# MEMORIAL RESOLUTION OF THE FACULTY OF THE UNIVERSITY OF WISCONSIN-MADISON

## ON THE DEATH OF PROFESSOR EMERITUS HANS RIS

Professor Hans Ris died on 19 November 2004 at the age of 90, in Madison. Born in Bern, Switzerland, on 15 June 1914, his interest in science in general and biology in particular was deeply rooted in childhood experiences. From the age of ten, he spent all his free time exploring the woods covering the hills around Bern. Observing and listening, he became fascinated by the diversity and beauty of living things. In addition to his observations, books by the French entomologist Jean Henry Fabre inspired and guided him to observe the habits of ants, wasps and bees. He was eager to learn about the origins and meanings of the phenomena he was observing as a human being in relation to other living species and to the planets and stars. Hans' joy of discovery derived clearly from his childhood fascination with the natural world, a world he described to friends and family as his "secret garden". While the cell nucleus commanded his greatest attention, his "secret garden" excluded no structure and no organism (and indeed, excluded no collaborator, regardless of stature). Hans' deep curiosity, and his knowledge of the structural basis of gene organization and redistribution enabled him to tackle the relatively obscure terrain of nuclear structure.

After coming to America in 1938, Hans worked first with B.H. Willier at Rochester, New York. Subsequently, he received his PhD with Franz Schrader and Sally Hughes-Schrader at Columbia University where he used the light microscope to elucidate the unusual role of the X chromosome in the bear-berry aphid. He then moved, first to Johns Hopkins and then to the laboratory of Alfred Mirsky at the Rockefeller Institute, where his studies of chromosome structure revealed the importance of non-histone proteins. After Avery had shown that DNA was probably the basis of inheritance, Hans' group was able to verify that the amount of DNA/chromatid and the DNA/chromosome set remained constant throughout the cell cycle.

In 1949, Hans came to the zoology department in Madison, one of the few places with access to an RCA EM2b electron microscope. He soon used this instrument to describe both the 10 nm and 30 nm supercoiled fibers that are the basis of chromosome structure in different ionic environments. With R.N. Singh, he was one of the first to recognize that blue-green algae were in fact a special type of bacteria, one having properties strikingly similar to those of the chloroplast. In 1960 these and complementary observations of an unusual mitochondrion in trypanosomes and the kinetoplast and the kappa factor in paramecium led him to be first to propose an endosymbiont origin for these organelles, an idea since developed with great success by a former UW Botany student, and now distinguished cell biologist Lynn (Sagan) Margulis.

During the next decade, Hans worked with others to modify the Kleinschmidt technique, used for viewing DNA in the electron microscope, so that one could identify heteroduplex regions of bacteriophage DNA. This modification allowed one to view mutations directly, and later led to the revolutionary discovery of the discontinuous nature of gene segment "exons" being interspersed with non-coding "intron."

When a million-volt electron microscope became available in the 1960s, Hans was one of the first to apply it to biological specimens. In 1972, he established the HVEM lab at Madison, installing a million-volt AEI electron microscope in an addition to the new Animal Science Building as one of the first NIH National Research Resources. He led the way in optimizing sample preparation for its use, and with others, coaxed the best out of this magnificent microscope for more than 20 years. As the technology improved, other microscopes were added: first video-enhanced DIC and confocal light microscopes, then the first of a new generation of low-voltage high resolution field-emission scanning electron microscopes. For a while Hans was generating images using quanta of one million, one thousand and 1 electron-volt.

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Among his many honors and awards, Hans was a member of the National Academy of Sciences and the American Academy of Arts and Sciences. He was also a founding member of the American Society of Cell Biology, its first treasurer and, in 1993, the recipient of the ASCB's prestigious E.B. Wilson Award for Lifetime Achievement. In 1983 he received the Microscopy Society of America, Distinguished Scientist Award, the highest honor bestowed by the society. As a scientist, he had an uncanny, sometimes startling ability to see in a micrograph something new or special that had escaped others' attention, epitomizing Dan Mazia's description of the gifted microscopist as a person who can "think with the eyes and see with the brain." Hans was always generous in disseminating "hunches" (actually hard-won products of disciplined thought and encyclopedic knowledge) to his colleagues, often to their great benefit, and never with any thought of receiving credit. Many of these insights formed the foundation of our understanding of endosymbiont organelle evolution, chromosome and nuclear pore structure, and cytoskeletal organization.

Despite Hans' prodigious intellectual and intuitive gifts, and his many scientific accomplishments, he was a remarkably unpretentious person. He eschewed personal "clout" and truly believed that scientists should be part of a welcoming, worldwide community of diverse scholars working for the common good. In his seventies(!), Hans learned Chinese and led groups of US scientists to the Peoples" Republic to support Chinese cell biologists trying to survive in a difficult political climate. He also helped to establish an ASCB program bringing deserving, but under-funded, foreign scientists to US meetings. Early in his career, Hans became concerned about the limited opportunities for professional advancement facing female scientists, and he began redressing such inequalities long before it was common to do so. His egalitarian attitude, decency, and commitment to providing serious scientific training to all, are remembered with great affection and appreciation by many today.

Hans enthusiastically recruited and assisted many biologists in their use of the Madison HVEM facility, and with his healthy skepticism and exacting scholarship, he set the standards for rigorous and careful interpretation of results. In this mode, he showed that the "microtrabecular lattice," a structure once widely believed to permeate the cytoplasm, was actually only a preparative artifact caused by incomplete dehydration during specimen preparation.

Although Hans 'retired' at age 75, he continued working at the bench well into his 80's, and along the way generated revolutionary, new high-resolution stereo FE-SEM images of the nuclear pore complex in *Xenopus*. These important structures he fondly called "fish traps," after those he saw in rural China. Publications based on his work appeared in 2003 and 2004 and other work that he performed at the age of 88 will soon appear in print.

While preparing this brief reminiscence, we received many warm descriptions of Hans' immense influence on many careers. Whether by his strong example felt during a brief collaboration, or by his inspiring mentorship and warm advocacy throughout an entire career, many of us remember him well: tall, elegant, vigorous, taking the steps two at a time to his modest office at the HVEM or 'loping' his way across campus. Hans reveled in the elegance of an experiment done well or of an old idea, newly seen, and had a profound appreciation for the aesthetic in biological structure and function. A pillar of integrity, Hans was a trusted colleague and mentor to all who had the privilege of working with him. Hans is survived by his wife Theron, a son Christopher and a daughter Anet. A memorial was held on April 9, 2005 in Madison, Wisconsin.

MEMORIAL COMMITTEE
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