Birth and growth of Ψ

ERWIN SCHRÖDINGER: AN INTRODUCTION TO HIS WRITINGS. By William T. Scott. 175 pp. U. of Mass. Press, Amherst, Mass., 1967. $6.50

by Nandor L. Balazs

During the 19th century attempts were often made to classify the creative temperament, the creative process being specialized to mean art and literature. Could one do the same for the natural sciences? Here too, one often speaks about the beauty and elegance of a theory and judges accordingly the efforts of people. But not only that! There are certain ways of approaching a problem we prefer to others; there is a style of action and a presentation one often prefers; a paper by Wolfgang Pauli is different from a paper by Erwin Schödinger and both differ, say from a paper by Niels Bohr. One of the pleasures of reading collected works is to discover the basic trend, the fundamental preoccupation of these people, and try to guess how this is linked to their personalities and temperaments.

Schrödinger's collected works have not appeared, and if we desire to read him we must go to his original papers (more than 150) and his books. This effort is interesting for several reasons: You will learn a great deal of physics, you will learn about Schrödinger, and you will discover a different atmosphere. In many ways Schrödinger and Einstein were the last two great 19th century physicists. Their views of the external world were different, and this reflected itself in their views on physics as well. The present book is a guide, and a pleasurable one, through Schrödinger's work and his interpretation of physics and the world.

There are four distinct parts to the book. One deals with Schrödinger himself and contains a biography and a bibliography; the next analyzes Schrödinger's work in statistical mechanics; after that the author describes the development of wave mechanics and Schrödinger's interpretation of it; finally the author presents Schrödinger's philosophical views on nature and consciousness. (What is not discussed in detail at all is Schrödinger's work on affine field theories. This work occupied the last 15 years of his life, and even though most physicists lost faith in unified classical field theories, the mathematics in these papers is very beautiful. The work is also relevant to Schrödinger's philosophical beliefs.) Each section is written with great care and contains a wealth of information, which shows the author's complete mastery of Schrödinger's writings and their relation to other people's work. To assess this mastery one only has to draw attention to things seldom mentioned. For example, the author points out that the equivalence of matrix mechanics and wave mechanics was first demonstrated not by Schrödinger, as is commonly quoted, but by Carl Eckart, on the other hand we again discover that the Klein-Gordon equation was first given by Schrödinger. (I may add here that Schrödinger once told me that he actually found the Klein-Gordon equation and solved it for the Coulomb problem *before* he found the Schrödinger equation; the order of publication is not the historical order.)

Physicists will also be interested in reading in more detail Schrödinger's efforts to grapple with the interpretation of quantum mechanics. Nowadays we teach the standard interpretation as if it would be obvious. Is it?

The author has presented us with a lovely book. It is written by a practicing theoretical physicist—one who is curious about the process of doing

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ERWIN SCHRÖDINGER, 1887–1961

physics as well. I am convinced that the present work will tempt many to read Schrödinger's original papers again.

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Soviet radio astronomy

RADIO TELESCOPES. Proc. (Trudy), P. N. Lebedev Physics Institute, Vol. 28. D. V. Skobel'tsyn, ed. Trans. from Russian. 270 pp. Consultants Bureau, New York, 1966. Paper $22.50

by George W. Swenson Jr

This is a compendium of papers on radio astronomy and related topics from the Radio Astronomy Laboratory of the Lebedev Physics Institute of the USSR Academy of Sciences. The director of the laboratory is the well known radio astronomer, V. V. Vitkevich, who states in the preface, ". . . the present collection does, in a sense, sum up a stage in investigations associated with large telescopes and, in our opinion, will be of interest not only to scientists directly concerned with the field of radio astronomy, but also to those specializing in antenna techniques."

In fact, the volume is devoted almost exclusively to instrumental problems; only three of the 17 papers deal with strictly astronomical topics. This is not inappropriate: 35 years after the birth of the science, radio astronomy is still dominated by instrumental problems, and the wise radio astronomer does not take his instruments for granted. Even so, the design details of important radio telescopes are not easy to locate in the literature. Major radio telescopes usually are unique in respect to their size, complexity and cost, rather than to their basic scientific principles; thus, their descriptions are often not acceptable as publications in the better engineering journals. Neither do they qualify as research publications in astronomy or physics. Nonetheless, the design and performance parameters of a radio telescope are essential to the interpretation of the data it produces, and the Lebedev group are to be commended for their efforts to disseminate the principles and characteristics of their instruments.

The Lebedev group is one of three major radio astronomy laboratories in the USSR whose works are well known to Western radio astronomers. The others are at the University of Gorkii and at the Pulkovo Observatory at Leningrad.

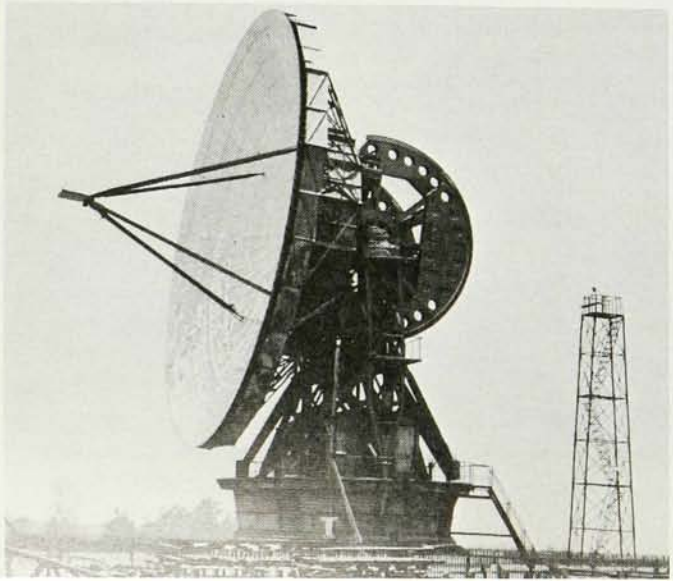
The Shternberg Astronomical Institute in Moscow apparently uses the telescopes of other organizations. In an effort to determine which telescope was used for one well known set of observations from the Shternberg Institute, the reviewer was led by cross references through two volumes of the *Soviet Astronomical Journal*, the journal *Radio Engineering and Electronic Physics* and finally, to "the 12 May 1961 issues of the newspapers *Pravda* and *Izvestia*." The front page of *Pravda* for 12 May carries a short announcement by the USSR Academy of Sciences of the detection of Venus by a radar experiment, but no description of the instrument. Probably it is a classified deep-space communication facility in the Crimea, consisting of an array of eight 16-meter parabaloids. Unfortunately, the absence in the technical literature of an adequate description of the instrument strongly limits the usefulness of its published scientific observations.

A survey of the numbers of papers on radio astronomy published in Soviet astronomical journals and in special volumes during the years 1966 and 1967 gives the following results, by observatories: Lebedev, 39; Pulkovo, 49; Gorkii, 26; Shternberg, 18; others, 15.

These 147 papers represent 16% of the total number of papers on astronomy published in the major Soviet astronomical journals and observatory bulletins. This percentage is probably biased in the higher sense by the inclusion of radio-astronomy papers from two special compendia (the present one and a similar one from Pulkovo) and by the omission from the survey of some observatory-bulletin series containing little or no radio astronomy.

A similar survey for 1965 and 1966 yields 153 radio-astronomy contributions in the two major publications of the American Astronomical Society, comprising 14% of the total number of papers and communications. Many additional radio-astronomy papers are published in journals of radio engineering and geophysics and in general

22-METER PARABOLOID at Serpukhov in 1961.



G. W. SWENSON JR

1-km MILLS-CROSS at Serpukhov in 1961.