

**1993**

**Hans Ris**

Hans Ris' admirable record of distinction and service of over half a century will be recognized when he is awarded the ASCB's 1993 E.B. Wilson Award at the Society's Annual Meeting this December in New Orleans. Now professor Emeritus of Zoology at the University of Wisconsin at Madison, his interest in biology was formed at an early age. He enjoyed walking through the extensive forests at the edge of his native city, Bern, Switzerland. Observing, listening, he became fascinated by the diversity and beauty of living things. Searching for meanings, he decided at age 15 that only science could give reliable answers. From a popular magazine he obtained instructions and lenses to build a microscope from cigar boxes and cardboard. Thus was born his passion to explore the world beyond human vision.

At the University he obtained the diploma of high school science teacher. But his dream was to become a researcher like his favorite teacher in Bern, Prof. Fritz Baltzer, who showed him how to design experiments to answer scientific questions. Baltzer also took Ris along with the Institute staff to the marine station at Banyuls in southern France. Here he first experienced the fascinating world of marine life. Observing cleavage divisions of living sea urchin eggs and chromosomes moving on the spindle left a deep impression which later led to research on chromosomes and mitosis.

In 1937 Ernst Hadorn became Ris' thesis advisor. Hadorn had recently returned from a year in the USA and in 1938 obtained a fellowship for Ris to spend a year in Rochester, NY. His task was to find the developmental origin of pigment cells in birds. Experimenting with chick embryos he showed that, like in amphibia, pigment cells migrate from the neural crest into skin and feathers. His teacher in that lab was a woman Ph.D. who had the bright ideas and did the crucial experiments of the lab which were then published by the professor!

In 1939 he was offered a teaching assistantship in Zoology at Columbia University where he joined the lab of the cytologist Franz Schrader. Also in that lab was Schrader's wife, Sally Hughes-Schrader, a brilliant researcher, teacher and human being who became his primary teacher at Columbia. The position of these two women first alerted him to the situation of women scientists at universities. For a thesis project, Schrader proposed to investigate the strange meiotic divisions in the male bearberry aphid. It was an excellent introduction into mechanisms of mitosis, and the solution came mainly through observation of living cells.

In 1942 Ris became Instructor in Biology at Johns Hopkins University, where he continued studies of anaphase movement in living spermatocytes of insects. He showed that separation of chromosomes was achieved in two steps, movement to the pole followed by separation of the poles (anaphase A and anaphase B). He began his studies of chromosome structure but soon realized that this required better knowledge of their molecular composition.

In 1944 Ris joined the lab of Alfred Mirsky at the Rockefeller Institute, who had become a leader in chromosome chemistry. It was an exciting time as the chemistry of the gene was just being discovered. Interest shifted then to the proteins associated with DNA and their role in chromosome physiology.

In 1949 Ris joined the Zoology Department in Madison where he soon established an electron microscope laboratory to study chromosome and nuclear structure. Around 1960 he became interested in reports of cytoplasmic genes and DNA in cytoplasmic organelles. Using the electron microscope he showed that chloroplasts resembled blue-green algae in organization, including a DNA containing nucleoid, and ribosomes, while mitochondria resembled bacteria. This revived an old hypothesis that chloroplasts and mitochondria originated from endosymbiotic microorganisms. A graduate student in botany, Lynn Margulis, became excited by the idea and pursued it with vigor and imagination, leading to its general acceptance today.

In 1969 Ris established the Madison High Voltage Electron Microscope Facility (HVEM) supported by the NCCR-NIH. It supplies a million volt EM for biological structure studies. This instrument provides high resolution stereo-micrographs of thick specimens like intact cells or whole chromosomes. In 1984, in collaboration with Prof. J. Pawley, the facility was expanded to include video-enhanced light microscopy, a confocal microscope, and a high resolution SEM working from 1-30 kV. The goal was to integrate the different imaging techniques in studying a biological system. Therefore the name was changed to Integrated Microscopy Resource (IMR).

Since his retirement Ris is enjoying continued research activity using the unique imaging and specimen preparation instrumentation at IMR. He has emphasized application of low voltage, high resolution SEM in the study of cell structures such as the cytoskeleton and nuclear pore complex. At Wisconsin, graduate students have played an important role in his research. He encourages them to choose their own projects, and considers them collaborators rather than team players. He strongly believes in working with the students in the lab.

Ris has long been interested in Chinese society and culture. Since 1985 he has visited Chinese laboratories seven times and in 1990 established a formal scientific exchange program between the ASCB and the Chinese Society for Cell Biology. Ris was a founding member of ASCB in 1960, served as its first Treasurer and later on the Council. He is a Fellow of the American Academy of Arts and Sciences and member of the National Academy of Sciences. In 1983 he received the Distinguished Investigator Award from the Electron Microscopy Society of America. He received an NIH Research Career Award from 1964-1984. He cherishes sharing the artist's work and life of his wife Theron (a painter), his daughter Anet (a dancer and video-artist), and his son Christopher and daughter-in-law Marni (Indian music and dance). For relaxation he loves traveling, hiking and camping, birdwatching, and classical music.