ficate under such conditions would be decidedly misleading.

The first motor given an approved-type certificate by the Department of Commerce was tested by the manufacturer, and was approved by the Department on the basis of the manufacturer's statement. Later it was discovered that the motor had so much vibration as not to be practical to fly.

Consequently, for the next test, a Bureau of Standards expert, T. T. Neill, who has since been in charge of this testing work, was sent to the manufacturer's plant to supervise the testing. The third motor was tested at the Bureau's own plant.

Only $60,000

This testing work, insuring the safety of fliers and the flying public, has cost the government an average of about $60.000 a year. To save this sum, the work is being discontinued. Four engineers, four skilled aviation engine operators, and eight other skilled workers are being fired. Apparatus recently installed at Arlington at a cost of $50.000 will remain idle as will also special equipment for the testing of air cooled engines under approximated altitude conditions, which represents another investment of about $35,000.

Meanwhile experienced men are being lost to the government, who will probably have to be replaced when public pressure demands the renewal of this public service. The present arrangement of testing in the manufacturers' plants makes no provision for the small manufacturer who has not the expensive testing equipment necessary to meet department requirements.

As a last minute job, the men who have been fired rushed through two tests, each requiring 100 hours continuous running of the motor. This meant that a group of men being fired from the government service in a time of general unemployment worked night and day for eight consecutive days up until almost the moment of leaving.

Science News Letter, July 15, 1933

AVIATION

Altitude Laboratory Idle For Lack of Funds

THE ALTITUDE LABORATORY of the National Bureau of Standards, the only one in this country, and the only one in the world doing published research for the benefit of the public, will stand idle during the coming fiscal year because of lack of funds.

Unless funds are made available from public works projects to renew the work there of testing airplane motors on the ground under conditions like those at high altitudes, this laboratory representing an investment of about $250,000 will not be used for the public service—simply because there is no money for the purpose.

When a manufacturer, or the Army or Navy, wants to know how a particular motor will operate at very high altitudes—or wants to know about the performance of a certain fuel or lubricant—it has been possible to make tests in the altitude chamber of this laboratory. Here the atmospheric pressure can be varied at will, as well as the temperature, the percentage of moisture, and other factors which are different at different heights above sea level. In other words the entire motor can be transported to conditions like those of any height up to 30,000 feet while the investigators remain on the ground and make observations of its performance.

Impossible To Manufacturer

No manufacturer is able to make such a test in his plant. He depends upon tests made when the pressure of the air fed to the carburetor is controlled. He has no way of controlling the pressure at the exhaust outlet, or the many other factors which affect the engine when it is actually in flight. None, that is, except the very unsatisfactory method of actually putting the motor in a plane and taking her up.

The U. S. Navy has facilities for controlling the pressure both at the intake and at the exhaust, but even they must rely on these approximate tests.

The plans of the altitude laboratory for the coming year included the working out of a correction factor which might be applied to such approximate tests to give some idea of what the performance would be when the motor was actually at altitude. So far no such correction factor is known. Yet the requirements of the Department of Commerce for altitude engines specify that they must be given either actual altitude tests or approximate altitude tests "corrected in a proper way."

The physicist in charge of the altitude laboratory who is being summarily fired without notice, or, technically speaking, "furloughed for an indefinite period," left industry during boom times to make a career of this work. He has now had five years' experience in the laboratory.

Science News Letter, July 15, 1933

AGRICULTURE

Experiment Station Funds Uncut for Three Months

THE AGRICULTURAL experiment stations of the various states will not have their federal funds cut by 25 per cent., at least during the first three months of the new fiscal year.

President Roosevelt's reorganization order chopped this regular annual appropriation by $1,095,222 for the year beginning July 1, but the great damage that would result to fundamental research work in science and agriculture caused official postponement of the ordered cuts for the first quarter of the new fiscal year. There is hope that the cuts can be mitigated for the balance of the year also.

Although final action has not yet been taken, similar postponement of the 25 per cent. cuts in agricultural colleges and vocational education federal grants was made to apply to the first quarter.

The agricultural extension service has received full payment for the first half year.

Science News Letter, July 15, 1933

METALLURGY

Information Service on Metallurgy Closed

THE SCIENTIFIC staff which is being fired by the United States Government does not consist of long-haired men with peculiar notions. Neither are they individuals with low efficiency ratings or those whose services are rated by superiors as unnecessary. They are being dismissed, or "separated" and "furloughed" for one reason only—lack of funds. That is, in order to save the small amount of their salaries for use on such things as public works.

Typical of young woman scientists who are being dismissed is Miss Marjorie G. Lorentz, research worker on metallurgy at the National Bureau of Standards.

When builders suspect a flaw in the metal to be used, say in building a new airship or in withstanding the stress of a great building, they may test it by an etching process. They take a cross section of the metal, treat it with the right reagent, and then photograph it. The photograph, because of the action of the reagent, will show up occlusions, or imperfections, and also the shape of the metal particles.

Miss Lorentz has experimented with many sorts of metals and reagents and has made convenient tables showing the best reagent for use with each metal for each purpose. These have been published as scientific papers of the Bureau. So that now, the man who wants to test a piece of copper may just look at the table under copper and learn exactly what is best for his purpose.

Information Center

Miss Lorentz also runs a sort of center or exchange of information of all sorts on the subject of metallurgy. She abstracts all current publications on this subject and indexes them in an up-to-the-minute file. This is probably the only such information file on metallurgy open to the public in the United States. She answers letters of inquiry from the public at the rate of over one hundred every month, and has daily many other requests for advice and data by telephone and personal calls. To meet repeated requests for the same data, she has compiled books on several metals.

Science News Letter, July 15, 1933

AUTOMATIC CHEMISTRY EXPERIMENT

Every two minutes at a booth in Chicago's Century of Progress Hall of Science the famous thermite reaction used in one kind of welding is performed to show the principle of chemical exchange or double decomposition. Iron oxide is mixed with aluminum dust and when the mixture is ignited there results molten iron and aluminum oxide with the evolution of great heat.

AGRICULTURE

Disease Resistant Banana Promises to Save Millions

VICTORY over the dreaded Panama disease which has cost banana growers millions of dollars in the last few years appears to be within measurable sight of achievement, according to experiments carried out by Prof. E. E. Cheesman, M.Sc., A.R.C.S., of the Imperial College of Tropical Agriculture, Trinidad.

Prof. Cheesman believes he has created a fruit which is completely immune to Panama disease and at the present time samples are being sent out to growers for further and more complete tests. Known as 1.C.2, the new variety has been planted alongside trees severely stricken with Panama disease in the grounds of the agricultural college here, yet no sign of the disease has been found.

In March, 1925, a variety known as 1.C.1, was evolved and this plant has proved to be completely resistant to Panama disease following continual close investigation ever since, but it has the grave commercial disadvantage that an occasional seed is noted as a result of self-pollination when multiplied up by suckers and grown under ordinary banana field conditions.

The primary economic end kept in view throughout the investigation has been the production of a new variety of banana combining resistance to Panama disease with the good commercial qualities of Gros Michel, outstanding variety of northern markets.

Experiments carried out so far by Prof. Cheesman have shown that the new variety, 1.C.2, is completely seedless while it is hoped to produce fruit of a good size. Furthermore, it is hoped that it will have the other necessary required commercial qualities such as compactness of bunch, a fruit skin not abnormally sensitive to bruising, ability to stand up well to conditions of bulk transport, and an attractive appearance on ripening.

In regard to the seed aspect of the problem the difficulty is scientifically extremely complex for bananas are naturally reproduced by vegetative means. The plant breeder must first induce the formation of seeds and then, if he wishes, he must completely eliminate them again. A banana seed, which the great majority of banana-eaters in temperate countries have never seen, is about a quarter of an inch in diameter, black in color, and very hard. Naturally, the presence of these seeds in the fruit would not enhance its market value.

In attaining his present success, Prof. Cheesman has had to explore the whole genetics of bananas and the breeding work has necessitated the introduction and study of a wide range of varieties.

The Imperial College collection contains about one hundred "numbers" obtained from several parts of the Tropics. Tests have been made with all these during the effort to produce a specimen immune to Panama disease.

A Londoner by birth, Prof. Cheesman has been engaged in his research work at the Imperial College for the past ten years.

Science News Letter, July 15, 1933