

AERONAUTICS

# VHF for Safe Landings

Instruments make it possible for planes to land through overcast skies at three-minute intervals. Use very high frequency radio.

► **SAFE AIRCRAFT** instrument landings at overcast airports at three-minute intervals are now possible by a new technique and very high frequency radio apparatus developed by the U. S. Civil Aeronautics Administration at its experimental station in Indianapolis at the municipal airport. By this method approximately 20 planes can be brought safely in on a single runway in an hour, while under the usual method the number is only four or five. It doubles the number of instrument landings an hour over that obtained in a method demonstrated only two months ago at the Washington, D. C., airport by the same organization.

The new method assists greatly in solving one of the most serious problems facing commercial and private flying with the greatly increased use of airways now expected. With high visibility and good flying and landing conditions, planes can safely land at a rate approximately 60 an hour on a single runway. When visibility is such that landings must be by instrument, approaching planes, under radio orders from the control tower at the port, must be "stacked up," circling at levels 1,000 feet above each other at some distance from the field, waiting often an hour or more before they can be permitted to land.

Very high frequency radio, called VHF for short, is the key to the new technique. Its great advantage is that the VHF channel is basically static-free. With the present lower frequency radio static causes much difficulty, and it is worse in bad weather when clear reception is most needed. Approach guidance is by means of a localizer element, also operated on VHF.

The new technique does not employ radar, but later, when certain developments now under way are more nearly perfected, a combination of the VHF control and radar will probably be used. This will help the tower control man "see" approaching and stacked planes, and, perhaps, result in instrument landings at the rate good weather landings are now made.

The technique of stacking and communication with the stacked planes is

important in the new method. Planes are held behind a radio vertical "fan marker" 10 miles from the tower on the approach airway. With the VHF radio equipment all pilots in the stack can hear the instructions to any individual plane, and therefore be ready for immediate action when their specific instructions come. This is a time-saver. When they hear the lowest plane in the stack ordered in, they know that each of them in turn will be lowered a thousand feet, and the pilot of the new low plane adjusts himself to be at the marker at the exact time designated by the tower man.

In a recent demonstration made for visiting scientists and aviation experts, five CAA planes participated in instrument landings under the new technique. The visitors, by means of loud speakers attached for the occasion, could hear the instructions to the pilots and their acknowledgments. The five planes made landings at intervals varying only a few seconds over or under the three-minute intervals.

When the first plane had covered about half the distance from the 10-mile fan marker to the airstrip it had glided down to perhaps a thousand feet of the earth, and the second plane was in place at the marker at a 2,500-foot level and immediately, when ordered, followed the first one in.

The government aeronautics experiment station in Indianapolis is maintained by the Civil Aeronautics Administration to develop aids to flying. It is not an institution for research and invention. Its job is to bring to practical application inventions originating in the aviation industry or in some other government agency. Much of its work, during the six years it has been in operation, has been in the development of radio aids to flying.

Its work, however, has not been confined to radio alone, but has included many other projects such as flutter recorder, fabric tester, transmissometer, approach lighting, impact-resistant windshield, stall warning device, and others. Among the radio aids developed are the instrument landing equipment and technique, the omni-directional radio range,



**OLD AND NEW**—The water buffalo assigned to the task of building a runway in China is unperturbed as one of our Fourteenth Air Force planes roars above him. The water buffalo is the principal beast of burden in most of China. Army Signal Corps photograph.

and the aural-visual radio range.

The transmissometer makes a continuous record of the resistance of the atmosphere to the transmission or penetration of light. In other words, it makes a visibility record. A narrow beam of light, carefully calibrated, is directed at a distant photoelectric cell. The response of the cell varies with the amount of light coming through.

The station is working on an experimental high intensity beacon, consisting of a series of evacuated glass coils, through which a bank of condensers discharges several thousand amperes at about 3,000 volts. The resulting flashes are of about 50,000,000 candlepower, visible to approaching planes in daylight but too bright to be used in darkness.

The station, also, has on the landing field an installation of two-color boundary lights. They show red from the airport side, and green from the outside. It has a glide path indicator that shows a flashing light to an incoming pilot. If he is on the correct gliding path for a landing, the light appears white. If he is above the correct path, the light appears green, and if below the light appears red.

All CAA traffic control towers are already equipped with the VHF system to assist instrument landing. Before the system can be put into full use commercial

and other planes will have to be properly equipped. There is a necessary transition period, and during it control towers will

necessarily use their older existing equipment as well as the new VHF equipment.

*Science News Letter, September 1, 1945*

is possible to locate magnetic ore bodies, and many other geological formations.

A technical report of this Florida survey has been prepared by the Bureau of Mines and is available at the Washington office.

*Science News Letter, September 1, 1945*

#### MEDICINE

## Pain of Shingles Relieved

Injections of the local anesthetic, procaine hydrochloride, into appropriate masses of nerve cells gives instant relief from herpes zoster.

► THE INTENSE pain of herpes zoster, or shingles as it is popularly known, can be relieved instantaneously and permanently by a nerve block treatment, Dr. Thomas Findley and Dr. Reynold Patzer, of Tulane University School of Medicine, New Orleans, report. (*Journal, American Medical Association*, Aug. 25.)

The treatment, known technically as paravertebral procaine block, consists of injections of the local anesthetic, procaine hydrochloride, into appropriate masses of nerve cells. The method is not new. It was reported by Dr. S. Rosenak, of Budapest, in 1938 and by an American physician, Dr. A. Street, in 1943. Physicians generally, however, are not acquainted with the method, it appears from the report of Drs. Findley and Patzer.

A woman who had had "virtually no rest" for seven days in spite of large amounts of sedative and pain-relieving drugs was completely relieved of the severe pain within 10 minutes after the nerve block was performed. She is among the four patients whose cases are reported by the New Orleans physicians.

A total of 29 cases, including these four, has been reported so far as having had this treatment. In only two was there failure to produce prompt and lasting relief.

Besides the prompt relief from pain, the blisters heal rapidly.

The treatment is not difficult, the physicians report, and "practically without danger if only procaine or allied anesthetic drugs are used and if one is familiar with anatomy."

A virus closely related to that of chicken pox is the cause of shingles, or herpes zoster. The condition is an acute inflammation of certain spinal ganglions, or collections of nerve cells, with various degrees of degeneration in corresponding sensory nerves. The extent of the skin eruption seems to parallel the intensity of the nerve inflammation.

The nerve block treatment relieves the

pain, the physicians state, by interrupting a vicious cycle of nerve impulses and abolishing the blood vessel spasm resulting from some of these impulses.

*Science News Letter, September 1, 1945*

#### GEOPHYSICS

## Magnetic Survey Shows Probable Petroleum Areas

► A MAGNETIC survey, by the U. S. Bureau of Mines, of the Florida peninsula shows areas in the lower part of the state that are favorable for the occurrence of petroleum. This first examination of almost an entire state has proved also the usefulness of this type of geophysical investigation for mineral and petroleum exploration over large areas, according to Dr. R. R. Sayers, Director of the Bureau.

Speed, economy, and the large amount of information obtained about the geology and sub-surface bedrock topography of a region are the outstanding advantages of this survey method, he states. A magnetic survey is the logical start in undertaking geological surveys of large areas, especially in regions devoid of out-crops.

Essentially, a magnetic survey is a method of determining the contours of the underlying granites and other formations—known to the geophysicist as the "crystalline basement." A knowledge of the crystalline basement, particularly in areas covered by marine sediments, he explains, is of fundamental importance to oil exploratory work.

Long ago it was observed, he continues, that magnetic masses within the earth, such as iron deposits, would affect an ordinary compass. These localized magnetic forces now have been harnessed by the precision instruments used in a magnetic survey. Employing a magnetic needle free to swing in a vertical arc, they measure variations, known technically as "anomalies," between local magnetic attractions and the normal magnetic field. With this information it

Mosquitoes of the genus *Psorophora* have the habit of laying their eggs in grassy areas that are likely later to be flooded by heavy rains; when the lands are flooded, the larvae hatch out and have water in which to develop.

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