to discover safe and profitable ways of farming steep lands.

Hillculture has under way such projects as production of sumac for use in tanning fine leathers, milkweed floss as a substitute for imported Java kapok, and Devil's shoestring roots for the manufacture of insecticides. Remarkable progress has been made in improving the raising of tobacco on sloping land.

One of the outstanding achievements of hillculture has been in developing the shipmast locust for use as posts, a great improvement over the abundant crooked-trunk black-locust stock.

A nursery is maintained at Beltsville. It is used to increase the growth of superior erosion-resistant plants. Many native and exotic species and varieties are under study and propagation.

Science News Letter, June 10, 1944

METEOROLOGY

To Measure Cloud Ceiling

Balloon methods replaced by air-cooled mercury vapor lamp and a photoelectric unit. Light projected vertically is reflected by clouds.

➤ THE U. S. Weather Bureau has begun installations of a new photoelectric instrument, called the ceilometer, for measuring the cloud ceiling at airports. The CAA has also announced its approval of the ceilometer after exhaustive tests at the National Airport in Washington, D. C.

Up to the present time, information concerning ceiling heights has been obtained by balloon methods, which were not satisfactory. The new ceilometer, developed by Laurence W. Foskett and B. L. Hansen of the instrument division of the U. S. Weather Bureau, provides a dependable means of obtaining cloud ceiling heights which are vital to the safe arrival and departure of aircraft at an airport.

The equipment consists of an air-cooled mercury vapor lamp of 30,000,000 to 40,000,000 candlepower, and a photoelectric unit, the ceilometer. The mercury vapor lamp projector directs vertically an intense beam of light which forms a spot on the base of a cloud. This spot of light is detected by the ceilometer, and the angular elevation of the spot, and thus of the cloud base, is noted. An automatic facsimile recorder connected to the ceilometer gives the airport meteorologist a constant check on the cloud ceiling height. This information is transmitted to pilots of incoming and outgoing planes.

"The ceilometer can be used in bright daylight or at night, and under all types of weather conditions," Mr. Foskett said.

The cost of a complete installation is about $3,500. It is expected that a nation-wide network of ceilometer installations will be in operation within a year or two.

Carrying on work begun by the CAA, another new instrument has been developed by the U. S. Weather Bureau in cooperation with the National Bureau of Standards and the Navy Department. This instrument, called the transmissometer, gives an automatic record of visibility by measuring the transmission of light through the atmosphere. Like the ceilometer it uses a powerful light projector and a photoelectric unit. The projector and photoelectric unit are set on the ground, about 2,700 feet apart, with the beam of light focused on the photo-cell. A recorder indicates the percentage of light transmitted which reaches the photo-cell, and by an automatic mathematical calculation the meteorologist is able to determine the visibility.

Both of these new devices are expected to be of valuable aid to post-war flying, enabling airports to have a minute-to-minute record of both cloud ceiling and visibility.

Science News Letter, June 10, 1944

ENGINEERING

Portable Fog Generators Can Blank Out Entire City

➤ NEWEST DEVICE for the protection of our troops as they storm the bastions of Fortress Europe, the midget M2 fog generator, was given its first public showing by the Chemical Warfare Service at an Army exhibition of weapons and equipment in Washington, D. C.

This fog generator is a compact, highly portable, trimmed-down but more efficient version of the M1 device that has done great service in North Africa, Sicily and Italy. Wholly automatic in operation, it uses the same materials and produces the same kind of concealing white cloud. Under proper atmospheric conditions, a CWS company equipped with 48 M2's could fog out a whole city.

CHECKS CEILING — Airplane pilots can have continuous information about the height of the clouds by means of this instrument, the ceilometer, shown here with Laurence W. Foskett, of the U. S. Weather Bureau, one of the inventors.

Big advance in the M2 generator is in its compactness and portability. It is only one-twentieth as bulky as the M1. Its dimensions are hardly those of a small steamer trunk; it is light enough to be carried on the back of a jeep. Four husky men can pick it up and carry it over rough ground or up rocky slopes. It can be hidden behind a low bush or set down in a fox-hole.

This does not mean that the M1 fog generator is headed for the scrap-pile. This big machine, looking a good deal like an old-fashioned circus steam calliope, will still function around permanent large installations that need concealment from enemy planes, such as airfields, seaports and railroad yards. The M2 will take over in the fighting zone, where high mobility and inconspicuousness as a target are at a premium.

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