KLAUS OSWATITSCH
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1910–1993

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KLAUS OSWATITSCH died on August 1, 1993. With his death the mechanics community loses one of its most prominent members who has, over the past decades, significantly influenced the development of fluid mechanics in many different areas.

Klaus Oswatitsch was born on March 10, 1910, in Marburg an der Drau, then a city of the Austro-Hungarian Monarchy. He studied mathematics and physics in Graz with, among others, Erwin Schrödinger. Owing to the bad economic situation, he was unable to find a suitable position when he had finished his Ph.D. study. In this difficult situation the twenty-eight-year-old Dr. Oswatitsch especially welcomed a scholarship by the Deutsche Forschungsgemeinschaft that enabled him to do research at the Kaiser-Wilhelm Institute in Göttingen headed by the founder of modern fluid mechanics, Ludwig Prandtl.

As we now know, Oswatitsch's decision to move to Göttingen proved to be a stroke of luck. Even his first scientific investigations showed his exceptional originality. His publications on the dispersion and absorption of sound in clouds, on condensation phenomena in supersonic nozzles, and on drag as the integral of the entropy flow are considered classic papers in the field of fluid mechanics.

Three "wanderjahre" (as he himself termed them) after the war led Oswatitsch to Farnborough, to Emmendingen, and
finally to Stockholm, where he taught at the Kungliga Tekniska Högskolan from 1949 to 1956. The wanderjahre—and in particular the time in Stockholm—were characterized by his increasing interest in transonic flow problems, but his widespread interest covered also the regimes of subsonic and supersonic speeds and the fields of hypersonic flow and three-dimensional flow past slender bodies in the whole Mach number range.

His work on transonic flow, which contained groundbreaking results, revealed an interesting feature of Oswatitsch's personality: a once recognized aim was never given up but pursued with heart and soul. In the case of transonic flows this meant that Oswatitsch stuck to this difficult but fascinating field for the rest of his life, even in a period of time in which it was considered out-of-date.

In 1956 Oswatitsch moved to Aachen. Here he founded the Institute for Theoretical Gas Dynamics, which he headed for sixteen years. Accepting an offer from the Technische Hochschule in Vienna, he returned to Austria in 1960, where he stayed until his death. Both in Aachen and in Vienna the investigation of nonlinear wave propagation problems constituted one important focus of his activities.

An attempt to do justice to Oswatitsch's scientific oeuvre, for example, more than 130 publications, including several books and handbook articles, in a few lines is bound to fail. The following considerations will, therefore, be limited to a single paper, which is one of the author's favorites.

The paper published in 1957 deals with the conditions for the separation of boundary layers on the background of Goldstein's discovery that solutions of the Prandtl equations in general develop a singularity at the separation point and can thus not be extended further downstream. Starting from the full Navier-Stokes equations, Oswatitsch was able to show how this singularity can be avoided by constructing appropriate local solutions. In 1957 this alone was an important result, but the paper also carried more information than was or could be recognized at that time.

The solutions derived by Oswatitsch satisfy the Navier-Stokes equations in a small neighborhood of the separation point.
However, they are also local solutions to the Prandtl equations, thus indicating that these equations can in fact, in contrast to earlier presumptions, be used to describe the process of boundary-layer separation. On the basis of this idea, a whole research area—interacting boundary-layer theory—has emerged.

Oswatitsch's influence on his students cannot be fully appreciated without having a brief look at his teaching activities. He was by no means a rhetorically perfect teacher. However, he impressed his students by the act of quickly revealing the essential points of a problem. He never presented final results but allowed the students to see how a theory developed from a few basic assumptions. They never got the impression that to teach was a heavy load. Rather, based on Oswatitsch's enthusiasm, they were led to suspect that to manipulate equations was an enjoyable activity. This may have stimulated them to pursue this source of intellectual delight later for themselves.

During his time in Vienna, Oswatitsch supervised seventeen Ph.D. students. In total, forty young scientists did their doctoral theses under his guidance. Many of them started scientific careers afterward and now hold academic positions in various countries. They all are grateful for many hours of scientific discussion but also for important words of encouragement in times of downheartedness.

Klaus Oswatitsch was awarded many honors and distinctions in recognition of his work. He was a member of the International Academy of Astronautics in Paris, the Deutsche Akademie der Naturforscher Leopoldina in Halle, the Royal Swedish Academy of Sciences in Stockholm, a foreign associate of the National Academy of Engineering in Washington, D.C., and an honorary member of the Gesellschaft für Angewandte Mathematik und Mechanik. He received honorary doctorates from the Universität Karlsruhe, from the Kungliga Tekniska Högskolan, and from the Eidgenössische Technische Hochschule in Zürich. He held the Ludwig Prandtl Ring of the Deutsche Gesellschaft für Luft und Raumfahrt, the Wilhelm Exner Medal of the Österreichischen Gewerbeverein, and the Johann Joseph Ritter von Prechtl Medal of the Technischen Universität Wein (Vienna Technical University).
With the death of Klaus Oswatitsch, the fluid mechanics community loses an eminent scientist who had a seminal influence on many areas of his field. His former students lose a dependable counselor and some of them even lose a fatherly friend.
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