

parts of the country, though nowhere so abundantly as it does in the Omaha region. Hemp is also cultivated in hidden illicit patches—it has even been found being nursed in city window

boxes. But a concerted drive next spring, with CCC men or relief workers to scythe it down, would undoubtedly help to reduce materially the available hemp supplies in this country.

*Science News Letter, January 15, 1938*

## AVIATION

## Future of Aviation Progress Lies in Invisible Film of Air

### Laminar Boundary Layer, Only Few Hundredths of Inch, Is Key to Perfection of Streamlining of Modern Plane

**T**HE FUTURE of aviation is linked with an invisible film of air only a few hundredths of an inch thick. So nearly perfect is the streamlining of modern airplanes that even the protruding heads of tiny rivets can cut miles an hour from the speed of a plane and greatly lower its flight performance.

The crucial air film is known as the laminar boundary layer between the wing of a plane and the air through which it flies. If the air passes smoothly over the wing all is well. If the air becomes turbulent air resistance is increased and speed and climbing ability are decreased.

Great advances in knowledge of the behavior of this invisible air boundary have been made possible by studies in wind tunnels. But now it is becoming apparent that the day may be approaching when wind tunnel tests, alone, will not be the last word in aeronautical research.

Speaking at the first Wright Brothers' Lecture of the Institute of the Aeronautical Sciences, the British air expert, Prof. B. Melville Jones of Cambridge University, pointed out that free flight study of real airplanes may soon supply the final check on research.

Flight in smooth air, free from small-scale turbulence is needed, he indicated, to disclose some of the parasitic air friction losses now being studied. A slight unsteadiness may persist in wind tunnels which produces effects differing from those of actual flight.

Key point of investigations is a study of the so-called transition point where the smooth, laminar flow of air turns into the turbulent pattern that robs planes of their performance. The transition point should occur as far back on the wing, away from the leading edge, as is possible. In free flight tests, Prof.

Jones disclosed, a thin layer of tinfoil only one five-hundredth of an inch thick was sufficient to shift the transition point forward and produce drag.

In another test the almost imperceptible film of mist on a plane's wing, after flying through a cloud, produced the same kind of increased drag.

Wind tunnels are not doomed as a tool of aeronautical research, Prof. Jones indicated to his distinguished audience that included Orville Wright who flew the first airplane. Rather the advances of wind tunnel tests are supplemented by actual flights.

*Science News Letter, January 15, 1938*

## ENGINEERING

## Radio Control of Models Offers Hams New Field

**T**HE much-pushed-around radio amateurs who have continually "worked" the unexploited portions of the radio spectrum of wavelengths, and then found themselves pushed out as soon as commercial possibilities came into being, now have a new field of activity. It is remote-control by radio of small model airplanes.

Model airplanes, both sailplanes and craft powered with gasoline engines, have become increasingly popular throughout the nation because of their performance in distance, speed and altitude. And with some of them now 13 feet in wingspan, they are not so tiny either.

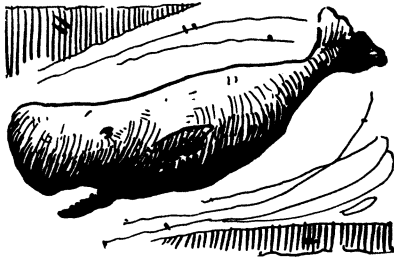
The increasing numbers of such powered models around airports has now led to a legislative ban on their uncontrolled use despite cries from the model plane enthusiasts. And in answer to those cries has come a response from the radio "hams." The solution is radio robot control of model airplanes so that they come outside the "uncontrolled" phrase in the laws.

Two Hartford radio amateurs, Ross A. Hull and R. B. Bourne, describe in the technical radio (*Turn to Page 47*)



### RADIO CONTROLS MODEL PLANE

*This model plane's rudder is controlled by radio controls devised by two Hartford, Conn., amateur radio operators. A model sailplane, the ship is as yet controlled only in part by the radio signals. It is the latest field to be entered by the "ham" operators, who have pioneered radio developments in dozens of ways.*



### The Reich Regulates!

GERMAN whaling ships have recently joined those of Norway, Great Britain, the United States and other nations on the seas. German economic policy is seeking new sources of the all-necessary fats and oils, to cut down the amount of imports now needed for food and technical purposes.

Concern was at first expressed by some conservationists, lest the new whalers ignore the principles of sound wildlife management and enter upon a ruthless campaign of get-all-you-can. Publication of the new whaling law of the Reich should go far to allay such anxiety. Indeed, if anything, the Germans would seem to be leaning over backwards in their efforts to preserve the living foundation of their industry.

"Protected" species, which it is forbidden to kill, include the following kinds of whales: whalebone whales, right whales, blue, gray, finback, humpback, and sperm whales. Minimum sizes are defined, and certain sea areas are permanently closed to whaling at all times.

Detailed records of all captures must be kept on the floating factories, as well as records of personnel and property. At the end of the voyage, full report must be made to the Reich authorities.

To make sure of the correctness of the whalers' conduct, every floating factory must carry at least one government-paid inspector. He enjoys prestige and authority equivalent to those of the ship's officers, and must be permitted to observe all activities and inspect all property.

Whaling operations of any kind by German citizens, even those living in a foreign country and under foreign jurisdiction, can be forbidden them un-

less they apply to their home authorities for permission. German citizens may also be forbidden to take part in any whaling operations conducted under foreign colors, unless such operations are subject to the same regulations as those prescribed in German law.

If whales can be protected by a bristling array of *verboten*s, surely there should be sanctuary for them here!

*Science News Letter, January 15, 1938*

### ENGINEERING

## Radio Is Latest Aid in Battle Against Snow

See Front Cover

RADIO is the latest innovation in the battle between science and snow. Twenty fixed radio stations and 16 portable units are being operated by the Washington State Department of Highways at Olympia in the effort to keep winter traffic on the move.

Because plowing must be carried on in remote mountain regions where wire communication is unavailable or unreliable, all rotary plows have been equipped with two-way radio installations in order that they may keep in constant touch with the maintenance offices of the Highway Department, receiving instructions and broadcasting weather reports or calls for help. Shop clerks and plowmen are licensed radio operators.

The radio-equipped plow sends word of weather and road conditions at regular intervals, and the base stations, open every minute of the day and night, keep close check on the snow situation throughout the entire State.

Maps are kept to show the location of all snow-fighting apparatus and the progress of storms and removal operations. Trucks equipped with short-wave receiving sets pick up these reports and alter their scheduled runs accordingly, while the general motoring public is informed of snow conditions by regular broadcasting stations which relay messages from the plows.

Since modern winter warfare on the highways has come to be a matter of keeping ahead of the storm, radio communication makes possible rapid concentration of equipment where it is most needed.

Plows which were formerly stranded for days in deep mountain passes can now call for additional supplies and equipment, thus saving time and money and increasing their effectiveness. Dangerous snow slides reported to headquarters permit greater safety for winter

travelers, and many marooned motorists can be rescued by radio.

The radio-equipped plows are powerful Diesel trucks with four-wheel drives, having auger-type rotary units which hurl the snow into the air and back from the highway as far as 150 feet. In bad seasons they operate continually. A small truck travels back and forth from the plow, bringing Diesel oil, supplies, and transporting the operators.

In the illustration on the front cover of this week's SCIENCE NEWS LETTER, Washington's Diesel Snogo, Station KGHA, radios to headquarters that Snoqualmie Pass is open to traffic. Note the triangular antenna installed over the engine, back of the driver's cab, and the "wall comber" projecting ahead of the rotary equipment to knock down overhanging snow walls.

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## From Page 39

magazine *QST* a control method of using a lightweight radio receiver aboard model airplanes. Hull is associate editor of *QST* while Bourne is employed by the Maxim Silencer Company at Hartford. Such controlled model planes would be useful for anti-aircraft target practice without risk to pilots.

So far control has only been achieved on the rudder of a 13-foot wingspan craft, but progress is being made on radio control of the elevators and ailerons of the craft.

The problems the amateurs have tackled are those which England has accomplished with her radio robot airplane which gave demonstrations last year. The details of operation of the large-sized British plane have never been announced because of military secrecy and wartime usefulness.

But Hull and Bourne's methods are no secret. Any enthusiastic radio amateur can build a similar controlling mechanism. And because all radio transmission must be in charge of a licensed radio operator it looks as though the radio "hams" and the airplane "hams" would form a permanent alliance.

*Science News Letter, January 15, 1938*

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