

local and state health services have been reduced about 20 per cent., the American Public Health Association estimates.

The U. S. Public Health Service has already been given \$1,000,000 from emergency funds to help out in this situation.

"But something more than these sporadic and temporary measures is needed to provide effective, well planned and conscientiously executed full-time health supervision," the *American Journal of Public Health* (January) points out.

"Obviously, public health service along lines now generally accepted and known to be effective, if extended to reach a large majority of the popula-

tion, would make a real contribution toward economic security through minimizing the tremendous annual loss from preventable diseases which now amounts to hundreds of millions of dollars."

With \$8,000,000 the federal health service can give much-needed aid to local health departments in their fight on malaria, venereal and other preventable diseases and in their efforts to provide public health nursing for state, city and county health authorities; and can help these officials to get more accurate and prompt reports of new cases of communicable diseases, so that outbreaks of smallpox, scarlet fever or meningitis, for example, can be checked at their start.

*Science News Letter, February 9, 1935*

## ENGINEERING

## Photographs Reveal Process Of Diesel Engine Combustion

USING special glass windows resisting temperatures up to 3,500 degrees Fahrenheit, aviation research scientists have just discovered how fuel oil burns in a Diesel engine.

New facts which are expected to advance the possibility of using Diesel engines in aircraft have been found by taking high-speed photographs through these windows. These facts were reported by A. M. Rothrock of the National Advisory Committee for Aeronautics Laboratories at Langley Field, Va., before the meeting of the Institute of the Aeronautical Sciences, in New York.

Mr. Rothrock showed motion picture film before the aviation meeting taken at the rate of 2,500 frames a second. The film upset views about how fuel burns in such engines; opinions which have existed since the Diesel engine was first invented in 1893.

The characteristic feature of the Diesel engine is that fuel oil is injected into the air of the cylinders which has previously been compressed by the stroke of the piston. Under compression the air temperature rises until it is high enough to ignite the injected oil. No electric spark is necessary. Previously it had been supposed that the oil began to burn as soon as it came in from the fuel jets. Mr. Rothrock's film proves that combustion occurs only after the fuel fills the cylinder.

G. W. Lewis, director of aeronautical

research of the N.A.C.A., told Science Service the new technique should speed research in the Diesel engine field. Heretofore, he said, various types of fuel jets—as only one example—were made and inserted in the cylinders. How well they worked could be determined only roughly as long as it was not possible to see or photograph what was going on inside during combustion.

With the new windows and high-speed photography, however, rapid checks on performance can be obtained.

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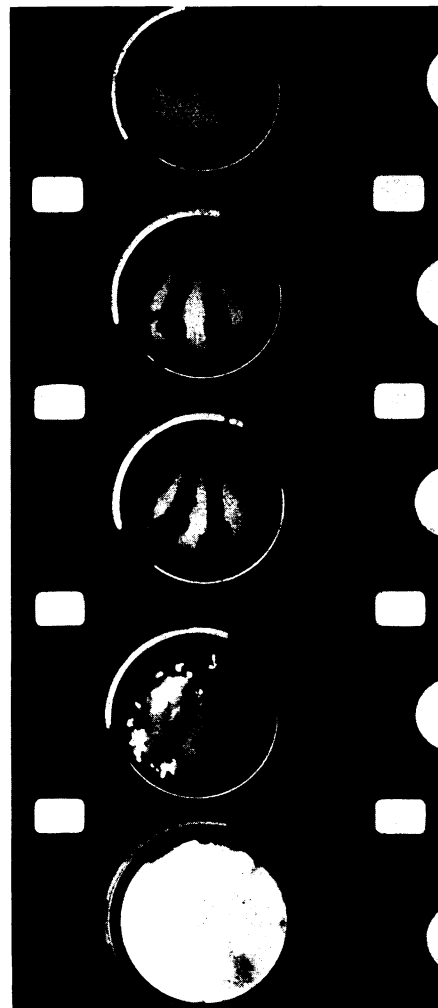
## AVIATION—METEOROLOGY

## Better Weather Service Foreseen for Aviation

BETTER weather service for the airways of America is foreseen by D. M. Little, chief of the U. S. Weather Bureau's Aerological Division, who described to the Institute of Aeronautical Sciences the recent extensive improvements in forecasting and weather reporting for those who fly.

The relatively new weather forecasting techniques, involving air mass and frontal analysis methods, have already been put into use in many aviation forecasting centers, Mr. Little explained.

At ten important air terminals, Atlanta, Burbank, Chicago, Cleveland, Dallas, Kansas City, Newark, Oakland, Portland and Salt Lake City, there is



## GOING ON INSIDE

Special heat-resistant glass windows enabled A. M. Rothrock, National Advisory Committee for Aeronautics scientist, to obtain these first photographs of fuel oil burning inside a Diesel engine cylinder. The top pictures show the fuel entering the cylinder through jets, the fourth shows tiny spots of flame beginning to appear, and the bottom one shows complete combustion one ten-thousandth of a second later than the previous view.

now 24-hour daily service, requiring the services of four highly qualified forecasters at each of the centers.

One of the recent improvements is the issuing of special trip forecasts for aviators, when requested, for periods up to 30 hours in advance to take care of long transcontinental flights which have become numerous in recent months.

Each day, in cooperation with the Army and Navy, weather sampling flights are made to heights of 17,000 feet. This is a new aid to weather forecasting.

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