BOOK REVIEWS

The House That Jim Built

Houses for Science. A Pictorial History of Cold Spring Harbor Laboratory. ELIZABETH L. WATSON. With Landmarks in Twentieth Century Genetics, A Series of Essays by James D. Watson. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1991. xvi, 351 pp. $75.

Cold Spring Harbor is a beautiful place. Great science is done there. These statements are both true, but are the two facts linked, as this elegant book implies? By interleaving straightforward descriptions of scientific accomplishments with stunning images of landscapes and buildings at Cold Spring Harbor, Elizabeth Watson encourages the reader to embrace the idea that great science is best done in beautiful surroundings. This seductive idea, which stems from the pastoral intellectual movement of the 19th century, remains surprisingly robust and has empowered much of the modern development of Cold Spring Harbor Laboratory. The laboratory's success is an affirmation that science at the highest level can profitably be carried out at some distance from the immediate problems of the real world.

Sadly, the relationship between scientific output and physical surroundings is not as simple as *Houses for Science* would have its readers believe. These days, good molecular biology pours as easily from drab buildings at state universities as from marble halls on the banks of the Charles. Laboratories with unpromising views of the outside world regularly produce people with great insights. Even at Cold Spring Harbor, the relationship between the science carried out in different buildings and the quality of the architecture is not clear. Some of the best work has been done in the most dilapidated of surroundings while some of the better buildings have yet to produce a good paper. Unhappily, there seems to be no easy way to judge the quality of scientists by the outside of the building they inhabit.

When Jim Watson became its director 25 years ago, Cold Spring Harbor Laboratory was intellectually rich and financially impoverished. Watson's predecessor, John Cairns, was a logical reductionist, and his response to the laboratory's surging tide of red ink was to abandon all activities that could not satisfy the most stringent of intellectual criteria. This policy led to strategic withdrawal from the more dilapidated of the laboratory's buildings, which were left to fend for themselves during the long winter and were occupied for only a few short weeks each year by migratory scientists from New York City and Europe. What I remember most about these semi-abandoned laboratories is their luscious loamy smell—part must from old experiments and part humus from the plants and vines that had entered under doors and through windows that no longer closed. You could spend a delicious solitary winter's afternoon listening to the echoes of last summer's voices, analyzing the half-finished experiments that still lay on the benches and deciphering the diagrams and messages on the chalkboards.

Watson began the task of renovation and restoration rather slowly. Because the laboratory had no money to pay his salary, he retained his position at Harvard and would drive to Cold Spring Harbor on weekends in a predictably unreliable English sports car. Once there, he would spend much of his time walking around the buildings and grounds, pointing dramatically at things that were offensive to him. This generated a rather feudal ambience that was not to everybody's liking. Consequently, an early-warning system was set up in which people from Watson's laboratory at Harvard would let those of us who were at Cold Spring Harbor know whenever he declared an intention to visit. Those people who were most likely to incur his displeasure would then find an urgent reason to go away for the weekend.

As far as I remember, Watson never developed an overall plan for the physical renovation and scientific expansion of Cold Spring Harbor Laboratory. In the early days, most potential private donors were skittish, and charitable foundations were wary, about committing funds to what appeared to be a very shaky enterprise. For many years, construction and repair were synonymous terms at the laboratory, and most of Watson's decisions about improvements to the physical facilities were driven far more by exigency than by esthetics. This was not the case with his scientific decisions, which were always bold. Within a few months of his arrival he had decided that the laboratory should place a major emphasis on eukaryotic molecular biology. This could easily have turned out to be a disaster, since Cold Spring Harbor's enduring strength had always been genetics and prokaryotic molecular biology. Furthermore, the year was 1967—still, perhaps, the heyday of *E. coli*—when conventional thinking held that it was either too early to tackle eukaryotes in a sensible way or, worse, that it was pointless to work on them at all since all important questions could be fully answered by prokaryotic molecular biology. Consequently, there were only a few laboratories in the entire country that were seriously interested in eukaryotic work, and it was a brave decision on Watson's part to commit Cold Spring Harbor's fragile resources to expensive and potentially sterile work on higher cells.

For the first few years, the modernization process was driven essentially by immediate scientific needs. New staff were hired, then as now, on the understanding that all of their salary would be drawn from grants, and the indirect-cost allocations from the grants were used to improve physical facilities in the year-round laboratories. Gradually, the laboratory began to attract good students and postdoctoral fellows, and their success is both written in the pages of scientific journals and inscribed in the stones of Cold Spring Harbor's new houses for science.

The improbable and rapid resurgence of Cold Spring Harbor was, I believe, chiefly due to two factors. The first was Watson's beliefs that good science is difficult enough and that boredom is an excellent stimulus for bright people to produce very good work. Most of us who worked at the laboratory also lived on its grounds and were therefore insulated from the few temptations that occasionally came on offer in nearby suburban Huntington. If you lived at Cold Spring Harbor you rapidly became addicted to its beauty, and there was then very little reason to leave the laboratory's grounds or to think about anything but experiments. The second factor was the division of the laboratory into a number of small buildings, each of which developed its own scientific personality. The few minutes' walk between buildings provided intellectual breathing space. Within the cramped laboratories, by contrast, sharing of facilities was mandatory and ideas quickly became public property. The people who did best were willing to accept some whittling of personal ambition in return for collaborations that could be extraordinary in their intensity and discussions that at times were remarkable for their depth.

In more recent years, as the supply of private and public money has become more reliable and Watson's extraordinary talent as a director has become acknowledged and celebrated, it has been possible for him to

think on a grander scale about new buildings for science. The best of these—the Grace Auditorium—works marvelously well, and its beauty shines through in the handsome images in this book. By contrast, the latest building—the Beckman Laboratory—is perhaps not as good as Elizabeth Watson's book makes it appear. Monumental in both style and size, it looms on the ridge like a large headache, and its mass overwhelms the more modest buildings that have served the laboratory so well.

From time to time, a few of us who remember the old Cold Spring Harbor get together and bleat about its newfound aspect as a DNA theme park complete with coffee mugs, T-shirts, and tourists. Casual visitors who buy this exquisitely produced book will find it informative, accomplished, and engaging. But it cannot move them as it moves us, who still dream of Cold Spring Harbor as it was. *Houses for Science* is, after all, a chronicle of our youth.

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Hopeful Meetings

The Cybernetics Group. STEVE JOSHUA HEIMS. MIT Press, Cambridge, MA, 1991. xiv, 334 pp. $25.

To a diverse group of mathematicians and behavioral scientists the time seemed ripe after World War II for a collaboration that would blend the mathematics of cybernetics and game theory with the new look in anthropology, biology, psychology, political science, sociology, and psychiatry. The 30-odd participants included Norbert Wiener and Julian Bigelow from the mathematics and computer side and, representing a concern with the development of the behavioral sciences, Gregory Bateson, Lawrence Frank, Lawrence Kubie, Rafael Lorente de Nó, Margaret Mead, and Arturo Rosenblueth. The challenge to the group was put forth most eloquently by Warren McCulloch, a neurophysiologist who played a central role and who on occasion would quote, "Tell me where is fancy bred, Or in the heart, or in the head?"

The form of the collaboration was a series of meetings called the Macy Conferences on Cybernetics that took place between 1946 and 1953. The story told in this account of the enterprise is a curious mixture of real politics, academic politics, egos, and great optimism in a period of political and scientific transition. In this context, a group of professionals who had little solid intellectual investment in common came together in a manner that permitted them to suspend at least some of their prejudices and engage in mutual monologues and possibly dialogues.

This reviewer, as a graduate student and postdoc, knew many of the *dramatis personae* covered in this book. Their enthusiasms, prejudices, and prognostications helped to make me understand the distinction between science and the sociology of science. This is a book about the sociology of science. It is written like a whodunit. The approach is historical. The context is set for U.S. physical and social science in the Cold War period. The liberal or conservative backgrounds of the major participants are sketched; the growth of McCarthyism and its influence on the academic community are noted. The narrative begins with a coming together of optimists as early as 1942, when Frank, Mead, and Bateson met with McCulloch and Rosenblueth to sketch out new ideas promoting the interaction of the so-called hard sciences with the social sciences. The concept of feedback as a means of modeling and studying human behavior caught the imagination of all. What analogies were in the minds of Wiener, Rosenblueth, and Bigelow may, however, have been far from those in the minds of Mead, Bateson, or the psychiatrist Kubie.

Possibly the most charismatic and dedicated seeker of the grail of understanding the mind and brain was McCulloch, whose dedication to the concrete understanding of mechanisms could and did drive most psychiatrists to distraction. The model of the mind put forth by McCulloch and Walter Pitts was congenial with the ideas of Wiener and John von Neumann and can be regarded as a precursor of the field of artificial intelligence.

In the social dynamics of the meetings it is of interest to note that the psychoanalyst Erik Erikson was essentially vetoed as a member by the more mathematical cybernetics wing, while the physicist and biologist Max Delbrück was invited to join but after attending the fifth meeting commented that it was "vacuous in the extreme" and declined to attend further.

The book provides thumbnail sketches of many eminent social scientists of the time, among them Leonard Savage, Paul Lazarsfeld, Kurt Lewin, and Gregory Bateson. As the plot unfolds one sees the battle between Kubie and McCulloch, in which the former expressed concern that Warren "needed help."

Where does the tale come out? Although one should not give away the plot, reviewers of complex mysteries with large casts are trapped into at least giving hints.

In academia it is still possible to use the conference series as a quasi-institution that self-destructs sooner or later. The Macy conferences enabled a large number of distinguished professionals to interact with, stimulate, infuriate, or fascinate each other. Other potential participants, such as Delbrück or von Neumann, attended infrequently or refused to join. Those with a deep mission such as McCulloch forged ahead, conferences or no.

The practice of holding pleasant half-baked conferences aimed at interdisciplinary collaboration is highly desirable. But the product cannot be measured easily in terms of joint papers or "breakthroughs." The interaction helps to change mind-sets, but in general the process is not immediate. When we view the sweep of the physical sciences, biology, the social sciences, mathematics, and computer science in the last 40 years, it is clear that the changes have been enormous. "Cybernetics" was an "in" word in the '50s; "chaos" is in now; strange attractors have trendy proponents and conservative detractors, but nevertheless knowledge has accumulated. The vision of being able to produce viable models of the mind and brain is still there; but the problems in understanding both human and artificial intelligence grow as we understand more.

The story told by this book is fascinating. The last line is, "The conversation continues." It also changes and expands.

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Neural Oscillations

Suprachiasmatic Nucleus. The Mind's Clock. DAVID C. KLEIN, ROBERT Y. MOORE, and STEVEN M. REPPERT, Eds. Oxford University Press, New York, 1991. xvi, 467 pp., illus. $85.

Like the answer to the question "How many circadian biologists does it take to screw in a light bulb?" (see below*), this book is best appreciated by those with some background in chronobiology. The focus is on the mammalian suprachiasmatic nuclei (SCN), two tiny groups of neurons located deep in the

*Answer: Two, as long as they are relatively coordinated (a reference to the term "relative coordination," used to describe the situation of an oscillator periodically influenced by, but not fully synchronized to, an entraining cycle).