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# THE BIOLOGICAL CENTURY

## FRIDAY EVENING TALKS AT THE MARINE BIOLOGICAL LABORATORY

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Edited by Robert B. Barlow, Jr., John E. Dowling,  
and Gerald Weissmann

with Pamela L. Clapp

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# **The Mechanistic Conception of Life: Loeb the Teacher, Stein the Student at the MBL**

*Introduction by Jane Maienschein*

Let's go back for a moment to one hundred some years ago, when a visitor to the MBL in the 1890s reported walking through deserted buildings and empty laboratories. He was curious about the place and its people, but unfortunately it was a Sunday morning and nobody was around. He found only a set of simple gray wooden structures, strung together as wings of the same building. He walked through the halls and heard only the sound of his own footsteps—until he went upstairs and paused outside one open door. The small energetic man inside called the visitor in, urged him to peer through his microscope, and excitedly discussed (in a thick German accent) the discoveries of the day. The visitor knew then that he had found the essence of the MBL in the enthusiastic, energetic, obvious love of science that this scientist exuded. The scientist, of course, was **Jacques Loeb**.

The MBL does involve the excitement and love of doing science that the visitor witnessed. But it includes something more. The MBL also means the sharing of science and the enthusiasm for the chase, so to speak, in the form of public education about the processes of doing science. The MBL has always involved the combination of doing science and the open, public discussion of ideas and their consequences. Loeb's eagerness to share his work with the stranger represents both aspects of what the MBL was—and has continued for over one hundred years to be—about. It is particularly appropriate that Loeb was honored on the MBL's Dedication Day, because Loeb saw the public side as well as the research side of science especially keenly.

Loeb wanted more than to gather knowledge or to accumulate facts. He wanted above all to use knowledge to control life. (See Philip Pauly's excellent *Controlling Life: Jacques Loeb and the Engineering Ideal in Biology*, Oxford University Press, NY. 1987.

Paper edition with University of California Press.) At first exploring problems of human and brain physiology, the German researcher had moved for financial reasons to ophthalmology. He quickly gave that up, however, and turned to marine studies and to "physiological morphology" during research visits at the Naples Zoological Station. After marrying an American, he resolved to move to the United States to pursue a scientific rather than a medical career. Bryn Mawr College had an opening because E. B. Wilson and physiologist F. S. Lee had just left for Columbia. T. H. Morgan had agreed to serve as the head of biology, but Bryn Mawr needed a physiologist as well. Unfortunately, Loeb was a German Jew—a problematic status indeed. Nonetheless, he was hired in 1891, but stayed only one year before moving on to the University of Chicago. His very first summer, Loeb also accepted C. O. Whitman's invitation to join the MBL staff as the head of a new physiology course, a position from which he inspired considerable interest in that functional side of biological processes.

Loeb's successful production of artificial parthenogenesis in sea urchins provoked great public attention, with newspaper headlines screaming about "Creation of Life" and "Immaculate Conception Explained." Public acclaim and controversy followed. In fact, other researchers, including Morgan, had developed techniques for initiating the division of sea urchin eggs without male fertilization. But only Loeb saw why that phenomenon might prove interesting. And only Loeb worked at getting the physico-chemical conditions just right so that he could make the development following artificial parthenogenesis work. Science should gain knowledge and understanding, then use it to make life better, he insisted.

In 1910, Loeb moved from the University of California (where he had gone from Chicago) to a research position at the Rockefeller Institute for Medical Research. With a lab provided for him at the MBL in addition, Loeb was free to do his research without outside pressures. In this role, he became the model for Sinclair Lewis's pure scientist Max Gottlieb in *Arrowsmith*. But Loeb remained concerned with "engineering" or control problems as well. He argued that man's ethical system, for example, must be based in evolution-based instincts and therefore ultimately depends on chemistry and heredity. Similar understanding of other life phenomena would follow from a proper "mechanistic conception of life." With understanding would come guidance and control.

With such a set of emphases, Loeb provided an important influence at the MBL and for American science more generally. His enthusiasm for science and for research inspired many—even many who disagreed with his particular approach, with his conclusions, or with his personal ideals. His concern with the public side of science extended his influence.

It is worth recalling the original purpose of the MBL to see how well Loeb fit in. For like Loeb, the MBL had a public and educational goal for science. The MBL began when members of the Boston Society of Natural History and the Woman's Education Association of Boston decided to establish a place for teachers to teach biology to teachers. Massachusetts had made this necessary by passing a law requiring that science, including biological science, be taught in the public schools. Louis Agassiz's short-lived Penikese Island School and Alpheus Hyatt's Annisquam School had responded to the challenge, but neither was intended to be permanent. Massachusetts needed a permanent place to combine the doing of biological science with the teaching of that science, both to carry out new work and to carry the work to the public—all as part of the move to progressivism that intended to use science to improve the world.

The first group at the MBL was half women; the supporters included prominent women; and soon a few women even became instructors. In fact, women had become active educators in biology at a time when the women's colleges led the way in science teaching. Remember that Wilson, Morgan, and Loeb, for example, all really began their professional careers at Bryn Mawr College. Women have remained a central part of the MBL in various ways for one hundred years, and so has the public, educational mission of the place: through courses, through the Friday Evening Lectures, through other lecture series, through special events such as the MBL's one hundredth birthday celebration, and, above all, through the work of scientists such as Jacques Loeb and Gerald Weissmann.

Weissmann's recent volumes of essays about medical practice and medical science have reached a wide audience, an audience eager to learn not just the facts of science or the great discoveries but also about the process of scientific discovery, about the excitement of doing science, of succeeding and of failing. People want to learn about the social and historical aspects shaping scientific work. They want to understand and to be able to use science. Many want to learn in order to be better able to teach about science themselves. Gerald

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Weissmann cares about addressing these concerns as he cares about the public and educational goals of science. He perpetuates the spirit of the MBL as Loeb did. It is therefore particularly appropriate that Gerald Weissmann honored Jacques Loeb on the one-hundred-year anniversary of the dedication of the Marine Biological Laboratory.

**Gerald Weissmann** is a graduate of Columbia College (1950) and NYU School of Medicine (1954). After clinical training at Mt. Sinai and Bellevue Hospitals (under Lewis Thomas) he did postdoctoral work in the Department of Biochemistry at NYU (with Severo Ochoa) and at the Strangeways Research Laboratory, Cambridge (with Dame Honor Fell). Since then, he has remained at NYU's Department of Medicine, where he has been a professor of medicine and director of the Division of Rheumatology since 1973. His research on inflammation and the structure of lipid membranes (liposomes) has won him the Robecchi Prize in Rheumatology, the Lila Gruber Award for Cancer Research, and the Distinguished Investigator Award of the American College of Rheumatology (1992). He has been president of the American Rheumatism Association (1982-83) and the Harvey Society (1981-82). He has spent every summer since 1970 doing research at the MBL; he received the MBL award in 1976 and 1979. An essayist for *Hospital Practice* magazine since 1973, Dr. Weissmann's essays and reviews have appeared in *The New York Times*, *The Washington Post*, and *The New Republic*. They have been collected into three volumes: *The Woods Hole Cantata* (Dodd, Mead; 1985), *They All Laughed at Christopher Columbus* (Times; 1987), and *The Doctor with Two Heads* (Knopf; 1990). Dr. Weissmann is currently the editor of *MD* magazine.