

Laboratory Equipment Takes Over for the Elements.—Engines for airplanes of the future are constantly being tested by the Army Air Force to determine performance at different altitudes, temperatures and humidities. They are tested not only at altitudes as high as 40,000 feet, where temperatures drop to -67 deg. F. and where air pressure falls to 5.54 inches of mercury (absolute), but also at low altitudes over deserts, where the temperature soars to 120 deg. F., the relative humidity amounts to only 5 to 10 per cent., and the pressure may rise to over 29 inches of mercury. The engines undergoing test never leave the ground, but meet these extremes of atmospheric conditions in Army Air Force laboratories, where refrigeration equipment, electric heaters, and evacuating equipment are taking over for the elements. Such a laboratory will soon be put into operation in the United States. It will house several test chambers, all of which will be testing engines under different conditions. To accomplish this, air will be partly conditioned and then delivered to the various test chambers by a 250 horsepower blower. At each test chamber the air will be further conditioned to obtain the exact humidity, temperature, and pressure for the particular condition desired, and then delivered to the engine carburetors. If air of extremely low humidity is desired, the air will first be dropped in temperature to a point as low as -70 deg. F. to condense out the vapor, which will separate from the air in the form of snow or frost. The dried air will then be reheated to the proper temperature by General Electric finned Calrod heaters before being delivered to the carburetors. The total reheating power of this installation will be 1500 kw. The amount of moisture permitted to remain in the air will be regulated by the extent of chilling to which the air is subjected. Slight chilling drives out only a small amount of moisture. Steam will be mixed with the air to raise the humidity. Six General Electric motors will drive compressors which with the electric heaters will regulate the temperature of the air delivered to the carburetors. Evacuating equipment will produce any pressure between 29.92 inches of mercury at sea level and 5.54 inches at 40,000 feet. To simulate flying conditions completely, provision is made for cooling the gasoline to -10 deg. F. and for heating it to 80 deg. F.

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