shows the overwhelming influence of the scientific preferences of a handful of powerful Swedish scientists. Fortunately their views coincided with the majority views among their foreign colleagues. Yet in terms of numbers of nominations for individual candidates there was little clustering of "votes" and little correlation between numbers of votes and winners, save for the first few years. In the two years in which Marie Curie received her prizes, she obtained a total of only three nominations, whereas Henri Poincaré, who received numerous nominations, never did receive a Nobel prize. Instead, the determining factor on the physics committee was the majority drawn from the University of Uppsala, where physics, as was often the case elsewhere, was taken to mean experimental physics, theoretical work, well represented at the rival Högskola in Stockholm, being considered speculation. The wording of Nobel's will, establishing a physics prize for "the most important discovery or invention," could be read in favor of the Uppsala physicists. Only after World War I did they, and the physics profession at large, fully consider theoretical discoveries and inventions prizeworthy. In the chemistry committee Arrhenius and his preference for the ionist school of research predominated, although not as pervasively as did the experimentalists among their physics counterparts. Comparisons of the fields of future winners would be of interest here. Are trends such as these perceptible in later years? Further attention to the "losers," both individuals and fields, in relation both to other nominees and to those not nominated, would also be of great interest. One wonders how, in hindsight, the winners and losers compared with each other and where they stood with regard to the overall development of science in the period. Did these prizes and prizewinners really warrant the abundant prestige they bestowed and received?

Crawford does not neglect the crucial role played by the public in the establishment of the prizes and their prestige. The awarding of the prizes created a kind of symbiosis between science and the public of which the awarding bodies were probably not unmindful. The huge financial awards, endowed by the inventor of dynamite for accomplishments yielding "the greatest benefit to mankind," easily captured the public imagination. Though the other prizes (literature, medicine, peace) at first gained more attention, the award of the 1903 physics prize to Becquerel and the Curies for their work on radioactivity vastly increased the public fascination with obscure researchers working in exotic fields on problems with unheard of implications—a fascination that has never ceased entirely. This soon translated into more financial support for science, which in turn generated more public interest in the science prizes and more approval of them among the grateful scientists. Although Crawford does not consider the issue, public fascination also tended at the same time to distort the image of scientific advance, making it appear overly individualistic, heroic, and unique—images that have also persisted. Discoveries are not always the work of one or two isolated individuals; nor is it always valid to categorize major advances in terms of Nobel-prize worthiness. One wonders whether later prize practice has taken such criticisms into account.

When Nobel laureates began to place their prestige overtly in the service of their belligerent nations in 1914, Arrhenius petitioned the Nobel Foundation to suspend the awards until the cessation of hostilities. Nobel's high ideals had obviously (then as now) not transferred to all his laureates, nor could the international prize long survive as a weapon of world warfare. The wartime hiatus provides a convenient closing to this first chapter in the history of the Nobel prizes, of which Crawford's welcome study takes wise advantage. The availability of the Nobel archives provides a major new source for the history of science in this century. Readers will eagerly await further well-argued installments based, like Crawford's, on this rich resource.

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Reforms in the Royal Society

All Scientists Now. The Royal Society in the Nineteenth Century. MARIE BOAS HALL. Cambridge University Press, New York, 1984. xiv, 261 pp., illus. $49.50.

The Royal Society has long and deservedly been much studied, but attention has focused chiefly on its founding and its first century and a half of existence. Hall's account of the Society in the 19th century is the first to cover in detail a later span of its history and is an important addition to the five official chronicles (1667, 1756, 1812, 1848, and 1944) and numerous other books and articles dealing with this oldest of scientific fellowships. Hers is a careful, well-organized, and graceful record of a century of change and of the persons and events that brought about the orderly transformation of an influential institution into an equally commanding but modernized scientific association. Her previous work on Robert Boyle, Henry Oldenburg, and Isaac Newton has given her invaluable experience in utilizing source materials related to the Royal Society, and her familiarity with British science enables her to put it to good use in the present volume.

Changes in the Royal Society in the 19th century reflected changes in science itself, as the discipline moved from being an amateurish enterprise to becoming a highly professional activity. In 1800 the Society was at the midpoint of the 42-year-long presidency of Sir Joseph Banks, a benign and respected despot who formed organized English science into a pattern fitted for his times. Hints of change, however, began to emerge early in the century, the two most significant being the formation of new specialist societies (the Geological in 1807, the Astronomical in 1820) in fields already addressed by the Royal Society and the election, after Sir Joseph's death in 1820, of two working scientists—W. H. Wollaston (interim president, 1820) and Sir Humphry Davy—as his replacements. A contingent of active fellows, including a group of younger men, began to press for greater emphasis on science and for reforms in the selection of members and in the operation of the Society, demands that grew louder during Davy's tenure and that of his successor, the conservative Davies Gilbert.

By 1830 the reform group was sufficiently aroused to take the unusual step of contesting a presidential election. Their candidate, the astronomer John Herschel, lost by a mere eight votes to the Duke of Sussex, royal nominee of the traditionalist faction. Nonetheless, when Sussex left office in 1838 most of the changes earlier called for had been quietly and amiably effected, together with a more business-like administration of Society affairs. Under the next three presidents—the Marquis of Northampton (1838–48), the Earl of Rosse (1848–54), and Baron Wrottesley (1854–58), able men of high birth and strong scientific interests—this quiet revolution continued.

Henceforth all presidents of the Society—and there were 18 in the 19th century in contrast to eight in the 18th—were practicing scientists of outstanding reputations, the presidency customarily alternating between the biological and the physical sciences. Other offices in the Society continued to be filled by capable

scientists; power was happily and successfully shared by the president and the council. Minor flurries occasionally arose but were soon resolved. Growing insistence on scientific qualifications for new fellows had, by the end of the century, elevated election to an internationally recognized mark of scientific approbation.

Hall deals also with the useful encouragement of science provided by the Society. She considers the relations of the Society with government, which frequently solicited its advice about scientific matters, and its cordial and cooperative dealings with other learned bodies. Her chapter on its encouragement of scientific exploration is particularly interesting.

By the end of the century the Royal Society stood as a model for superior societies everywhere, its fellowship now scientists all and its activities profoundly useful. Twenty-seven excellent illustrations add to the enjoyment of this authoritative book.

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Letters from Russia

Kapitza, Rutherford, and the Kremlin. LAWRENCE BADASH. Yale University Press, New Haven, Conn., 1985. xii, 129 pp., illus. $20.

Valuable, scholarly books on the history of Soviet science are not many. A principal reason for this is that scholars who have access to archival sources are not free to write the whole truth and those who have freedom have no such access. Soviet historical literature, although abundant, has somewhat limited informational value, since one of its implied functions is to improve the image of the system. The Soviet past is still crowded with Orwellian un-persons and un-events. Western students of Soviet history are, on the other hand, in the situation of the proverbial drunkard who looks for his lost watch under a street lamp because that is the only illuminated spot around. They have to content themselves with scraps scattered among archival collections in the West, only rarely being given very restricted access to the Soviet archives. In this situation, Lawrence Badash's book on Peter Kapitza comes as a welcome surprise. Making use of previously unpublished documents found in the Rutherford collection in the University Library at Cambridge, England, Badash proves that under some lamps one can still find something of value.

The role played by Kapitza in the development of Soviet physics was both practical and symbolic. As the director of Moscow's Institute of Basic Physical Problems Kapitza was the founder of one of the world's best centers of low-temperature physics; his personal scientific contributions were recognized internationally and won him the Nobel Prize in physics in 1978. His own government bestowed highest official honors upon him—he was awarded the Order of the Red Banner of Labor and four times the Order of Lenin. His life, however, was not just a simple success story. The vicissitudes to which he was subjected made his fate symbolic in two respects: first, the Soviet authorities, who valued his services highly, granted him everything except personal freedom. For a very large part of his active life Kapitza was, for all practical purposes, a prisoner in his own country. Second, his case was also characteristic of the tangled relationship between Soviet scientists and the foreign intellectual community. This relationship was marked by a mixture of dependence and official mistrust. The Soviets borrowed from the West, at the same time rejecting its values; most of the leading Soviet physicists of the 1930's were educated abroad and then denied the possibility of continuing working contact with their Western colleagues.

Kapitza belonged to this select group. In 1921, as a young scientist with an engineering background, he went to Cambridge to work in the famous Cavendish Laboratory under the direction of Ernest Rutherford. Kapitza did so well that he was soon appointed professor of the Royal Society and director of his own magnetic laboratory. These accomplishments did not go unnoticed in his native country, but the recognition took a peculiar form. In the summer of 1934, during a visit to his homeland, Kapitza was detained and denied the right to return to England. With the exception of short visits abroad some 30 years later, he stayed in the Soviet Union until his death in 1984.

Badash's *Kapitza, Rutherford, and the Kremlin* focuses on the 1934–35 episode of Kapitza's life. It is based on a collection of Kapitza's letters to his wife, Anna, who remained in Cambridge for about a year after his detention in the Soviet Union before going to Moscow to join him. Parts of these letters, mostly those dealing with less personal matters, were translated by Anna Kapitza for Rutherford, who was leading an effort to bring the Soviet physicist back to England. These fragments were preserved in the Rutherford collection, and they form the core of the book. They provide us with unique insight into Kapitza's feelings and the everyday problems, some grand and some rather trivial, that he experienced during the first year of his detention.

There were many scientists, among them leading physicists, who fared much worse than Kapitza and perished together with millions of other victims of Stalinist terror. Kapitza survived and was given ample opportunity to develop his scientific talents. The Soviet government even bought the equipment of his Cambridge laboratory in order to recreate favorable working conditions for him. Did he find consolation in his research and in the apparent success that crowned it? This we do not know, because he was never allowed to tell his own story, and some questions concerning his life in the Soviet Union will quite possibly remain unanswered forever. We may never know for sure, for instance, whether Kapitza fell into disgrace and was a victim of persecutions in the late '40's, when he temporarily disappeared from public view. Perhaps he was just entrusted with an important role in the Soviet atomic project. As far as the circumstances of his 1934 detention are concerned, Kapitza's letters to Cambridge, brought to light by Badash, may in fact be the most complete and reliable source of information available. This is exactly the type of episode that Soviet historians might find difficult to reconstruct in all details.

Kapitza's letters make for enlightening reading. They are matter-of-fact and free of grandiloquence, although the circumstances they refer to sometimes border on farce. Kapitza had, for instance, to instruct his colleagues in Cambridge not to wrap laboratory equipment in old newspapers before sending it to the Soviet Union because every piece of printed matter had to pass censorship. Badash is a historian of science who has not specialized in Soviet studies. (He might have avoided a formal deficiency of inconsistent spelling of Russian names by consulting a specialist in the field.) He did not attempt to write a definitive biography of Kapitza. He does, however, provide the reader with sufficient background knowledge concerning the broader historical and political context in which Kapitza's case should be considered. Badash cannot be blamed for the fact that of the three main actors listed in the title of his book—Kapitza, Ruther-