FIRST ANNUAL INSPECTION

This is the First Annual Inspection of the Cleveland Laboratory. Many of you, however, have attended specific research conferences and have visited certain facilities at the laboratory. A brief statement of the laboratory's facilities that you will inspect today will be of interest to everyone.

The construction of the Flight Propulsion Research Laboratory was started in 1941 and the majority of the facilities were completed in 1943. The laboratory was designed to include 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 turbosuperchargers. The performance of the powerplant as a complete unit could 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 for study 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 component parts of the jet engine are the compressor, the combustion chamber, the turbine, and the tail pipe. 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 test 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 test chambers will be available for research on the component parts of the jet engines.

A group of scientists under Major General Powers of the Army Air Forces recently made a survey of the jet-engine research facilities in England and, following that survey, they visited the outstanding research laboratories and engine manufacturers in this country. At the end of the day at the Flight Propulsion Research Laboratory, General Powers was asked how the laboratory's research facilities for jet engines compared with those of the British. The General said, "I have seen more research facilities in the one day at this laboratory than I saw in all of England in 6 weeks."

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 research data that have been obtained on the component parts of current jet engines.

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS
FLIGHT PROPULSION RESEARCH LABORATORY

FIRST ANNUAL INSPECTION
October 8, 1947

Opening Remarks - Chairman Hunsaker: (1st day). Mr. Victory (2nd and 3rd days).

In the name of the National Advisory Committee for Aeronautics it is my privilege to welcome you to this the First Annual Inspection of the Committee's Flight Propulsion Research Laboratory. Many of you are old friends and have visited the other laboratories of the NACA on similar inspections. For some of you this may be the first visit to an NACA laboratory.

The National Advisory Committee for Aeronautics was established by law in 1915 in QUOTE supervise and direct the scientific study of the problems of flight with a view to their practical solution UNQUOTE. We interpret this task as including laboratory and flight study. The NACA does not design or build airplanes or engines. Its policy is to cooperate with the military services and industry to improve military and commercial aircraft. While the military services and the industry are like clients, the NACA has an independent responsibility to the nation to advance aeronautical science, and to lay the groundwork for future development work.

The NACA is composed of 15 members appointed by the President and serving as such without compensation. Members include General Spaatz and General Powers from the U. S. Air Forces, Admiral Duncan and Admiral Lonnquest from Naval Aviation, the new Assistant Secretary of Commerce for Aeronautics, John R. Alison, and Dr. T.P.Wright, Administrator of Civil Aeronautics, the heads of the Smithsonian Institution, the National Bureau of Standards and the U.S.Weather Bureau, and six others from private

life, three from the ranks of industry and three from the ranks of science. To assist the main Committee in the formulation of research programs, there are six major technical committees and 20 subcommittees, the members of which are appointed annually by the main Committee from the best qualified technical men in the military services, in industry, in educational institutions and from the research staff of the Committee. The members of these subcommittees, like the members of the main Committee, take an oath of office as officers of the Federal Government and serve as such without compensation. These leaders in science and engineering advise on research programs, and coordinate research work in progress in their special field of competence.

With the continued support of the Congress the NACA has built three major research stations having a plant value of around $95,000,000 and a paid staff of about 6,000 employees. The first and for over 20 years its only research station was the Langley laboratory located on the Army's Langley Field. The second, authorized in 1939, is the Ames Aeronautical Laboratory, located on the Navy's Moffett Field, California, and the third, authorized by law in 1940, is the Flight Propulsion Research Laboratory, where we are assembled today. The NACA also has a field station for free flight rocket research at Wallops Island, Virginia, and a field station for high-speed flight research on piloted aircraft at Muroc, California.

The Langley and Ames laboratories are devoted to research on the airplane and the Cleveland laboratory to research on propulsion systems. The work is coordinated through the Washington Office of the Committee. In many cases specific projects are worked on jointly by two or all three of the laboratories.

It has been the policy of the NACA over a score of years to have the general inspections of its Langley laboratory. During the past decade these general inspections, suspended during the war years, were supplemented by many technical conferences called from time to time to discuss critical subjects in special fields of aeronautical science. So far at this Cleveland laboratory there have been six specialized technical conferences. This is the first section of the First Annual inspection. It will be followed tomorrow by the second section for the military services and on Friday the third section for Cleveland and supporting industries, and to accommodate the overflow who could not be registered for this first section.

I am happy to see so many representatives of industry present on this occasion. I trust that this inspection will prove as interesting and stimulating as the Langley inspections in the past have been.

It grieves me that the man most responsible for the organization and development of this great laboratory, and in fact of the Committee's entire research staff and facilities, cannot be present on this important occasion. I refer to our Former Director of Aeronautical Research, well known in the ranks of aeronautical science throughout the world, and highly esteemed by all who know him — Dr. George W. Lewis. Dr. Lewis was forced by reasons of health to lay aside his important duties as Director of Aeronautical Research, but the Committee is most fortunate in being able to retain his wise counsel and assistance as research consultant.

To succeed Dr. Lewis, the Committee selected Dr. Hugh L. Dryden, Associate Director of the National Bureau of Standards and past president of the Institute of the Aeronautical Sciences. He, too, has an international

reputation in the field of aeronautical science. For nearly 20 years he has been identified with the NACA as member of chairman of one or more of the technical subcommittees. It give me pleasure to present to you or new Director of Aeronautical Research -- Dr. Hugh L. Dryden.