Vignette: Leo Szilard

Enmity to [Szilard] is partly based on formalities, such as curt behavior, which does not serve the purpose when official personalities are to be faced. . . . Nobody understands his motives, his interests, his attitude. His lack of self-interest evokes mistrust. . . .

As far as I myself am concerned, I consider S. one of the rarest phenomena, to be judged in a positive way, a person whose qualities can be utilized only with difficulty in the present economic system. He is what he seems to be: an idealist devoted to the task. As his consciousness, however, is materialistic, leaning to experimenting, and agnostic, he fails to understand himself, same as the world fails to understand him. I am holding him in honor, and I value him.

—*Karl Polanyi*, around 1938, in a letter to his brother Michael, as quoted in *Genius in the Shadows*

Commission, published in 1962) that Rudolf Peierls and Otto Frisch's work in wartime Britain, embodied in the reports of the MAUD Committee and conveyed to Vannevar Bush and James Conant by Kenneth Bainbridge and Charles Lauritsen in the fall of 1941, was decisive in committing them and the National Defense Research Committee to the project and in initiating the massive effort that led to Stagg Field, Argonne, Oak Ridge, Hanford, and Los Alamos. Moreover, as has been emphasized by McGeorge Bundy in *Danger and Survival: Choices About the Bomb in the First Fifty Years*, it was because Conant and Bush committed themselves to the effort before Pearl Harbor that it was feasible to give it the support and momentum that made the commitment irreversible. This would have been impossible if the decision had had to be made after Pearl Harbor in competition with more immediate and pressing demands. The larger picture in no way detracts from Szilard's crucial contributions to the project, but it places the events in their correct perspective. It was the British effort that played the all-important role in getting the American effort going at a level that would guarantee success, not Szilard and Einstein's initial démarche. Unfortunately, the book makes no reference to MAUD, to Peierls and Frisch, or to Bundy's account.

The biography suffers from other defects. To comprehend why so perplexing and peculiar a personality as Szilard was taken so seriously in scientific circles it is important to appreciate his powers in scientific matters, and the book is weak in its presentation of that aspect of his activities. The reader cannot appreciate the significance of Szilard's work in thermodynamics in 1922 or his role in shaping molecular biology after the war from the descriptions given in the book, which are at best superficial and at times wrong, nor are Szilard's general acuity and brilliance in dealing with scientific issues adequately conveyed. In almost any area of science Szilard had the ability to go to the heart of the matter, extract the essential element, and find marvelous but credible ways to account for the phenomena that had been observed. The scientific community accepts behavior from its most brilliant members that would never be condoned in the society at large, and as long as he thought what they were doing was worthwhile and interesting, people got enormous pleasure as well as valuable insights from discussing things with Szilard—though his associates did indeed find it difficult to reconcile his deep commitment to critical inquiry with his mania for patenting all the devices his scientific ideas suggested to him.

Despite its shortcomings, the biography is a valuable piece of work. Lanouette corroborates and gives further evidence—based on FBI files and on documents from the Groves papers—that it was the war, and in particular the Manhattan Project, that transformed the political framework in which scientists operated. The national security state was born with the war, and with the Manhattan Project. Groves testified at the Oppenheimer hearings in 1954 that by 1942 he had no illusion "but that Russia was our enemy." From its very inception he directed the atomic bomb project and instituted its security system on the basis of that assumption. Szilard was always suspect and was constantly watched by the FBI. Initially this was due to the antipathy of Groves. Later on, Szilard's forthright stand against the use of the bomb on Japanese cities, his commitment to the international control of atomic energy, his unconventional views on how to stabilize the arms race by abolishing secrecy, and his proclivity for carrying on personal diplomacy at the highest levels all reinforced the presumed need for surveillance. The FBI files Lanouette studied are voluminous. The biography vividly describes Szilard's postwar political involvements to try to make the world a safer place to live in and sensitively delineates the role he played in shaping the character of the Salk Institute.

The physicists who created quantum mechanics had been brought up with the belief that rigid boundaries existed between the moral and the physical domains. They helped destroy that fiction. Szilard's life can be read as the attempt by a highly gifted and thoughtful person to find a means to build a stable world in which it is realized that the moral, the political, and the scientific spheres are inextricably related and constantly interact. For all his personal shortcomings Szilard's life and accomplishments merit close study. Lanouette has helped us in that task.

Silvan Schweber
Department of Physics,
Brandeis University,
Waltham, MA 02254

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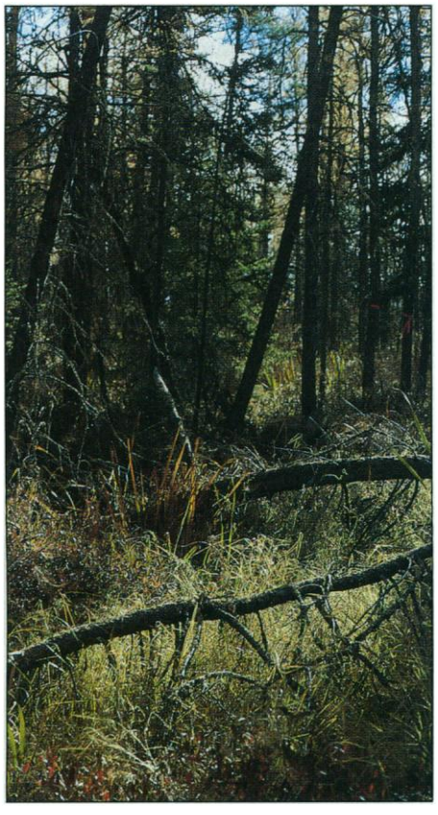
An Intricate Ecosystem

The Patterned Peatlands of Minnesota. H. E. WRIGHT, JR., BARBARA A. COFFIN, and NORMAN E. AASENG, Eds. University of Minnesota Press, Minneapolis, 1992. xx, 327 pp., illus. $44.95.

Cancers across the landscape to some, potential profit to others, wild beauty to still others—peatlands inspire a variety of reactions. With their complex patterns, strange plants and animals, mysterious soggy surfaces, and buried history of all of these features, how can they fail to intrigue? Yet the intricacies of peatlands and how this complicated ecosystem has developed have been relatively little studied. Take, for example, the carbon cycle. We know much about this cycle in oceans, lakes, and forests, but where are the data on peatlands, which have the largest carbon store of all northern terrestrial ecosystems? Out of this sea of ignorance comes a rich deposit of knowledge in the form of this book—a comprehensive treatment of the largest peatland area in the 48 contiguous United States.

The editors of *The Patterned Peatlands of Minnesota* have organized its 19 chapters around five major themes: vegetation (including development and landscape ecology), fauna, hydrology, historical development, and human influences. The contributions vary in quality, readability, and useful-

ness. Glaser's excellent chapter on the ecological development of patterned peatlands is superbly illustrated, and his well-written chapter on rare vascular plants should be read by anyone interested in this topic. J. Janssens's contributions are of mixed value. On the one hand, his chapter on bryophytes—plants that are extremely important in peatlands in terms of biomass and nutrient cycling as well as being significant indicators in classification—is superficial, consisting largely of a table showing the landform distribution of Minnesota peatland moss species, along with maps showing the location of collection sites and detailed drawings of some of the species. Although the illustrations are handsome, their value is diminished by the absence of corresponding text. However, Janssens's treatment, with Hansen, Glaser, and Whitlock, of the ecological development of peatlands makes full use of macrofossil indicators to reconstruct peatland history, even though the authors do not use the recently developed approaches that utilize multidimensional responses of species to environmental gradients. C. R. Janssen explains his earlier, pollen-based studies, which contrast with J. Janssens's more modern approach.



"A tree island. The tree islands are dominated by tamarack (*Larix laricina*) and occasional spruce (*Picea mariana*). Notice the substrate of dry moss-covered hummocks and water-filled depressions. The trees are *Larix laricina*." [From *The Patterned Peatlands of Minnesota*; photo by Paul Glaser, Red Lake peatland, 1978]

Of particular interest are the chapters documenting the human influences on the area. Meyer's review of the Red Lake Ojibwe helps us to better understand the complex interactions between the peatlands and the native Americans and early European settlers. And no source provides better coverage of the early history of drainage attempts than Bradof's overview of efforts in the early 1900s in the Red Lake area.

A significant weakness of the book is its lack of material on processes and biogeochemical cycles, in which peatlands play important roles. For example, there is no coverage of carbon, nitrogen, sulfur, methane, or carbon dioxide dynamics, despite the fact that peatlands, including the Red Lake area, serve as important sinks and sources of carbon.

In the early 1970s, when I began to study Michigan peatlands with Howard Crum and Nancy Slack, I frequently referred to Verona Conway's (1949) and Miron Heinselman's (1950s) early works on Minnesota peatlands. At the time I had no idea how extensive these peatlands were. When I first met Herbert Wright at a Friends of the Pleistocene meeting in 1967, my interest was further stimulated. The development of a world-class group of peatland researchers at the University of Minnesota, including Eville Gorham, Paul Glaser, and Jan Janssens, set in motion a program of peatland investigation that is still talked about today. *The Patterned Peatlands of Minnesota*—the culmination of the efforts of all these scientists—establishes a benchmark for North American peatland ecology.

Dale H. Vitt
Department of Botany,
University of Alberta,
Edmonton, Alberta, Canada T6G 2E9

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Fisheries Oceanography

Marine Climate, Weather, and Fisheries. The Effects of Weather and Climatic Changes on Fisheries and Ocean Resources. TAIVO LAEVASTU. Wiley, New York, 1993. xii, 204 pp., illus. $49.95 or £32.50.

Although lip service is often paid to "environmental factors" in fisheries management forums, most people would be shocked by how little information is actually used to make management decisions, and by the general state of fisheries in North America. Cost-conscious politicians have contributed to the problem over the last few decades. Since catch statistics are less costly to obtain than complex environmental information, fisheries managers have relied on methods of assessing fish stock that are based on conventional equilibrium theory instead of considering the many ecological factors that directly affect fisheries production. These factors include natural physical processes such as weather and volcanism as well as human factors such as overharvesting, pollution, and habitat destruction. Conventional assessment models do not acknowledge that fish live in dynamic habitats or that they are harvested by fishermen concerned with day-to-day practicalities, both within and beyond their control. Consequently, conventional fisheries management is fraught with unpleasant "surprises."

In 1962 Taivo Laevastu and his colleague I. Helle published the first book on applied fisheries oceanography. The revised 1970 edition remains the leading source of wisdom about the different ways in which various fishing methods must take account of and respond to environmental processes. In more than 30 years of thinking about these issues, Laevastu has developed insights that only firsthand oceangoing experience and great concern for the fisherman's perspective can bring. Armed with only their own experience and knowledge of the price of fish, each day fishermen make decisions about where to fish, which species to target, and what kind of gear to use to optimize their catch. Knowledge of the behavior of fish in response to climate-driven oceanographic variability is essential for their success. In his new volume, *Marine Climate, Weather, and Fisheries*, Laevastu describes climatic, meteorological, and ecological factors that affect fisheries production, first from the perspective of at-sea fishing operations and then from that of resource managers. Throughout the book he suggests ways to better integrate the fishing industry and make it more attuned to environmental variabilities on all time and space scales.

Critics of fisheries oceanography often cite its failure to contribute significantly to an understanding of population responses to environmental variation. Yet Laevastu argues that this failure can be attributed largely to misguided approaches to the problems. He discusses the pitfalls inherent in interpretation of sea surface temperature, which is the most frequently referenced ocean variable but the one measured by the greatest number of methods, with different results. At any rate, fisheries oceanographic research should be conducted with the understanding that "surface water temperature is an integrator of action of several past weather elements on the sea surface layers" and that few if any of the critical processes for most fish populations take place in the top few meters of the ocean, the area that yields surface temperature data. Laevastu suggests that one among many pos-