BOOK REVIEWS

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F. Aaserud, *Redirecting Science: Niels Bohr. Philanthropy and the Rise of Nuclear Physics,* Cambridge University Press, New York, 1990.

> "[Up] here I am really dreaming most of the day about the problem of evolution, on skis, though only when it goes up-hill, for when it goes down, there is luckily no question about any conscious analysis of the riddles of life." (*Bohr–Heisenberg*, January, 1930)

At first there was beer...Beer produced by the famous Carlsberg brewery. The owner, Jacob Christian Jacobsen, was one of the richest people in Denmark. The Carlsberg brewery became a symbol of success; it provided the owner with such a large income that a private foundation—the Carlsberg Foundation—was created in 1876 from the capital left by Jacobsen. The purpose of the Carlsberg Foundation was "for advancement of scientific purposes ... ." The Foundation played a large role in the cultural life of Denmark.

It is to this foundation that a young professor at Copenhagen University turned in 1917 with a request to finance acquisition of equipment for a new institute (Bohr sent the proposal four founding the institute to the directors of Copenhagen University in April of the same year). Later, the Institute also obtained support from other organizations, in particular, the International Education Board, which was backed by the Rockerfeller fortune, but the beer king's foundation is distinguished by its special participation in the fate of Niels Bohr.

The Carlsberg Foundation owns in Copenhagen a beautiful 19th century private mansion. The Foundation decided to bequeath the mansion "for life to a man or woman appreciated by society for his or her activity in science, literature, art or in other respects... ." Life in this luxurious mansion became an expression of highest honor for Dane. In 1932 Niels Bohr moved here from an institute apartment.

Fame did not change Bohr's character. His life was inseparable from the Institute's life. In other countries such a symbiotic, organic relation between the scientist and the Institute existed in Rutherford's Cavendish Laboratory in Cambridge. In our country we have A. F. Ioffe's Physicotechnical Institute (during its period of flowering) in St. Petersburg and P. L. Kapitsa's Institute of Physical Problems in Moscow. The direction of scientific research in such institutes has by no means always been determined by administrators, and their best years coincided with a period of relative freedom of creative activity. But, unfortunately, the end was banal. A. F. Ioffe one day found the door connecting his apartment with the working study sealed and P. L. Kapitsa had to spend several years under house arrest in his dacha in the environs of Moscow on Nikolinaya Gora.

Unfortunately, historians of science have not paid much attention to the birth and decline of scientific schools. Scientific institutes, like live organisms, age and die (though they often continue to exist even after their scientific death). It is obvious that besides the history of discoveries in science the so-called social history of science should also be an independent field of research.[1)] This is precisely the subject of Finn Aaserud's book. This is a social history of the young Institute from birth to maturity, when the Institute switched to a new subject area—theoretical and experimental study of the atomic nucleus.

Niels Bohr's style, deftly christened the "spirit of Copenhagen" by Heisenberg,[2)] was personified in this event. The switch to new tracks was done painlessly. The Institute immediately assumed its exceptional role in the global society, almost the same role that it played in quantum mechanics during its youth.

This process was initiated by Bohr himself. The restructuring started with the advent of the model of a compound nucleus, discovered by Bohr in 1932.[3)] But Bohr was not only a great physicist. He also had a talent for administration, and as an administrator he formulated precise goals, he was able to achieve success at different levels of administration, and he was able to lead coworkers of the Institute and young scientists who came to see him from around the world. Young and mature physicists ecstatically submitted to Bohr's authority, while maintaining their own independence in scientific deliberations and debate. The secret was simple but unusual: "We simply never considered anyone to be stupid" explained Bohr at a meeting in Moscow.[4)]

Speaking about Aaserud's book, at least a few words must be said about the author. A Norwegian by nationality, Aaserud graduated from Oslo University and selected as his specialty the history of science, in which he obtained a doctorate. He arrived in Copenhagen in 1989 from the Center for the History of Physics at The American Institute of Physics. At the Niels Bohr Institute he was the director of archives.[5)] His rare ability of working with archival documents enabled him to base his book on an unusually large number of letters and oral testimony. In the book the list of sources fills 19 pages. The author devotes another 50 pages to detailed commentaries. Adding an-

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other 18 pages of index, it can be concluded that the reference material constitutes about one-fourth of the book. The 3:1 ratio is probably a reasonable proportion between the free style of the exposition and accurate documentation.

Besides the main line of the exposition of the birth and rise of the physics of the atomic nucleus at the Institute, the reader will encounter in Aaserud's book an enormous number of familiar names: not only physicists, but also chemists and biologists worked at and visited Niels Bohr's Institute.

Using almost boundless material, Aaserud shows that Niels Bohr and his institute were successful not only because of the interaction between the staff and the Institute's director, but also, to a significant degree, for reasons lying outside science. The role of science in society changed, the principles of financing of science by governments and private foundations changed, scientists emigrated from Nazi Germany, and the authority of the director, who determined the relation between different foundations and the firms providing the equipment, increased. All these factors determine what can be called the ecology of science. People have acknowledged the role of ecology in the modern world only in our time. The neglect of the ecology of science has resulted in a crisis in science, reminiscent of the crisis in the state of the environment. Aaserud's book gives interesting and instructive material about the ecology of a healthy scientific society.

[1)] I can think of only one serious monograph on this subject, M. S. Sominskii's book *Abram Fedorovich Ioffe*.

[2)] The term Kopengagische Geist first appeared in Heisenberg's lectures, which he read at Chicago University in the spring of 1929.

[3)] Biology developed at the Institute in 1929–1936, prior to the "epoch of the nucleus." Bohr was fascinated with the idea of complementarity in application to the living world. A significant part of Aaserud's book is devoted to the story of this transitional period. Bohr inherited his interest in biology from his father, the physiologist Christian Bohr.

[4)] Among Russian physicists, L. D. Landau and G. A. Gamow worked with Bohr. They not only made a significant contribution to the Institute, but they also contributed the spirit of a libertine, which Bohr accepted completely. Otto Frisch recounted in amazement how Bohr discussed some physical questions with Landau who conducted the debate lying on his back on a table. Gamow staged in celebration of Bohr's fiftieth birthday the paradistic opera "Faust," the Russian text of which (translated by G. L. Vardengi) is published in the third issue of the Journal "Priroda" for 1972.

[5)] At what other institute does a young doctor of science manage the archive?

Translated by M. E. Alferieff