Slattery Journal

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J. Stack's acceptance speech.

The Collier Trophy Committee was indeed wise in including the words "and associates" in the citation. These words have made it easier for me to make this acceptance for many individuals other than myself have made significant contribution to the successful effort honored by the Committee.

The history of this effort goes back a long time. The first specific notes that indicate we were reasonably certain that we had a transonic solution appear in 1946 letters written to Dr. Lewis by me from Europe. I am certain that sometime before these letters I, at least, was certain that a solution had been found and the form and tone of the letters so indicate. These letters make the following points clear:

(a) I, at least, was satisfied that we had an answer.

(b) In Europe in 1946, I was trying to discover if solutions had been found there - they had not been and more recent history confirms this.

(c) That a good part of our faith in the probability of the solution at that time laid in the subsonic high-speed theoretical studies of Ray H. Wright.

(d) That before leaving for Europe in 1946 and in consultation with Mr. D. D. Baals, Mr. W. F. Lindsey, Mr. J. V. Becker, and Mr. Ray H. Wright, we had made tentative arrangements to make a special experiment in a small apparatus in which Mr. Lindsey was conducting research to achieve a nearly similar object. Mr. Baals, at that time, was engaged on

special studies of the laboratory facilities needed for the maintenance of United States supremacy in the field. Mr. Becker was head of the 16-foot tunnel, the modernization of which was a primary aim at that time.

In late 1946, probably early November, experiments were instituted in a crude model at the 16-foot tunnel. Mr. Becker assigned Mr. V. G. Ward to the conduct of these experiments. Meanwhile, we became so certain of the eventual soundness of our approach that the 16-foot tunnel was committed, at least in our own minds. The experimental results when analyzed by Wright confirmed his earlier subsonic theories. The transonic results for which there were then no theories did seem to us that we had no fundamental misconception. To some others, however, the same results were nothing but discouraging. I have been told since that there were some who almost questioned our soundness of mind!

At this point, early 1947, the 16-foot tunnel modernization was then definitely committed to the new idea and several million dollars were at stake. A few of us were definitely conscious of a very strong undercurrent of disbelief, of incredulity.

We did not have sufficient basic research information to properly design the throat for the 16-foot tunnel at this time. We, therefore, went ahead with all other parts while we worked further with models - some of a few inches in size.

At about this time, late summer 1947, Mr. Becker was made Chief of the Compressibility Research Division. Mr. E. C. Draley became Assistant Head of the Full-Scale Research Division and Mr. Blake W. Corson became

head of the 16-foot tunnel. Mr. Draley and Mr. Corson have been very vital contributors since.

We called in other research components of the Laboratory at this time, notably, Dr. K. F. Rubert, W. J. Nelson and W. F. Lindsey of Becker's Division, Mr. George Wood and Dr. Kaplan's Physical Research Division, and to a lesser degree but nevertheless of great importance Mr. E. C. Budkley and one of his colleagues of the Instrument Research Division, Mr. A. Sabol. A short but intensive study of the basic problems produced the bare minimum of information to proceed with the design of the most critical part. While all this research work was going on the design and contracting for all other parts had been accomplished.

Finally on June 1, 1948 a definite contract was made with the builders for the new throat and from then on there was no turning back. Two years from the glimmering of a solution to the point of no return.

We were not yet in the clear, however, because the power requirements of the throat were excessive as indicated by the model results. We knew probable causes and probable cures and the design of the new throat 16 T.T. had been made accordingly. We continued some research on models.

In 1949 we proceeded to study designs of the new throat for incorporation in our 8-foot high-speed wind tunnel. We were fortunate here in that we had earlier, and before the transonic question was serious, repowered this tunnel to handle the speed problems up to roughly 90 percent of the speed of sound but in repowering had done so with faith and foresight so that the handicap of high power requirement for the new throat was not nearly as critical as for the 16-foot tunnel. In the spring of 1950 we had the new throat installed in the 8-foot tunnel. There then

followed a period of considerable experimentation. We achieved smoother flow in transonic ranges than had been common to most existing subsonic tunnels. But of vital importance a big reduction in the power requirement was made. This improvement in efficiency was ready for the 16-foot tunnel. The work in the 8-foot tunnel involved, as principals, Mr. E. C. Draley, Mr. A. T. Mattson, Mr. R. T. Whitcomb, Mr. V. S. Ritchie, and the ever-present Mr. Ray H. Wright.

Thus, while the 8-foot tunnel was the first tunnel to run with the new throat, the real decisions were made much earlier for the 16-foot tunnel. The scientific adventuring involved the 16-foot tunnel first. All concerned had a nice Christmas present in 1950 when a few days before the holiday the first runs of the 16-foot tunnel were successful.

To end my statement here would be wrong. The importance of a research result or idea is little if it is not applied. In the application a vast amount of engineering and constructional skill and ingenuity is required. The service divisions of the Langley Laboratory under the able direction of Mr. Ernest Johnson made major contributions. Mr. E. M. Gregory of the engineering service division filled the capacity that might be called Chief Mechanical Designer. His part was major. The men of the Mechanical Service Division constructed and installed the new throat in the 8-foot tunnel. It was in no small measure due to their effort that the research staff had the solution for the original high power requirement ready for the 16-foot tunnel.

The Newport New Shipbuilding and Drydock Company fabricated and delivered to the site all the critical steel components and their engineers aided in the structural design. General contractor for the throat was

the Pittsburgh-Des Moines Steel Company and general contractor for the remainder was the E. and E. J. Pfotzer Company. Newport News construction men aided the general contractors at the site. The main drive of 60,000 horsepower was by the General Electric Company. Mr. Charles E. Wilson, then president of the General Electric Company, took sufficient personal interest to bring about a considerable improvement in delivery of critical electrical items.

There were plenty of difficulties along the engineering and constructional way. Engineers of the builders and of our Engineering Service Division struggled with the problems and, it is fair to say, sometimes with each other but brought about solutions.

The top Directorship of the Langley Laboratory and of the NACA had its problems. There was a considerable body of opinion as I stated earlier who thought we were plain crazy. The top Directorship were in somewhat the position of a man a way out on a limb in a high wind. They had the courage to stay out on that waving limb. They could at almost any time have called it off to remain on the old certain ground and suffer no condemnation. They must have had misgivings but the basic decision to lead rather than to follow is the primary element of strength. If that is preserved we can hold our place through most anything.

The Collier Throphy Committee credits this achievement with giving America a two-year lead in the "design of faster than the speed ~~Aeronautical Field~~. A word of warning is necessary here. This achievement is a tool. It is the use of the tool that will give us and let us keep that two-year lead, not just its existence. As of now we are not making maximum use of this tool. The

presently existing tools ~~of the type~~ are understaffed. They are on the five-day, forty-hour week. Other high-speed wind tunnels are not fitted with the new tool. These are obsolete for the job at hand. At the present rate of conversion it will be several years before full utilization of the tool. Those to whom the economy and safety of the country is entrusted have a big decision in the aeronautical field confronting them.