Book Reviews

A Theoretical Physicist

Landau. A Great Physicist and Teacher. ANNA LIVANOVA. Translated from the Russian edition (Moscow, 1978) by J. B. Sykes. Pergamon, New York, 1980. x, 218 pp., illus. $22.50.

Anna Livanova quotes the poet Mayakovsky as saying, "I am a poet. That is what makes me interesting." Lev Davidovitch Landau was a physicist, and, as Livanova says, that is what makes him interesting. This little book, although it is written with a bit too much naïve adulation and Russian schmaltz, is interesting because it presents a true picture of Landau and the attitude toward him in his school.

Landau was as extraordinary a man as he was a physicist. He claimed with characteristic immodesty, ignoring his friends Peierls and Weisskopf among others, to be "the last universalist." He was one of the giants and had the charm, quickness, and fire—and ability to advertise himself—that evoked the kind of adulation that surrounded that other "swami" of physics, J. Robert Oppenheimer. Landau is often compared to Pauli because of their quickness, cocksureness, and stinging tongues, but it is the charismatic Oppy I find myself thinking of. There is even a physical resemblance between Landau and Oppenheimer, and again and again in the book the quality of Landau's personal friendship and his warmth and gaiety in social situations are attested to, as is the case with Oppenheimer but not with Pauli.

These two "swamis" of physics, however, exerted two different forms of moral leadership and had very different effects on their worlds. Oppenheimer tasted power, built the Bomb, and by his own testimony "knew sin," returning to the seminar room only late in his career. In the Soviet Union, the bright, irreverent Jew Landau barely managed to stay in the seminar room but nonetheless built a great school and a far greater edifice of scientific achievement; beside Landau, who is responsible among many other things for modern condensed matter physics, Oppenheimer is merely a footnote in theoretical physics. The kind of leadership image Landau represented is expressed in a key quotation from Livanova's admiring introduction:

> Though seeming to some a person aloof from ethical questions, he became something of a moral paragon by his purely scientific and professional work. . . . In all his actions Landau was essentially defending physics against . . . debasement. . . . Genuine science is essentially moral.

We will never know how much the differences between Landau and Oppenheimer were conditioned by the differences between the two countries.

Livanova's charming book is full of Landau stories; as with those of Bohr, Onsager, or Pauli, Landau's legend was maintained by characteristic anecdotes. But the book concentrates primarily on the physics: half of its all too few pages are a very good popular but historically accurate account of Landau's theory of liquid helium, for which he received the Nobel Prize. Of Landau's parents and childhood, we get one page; of his wife and son, three sentences. His troubles with the regime are all conveyed between the lines; we note the statement that at Kharkov

> his closest and dearest friends were experimentalists—Lev Shubnikov and his wife. . . . Shubnikov was "Fat Lev," Landau "Thin Lev."

A page later:

> The conflicts in which Landau and some of his friends and pupils became involved led to considerable unpleasantness that was a serious matter. In the end, it was necessary to think of moving to another city.

To interpret these passages properly, one has to remember that Shubnikov was killed by the Stalinists and that Landau had to move. It is perhaps amazing that in a Russian book the evidence is there at all. There is also an easily interpretable account of the kidnapping of Kapitza and his helium liquefier from Cambridge by the regime and Kapitza's later protection of Landau.

Much fuller is the description of Landau's teaching methods, of the informal atmosphere of his seminars, at which the audience joked and roared and the speakers quaked in fear of being dismissed with "What next?" Reading of the atmosphere around him, one begins to find almost plausible the incredibly great school of pupils and associates he built up in the most miserable conditions, surrounded by incompetence and cut off from the world of physics by barriers erected by a barbarous regime.

Livanova is open enough to document a few of the weaknesses of Landau's cocksure, ad personam, open-and-shut judgments, but she fails to mention the most important: his refusal to accept the relevance of Bose condensation to superfluidity, probably because it was suggested by minds he could not tolerate—notably that of Laszlo Tisza. Perhaps this was behind the famous incident, documented in Abrikosov's London prize lecture, of Landau's advice to Abrikosov which led him to put away his theory of Type II superconductivity for seven years.

Nonetheless, this is a minor fault when compared to the admiration evoked by a man who could say things like the following:

> You ask . . . which branches of theory are the most important. . . . One must have a rather ridiculous immodesty to regard only "the most important" problems of science as worthy of one's interest. [A] physicist should . . . not embark on his scientific work from considerations of vanity.

In the end, I am as committed a member of the Landau cult as any of his pupils and as sensible to the loss of him, far too early, from an auto accident. I am also sensible to the loss, caused by the Soviet regime's policies, of the West's communications with the superb Landau school, which was just beginning to recover from the death of its leader.

P. W. ANDERSON
Princeton University, Princeton, New Jersey 08544

Internationalism in Denmark

The Early Years. The Niels Bohr Institute 1921-1930. PETER ROBERTSON. Akademisk Forlag, Copenhagen, 1979. 176 pp., illus. $12.20.

The creation of quantum mechanics in the 1920's, one of the main intellectual achievements of this century, was primarily the work of a small band of young and brilliant, well-bred European physicists who trained and traveled among a handful of European centers of physics, such as Munich, Göttingen, and Cambridge. But it was in Copenhagen, in Niels Bohr's Institute for Theoretical Physics, that they and their science were