



### Physical Research Laboratory

#### Description:

95 by 229 foot laboratory for housing research equipment and personnel. Outdoor facilities include  $4\frac{1}{2}$  foot diameter freon tunnel, a 20 foot diameter vacuum sphere, and free-flight apparatus.

#### Purpose of Equipment:

To provide facilities for the study of the fundamental physical problems associated with the flight of aircraft, especially in the vicinity of the speed of sound.

#### Research Projects:

- a) The study of the fundamental theory of vibration and flutter, especially at very high speed.
- b) Development of the fundamental theory of high speed flows.
- c) The study of the physical concepts of the boundary layer, with extension to supersonic flows.
- d) The application and extension of the potential flow theory to interference problems, propeller problems, helicopters, etc.

#### Illustrations:

1. Remains of the original tail surface of the P-47 after flutter tests in the 8' HST. These tests aided considerably in explaining early flutter difficulties and in evolving the final design.
2. Schlieren photograph of high speed flow over a "bump" for the purpose of confirming certain theoretical calculations on compressible flows.
3. Plastic model of propeller wake pattern for use in electrolytic tank to permit mathematical solution of the optimum disc loading for counter-rotating propellers.

