MR. KEMPER'S TALK AT MORNING SESSION OF

FIRST ANNUAL INSPECTION

FLIGHT PROPULSION RESEARCH LABORATORY

This is the First Annual Inspection of the Cleveland Laboratory. Many of you, however, have attended the laboratory's specialized research conferences on compressors, turbines, combustion and have visited certain facilities at the laboratory. A brief statement of the laboratory's facilities that you will inspect today and some facts concerning the construction of the laboratory will be of interest to everyone.

The construction of the Flight Propulsion Research Laboratory was started in 1941. By a speed-up of construction, facilities were completed in 1942 so that the Committee could contribute effectively to the war effort by conducting necessary research requested by the Army and Navy on the powerplants used in military airplanes. The majority of the laboratory facilities were completed in 1944. The laboratory was designed to incl de research facilities that would enable investigation of the scientific problems associated with reciprocating engines. The maximum power of the reciprocating engines for which laboratory facilities were provided was 4,000 horsepower. The air facilities supplied 8 pounds of air per second at temperatures of -70 degrees Fahrenheit and altitudes of 50,000 feet.

One of the unique research facilities at this laboratory is the 20-foot Altitude Wind Tunnel. This tunnel was designed to permit the investigation of the reciprocating engine installations complete with flight propeller, cowling, engine controls, heat exchangers, and turbo-superchargers. The performance of the powerplant as a complete unit can

be investigated for a range of flight conditions from sea-level to 50,000 feet altitude and for a maximum air speed of approximately 400 miles per hour (P-47). The tunnel, with no blocking, has a maximum air speed of 520 miles per hour, an altitude limit of 50,000 feet, and a minimum air temperature of -37 degrees Fahrenheit. The make-up air capacity of the tunnel is 100 pounds per second.

With the advent of the jet engine in the United States in 1945, the decision was made to shift the emphasis in research at the Cleveland Laboratory from the reciprocating engine to the jet engine. The Altitude Wind Tunnel was the only facility in the United States that permitted the installation of the complete jet engine with fuselage and air inlets so that a study could be made of the combustion and performance characteristics under altitude conditions. All new jet engines have been investigated in the Altitude Wind Tunnel at the request of the Air Materiel Command or the Bureau of Aeronautics, Navy Department. The operating time for this tunnel has been scheduled 8 to 12 months in advance since its completion.

The laboratory's research facilities have been converted and enlarged so that today we have an air-supply system of 80 pounds per second. This quantity is ten times that required for research of the 4000-horsepower reciprocating engine. Even this quantity is sufficient only to supply the demand of current jet engines. The new designs of jet engines now on the boards will require air supplies of approximately 400 pounds per second.

The new Compressor and Turbine Wing to the Engine Research Building completed in 1946 has research facilities that provide drives for compressors of 15,000 horsepower and absorbing power for turbines developing 17,000 horsepower.

Of particular interest during your inspection will be the two new altitude chambers that can be used to investigate the performance of jet engines from sea-level to 50,000 feet altitude and at temperatures from 200 degrees Fahrenheit to -70 degrees Fahrenheit. These research facilities will greatly relieve the work load on the 20-foot Altitude Wind Tunnel and will speed up scientific research on the complete jet engine. The same air supply for the altitude chambers will be available for research on the component parts of the jet engines.

During your inspection today you will see only a limited number of the laboratory's research facilities, but you will obtain a good general view of these facilities and in many cases see the latest research data that have been obtained on the certain component parts of current jet engines.

ANNOUNCEMENT FOR PRESS, by MR. SHARP

We have invited a few selected people from the press to attend this inspection mainly to gain background material rather than to find spot news stories. We were obliged to be selective because much of the material to be discussed today is of a classified nature and not subject to press release.

We have had the introductory remarks of Dr. Dryden mimeographed and have prepared a brief story on the ram jet engine for release for morning papers on October 10. I must ask that any stories written for October 10 release be confined in subject matter to these written statements.

Some of you may wish to write a longer story on what you see and hear throughout the day. We shall be happy to have you do so providing you submit the story in advance of publication to us for approval and release. Most of you have handled NACA material in this manner before and so far as I know there have been no complaints about the way we have handled press stories. Please submit the material to E. E. Miller at 1724 F Street, Washington, 25, D.C.

Mr. Sharp: (To be announced at lunch)

..... There will be a flight demonstration of a ram jet engine in front of this building at (time). The demonstration will be described by Mr. Gough of the Flight Operations Section....

P-61 WING RAM JET DEMONSTRATION

The P-61 airplane will fly by the front of this building with the wing ram jet engine in operation. It will approach from an easterly direction at a speed of about 200 mph. The engine is mounted under the fuselage.

For demonstration purposes, the fuel-air ratio is very high, resulting in a long external yellow flame. When operating at optimum conditions of airspeed, altitude, and fuel flow, the flame is blue, very short, and almost entirely within the combustion chamber. Under such conditions, combustion efficiencies as great as 80% have been obtained.

(First Fly By)

The P-61 will make a 180° turn and fly by in the opposite direction. The engine operating conditions will be the same.

(Second Fly By)

The wing ram jet engine has been tested in flight at altitudes between sea level and 26,000 feet and true airspeeds between 160 and 340 miles per hour.

(Second Fly By - Alternate Time)

Various flame holder, fuel spray, and air inlet arrangements are being studied in the interest of determining pressure recovery and combustion efficiency characteristics.

This demonstration has been completed. Please board the busses.