

cule even smaller and simpler in structure.

With successes like these to start on, chemists are making modified molecules of the same general pattern—for example, substituting fluorine for some of the chlorine atoms in DDT, with interesting-looking results in the tests. It may be that we shall have an analogue for the history of the sulfa drugs; at first there was only sulfanilamide, but after a while

the sulfa compounds could be counted by the dozens, and from being expected to lick all the bacteria in sight, sulfanilamide presently became assigned to a narrower sector where its work was really effective. Some years hence, the now almost-universal insecticide, DDT, may be only one weapon in the entomologist's armory, with many more of the same general class ready for special missions on the hexapod front.

Science News Letter, May 4, 1946

ELECTRONICS

Fog Turned to Rain

Siren blasts clear landing fields. Inaudible, high-frequency sound waves, without unpleasant effect of sirens, to be tested.

► SOUND WAVES that convert fog into rain may be used instead of wartime flame vaporizing systems to keep future landing fields clear for aircraft, according to officials at the Navy's Landing Aids Experiment Station at Arcata, Calif.

Successfully tested against fog, the first sound system used a battery of sirens whose blasts not only bombarded particles of fog into rain but also nauseated personnel on the airfield.

For the future, a new system to be tested this summer will send out ultrasonic waves that are inaudible to human ears. Transmitting vibrations at 20,000 to 40,000 cycles per second, the equipment is expected to operate as effectively against fog as the sirens but without the unpleasant effects of the latter.

During the war, the British pioneered in FIDO, fog investigation and dispersal operations, and they developed the important Haigill system, that permitted Allied aircraft to land at bases in Britain in severe fogs. The principle used is that of vaporizing the fog by intense heat from controlled fires lining landing strip runways.

Disadvantages of Haigill include the high cost, as much as \$4,000 or \$5,000 to land one plane with high-octane gas as the fuel for flames. Although this cost was small compared with the lives and equipment saved during the war, intensive research has gone into modifications of the system.

Probably the best thermal installation for clearing fog from airports is the one scheduled for the test at Arcata during the next two months. Known by the code name ELMER, this vaporizer can reduce fuel costs for a landing to as little

as \$150. ELMER can burn gasoline, kerosene or diesel oil and has an atomizing nozzle with electrical heating elements for igniting it instantly. Haigill systems burned more expensive fuel and required 10 minutes of "warm-up" for effective operation.

While the Navy experimented with ELMER, it also started an investigation of sonic fog clearing. The first tests worked well against the fog but created new problems.

A battery of 12 powerful air raid-type sirens with 24-foot wooden amplifying horns blasted a heavy fog over the experiment station with enough force to merge the fog particles into raindrops that fell to earth, clearing the overcast above the landing field. Personnel on the field had cotton in their ears, with a sponge rubber covering over the outside. They reported no ear trouble, but most of them became nauseated from the intense sound.

The powerful sirens also proved to be more effective than a hunter's horn, as several birds were blasted out of the sky by the noise.

Now, experts at the Navy's Landing Aids Experiment Station believe that the answer is in the use of ultra-sonic transmitters sending out waves at such high frequencies that men and animals won't be able to hear them.

Two problems that sonic engineers hope to answer with full-scale experiments this summer are the possible effects of the sound blasts on personnel in planes and the danger of damaging aircraft by the powerful waves.

If the tests are successful, Navy officers believe that high-frequency sound systems will be more practical than

thermal fog dispersal. A sonic system would have approximately the same initial cost as flame installations and could be operated more economically. For Naval use, the sound system may be developed for aircraft carriers. Now being investigated, sonic installations on carriers would enable the big ships to improve their own weather under adverse flying conditions.

A third fog-clearing system tested here used a huge blower to throw curtains of hot air at right angles to the wind. Causing the wind to move in a vertical circle, this wave of hot air consequently dispersed the fog.

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