Book Reviews

Biography of a Reluctant Subject

Einstein. The Life and Times. RONALD W. CLARK. World, New York, 1971. xvi, 720 pp. + plates. $15.

Every biographer of Einstein must be uncomfortably aware of the potentially disapproving judgment implicit in a remark from Einstein's own "Autobiographical Notes":" That which is essential in the life of a man of my sort lies in *what* he thinks and *how* he thinks, and not in what he does or suffers." This can be read as casting doubt on the whole biographical enterprise, and we do know that Einstein was not particularly enthusiastic about any of the biographies written about him while he was alive. It can also be read as a challenge to the biographer. Einstein became a world figure, a household word, extravagantly lionized and equally extravagantly abused in the public press, but he felt that all of this "belonged to another world, with which [he had] no connection whatsoever." The great thing in his life—its very core—was his scientific work, and it is up to the biographer to make this real to us. To do so takes much more than an exposition, popular or technical, of Einstein's scientific achievements as they appear from the standpoint of present-day physics. We have to see his ideas developing, his work in progress, and to see this work in the context of the scientific problems of his time. We have to be made to recognize the ways in which Einstein's particular mind grappled with these problems and to understand how that struggle made up the substance of what he considered to be his real life. The goal is to grasp or at least to appreciate what Einstein meant when he wrote, "But the years of anxious searching in the dark, with their intense longing, their alternations of confidence and exhaustion, and the final emergence into the light—only those who have experienced it can understand that."

This is not to deny the legitimacy of our interest in the personal and the public life of Einstein. It could hardly be otherwise: this man whose scientific achievements are the only parallel to Newton's was an extraordinary human being in many other ways as well. Of course we want to know as many details as we can find out about how he lived and what his relationships with his family and friends were like and what he did day by day—all in the hope, the vain hope, of understanding how this particular instance of supreme human achievement came about. And Einstein's unique role as a public figure is both part of the history of our times and a major aspect of his life after 1919. It is the easiest part of his life to document, and the natural favorite of popular biographers.

Ronald W. Clark's *Einstein* is not the biography that we have been waiting for. It has the appearance of a major work, not only because of its length, but also because of the extensive bibliography and copious notes, which together occupy some 65 pages. Clark has had access to the treasures in the Einstein Archive at Princeton, he has consulted many people who knew his subject personally, and he has studied manuscripts and other sources located in archives from San Diego to Rehovot. Nevertheless, his book does not begin to be an adequate treatment of Einstein.

Clark recognizes and says repeatedly that Einstein's scientific work meant more to him than anything else in his life, but his book does not often show us Einstein at work. Since he is not a scientist himself, Clark is simply not able to handle Einstein's physics with the understanding and assurance that are as much needed for popularization as they are for teaching. He is in no position to make an independent appraisal of the scientific importance of Einstein's papers, and the judgments he does express are often misleading. Einstein's three early papers on statistical mechanics, for example, although written before his great works of 1905, are hardly to be passed off as "the result of postgraduate enthusiasm"; these papers contain an independent analysis of the foundations of the subject and a treatment of fluctuations more profound than that of Gibbs or Boltzmann. Einstein's work on specific heats in 1907, to cite one more instance, was the first statement of the need for a quantum theory of matter, but Clark refers to it as merely "adding the odd page or two" to man's knowledge. The reader simply cannot rely on Clark's scientific history or his explications of scientific ideas as being either correct in detail or illuminating on the general tendencies of Einstein's work.

It would be difficult enough for a nonscientist like Clark to deal adequately with Einstein's science under any circumstances, but he has made his task even harder by adopting a Procrustean approach throughout his book. He sees Einstein's life as a series of paradoxes whose cumulative effect was to make him into "one of the great tragic figures of our time." The scientific paradox for Clark is Einstein's steadfast refusal to accept the generally received view among physicists since the late 1920's that quantum mechanics is a thoroughly satisfactory physical theory. Despite its formidable success, which he freely granted, Einstein could not reconcile himself to a theory that did not, as he saw it, give a complete description of the real physical system. His biographer needs to do more, however, than to describe Einstein's arguments as a "stubborn rearguard battle against the new movements in physics." Einstein himself considered his repeated and protracted attempts to construct a unified field theory as a possible route to the kind of physics he thought would replace quantum mechanics. He saw his work as a unity; he closed his "Autobiographical Notes" with the hope that he had shown "how the efforts of a lifetime hang together and why they have led to expectations of a definite form." The future will show whether or not he was right; his biographer need not sit in judgment on a scientific issue that divided Einstein and Bohr.

The real interest in Clark's book lies in the wealth of material that he presents concerning Einstein's external life. No other biographer has provided us

with so detailed an account of Einstein's career, his travels, and especially his activities on behalf of the causes to which he committed himself. Clark follows Einstein's concern for peace from his dissenting opinion on the German war effort in 1914, through his pacifist activities in the '20's, to his advocacy of armed collective security against Hitler and his fight for nuclear disarmament and world government after 1945. Clark also treats Einstein's increasing concern with Zionism from his 1921 lecture tour on behalf of the new Hebrew University in Jerusalem to his declining the presidency of Israel in 1952. But once again Clark mars his narrative by his continual patronizing criticism of Einstein. He is as likely to object to Einstein's "naive" pacifism as he is to his being a "cool customer" and rejecting pacifism in 1933. It might be worth quoting what that very politically conscious author C. P. Snow has written on Einstein's views: "About politics in the widest sense, I don't think there has been a world figure in my time who has been wiser than Einstein."

Einstein has not yet found his proper biographer, but perhaps it is too soon to expect one. The great bulk of his correspondence is still unstudied. His scientific development awaits the detailed and thorough analysis it requires. Only when these fundamental scholarly tasks are completed can the biographer go to work. Let us hope that Einstein will not have to wait as long as Newton.

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Antarctica

Research in the Antarctic. A symposium, Dallas, Texas, Dec. 1968. LOUIS O. QUAM and HORACE D. PORTER, Eds. American Association for the Advancement of Science, Washington, D.C., 1971. xvi, 768 pp., illus., + loose map. $24.95; members' cash orders, $19.95. AAAS Publication No. 93.

The most effective international and interdisciplinary symposium on Antarctic Research that I have been privileged to attend takes place on a continuous basis each summer in the United States Antarctic Research Program quarters in McMurdo Sound, Antarctica. During several weeks of research at McMurdo one meets a constantly changing stream of visitors. Many are scientists, experienced or young and promising, en route to or returning from their specialized field researches and full of the interest and excitement of the field program. Others may be Senators and Congressmen, administrators or scientists from other countries, reporters, NASA officials and astronauts. The resultant atmosphere with such a varied group leads to questions and answers and an enthusiastic exchange of ideas far into the night that most symposium organizers would envy. *Research in the Antarctic* records some of the ideas that at one point in time (around 1969) one could hear at McMurdo.

The editors say that it is "an outgrowth from, but not a complete record of" a symposium held by the American Association for the Advancement of Science. What is such a symposium meant to achieve and does this volume show this achievement?

This symposium embraces many fields. The reader therefore should expect broad summaries outlining progress in fields selected as representing the wide range of research that is being carried out. The authors of perhaps two-thirds of the papers have borne this need in mind and avoided too much technical terminology and too many minor references. Two or three papers go into so much detail that, although they will become standard sources of information in their subjects, they will not capture the interest of scientists in related fields. However, the majority of papers do have a wider appeal, and will stimulate thought on an interdisciplinary basis.

One example of this is the growing conviction among some Antarctic oceanographers of the role of bottom melting or freezing beneath the Filchner and Ross ice shelves as a source of the Antarctic bottom water which spreads out under so much of the world's ocean. The mass of water involved makes the process sound unlikely to a glaciologist, but more knowledge is needed. This should come before too long from the planned project for drilling through the Ross Ice Shelf.

The biological papers deal at length with ecological problems in marine and terrestrial environments, and emphasize the ease with which the ecological balances could be upset. The subjects of the behavioral studies range from human beings at the South Pole—"this particular and unique ecological niche"—to penguins. These birds, released in the middle of a snowy desert far from the sea in the Antarctic, steer in a straight line to the north northeast by the sun, correcting automatically for its movement of 15° per hour across the sky. When released under similar circumstances in the Northern Hemisphere, they apply the same correction for solar movement, but because the sun moves from left to right instead of right to left their course swings around by 30° per hour. The reviewer, as another native of the Southern Hemisphere, feels much sympathy for such penguins, since he also lost his instinctive sense of direction when he moved to the Northern Hemisphere.

The glaciological section deals largely with the nuts and bolts of Antarctic glaciology, rather than presenting the exciting new results from deep drilling in the ice. It is a pleasure, however, to find that, as usual, an administrator as senior as A. P. Crary does not mention administration once but asks interesting questions about the effect of ice loads on the earth's crust and mantle in relation to current ideas on the distribution of viscosity in the interior of the earth. Other sections deal with weather systems on macro and micro scales, and there are illuminating contributions on the upper atmosphere and on Gondwanaland by authors distinguished for their work in these areas.

All the authors come from universities and research institutions within the United States. The American character of the volume is further emphasized by an opening tribute to and reprinting of some interesting papers by James Eights—"the first qualified naturalist to set foot on land south of the Antarctic Convergence." This American emphasis is natural for a symposium of the AAAS. It brings home the success of the National Science Foundation's policy of involving leading research scientists throughout the United States in the Antarctic program. International aspects of Antarctic work are not neglected, either by individual contributors or by the editors, who have included opening chapters on SCAR (the Scientific Committee on Antarctic Research) and the Antarctic Treaty. However, no opportunity is given for authors from other countries to express thanks for the tremendous opportunities created by the NSF and the U.S. Navy for their research in Antarctica.

Printing, illustrations, and diagrams are effective, and one does not at first realize that the volume contains 750 pages. There are many very interesting