

cart Calkins, who has been with the Survey since 1901.

A leading authority on deep earth temperatures particularly as related to important oil fields goes with the leaving of C. E. Van Orstand.

Dr. Nelson Horatio Darton's contributions have been in the geologic and topographic mapping of the southwestern part of the United States. For this work he has been awarded the Charles P. Daley medal of the American Geographical Society.

Dr. Arthur Coe Spencer is a specialist on mine deposits and has also investigated dam and reservoir sites.

Louis M. Prindle is an expert on the complex geology of northwestern Massachusetts and adjoining states.

Dr. Charles Butts is a stratigraphic geologist.

Dr. George Burr Richardson, a specialist in oil and gas and in the mapping of oil and gas fields of the United States, has also served the Internal Revenue Bureau for special investigations in connection with the valuation of oil and gas properties.

Arthur James Collier is an authority on coal, petroleum, and gold deposits.

These men are typical of those that the government service is sacrificing in the name of economy.

International Congress

By unhappy coincidence this "economy" attack on the U. S. Geological Survey comes at a time when America is host to foreign geologists. The International Geological Congress meets in Washington during the last week in July. Not a cent of Government support is given this meeting, although foreign governments have subsidized previous congresses held in their countries. Uncle Sam's greeting to the foreign geologists comes in the form of dismissals to some of their colleagues who will act as hosts.

Science News Letter, July 15, 1933

PHYSICS

Cuts Destroy Uncle Sam's Photographic Laboratory

UNCLE SAM has fired his experts on the making of photographic films. In the interests of "economy" dollar saving, the Government will scrap a laboratory which it has taken a decade to build and which could not be duplicated except at immense cost in time and money.

All the Government saves by this

move is less than \$10,000 a year. Thousands, not millions! Less than half of the initial cost of one of the Air Service's photographic planes! Yet with this Bureau of Standards laboratory gone, the plane and all other military and civil photographic outfits of the Government will depend entirely upon the few commercial film companies in this country for knowledge regarding the emulsions they must use. In peace time, this is a serious situation. In war time, it might be disastrous.

Only Research for Public

With the laboratory, goes Dr. Bert H. Carroll, young physical chemist, who has had the distinction of being the only scientist in this country to do research work for the public on the important subject of the making of the emulsions that make photographic films sensitive. He is one of the very few men in this country outside commercial film companies who are familiar with the subject. With him also goes Dr. Donald Hubbard, who has been in the laboratory for seven years rated as a "junior chemist" although qualified as a specialist in this field.

The making of emulsions for films has always been considered an art. The men who could do it have guarded their skill as a trade secret, and have passed it on to others only in the same company. Even they have great difficulty in making the emulsions in case they move to another plant and have to work under different conditions, because the underlying principles have not been understood. Even the most modern emulsion plant when it moves from place to place usually takes more than a year to get going again.

When the United States was faced with the World War, the importance of aviation photography became evident. We had to have photographs, from the air, of the enemy lines. This meant that we had to take photographs at long range. We had to take them with short exposures. We had to take them through the mists which invariably lie between a high flying plane and the ground. And we had to have results that would show details clearly.

This meant, in turn, that we must have better films. Films sensitive to the red end of the spectrum were an absolute necessity.

Then the Government discovered within the service, in the spectrographic laboratory at the Bureau of Standards, experts on the sensitization of plates or film to the red. Research was started

which resulted in the hypersensitization process used for ten years by the air service.

In 1922, funds were transferred from the air service to the Bureau of Standards for research on making films more sensitive, and particularly on the making of new and better emulsions.

It was necessary to build from the ground up. Nothing recent existed in print on the subject of emulsion making. Dark secrecy surrounded the whole subject. Even today, no university in the land is doing research on this subject. No laboratory in a public institution had undertaken it.

Even in the commercial research laboratories, the work has been extremely limited. Manufacturers have produced dyes which are added to the emulsion to make it sensitive to the red end of the spectrum, but they have published extremely little which dealt with anything remotely connected with making of the emulsions themselves.

Science News Letter, July 15, 1933

AVIATION

Public Safety In Air Endangered By Slashes

GOVERNMENT CUTS in the name of economy are endangering public safety in the air.

The U. S. Department of Commerce issues certificates for approved types of airplane engines. In June, 1933, this meant that the engine stamped with this mark of Uncle Sam's approval was of a safe and practical type. It meant that the engine had been tested by experts of the National Bureau of Standards in the government's own testing plant at Arlington, Va.

Manufacturer's Test Accepted

But in July, 1933, and thereafter unless funds not now provided for this purpose are forthcoming, Uncle Sam's certificate will mean something entirely different. It will mean that the manufacturer, not the government, has tested the engine. The tests will be conducted in the plant of the manufacturer, by persons in the employ of the manufacturer, with the manufacturer's testing equipment. A single government inspector visiting the plant will be expected to insure that test conditions are satisfactory.

Some aviators, who have to trust their lives to their motors, have expressed the opinion that a government certi-

ificate 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.