

tion work for a ten-year period, but all actual work is being delayed until the need for work comes.

Now with incomes high, taxation is being raised to pay for the hard times of the future. When that time comes, business men will not be afraid to run the government into the red again.

Sweden's way of solving great social problems is by study in a Royal Commission. The problem of recurring depressions was tackled by a Royal Commission on Budget Structure. On this sat experts from the universities and from the administration, including five economists and five members of higher administration. Prof. Myrdal was one. The ideal of a royal commission is to reach an agreement of all members so far as is possible and to define all disagreements.

Sound finances are desired by the Socialists (now in the majority in Sweden) in order that they may put through their long-time program of social reforms; they are equally desired by the Conservatives. The principle of the unbalanced budget now meets the approval of both, Prof. Myrdal said, and the plan is in effect.

All extraordinary borrowings during the last depression are now paid back and the Swedish government operated within its budget for the fiscal year 1936-1937.

"It works," Prof. Myrdal declared.

*Science News Letter, June 18, 1938*

## ● Radio

Every Friday at 7:30 p. m. EDT, 6:30 p. m. EST, 5:30 p. m. CST, 4:30 p. m. MST, or 3:30 p. m. PST, Science Service cooperates with the Columbia Broadcasting System in presenting over the Columbia coast to coast network a new series of "Adventures in Science" presenting dramatizations of important scientific advances and discussions by eminent scientists.

### AERONAUTICS

# New Giant Air Transport Exceeds Expectation in Tests

See Front Cover

**T**HE GIANT Douglas DC-4, America's largest air transport, scored "perfect" on its initial hour-and-a-quarter flight test in the hands of Major Carl Cover, test pilot and vice-president of the Douglas Aircraft Company, makers of the plane.

The big plane, developed as a type for America's five major air lines, carried a gross load of 53,000 pounds at takeoff. It required less than half of the 2,800-foot runway of Clover Field to get into the air.

Two months of further flight testing by its makers will now follow. Seats and special instruments for eight flight observers have been installed in the plane, on which two years and \$1,700,000 have already been spent.

Prior to its flight test, the 65,000-pound giant, was successfully put through a bewildering array of novel load and "indoor flight" tests, without ever leaving its hanger, devised to guarantee that the 42-passenger plane would be able to stand strains more than three times as great as any it will meet when it goes into service on United States airlines, officials of the Douglas Aircraft Company, its builders, announced. The picture on the front cover of this week's SCIENCE NEWS LETTER shows one of these tests.

"Indoor flying," never before attempted as part of the checking of a new airplane, was provided by wind tunnel and vibration tests reproducing

conditions far more severe than any it will ever meet, it was stated.

The great plane, which weighs two-and-a-half times as much as the Douglas DC-3 plane now used on almost every major airline in America, was loaded with hundreds of thousands of pounds of lead during the test.

Its tricycle landing gear, the first ever placed on a large transport, was dropped 50 times to simulate "landings" of the hardest pancake variety. Each "landing" duplicated an impact of 120,000 pounds on the main wheels and 54,000 pounds on the nose wheel. The novel landing gear will enable the plane to rest horizontally on the ground as well as land safely under less favorable wind conditions than those required for the present type of landing gear.

Harry H. Wetzel, general manager and vice-president of the company, pronounced the great craft's performance "eminently satisfactory."

A load of 175,000 pounds was placed on the wings as one part of the checking. In a final test, conditions of a "high angle of attack," such as the plane entering a climb of 2,000 feet a minute from level flight of 235 miles an hour, were duplicated.

Two special steel structures, each built from 20,000 pounds of steel, were built to reproduce forces acting on the plane's wings during flight. Cables running over pulleys exerted an upward pull while hydraulic jacks applied pressure beneath the wings as part of the tests, designed to check in advance any possibility of structural failure.

*Science News Letter, June 18, 1938*

### DOCUMENTATION

## Scientists Can Now Publish Research Upon Microfilm

**A**WAY in which scholars and scientists can publish the complete record of their researches without large subsidies now often necessary was presented to the Special Libraries Association by Watson Davis, director of Science Service.

By using microfilms, which are reduced-size photographic images upon 35 mm. film, it is now practical to furnish at low cost any text, pictures or other

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material available. A single microfilmed copy can be distributed at a cost no higher than it would be necessary to charge per copy if the same material were printed conventionally in a minimum practical edition of about 1,000 copies.

Microfilm also makes possible for the first time the protection of the essential records of business and government, Mr. Davis said. This is the first practical method of insuring deed books and other legal documents which, if destroyed, could not be replaced.

Mr. Davis visualized the libraries and intellectual institutions of the world cooperating to provide microfilm services that will greatly speed the communication of scientific information. Already the great bulk of the world's literature can be obtained in microfilm form upon specific order at a few cents a page.

Microfilm, upon which a conventional letter or book page is not much larger than a postage stamp, is read by optical enlargement in a special reading machine. This device is used in the office like a typewriter, but costs less.

*Science News Letter, June 18, 1938*

## ENGINEERING

## Army Blasts Military Road From Hawaiian Lava

ONLY now, that the job is done, is the U. S. Army talking about its new, strategic military road across lava-lined Kole Kole Pass on the island of Oahu, Hawaii. Although only six miles long, the road rises from 450 feet at its western end to 1635 feet at the pass and then drops to 1,063 feet at its eastern terminus. Schofield Barracks and the Naval Reservation in the Lualualei pocket are the terminals of the strip.

At Schofield Barracks is important Wheeler Field of the U. S. Army Air Corps. The post has often—and rightly—been called the hub of a spoked wheel in Hawaiian defenses. The new Kole Kole Pass Road, together with other highways recently completed, will link Schofield Barracks with the defenses of Oahu previously connecting only through vulnerable approaches.

Much of the highway was dug and blasted from lava cliffs. Three hundred thousand cubic yards of earth and rock were moved but some 30,000 cubic yards had to be handled five times, so that the figure mounts to more than 500,000 cubic yards total excavation.

At one stage, reports Col. Robert S. Thomas, who completed the job, 24 tons of explosives loosened 31,000 cubic yards of rock. But the rock hung tenaciously to the mountainside and could not be undercut for fear of starting tremendous avalanches. Thus it was removed, from the top down, by a series of terraces states Col. Thomas (*Civil Engineering*).

The road has a minimum width of 18 feet and consists of six inches of macadam base with over two inches of wearing surface of hard rock and bitu-

men. Lying in the severe rain belt of the Koolau mountains, where 24 inches of rain have fallen in a single day, the Kole Kole Pass Road was completed in 18 months despite severe rainfall.

*Science News Letter, June 18, 1938*

## PSYCHOLOGY

## Religious Attitudes Are Difficult To Analyze

WHAT 107 persons from the Emergency Relief Bureau think about God, the Bible, Sunday observance, censorship and the proper treatment of criminals has provided a contribution to the knowledge of the human mind. (*Science*, May 27)

Tests for these religious and social attitudes were administered by Dr. Irving Lorge, of Teachers College, Columbia University. Statistical analysis of the results showed that attitudes of this sort cannot be profitably taken apart or broken down into their basic elements in the way that a chemist can break up a compound, or an artist resolve a delicate hue into its primary colors.

When the psychologist becomes too devoted to the factor method, "psychological nonsense" is likely to result, Dr. Lorge and his assistant, N. Morrison, said in their report.

"Traits beyond the first will be inadequately identified and, hence, frequently misnamed," they declared.

*Science News Letter, June 18, 1938*

## THE AUTOBIOGRAPHY OF GENERAL ISAAC J. WISTAR

(1827-1905)

Almost hermetically sealed for 32 years after his death, the autobiography of General Isaac J. Wistar, colorful character of a colorful period, gives the American reading public a fresh, first-hand account of the nation's roisterous makers, from the Forty-Niners to the early industrialists.

Written from his diary and contemporary notes, Wistar's opus was intended only for close kinsmen's consumption. It tells with especial frankness of the gunfights and slayings, raw deals and chicanery of the opening of the Far West. In these Wistar, though of heroic stature, is not a hero to be emulated by good little boys. His will, upon his death in 1905, prohibited publication of the autobiography for at least 5 years. In 1914, The Wistar Institute of Anatomy and Biology, which he endowed, cautiously printed 250 copies with a foreword which bound their select readers to confidence.

This new limited edition is published, turning new light on historical controversies of the Civil War period and giving naturalists one of the few eye-witness accounts of the virgin wonderland of the Northwest by a nature lover who literally blazed its trails.

## Recent Reviews

"This autobiography reveals one of the most colorful characters and careers in American history."

Westchester Feature Service.

"Valuable adjunct to historical records."

Boston Sunday Post.

"A strange adventure tale interlarded with the vigorous opinions of a man who knew his own mind better than most, it relates many striking incidents."

Time.

"Easy, smooth, readable literary style."

Florida Times Union.

"Unusually colorful and frank."

The Enquirer, Cincinnati.

"The book is a fortunate combination of historical material with vivid narrative and unquenchable personality, at all times vigorous, shrewd and veracious record."

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