everyone from an 8-year-old to an aging meteorologist. Starting with the feel of a snowflake ("There is a sudden cool touch on your cheek"), they tell how snowflakes are born and grow and how they differ from frost, glaze, rime, and hail.

►First Book of Conservation. By F. C. Smith. 68 pages. Franklin Watts. \$1.75. One of the few intelligent introductions to earth-plant-animal relationships and how man has tampered with them, this nature-study-with-a-purpose stresses the importance of conservation and what's being done (including what a child can do) to restore nature's balance.

►All About Whales. By Roy Chapman Andrews. 148 pages. Random House. \$1.95. Like Captain Ahab of "Moby Dick," Dr. Andrews, usually identified as the man who found dinosaur eggs in the Gobi Desert, spent a good part of his life chasing whales. His well-informed biographies of the world's whales are crammed with such data as the fact that a sulphurbottom has exactly 32 whiskers on its chin.

►Through the Magnifying Glass. By Julius Schwartz. 142 pages. McGraw-Hill. \$2.50. Julius Schwartz, a New York



Read all about it: Boy's anatomy

City science teacher, has written a handbook on what to look for with that universal scientific tool, the magnifying glass. With Jeanne Bendick's delightful illustrations, it should beguile any child who has been reading for a few years.

►Prehistoric Animals. By William E. Scheele. 125 pages. World. \$4.95. Boys who delight in dinosaurs still abound despite more timely distractions. To keep them busy, the author-artist, who is director of the Cleveland Museum of Natural History, has put together a remarkably handsome, informative chronicle of the strange life that sprang from the sea to reach its ferocious peak some 70 million years ago. Scheele tells the story simply but doesn't dilute his fossils; he calls a parasaurolophus a parasaurolophus.

Periscoping Science

The telltale radiations from tracer atoms made at Oak Ridge are now fighting crime for the FBI and several big-town police departments. Big-time jewelers, too, are buying these radioactive isotopes to mark gems invisibly for sure identification if later picked up as stolen property. . . . The Atomic Energy Commission is worried about a possible source of international ill will, that could cast a shadow on the atoms-for-peace program. Hundreds of foreign scientists are applying for the special Oak Ridge isotopes course that is to be given in May 1955. Only 32, unfortunately, can be squeezed in.

►Wonders of the Human Body. By Anthony Ravielli. 125 pages. Viking. \$2.50. Tony Ravielli had a skeleton in his studio. An illustrator who frequently has worked with physicians, he had thought of writing an anatomy book for adults. But visiting nieces and nephews, fascinated by the skeleton, convinced him that children are "far more curious about their bodies than adults." His child's anatomy book is a superb unity of well-written text and enchanting, yet always vigorous, illustrations.

►Numbers: Fun and Facts. By J. Newton Friend. 208 pages. Scribners. \$2.75. Tough going for many an adult, this sprightly dissertation could, nevertheless, be duck soup for a teen-ager who has a bent for figures and a desire to know something about the odd history of numbers.

►Weapons: A Pictorial History. By Edwin Tunis. 152 pages. World. \$4.95. As they never were in a field manual, here are the products of the armorer's art from the stone ax to the V-2 and the 280-millimeter atomic gun. Tunis's somewhat sardonic history is on the same high level as his fascinating line sketches.

►The Caves of the Great Hunters. By Hans Baumann. 159 pages. Pantheon. \$3. Extraordinarily beautiful color reproductions of ice-age masterpieces make this the handsomest children's book of the year. Translated from the German, the fictionalized story of four boys and one dog who discovered a prehistoric art gallery in a cave near Lascaux, France, moves so fast the reader hardly realizes how much archeology he has absorbed.

►All About the Wonders of Chemistry. By Ira M. Freeman. 148 pages. Random House. \$1.95. As light and bright a book —on what is frequently a turgidly treated subject—as any beginner could ask for. Dr. Freeman, a Rutgers physicist, puts his chemical theory up front and leads from that, with a judicious sprinkling of history, into chemistry in the human body, in medicine, on the farm, in plastics, and in cosmetics and candy.

►Engineers' Dreams. By Willy Ley. 239 pages. Viking. \$3.50. A tunnel beneath the English Channel, volcanoes harnessed for steam heat, a plan to shrink the Mediterranean Sea—these, and many more, are projects which could be achieved except for financial and political obstructions. The author of "The Conquest of Space" (the science book most frequently stolen from the New York Public Library) doesn't talk this time about cities on the moon; his intriguing book indicates there is plenty for engineers to do right here on earth.