



**JET ENGINES**—Although these two jet engines have equivalent diameters, the new Allison J35-A-23 on the left is much more powerful than its predecessor, yet fuel consumption has been cut considerably. Looking over the engine are Henry Devaney, engineer, and Frank Herdrich, foreman.

#### AERONAUTICS

### Four New Jet Engines Do Work of Six in B-47

► A NEW version of the U. S. Air Force B-47 jet-propelled bomber is expected to have greatly increased range with a new jet engine developed by the Allison Division of General Motors, Indianapolis. Four of the new engines will do even more work than the six used in the present B-47 Boeing Stratojets, saving weight and fuel.

The four engines will deliver a great deal more power than the six engines now in use, Allison engineers declare. They effect a great saving in engine weight, together with substantially improved fuel economy. The new engine is dubbed the J35-A-23. The plane in which it is to be used in its first applications is the XB-47C. The first experimental model is scheduled to fly later this year.

The new super-jet is described as an "all-weather" engine, incorporating de-icing features on the air inlet vanes and the bullet nose of the air intake. An automatic ice detector also is supplied. Heat for the de-icing is taken from the compressor.

The engine also features what engineers call a "cannular" combustion section. Its outer combustion chamber is a single can similar to an annular type burner section. But within it are ten individual cans, and compressed air flows from the outer can into the inner liners for combustion. This unusual construction adds to the structural strength of the engine and contributes to the ease of assembly.

The new engine has the same outside

diameter as present Allison jets so that it can be used to replace older models if space is available to accommodate its longer length. Its overall length is 172 inches. A special feature is that it has 16

axial stages of compression with a three-stage turbine. Entirely independent of external oil supply, the J35-A-23 has its own complete oil system.

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#### METEOROLOGY

## Weather Control Remote

Recessed hearings demonstrated that scientists have long way to goal of artificial control of weather by man. Research by government and private industry continues.

► GOVERNMENT control of weather is still a long way off. Net result of Congressional hearings on rainmaking, now recessed, is that scientists demonstrated they have not yet arrived at any answers as to the feasibility of artificial control of the weather by man.

Western ranchers and farmers are spending hundreds of thousands of dollars on efforts to make rain. Many of them swear this money was well spent. But, the Weather Bureau, backed by nearly 100 years of records and research, will usually tell them that it would have rained anyway.

Most proponents of rainmaking will say that they can only make rain when weather conditions are such that it would have rained a little anyway. The honest ones deplore the wholesale commercial rainmaking efforts in the West. Many of the commercial rainmakers, they say, are inept, many of them pour too much silver iodide into the air, therefore actually preventing it from raining when it should have rained.

Congressional sources report that this year there has been a signal dropping off of mail from those voters who should be

most interested in rainmaking. Last year, they say, letters poured in from water users all over the West, urging government action. This year, there are few such letters.

This leads them to believe that none of the three major bills looking toward control of rainmaking will be passed during this session of Congress. One sets up a new Weather Control Commission patterned after the Atomic Energy Commission, another puts research and control in the Interior Department, another in Agriculture.

Some method of hampering charlatans who charge high prices for purportedly making rain, however, may come out of this Congress. Not only does it not usually pay off for those who spend the money for it, but also it usually interferes with serious scientific research in rainmaking.

In the meantime, serious research in the artificial control of the weather by man will probably be carried on by different and, in many cases, competitive private and governmental agencies. Out of this seeming chaotic pattern may come, eventually, the real answers.

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#### ZOOLOGY

## Texas Bird Cools Self

► WHEN one of those scorching summer days arrives, how would you like to cool off just by opening your mouth?

That is what the Texas nighthawk does, according to Dr. Raymond B. Cowles and William R. Dawson of the University of California at Los Angeles.

These West Coast zoologists have discovered that this particular species of bird has a special cooling mechanism in its mouth that allows it to sit all day in the hot desert sun while protecting its eggs.

Since the nighthawk has no sweat glands, cooling is taken care of mostly through its mouth, which comprises more than 15% of the total body area.

"The nesting activity of this bird takes place in June when the temperatures on the desert are ranging above 100 degrees,"

said Dr. Cowles. "The eggs are incubated in the open where heat would rapidly kill the embryos; therefore the adult bird must remain in the open to shield its eggs."

When its body temperature reaches an uncomfortable point, the nighthawk opens its mouth and begins "fanning" with a set of muscles near the throat. Evaporation of moisture covering the oral surfaces lowers the temperature of a large amount of blood which has filled the mouth vessels for cooling.

"Temperature control of this nature means an extravagant amount of water loss, but the Texas nighthawk sits it out on the hot desert all day, only soaring in search of water after sunset," said Dr. Cowles. The observations are reported in CONDOR (Jan.-Feb.).

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