

AERONAUTICS

Airplane-Guidance Beams

Blanket of VHF radio beams will cover America soon from 409 transmitting stations. These omniranges will aid pilots in knowing their exact positions.

► AN INVISIBLE blanket of crisscrossing but distinct radio beams for airplane guidance will soon cover the entire United States. They will be the very high frequency type and will originate at 409 transmitting stations which the U. S. Civil Aeronautics Administration has just revealed it is erecting. With their aid, any pilot may know his exact position at any time.

In addition to these CAA stations, there will be others erected by the U. S. Air Force and the Navy. These two government agencies are planning on about 140 of them, but many will be outside the continental United States. Those at home will be at stations of the Armed Services not adequately served by the CAA system.

The air navigation system made possible by these new radio stations requires a new type of radio receiver in all planes. All types of commercial aircraft, and perhaps the majority of private planes, will be equipped with them by 1952, it is expected. Some of these very high frequency transmitting stations are already in use and commercial airliners are already provided with receivers. The new installation is to replace completely the older radio-guidance system which provided radio beams for pilots to follow, but provided only four courses.

This new type of radio range is called the omnirange. A more complete name is very high frequency (VHF) omni-directional range. It derives the title from the fact that each station sends out beams in all directions, or at least in 360 different directions one degree apart.

Being VHF, the beams are static-free and "line-of-sight" type. This latter means reception ordinarily requires a path between the transmitter and receiver uninterrupted by mountains and other obstructions. A plane in the air at high altitude can receive the transmitter signals at much greater distances than one near the ground.

Operating on the static-free VHF radio

band, the system permits a pilot to fly by watching a vertical needle on his instrument board instead of listening to blurred and wearying sound signals. The omniranges present many other advantages. Pilots can fly a course either toward or away from an omnirange in any direction. This makes the ranges equally useful on or off an established airway. The system permits travelling across country instead of following beams, where this is desirable.

Distance-measuring equipment (DME for short) when used with the omnirange permits far simpler and safer air navigation than was possible with the old-type four-course radio range and marker beacons. When a pilot tunes his DME at an omnirange site, a pointer on its dial shows him in miles his exact distance to that station.

The combination of omnirange and DME gives the pilot a means of knowing his geographical position at all times. From his omnirange indicator he can read his course to or from the omnirange station, and from his DME dial he knows exactly where he is along the navigation line. The combination brings air navigation close to ultimate simplicity.

Omniranges and DME are designed to make flying high above clouds safe and sure. They are navigation aids, not landing instruments. However, they help bring a plane to the neighborhood of its destination where landing instruments take over and bring the plane down through overcast, sufficiently close to the runway to enable the pilot to make a visual landing. The well-known Instrument Landing System provides the plane with a glide path followed automatically by a properly equipped plane; and precision beam radar, better known as Ground Controlled Approach radar, provides the pilot with voice information as to whether or not his plane is exactly on the glide beam.

Science News Letter, December 11, 1948

BOTANY

Bracket Fungus Wanted

► MUSHROOM-HUNTING would seem to be over for the year, now that autumn has faded into winter. But it needn't be, if you've a mind to be helpful to a scientist who needs one kind of fungus and needs it badly. He is broadcasting an appeal over the land for it.

His name is Dr. Robert L. Frank, and he does his research in the William Albert

Noyes Laboratory of the University of Illinois. He doesn't want mushrooms to eat. What he wants aren't exactly mushrooms, though they are closely related to mushrooms; they are one particular species of bracket fungi. They aren't fit to eat, not because they are poisonous but because they are so tough and woody that only a bill-goat could relish them.

One kind of bracket fungus, and only one, contains the thing that Dr. Frank is trying to get—a rare compound called polyporic acid, which he needs in his scholarly business. There isn't much of the acid to the ounce of the one-and-only bracket fungus that yields it at all, so he needs a lot of ounces. Hence the appeal.

The particular fungus needed belongs to the group known as the polypores, so called because their undersides are completely honeycombed with pin-sized pores or holes. The top surface is mainly smooth, though there may be some bumps and uneven spots. It is not divided into bands or zones, as many other bracket fungi are.

It is not a very big plant, as a rule; four inches long and three inches wide is about as big as it ever gets, and you may find specimens down to the size of your thumbnail. It is a thickish growth, with a definite bulge both above and below.

Color ranges from pale yellow to flesh-color or tawny copper. The whole body of the fungus has the same tint. When fresh, it is soft and fleshy, and is said to smell like anise. Even the dry specimens you will find in the woods now are likely to have a fragrance.

This species is to be found only on dead wood, usually of hickory, though also on poplar, maple, beech, some of the oaks, and a few other trees. It is easiest to hunt at this time of year, when the distractions of flowers and green leaves are out of the way.

In the botany books it is listed as *Polyporus nidulans*. A while back, it had its name changed so that you may find it listed in some of the older reference books



SOURCE OF ACID—This is what the sought-for bracket fungus looks like, viewed from beneath. The crucial test is to moisten it with a drop of ammonia. If it turns purple, you've got it.