AERONAUTICS

# Farming From The Sky

**Vast areas are now seeded, fertilized and protected from weeds, brush, insects and plant diseases by airplanes. Special airplane, Ag-1, promises expansion.**

By A. C. MONAHAN

➤ FARMING is going skyward. The famous "man with the hoe" is still with us but on big farms he is being replaced by the pilot with a plane.

Aircraft is being used to seed great areas of pasture land, forest land, rice fields and other crop land. Later the same planes are used to protect the growth from destructive insects and plant diseases. They are used also to distribute chemicals to kill broadleaf weeds in grain fields and brush growing on pasture ranges.

Aerial farming is the term that covers farming processes carried out by aircraft. It is now big business in many parts of the world but particularly in the United States. Although about two decades old, it was minor business until after World War II. Since then it has grown to an activity in which some 5,000 airplanes are employed and many millions of acres are treated annually.

Its growth is due to effectiveness. Prewar experience proved that. A shortage of inexpensive planes and competent pilots prevented wider use then. But following the war the situation was changed. There were plenty of young men, skilled pilots of war planes, available and looking for jobs.

Surplus military planes were to be had at low cost. Chemical plants, freed from war work, greatly increased the manufacture of insecticides and weed-killers. And more important, farmers had learned to accept the system.

## Now Big Business

It is the combination of available pilots, available planes, available chemicals and a job to be done that made big business of aerial farming almost over night. Growth, however, would have been slow if modern farmers had not become convinced that airmen could replace ground laborers and do so at a decreased cost.

Seeding from the air is an important part of aerial farming but it has limitations, of course. It is particularly successful for rough and wet areas where ground operations are difficult. That is why the plane has been used to reseed great tracts of pasture land on western ranges. Much seed is lost by surface seeding but the lesser cost of sowing from a plane makes up for this.

One noteworthy example of aerial seeding in forestry was work carried out in Maine during the winter of 1948 to restore great areas of forest lands burned out in the great fire of the preceding fall. It was a test by the U. S. Forest Service to determine the most economical way of restoring burned acreage.

In this Maine experiment, white pine seed was used. To get good distribution on the ground, the seed was mixed with three to ten times its bulk of sawdust. The seeding was done while snow was on the ground, an effective procedure to protect the seed from small wild rodents which otherwise might have eaten much of it. Fairly satisfactory germination resulted, according to officials of the Forest Service, and they predict wide use of the method.

While seeding from the air is important, spraying and dusting to control pests, diseases and weeds is even more so and this job is a big feature of aerial farming. Millions of acres of farm lands and also millions of acres of forests where spraying by other methods is necessarily done only with great difficulty are being farmed from the air.

A notable experiment in forest spraying was carried out in northeasern states during the summer of 1949 in the job of trying to eliminate the destructive gypsy moth that has played havoc with trees and other vegetation during the past two decades or so and is rapidly spreading toward the Middle West and the South.

It was a cooperative experiment, with entomologists of the U. S. Department of Agriculture working with local state officials. The effectiveness and economy of this method of insect elimination, government agents stated, offer the best hope for practical control of several forest pests.

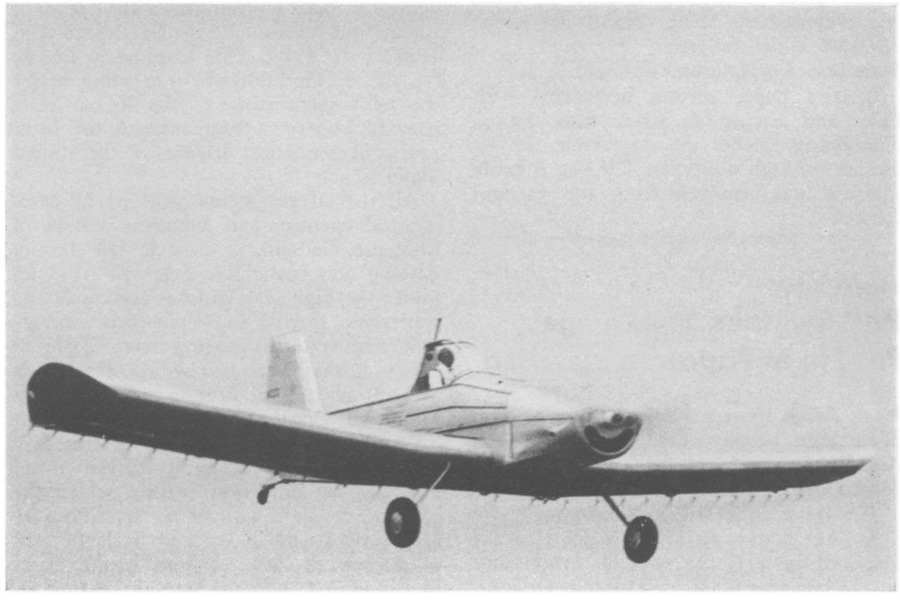
## Birds Not Much Affected

Bird lovers have expressed a fear that the distribution of insecticides over forest areas would kill the birds as well as the bugs—and birds themselves are the best insect control provided by nature besides being desirable for other reasons.

However, the scientists state that the small quantities of poisons used per acre in the insecticides guard against all but minor effects on other life in the areas treated—birds, wildlife, fishes and beneficial insects such as bees.

Aerial spraying and dusting is not confined to farmlands and forests. Many cities in the United States have used the method, using DDT as an insecticide, to eliminate household flies and mosquitoes.

Many malarial sections of the world, unused because of the abundance of malaria-bearing mosquitoes, have been made habitable by aerial spraying. Notable are great sections of India that have been cleared of



***SPECIAL PLANE—The CAA developed plane for aerial farming is shown here in flight. Tagged the Ag-1, it is able to fly low, slow, make quick turns at the end of a field and can take off and land on rough areas.***

malaria and now are growing rice and other food products to help eliminate starvation in that country.

Farming from the air may seem a simple job to many but it is not. It takes a good plane, a good pilot and good equipment in the plane to distribute the seed or insecticide properly. Flying is dangerously low. Pilots skim over a field at an elevation not much above ordinary tree tops.

At the end of a field, the pilot must climb much higher in order to make a turnabout for a return. Time and fuel are wasted unless the turn is made quickly. There is great danger if the turn is made too quickly or at too low an altitude for the particular plane he is using.

A safer plane for seeding and spraying has long been the great need in aerial farming. Several have been developed by commercial companies. But what seems to be the best yet has been developed under sponsorship of the U. S. Civil Aeronautics Administration and it has already made many flight tests. The plane was built at the Aircraft Research Center of the Texas A & M College, College Station, Texas, under contract with the CAA.

## Tagged Ag-1

The plane is now officially Ag-1, the Ag standing for Agriculture. The CAA will not build duplicates of the craft. Plans and specifications of the plane will be made available to any aviation manufacturer. Any manufacturer can build and sell this particular plane in quantity. Or he may make adaptations of it, or copy any of its features into his own design.

Particular features of this Ag-1 are its ability to fly slow, its ability to make quick turns with safety at the ends of the field and its ability to land on rough terrain with a very short run. In a recent demonstration before officials in Washington the pilot showed how the plane is easily controlled at speeds as low as 45 miles an hour, and can quickly turn at the end of a row of crops for the next pass. After several low-altitude runs and tight turns, he landed the plane and brought it to a stop in a space approximately three times the plane's length.

The plane can carry 1,200 pounds of spray or dust. It is able to lift this load from unprepared fields and quickly climb over obstacles such as power lines. It is able to do this because of a combination of high-lift wings, full-span slotted flaps and slot-lip ailerons. The pilot sits high to give him good vision. The plane has wide landing gear with heavy tires for landing on rough farm fields.

Safety feature included in the plane is protection for the pilot in case of crash landings by the long forward structure of engine and dust hopper, by the shoulder harness with inertia reel allowing freedom of action and by the guide tubes over the cockpit. Sharpened landing gear legs, and cable from cockpit to top of fin are a protection in case wires are encountered.

The plane, with its square-tipped wings, has a span of 39 feet. It is almost 30 feet in length, and has an empty weight of a little less than a ton. Its loaded weight is 3,400 pounds. Maximum speed is 115 miles an hour. It can land without payload at 37 miles per hour. It can climb at the rate of 600 feet per minute, and its take-off to clear a 50-foot obstacle requires a 1,300-foot runway.

Although some 5,000 airplanes are now in use in aerial farming, the plane is not the only type of aircraft employed. Helicopters are playing a big part, and there are many who predict that this type of craft may play a far more important part in the future. Helicopters designed particularly for the purpose are under construction.

The helicopter in aerial farming, and also for use in ridding cities of flies and mosquitoes and cleaning up malarial areas, has many advantages. One is its ability to hover over areas needing heavy applications. More important is the heavy downward draft made by its nearly horizontal rotating wings that helps drive the released material directly downward to the crop or trees. The probability is that both airplane and helicopter will be widely used in aerial farming. And the blimp also may find a place in the job.

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