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Holger W. Jannasch (1927–1998): “small is powerful”

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Holger W. Jannasch, microbiologist and oceanographer, passed away in Woods Hole, Massachusetts, on September 8, 1998, after a long illness. Cancer had been a part of his life for several years, but never diminished his personal courage or dampened his spirits. In April and May of 1998, he was still active, leading an international cruise to the Guaymas Basin and 21° North East Pacific Rise vent sites off the Pacific coast of Mexico, enjoying the opportunity to dive in Alvin to the hydrothermal vent sites, and doing everything in his power to make the expedition a success for all participants.

Born on 23 May 1927 in Holzminden, Lower Saxony, and growing up in Silesia and after 1945 in the hill country around the upper Weser River in Northern Germany, Holger Jannasch first encountered the sea when he spent a year (1948–1949) as a bird warden on the North Sea island of Scharhörn. While studying biology at the University of Göttingen he supported himself by working on fish trawlers in the North Sea and the North Atlantic, not deterred by the rough conditions at sea. During his studies he became increasingly interested in aquatic microbiology and microbial ecology. The exploration of this wide and open scientific field required not only scientific curiosity, but also an independent spirit that would choose the road less travelled, and some manual dexterity, in order to develop methods and to solve practical difficulties. His gift for intelligent tinkering and getting things to work, often in unorthodox ways, would serve him well all his life. With enthusiasm and talent for organization, he became a student co-founder of the limnological River Station Schlitz in Hessen, now within the Max-Planck-Society. As soon as possible, Holger Jannasch expanded his horizons by travels. His first stay at the Stazione Zoologica in Naples in Summer 1953 was followed the next year by an improvised “microbiological” field trip to Egypt, to the Nile and to the alkaline salt lakes of the Wadi Natrun. This auspicious beginning would develop into a life-long exploration of the globe, driven by scientific curiosity as well as a genuine appreciation of faraway lands and seas.

After his Ph.D. defense in 1955, on growth and distribution patterns of heterotrophic aquatic bacteria in their natural environments, Holger Jannasch’s mentor August Thienemann, the director of the Max-Planck-Institute for Limnology, suggested exposure to microbiology abroad. The first stop was with Claude Zobell at the Scripps Institution of Oceanography, La Jolla, California. But the meeting with Cornelius B. van Niel turned out to be decisive, especially after Van Niel invited Holger Jannasch in 1958 to participate in his microbiology

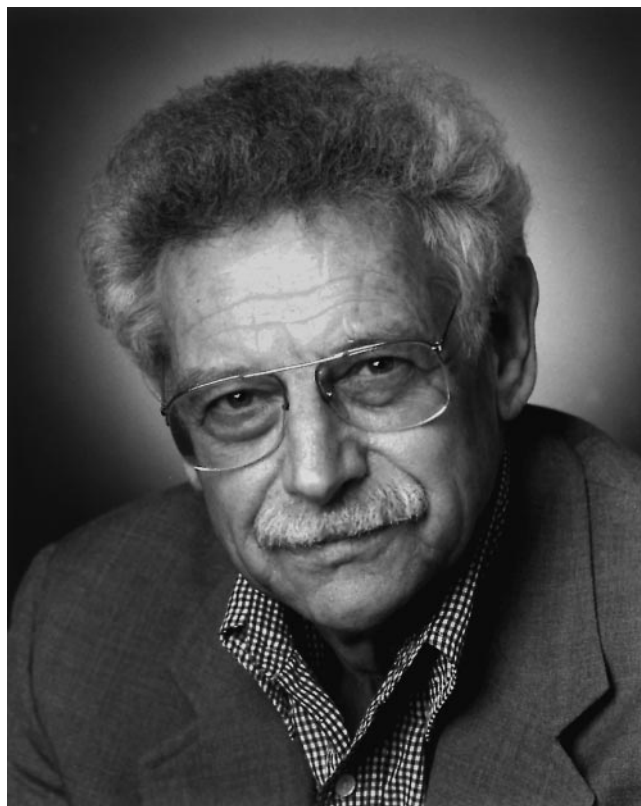


Fig. 1 Holger W. Jannasch (1927–1998)

summer course at Hopkins Marine Station in Pacific Grove. Van Niel became, in Holger Jannasch's words, "the scientist of my life". Van Niel's way of thinking and working, to start with the physiology and biochemistry of a microorganism in order to understand its ecological role, became extremely important for Holger Jannasch's own style of research and teaching. Van Niel's philosophy shaped the Microbial Diversity Course at the Marine Biological Laboratory in Woods Hole, founded in 1970 by Holger Jannasch and Ralph Wolfe. This course takes place each year for at first 12, now 6 intense weeks which inspire students and teachers alike. This unique and freewheeling exposure to the microbial world has influenced a number of career paths over the years, and it is not uncommon that former students return as teachers at a later time.

Back in Germany in 1960, Holger Jannasch fulfilled his "habilitation", the obligate requirement for being eligible for a professorship, with research on bacterial growth kinetics at low substrate concentrations—a field closely related to his later work on microbial biomineralization processes in the cold and organic carbon-depleted deep sea. However, the deep impressions of the USA, the friendships formed in this country, and the promise of a more versatile and congenial research environment prompted Holger Jannasch's decision not to remain in Göttingen, but to accept a position at the Woods Hole Oceanographic Institution, a place he knew from previous visits. In his words: "Attracted by the tone of the letter and the congenial collegueship and working climate it promised, I accepted." Since coming to Woods Hole in 1963, his research has led Holger Jannasch into all corners of the globe, but always back to Woods Hole. This Cape Cod village, half fishing and sailing port, half university, surrounded by wooded hills and by the waters of Vineyard Sound and Buzzards Bay, became his scientific base, and the country of choice for him, his wife Friederun and their son Hans.

Holger Jannasch describes his research in Woods Hole as falling into three categories: Growth kinetics and ecology of oligotrophic marine bacterioplankton; baro- and psychrophilic bacteria of the deep sea and their bioremineralization processes; and, since the discovery of hydrothermal vents at mid-oceanic ridges in 1977, their diverse thermophilic and sulfur-oxidizing microbiota. In these areas of marine microbiology, he has done pioneering work and opened new research fields which are far from being exhausted. The large oligotrophic portion of marine bacterioplankton has been studied only in relatively few samplings (i.e. by Schut, Gottschal, and Prins), and recent rRNA-based studies indicate that a large share of these populations is not bacterio- but archaeoplankton. The question of microbial degradation processes in the deep sea became known through the involuntary "lunch box" experiment. When in 1968 the Woods Hole Oceanographic Institution research submersible Alvin sank to the North Atlantic bottom at 2000 m depth (the crew could fortunately escape in the last moment), it started

a long-term in-situ incubation experiment of the lunch box sandwiches on board, which turned out to be still edible when Alvin was recovered a year later. Holger Jannasch's research program beginning in the seventies focused, by means of in-situ studies and laboratory simulations in high-pressure incubation chambers and eventually chemostats, on the microbial utilization of organic substrates under the high pressures and cold temperatures of the deep-sea, and showed clearly that this most extensive area of the seas must not be abused as a marine waste dump.

Holger Jannasch became known to a general audience by his investigations of the hydrothermal vents and the microbial basis of their ecosystems, dominated by chemolithoautotrophic, sulfur-oxidizing bacteria, often as symbionts associated with marine invertebrates, or by extremely thermophilic archaea. Well prepared by his earlier work on the microbiology of sulfur oxidation together with Jon Tuttle, and by his extensive contacts, he not only had the unique chance to see and to explore a new world, he actually did it with all his characteristic energy and thoroughness. He provided many others with opportunities to participate in this great project or work-in-progress, and to become well-salted (or sulfide-pickled?) vent microbiologists on their own. Having participated on one of his research cruises will remain for many the seminal scientific adventure of their lives.

The enormous increase in our knowledge of hyperthermophilic archaea and of the microbes of the marine sulfur cycle; the concept of symbiotic autotrophic bacteria; and the clear understanding of the biogeochemical significance of vent microbiota are only a few of the lasting accomplishments which will remain associated with his name. Biochemistry and genetics of hydrothermal vent archaea are developing rapidly; certainly not by chance the first archaeum to be selected for a complete genome sequencing project was *Methanococcus jannaschii*, isolated from the Guaymas Basin vents. It is hard to guess how Holger Jannasch's scientific interests would have evolved if he had had more time; with great interest, skeptical competence and correcting remarks, he followed the recent lively debates on autonomous microbial oases in the Earth's crust and potentially on other planets.

By his unique career he has demonstrated what a life in science can be: "Science is not a career, it is an adventure." In this adventure, he trusted character and personal communication; he never had a large laboratory and limited himself to a few excellent, trusted and steady teammates, Carl Wirsen and Stephen Molyneaux, and maximally one postdoc at a time. The title of his autobiographical chapter in *Annual Review of Microbiology* 1997, "Small is powerful", may allude to his preference for a style of science and research which prefers quality over quantity; it may also allude to his personal attitude, a kind of confident understatement which knows exactly the difference between substance and appearance. He regarded the

integrity of the researchers as an essential prerequisite to ensure that the freedom of research survives the unpredictable mood swings of the public-at-large and the funding agencies, and he put his hope for the future into the better insight and conscience of his contemporaries. Of the honors which he received over the years, he probably valued the most his election as a foreign member of the National Academy of Sciences of the USA in 1995. He actively participated in the Academy's initiative to release imprisoned regime critics and scientists by diplomatic pressure, and did not keep his liberal

convictions for himself. On a scientific as well as on a personal level, his genuine interest in his conversation partner, his ability to make connections, his erudition, classical education and experience made him one of the few living experts in the art of conversation. His wide horizon, his love of music, and of course his delight in good stories put him on good terms with many young members and students of the department, sometimes more than with his own generation. He will be missed by all who knew him, even by those who have met him only once or a few times.