

## Obituary

## Eduard Kellenberger (1920–2004)

When asked, at the 1964 Swiss national exhibition, if one “could be a good Swiss citizen and get up late”, Eduard Kellenberger answered “yes”. He was not referring to himself. He was an invariably early riser, one who has left an enduring legacy to Swiss — and European — science. His contributions to electron microscopy and the genetics of bacterial viruses (phages), as well as his institutional achievements, made him the earliest representative of molecular biology in Switzerland.

In many ways, Kellenberger’s career was typical of the now-vanishing generation that founded European molecular biology. He studied physics at the Swiss Federal Institute of Technology in Zurich under Paul Scherrer, the most prominent atomic physicist in Switzerland. In 1945, he joined the laboratory of Jean Weigle at the University of Geneva to work on developing a Swiss-made industrial electron microscope. To illustrate the usefulness of such an instrument for biomedical research, Kellenberger attempted to provide micrographs for the sales catalogue. At that time, however, preparation methods were so crude that biological samples were either destroyed by the electron beam or so distorted as to be meaningless. Focusing on bacteria and phages, Kellenberger eventually succeeded in 1958, together with the chemist Antoinette Rytter, in developing the ‘RK-method’, which went on to become a standard protocol, and their paper a citation classic.

The scientific priorities of the atomic age brought many young men and women into physics, but they also pushed some physicists out of the discipline. Weigle, for example, who did not wish to work in the large teams of ‘big science’, left for the California Institute of Technology in 1948, where he became a phage geneticist, a close collaborator of Max Delbrück, the spiritual father of the rapidly growing Phage Group. By returning every year to his former laboratory, then led by Kellenberger, Weigle created a crucial transatlantic bridge, making the Geneva group part of a handful of European researchers working on phage genetics.

The scientific reputation of Kellenberger’s laboratory resulted from a unique combination of electron microscopy and phage genetics. Unlike many microscopists, or physicists more generally, Kellenberger not only sought instrumental virtuosity but had a deep



## Pioneer in electron microscopy

desire to understand the biological problems at stake, such as the function of genes involved in phage assembly. As a result, in the early 1960s, Kellenberger’s laboratory became a central source of phage and bacterial micrographs for molecular biology textbooks. These micrographs also made a strong impression on a broader public, including university and political authorities. Crucially, they gave these key administrators a visual appreciation of the promise of biology at the molecular level.

Kellenberger cherished freedom of thought. In his laboratory meetings every idea was welcome, even the apparently naive. His intellectual generosity and respect for the work of others created a relaxed atmosphere that encouraged individual initiative. In 1959, for example, he hired the physicist Werner Arber to investigate the mutagenic effects of X-rays. Two years later, Arber had still not unpacked the X-ray apparatus as he had found himself enmeshed instead in the study of ‘host-controlled variation’. Rather than pressuring him to move back on track, Kellenberger supported Arber through what appeared to be a highly unfashionable project — wisely so, as Arber’s work eventually led to the discovery of restriction enzymes and to a Nobel prize in 1978.

Kellenberger did much to secure molecular biology a place on the science policy agendas, both nationally and at the European level. Until the late 1950s, the term ‘molecular biology’ enjoyed little currency and was largely undefined. As early as 1959, however, Kellenberger began

the planning of an Institute of Molecular Biology at the University of Geneva. In addition to his biophysics laboratory, centred on electron microscopy and phage genetics, Kellenberger conceived of a biochemistry laboratory to be headed by Alfred Tissières, then working with James Watson at Harvard. In his mind, structural, biochemical and genetic approaches were a necessary combination for molecular biological research, a vision shared by an increasing number of scientists around the world. In 1963, the institute was created in Geneva, along the lines of Kellenberger’s plan.

That same year, Kellenberger took part in the founding of the European Molecular Biology Organization (EMBO) and sat on its first council. EMBO wished to foster molecular biology in Europe, even though it began as nothing more than a club of scientists, without funding. Kellenberger arranged for EMBO to become a legal organization under Swiss law and then directly contacted the Swiss minister of foreign affairs with a letter entitled “What is life?”. This must have had an impact, because the minister engaged the Swiss government in taking the delicate diplomatic initiative of bringing European states to support EMBO financially. Once an intergovernmental agreement was reached, EMBO began planning a biology equivalent of CERN, the European particle physics facility — leading to the opening of the European Molecular Biology Laboratory in Heidelberg.

After having spent 25 years at the University of Geneva, interrupted only by occasional sabbaticals in the United States, Kellenberger decided to take up another challenge and, in 1970, helped found a new interdisciplinary research institution at the University of Basel: the Biozentrum. At that time, molecular biology was becoming increasingly established in European institutions, thanks to those, such as Kellenberger, who early on had understood its potential.

Kellenberger did not defend science at all cost, however, but was driven by a strong humanist ideal that led him to question the place of atomic energy, and later biotechnology, in society, long before it was fashionable to do so. Until his death on 13 December 2004, Kellenberger was a vigorous proponent of socially responsible globalization, driven by the desire to make knowledge serve the common good. For all this we are profoundly grateful to him.

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