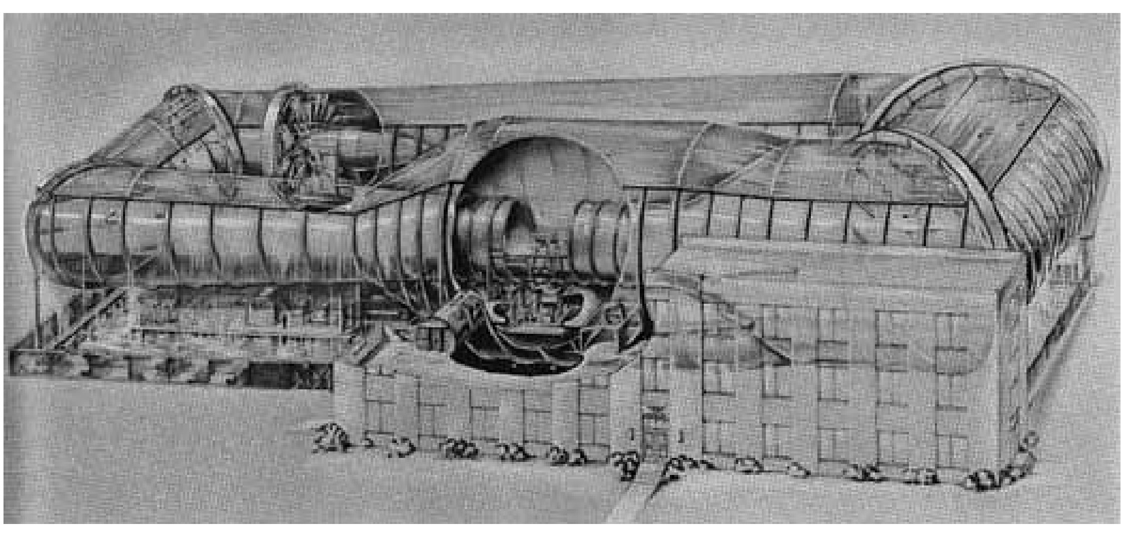
Chapter 3 - Through the Barnstorming Days to World War II

A Nineteen-Foot, High-Pressure Giant

[28] Langley's 19-foot Pressure Tunnel required approximately 5000 tons of steel to contain its 2-1/2 atmospheres pressure. An 8000-horsepower electric motor driving a 34.5-foot propeller was needed to create a 300-mph velocity at the test section. Operators of this tunnel, like deep-sea divers, had to enter and leave their working quarters through a decompression chamber. Why build such a monster?

The NACA free-flight wind tunnel investigated airplane stability and control characteristics using free-flying models.



The 19-foot pressure tunnel at Langley Field.

The 19-foot pressure tunnel was a response to NACA's continuing concern over scale effects. Could its results with models be applied with confidence to full-scale aircraft? The small variable density tunnel had provided some of the answers, but to reach fullscale Reynolds numbers, the aerodynamicists needed a bigger tunnel operating at high pressures. (Reynolds number is proportional to both size and air density.)

The result-the 19-foot high-pressure tunnel-was the first attempt anywhere to combine large size and high pressure in a single facility.

Beginning operation in 1939, this tunnel helped develop the A-20, the B-32, the F-8U, and other World War II military aircraft. Later, as more advanced variable density tunnels came on line, the 19- foot tunnel was assigned to research in aeroelasticity and flutter at high speeds. In 1959, after major conversion work, it became the Transonic Dynamics Tunnel.
