

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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