Robert T. Jones

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Memorial Tributes: Volume 9

ROBERT T. JONES

1910–1999

BY WALTER G. VINCENTI

ROBERT THOMAS JONES, one of the premier theoretical aerodynamicists of the twentieth century, died on August 11, 1999, aged eighty-nine, at his home in Los Altos Hills, California. At the time of his retirement in 1982, Jones worked as a senior research scientist at the Ames Research Center of the National Aeronautics and Space Administration in nearby Mountain View. Following formal retirement, he served until 1997 as a consulting professor at Stanford University.

Jones—"R.T." to his friends and coworkers—was born on May 28, 1910, in the farming-country town of Macon, Missouri. Writing about his days in Macon High School in an unpublished autobiographical article, he pays tribute to "a wonderful mathematics teacher . . . who took us along the intricate path of exponents, logarithms, and trigonometry." Like so many of his generation, he also built model airplanes, radios, and electronic gadgets. More important for his later work, he "devoured eagerly" the technical articles appearing in aeronautical magazines and the technical reports from the National Advisory Committee for Aeronautics (NACA). These experiences would influence him for life.

Following high school, R.T. attended the University of Missouri, dropping out after an unsatisfying freshman year. Returning to Macon, he joined the locally based Marie Meyer Flying Circus, a stunt-flying group typical of the time. Here he received

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flying lessons in exchange “for carrying gas and patching wing tips,” though he did not solo for another fifty years. As things turned out, he never went back to the university, and his only college degree would be an honorary doctor's degree.

In 1929 the fledgling Nicholas-Beasley Airplane Company of the nearby town of Marshall found itself without its one engineer, Walter Barling. An owner of the flying circus, aware of R.T.'s self-education, recommended him for the job, and he was hired immediately. He thus found himself nineteen years old, a college dropout, and chief (or only) engineer at a salary of $15.00 a week. In his new position, he helped with production of the Barling NB3, a new type of two-person, low-wing, all-metal monoplane. The airplane experienced some success, but in the Great Depression of the 1930s the company, like many others, did not survive.

Finding himself thus jobless in the depths of economic adversity, R.T. got a ride with some neighbors to Washington, D.C. In the nation's capital, Macon's local congressman found him a “wonderful” job as an elevator operator in the House Office Building. Intent on becoming an engineer, R.T. spent his spare time in the nearby Library of Congress studying mathematics from original sources and visiting occasionally with A.F. Zahm. Zahm, a well-known aerodynamicist, was in charge of the library's aeronautics collection and had been a member of the NACA. R.T. also attended night classes taught at Catholic University by the brilliant but difficult German theoretical aerodynamicist, Max M. Munk, who had studied with the great Ludwig Prandtl at Göttingen. Munk's general approach and specific work played an important role in R.T.'s later achievements.

In 1934 the new Public Works Program, begun to help combat the depression, made available a number of nine-month positions at the NACA's Langley Aeronautical Laboratory near Hampton, Virginia. With recommendations from Zahm, Munk, and a congressman who had been referred to him by Zahm for tutoring in mathematics, R.T. obtained one of these positions. When the nine months were up, his supervisors wished to retain him in a permanent appointment. This at first appeared impossible, since the beginning civil-service grade called specifically

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for a college degree. The problem was solved, however, when someone noticed that the next higher grade, which was ordinarily attained by promotion, had no such specific requirement. There could thus be no objection to his appointment at that level. Except for a period in the 1960s, R.T.'s career with the NACA and its successor NASA would occupy him until retirement in 1982. Langley remained his workplace until 1946, when he moved to the new Ames Laboratory in California.

At Langley, R.T.'s work dealt mostly with airplane stability and control, on which he became a recognized authority. Here he pioneered the introduction of operational methods in theoretical analysis of the transient motions of aircraft following a disturbance. He also extended the theory of oscillating airfoils to wings of finite span and analyzed the operation of a new type of airplane with only two controls (elevator and ailerons).

R.T.'s most renowned contribution came near the end of his Langley period with his theory of sweepback as a means for avoiding the high drag of straight wings at transonic speeds. The planform of every high-speed transport one sees overhead embodies R.T.'s idea. The same concept had been arrived at several years earlier in wartime Germany, but this fact did not become known in the United States until after R.T. had made his discovery. Because of objections by Langley's eminent senior theoretical aerodynamicist, who did not believe the result possible in the supersonic speed range, NACA management held up publication of the findings until confirmed by experiment. A bit earlier, R.T. had also produced a relatively simple but far from obvious theory, valid throughout the speed range, for wings with a planform long and narrow in the flight direction. With characteristic generosity, he attributed both of his important developments to thinking prompted by the writings of Max Munk.

After moving to Ames, R.T. worked on the understanding and improvement of narrow and swept-wing performance at supersonic and high-subsonic speeds. This work included his startling (and still unexploited) concept of the oblique, asymmetrically swept wing, that is, swept forward on one side and rearward on the other. He cooperated in tests of this idea with people at Ames and later with faculty and students at Stanford. He also produced

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(with Doris Cohen) a comprehensive work, *High Speed Wing Theory* (1960), and, later, his small but inclusive book entitled simply *Wing Theory* (1990), described by the noted aerodynamicist William R. Sears as, “surely . . . one of the most important books on aerodynamics to be written in our time.”

In a complete change of focus, R.T. devoted his absence from Ames from 1963 to 1970 to problems of blood flow as senior scientist at the Avco-Everett Research Laboratory in Massachusetts. Here he was responsible for scientific direction of the development of cardiac-assist devices, including one of the early artificial hearts. He also published a number of articles on bioengineering in regard to blood flow.

R.T.'s creativity, however, was not limited to fluid mechanics. In his spare time in the 1950s, he devised and constructed an improvement on a type of reflecting telescope and published a number of related articles. In this connection, he formed and operated an instrument company that produced and sold some 40 six- and eight-inch telescopes of this kind. At Ames in the late 1950s and early 1960s, he worked and wrote on accelerated motion in relation to the theory of relativity. And in the early 1950s, when one of R.T.'s daughters needed for her musical studies a better but discouragingly expensive violin, he undertook to make one for her. After experimental study of violin acoustics and one failed but instructive attempt, his second effort was a notable success. His daughter has since used the instrument in recitals and in performances with the La Jolla Symphony. He went on to build more than a dozen fine violins and violas.

R.T. was elected to both national academies, the National Academy of Engineering in 1973 and the National Academy of Sciences in 1981. His many other honors included the Sylvanus Albert Reed Award of the American Institute of Aeronautics and Astronautics, the Langley Medal of the Smithsonian Institution, an award shared with such aviation notables as the Wright brothers and Charles Lindbergh, and the Prandtl-Ring of the Deutsche Gesellschaft für Lüft und Raumfahrt. His honorary doctorate came from the University of Colorado in 1971.

R.T.'s friends knew him as a modest, considerate person of absolute integrity. According to an associate at Stanford, “Those

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of us privileged to call him a colleague . . . were continually surprised and inspired by this maverick scientist who contributed so much to our understanding of flight. In addition to his well-known technical contributions . . ., he captivated a generation of students with fresh insights and new ways of looking at problems ranging from hang-glider dynamics and optimal bird flapping to supersonic aircraft." Most important for his various activities, he seemed to have a quiet confidence that he could accomplish whatever he set out to do— even if it was to make a fine violin. We do not see his like very often.

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