

Nachruf auf Helmut W. Sauer

12. August 1936 – 25. April 2016

A Personal Memoir
Karl J. Aufderheide

Dr. Helmut W. Sauer died on 25 April 2016 of complications from a long struggle with Parkinson's disease.

He was born in Kassel, and grew up in Rotenburg a. d. Fulda, Germany. He earned a Ph.D. rer. nat. from Phillips University in Marburg, working under the direction of Friedrich Seidel, on embryonic development in the cricket *Gryllus*. He did postdoctoral studies on mitotic regulation in the slime mold *Physarum* at the McArdle Laboratory for Cancer Research in Madison, Wisconsin, USA. He held successive faculty positions in Germany at the University of Heidelberg, the University of Konstanz, and at the Julius Maximilian University of Würzburg.

In 1981, he was appointed to be Head of the Department of Biology, Texas A&M University in College Station, Texas, USA. At the time of his arrival, the Department was experiencing a turbulent time of reorganization and redefinition of its academic role in the University. His mature and low-key style of administration was important in helping guide the Department through much of this difficult transition. He especially encouraged better collegiality among the faculty and promoted faculty sharing of large, expensive items of research equipment that could have common use, such as ultracentrifuges and advanced research microscopes.



photo: private archive

Once he stepped down from being Department Head, Dr. Sauer assumed the faculty responsibilities of research and of teaching undergraduate and graduate cell and developmental courses. For many years, in the weekly departmental seminars, it became traditional that Dr. Sauer would ask the final question of the speaker. And that question would typically incisively summarize the main points of the speaker's seminar, as well as pointing toward critical areas of future research. In 2007, Dr. Sauer retired from his faculty position and assumed the status of Emeritus Professor in Biology. His retirement was partly driven by the steady progression of health problems from Parkinson's disease.

Dr. Sauer's research focused on regulation of mitosis and development in the slime mold *Physarum* (Sauer, 1982). At one stage of its life cycle, this organism forms a giant syncytial cytoplasm that can extend over several cm and contains several hundred million nuclei in one cell. When this cell enters mitosis, all the nuclei synchronously enter the nuclear division process within a few seconds of one another. The advantages of this organism to studies of control of mitotic activity are manifold, and Dr. Sauer's work took advantage of them. For instance, he discovered that, in *Physarum*, the regulatory component cyclin is not degraded through the mitotic cycle but instead persists. Although this was an unusual exception to the usual control story, the phenomenon also illustrated the importance of other mechanisms of regulation of cellular control of mitosis by additional means (Cho and Sauer, 1994; Shipley and Sauer, 1992). He also discovered that, among developmentally regulated genes in *Physarum*, those that are replicated early in S are also actively transcribed, whereas unexpressed genes are typically replicated late in S phase (Diller and Sauer, 1993). The significance of these phenomena are still of general interest to the topics of mitotic regulation and gene regulation.

A late project in Dr. Sauer's intellectual life was an effort to reinterpret Theodor Boveri's original embryological work in a modern context. He argued that Boveri's interpretations of patterns of differentiation in normal and abnormal embryos presaged Wolpert's model of Positional Information based on a gradient, more than 50 years later (Moritz and Sauer,

1996). Whether Dr. Sauer was successful in this argument is a topic for discussion, but his efforts illustrated that the pioneering cell biological workers in the early 20th Century might have been technologically limited in their investigations, but they were certainly not intellectually limited in their thinking of how cells must interact in developing systems to produce the phenomena seen. Dr. Sauer's efforts in this project illustrated the wide scope of his curiosity and ability to integrate and rationalize concepts and ideas, even when they are separated by space and time.

Dr. Sauer's interests outside of science were many. He enjoyed many different outdoor sports, including horseback riding, mountain climbing, hiking, and skiing. Each summer, he would travel to Germany to visit with old friends and colleagues. He read a wide range of scientific and non-scientific literature as well attending many theater and musical performances. He left behind a loving family of his widow, his daughters and grandchildren.

These briefly stated facts of the life of Dr. Sauer do not fully reflect his scholarly erudition, nor his ability to digest and present to students a wide range of progress in diverse research topics. My own memories of the several years that we were co-instructors in a number of graduate and undergraduate courses in cellular and developmental biology at Texas A&M University might help better illustrate some of the special characteristic features of his personality. Helmut's analytical and synthetic skills were of a remarkable nature and deserve commemoration among those who follow him.

Hearing a lecture from Helmut was an amazing experience. I expect that many students, at both graduate and undergraduate levels, had never before interacted with a mentor of such broad and comprehensive erudition. He would spend weeks preparing for a lecture by reading the latest primary literature on a particular topic. In the 1990s, for example, these topics involved the latest discoveries in the regulation of mitosis and the elucidation of the molecular mechanisms involved in the Spemann Organizer in the vertebrate embryo. He would digest these complicated processes into a narrative that involved historical information as well as the current understanding of the mechanisms involved and directions of future investigations. His lectures were both deep in content and also highly allusive, referring to ideas both in science and other academic subjects, especially Greek and Roman mythology. Undergraduate students, without a broad or extended exposure to a variety of disciplines, had an especially difficult time keeping up with him as he lectured (Helmut's German-accented English didn't help.). To assist the students, as co-instructor in the course, I found it useful to take notes of Helmut's lectures and transcribe those into typed files that could be distributed to the class. Doing this was a challenge, because I had not only to interpret and transcribe what he was saying in the lecture, but also to add to the notes sufficient background information to enable students to understand some of the allusions he would make during his lectures. The class greatly appreciated my efforts, helping them to better understand the content and meaning of

the lectures. Helmut also appreciated my note-taking, and would also ask for copies of the notes. He claimed that he could never remember what he said during his lectures, so my transcriptions helped him as well.

Helmut also asserted that he couldn't read his own writing, although, most of the time, I could. Therefore, he often would give me his own notes and handwritten manuscripts to decode and transcribe into typed text for him.

Helmut once told me that, when he was on the faculty at Würzburg, he discovered that the desk he used was the same desk used by Theodor Boveri. Thus, he said, he felt a connection to Boveri and his pioneering work on the connections between cellular phenomena and developmental phenomena, presaging our current "evo-devo" understanding, and this connection was a major motivation for his efforts to reinterpret Boveri's work in a modern context.

Whether they realize it or not, the Department of Biology at Texas A&M University, and the rest of the world, are the poorer for the loss of the creative contributions of Dr. Helmut Sauer. He is sorely missed.

LITERATURE CITED

- Cho, J.W., and Sauer, H.W., 1994. A non-cycling mitotic cyclin in the naturally synchronous cell cycle of *Physarum polycephalum*. *Eur. J. Cell Biol.* 65, 94–102.
- Diller, J.D., and Sauer, H.W., 1993. Two early replicated, developmentally controlled genes of *Physarum* display different patterns of DNA replication by two-dimensional agarose gel electrophoresis. *Chromosoma* 102, 563–574.

Mortiz, K.B., and Sauer, H.W., 1996. Boveri's contributions to developmental biology — a challenge for today. *Int. J. Dev. Biol.* 40, 27–47.

Sauer, H.W. (Ed) 1982. *Developmental Biology of Physarum*. (Developmental and Cell

Biology, Vol. 11). Cambridge University Press, Cambridge, UK, 251 pp.

Shiple, G.L., and Sauer, H.W., 1992. Evidence for a homolog of the yeast cell regulatory gene product of *cdc2+* in *Physarum polycephalum*. *Eur. J. Cell Biol.* 48, 95–103.

Professor Dr. Karl J. Aufderheide
Department of Biology, Texas A&M University
College Station TX 77843-3258, U.S.A.
kauf@bio.tamu.edu