OPENING REMARKS

Abe Silverstein
Chief of Research

Let me extend my welcome and the welcome of the research staff to all of you, and express the hope that you will have an enjoyable and perhaps educational visit with us here today.

In your tour of the laboratory plot and its facilities it may be well to remember that on January 23rd of this year the NACA staff paused briefly to note the tenth anniversary of the breaking of ground at this site of NACA's new engine research center. The anniversary was an occasion for a brief look backward; but it was also a time for consideration of present problems and, most importantly, a time for charting of future research goals.

In ten years the Lewis Laboratory has grown from an initial engineering staff of 125 personnel with an appropriation of 8 million dollars for research facilities, to a complex and highly integrated organization of 2700 trained research and technical personnel, with facilities now in use and under construction valued at more than $100,000,000.

In this same period industry, likewise, has made great progress in the design and construction of turbine engines, ram jet engines, and rocket engines, some of which are in the skies over Korea, some on the production lines, and still others of greater power and advanced design in the

experimental shops and test facilities of industry and of the Lewis laboratory. But now is not the time to rest on these past accomplishments, rather it is the time for renewed and accelerated efforts.

America has made great progress but more remains to be done. In the new work research must lead the way. Research experience and advanced analysis have revealed many new directions for continued development.

New fuels of higher heat content and improved combustion characteristics are definitely to be looked for in the future. New high-temperature materials of superior strength and durability and fabricated from raw materials that are plentiful in this country are definitely to be expected and their application awaits only continued research and development.

Advanced cooling techniques that will enable the thrust of turbojet engines and the power of turbine-propeller engines to be more than doubled have already been brought to an advanced research stage, but further effort is required before these techniques can be fully utilized in production of engines.

The Lewis Laboratory has been largely responsible for the research that has led to the development of the afterburner, the device which when added to the tailpipe of the turbojet engine converts a normally subsonic propulsion device into one adequate for propulsion to speeds of 1500 mph.

Despite five years of research on this most important turbojet component, much still remains to be done to increase its economy and reliability and to utilize most fully its potentialities for supersonic propulsion.

In the allied fields of aircraft operations, recent research at the Lewis Laboratory has made remarkable progress in providing an understanding of the mechanism by which fires are ignited and propagated in an aircraft crash. By means of laboratory research and actual crash studies with full-scale aircraft carefully instrumented to record pertinent information in the crash, a considerable body of engineering information has been obtained which provides the clue as to how the incidence of crash fires may be reduced. Extension of these crash fire studies may lead eventually to major reduction in lives lost in aircraft accidents.

In the fields of aircraft operation similar progress has been made in reducing the hazards of flying in ice. Modern high-speed jet-propelled aircraft in their rapid flight through clouds intercept the ice-forming cloud droplets at a rate many times the rate for conventional aircraft. Extrapolation to very high speeds of these methods of ice protection that have been developed for present transport aircraft lead to impracticably heavy installation of deicing equipment. Research in our icing tunnel has provided the key to possible reduction of the

heat requirements for deicing to one tenth the values required using present day techniques. In order to make the benefits of this new system available to diverse types of transport and military aircraft now in the design phase, further research is needed on modified systems adapted to the particular requirements of the airplane type.

These and other objectives of our present and future research are products of coordinated and integrated research programs, pieces of which will be shown to you today in your inspection of the laboratory.

A representative section has been cut through the laboratory to reveal samples of three categories of research programs: (1) long-range research programs that will bear fruit in future years; (2) shorter range programs, the results of which will be applied in the next few years to production airplanes; and (3) immediate research aimed at the urgent problems of the moment. At several of the demonstrations you will see shown the supporting effort that lies just behind the research man in his attack on a problem.

In cutting this section through the laboratory's effort and highlighting particular demonstrations, we were concerned that the bits and pieces might be overemphasized and the attack on the broader idea and problem phase of the laboratory's work would go unmentioned.

Let me mention then, that in the performance of its work the Lewis Laboratory is not a loosely knit confederation of experts each working independently on problems in a narrow field of accomplishment. The problems now faced are individually so difficult and so complex, and are so intermingled with other problems of equal complexity that an entirely new order of team activity is required. The staff is composed of teams of specialists with combined knowledge of many scientific fields. These teams in turn are welded into a single purpose organization which explores deliverately and intelligently the problems in the aircraft propulsion field.

In reviewing the inspection demonstrations, think of them as part of the larger integrated problems of propulsion to which the laboratory staff is applying itself with unstinted energy and effort.

We are aware of our responsibilities and expect to discharge them.