The great engineer (Hungarian style)

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THE WIND AND BEYOND: Theodore von Karman, Pioneer in Aviation and Pathfinder in Space. By Theodore von Karman with Lee Edson. Illustrated. Little, Brown. 376 pp. $10.

By Edward Edelson

Theodore von Karman was one of that small group of transplanted Hungarian scientists whose knowledge, wit and insight did so much to make our world what it is today. But unlike many of the others — Leo Szilard, John von Neumann, Edward Teller, Albert Szent-Gyorgyi — his name is almost unknown to the general public.

Von Karman was basically an engineer, specializing in the apparently abstruse discipline of fluid dynamics — the flow of air and water. When others were telling politicians to build atomic weapons, he was telling them to build wind tunnels. But no scientist established a closer relationship with the military, and von Karman's influence still lives.

Von Karman was a kind of scientific Lanny Budd, with the knack of being where the action was. He was at Göttingen in the prewar days when that German university was the center of atomic studies. He worked with the Zeppelin Company on airships and with Junkers on airplanes in Germany. Moving to the California Institute of Technology when the Nazi ugliness began, he went to Japan to help build their first modern wind tunnel and then to China to help that aircraft industry build *its* first wind tunnel. He was a prime mover in starting the Aerojet Corporation, the nation's leading producer of rockets — and the story of how the General Tire and Rubber Company forced him to give up his stock is a sharp story of corporate morality, told without rancor. In 1945 von Karman headed the scientific advisory group that laid out the blueprint for the postwar development of the Air Force, and he was instrumental in establishing the research arm of NATO.

And the work is fascinating. Von Karman became interested in the problem of using sheet metal to build airplanes, in the days when fabric was the standard. Von Karman found that an all-metal plane could be prevented from buckling by running stiffeners along the sheets of metal. Later, he was called in when the Grand Coulee Dam began to crack under the pressure of water as it was filling. The problem, von Karman found, was essentially the same as that of the metal airplane skin. For all its bulk, the dam was acting like a thin plate under stress. When he advised installing stiffeners, the dam builders were incredulous at first; then they followed von Karman's advice and the dam held.

It was the same story when the Tacoma Narrows Bridge literally flapped itself to pieces in 1940. On paper, the bridge could take any stress it might be exposed to — but the designers hadn't taken into account the aerodynamic forces created by the winds. Von Karman suggested that models of the new bridge be tested in a wind tunnel. In this way the aerodynamic problems were avoided, and the government hastily checked out the country's other major bridges. All are safe, von Karman reported, although the Golden Gate Bridge might be in trouble if exposed to prolonged 110-mile-an-hour winds.

In the end, the portrait is that of a man who lived the finest ideals of a scientist. While he worked with the military, his aim was not better weapons but better science. The establishment of NATO's research branch was regarded by von Karman not as a road to more efficient killing but as a new method for promoting international cooperation among scientists and of getting support for scientists in smaller countries. He was always looking for ways around the secrecy that politicians love and scientists abhor. When Dutch scientists set out to build a transonic wind tunnel, they could not get details of a classified American development that was essential to the project. Von Karman found that some Swiss engineers, who were not bound by security, knew the details, and he put them to work helping the Dutch. Then he arranged for American engineers to "criticize" the design on the basis of Swiss information. A truly Hungarian scheme, it resulted in the construction of one of the best wind tunnels in Europe.

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