An Institute of Technology

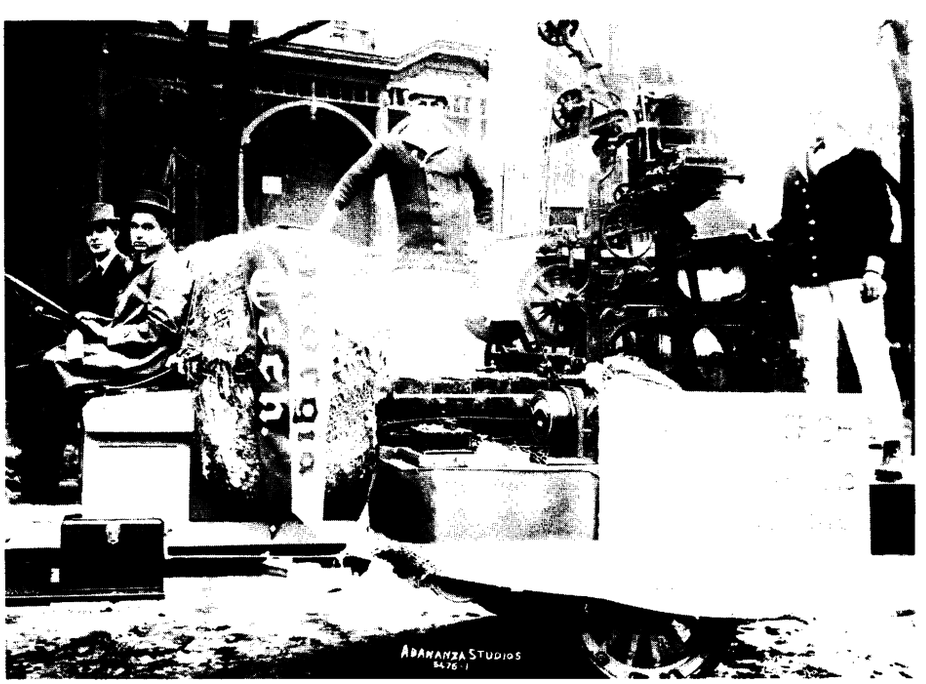
Engineering the New South. Georgia Tech, 1885–1985. ROBERT C. MCMATH, JR., RONALD H. BAYOR, JAMES E. BRITTAIN, LAWRENCE FOSTER, AUGUST W. GIEBELHAUS, and GERMAINE M. REED. University of Georgia Press, Athens, 1985. xiv, 560 pp., illus. $37.50.

The names of America's prominent technical schools—the Massachusetts Institute of Technology, the California Institute of Technology, the Georgia Institute of Technology—are so much alike it is easy to imagine the schools themselves are the same. But this well-researched centennial history of Georgia Tech reminds us of the special nature of the Southern experience and the region's institutions.

The Institute grew out of Atlanta's 1881 International Cotton Exposition and the vision it inspired of a "New South," economically emancipated from the North's manufacturing supremacy. From the outset, the founders meant to imitate New England's industrial success, and they looked there for educational models, too. But it was not MIT, with its intellectual sophistication, that caught their eye. Instead, they fastened on the Worcester Free Institute, a sort of high-level trade school that met its expenses by selling the shop work of students.

The need for ingenious solutions to the problems of finance was to prove an enduring element in Georgia Tech's history, but the Worcester example was also attractive because it promised immediately practical benefits and a solution to certain social problems; among other things, Georgians looked for their projected school to employ the idle, "stop the drift towards communism, and insure subordination to law and order in all classes of our complex population." That seems a tall order, but a rigorous military-like discipline explicitly emphasized hard work, respect for authority, and cooperative behavior to create, as one commencement speaker claimed, "cadets in the West Point of industry."

This language of economic warfare also characterized the introduction of new courses of study in textile and electrical engineering, since the electrification of cotton mills might overcome the advantage of New England's cheap water power. But Georgia Tech had battles to fight at home, too. The University of Georgia, with its rural setting and classical tradition, always proved better able to command tax dollars. Yet if the university embodied the old values of Southern culture, the technical school's fate reflected the state's economic and political realities. As a consequence, Georgia Tech long remained a local or at best a regional institution, where an underpaid faculty devoted itself almost entirely to undergraduate instruction. In 1906, for example, the total payroll for a teaching staff of 45 was $46,520. At the same time, Dugald C. Jackson, an MIT professor of electrical engineering, earned twice that amount in outside consulting.



"Hog and Hominy Parade." [From *Engineering the New South*]

Though Georgia Tech steadily grew in size and in reputation, its essential character remained unchanged until after World War II. Only then did graduate programs and advanced study become significant. With that development, and with defense-related federal funding, the teaching staff more and more resembled that of other technical schools. Indeed, now they come from Stanford, MIT, and Caltech, and with research as their vehicle move easily between government, the private sector, and the academic world. Yet for all the changes, there are familiar echoes. The students are still mainly from the South and those who give Georgia Tech its current direction tend still to look elsewhere—to Silicon Valley and Route 128—for models to emulate.

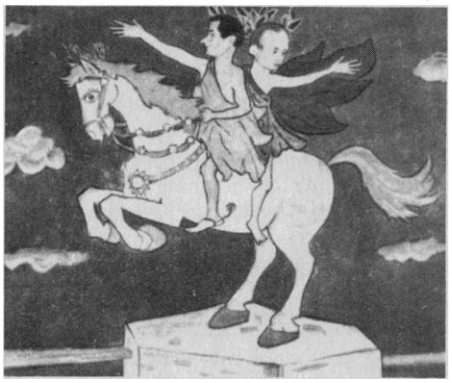
BRUCE SINCLAIR
Institute for the History and Philosophy of Science and Technology, University of Toronto, Toronto M5S 1K7, Canada

A Soviet Physicist

Rem Khokhlov. V. I. GRIGORYEV. Mir, Moscow, 1985 (U.S. distributor, Imported Publications, Chicago). 110 pp., illus. Paper, $2.95. Outstanding Soviet Scientists. Translated with revisions from the Russian edition (1981) by G. G. Egorov.

The death of the Soviet physicist Rem Khokhlov in 1977, at the age of 51, was a tragedy for the Soviet Union and the Western world as well; we have been deprived of a truly fine "gentleman and scholar." Khokhlov was a master tactician of management and politics as well as an outstanding scientist. But the image I retain of him, since our first meeting at the Nonlinear Optics Conference in Puerto Rico in 1965, is that of a truly gentle person. I have known many very ambitious and "achievement-oriented" people in many countries, but never one whose kindness and humane sensitivities matched Khokhlov's. Had he lived I am convinced that he would today be playing a vital part in nurturing collaboration between the United States and the Soviet Union.

Khokhlov's career, both in science and in administration, was meteoric, especially by standards in the Soviet Union, where (until recently) the ascendancy of a young person would be most unusual. In his science, Khokhlov developed a premier group at Moscow State University which in the 1960's made many noteworthy advances in nonlinear optics, advances that were all the more remarkable considering the paucity of



A "friendly caricature" honoring Rem Khokhlov (left) and S. A. Akhmanov on their winning the Lenin Prize for their research on nonlinear coherent interactions in optics in 1970. The pedestal represents "a nonlinear crystal through which a beam of red light [becomes] green." The caricature "was reproduced abroad in a leading physical journal dealing with laser research. . . . This fact . . . speaks of the international recognition in terms that are more eloquent than any other expression of praise or reward." [From *Rem Khokhlov*]

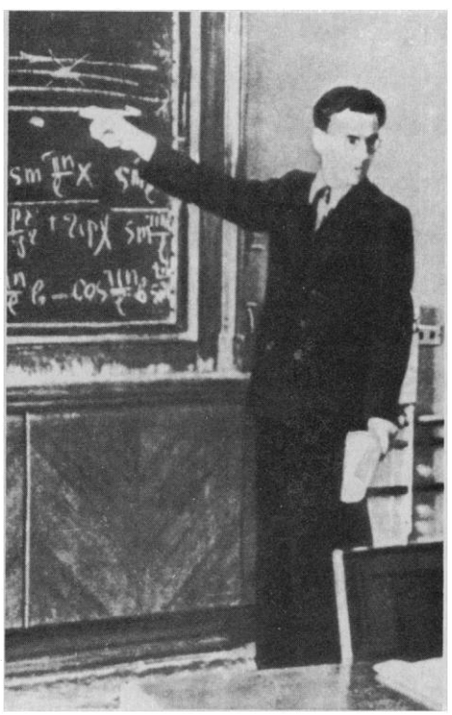
technological support provided his group and the heavy administrative burdens he had already assumed. The appointment of Khokhlov as rector of the university when he was only 47 is but one indication of his achievements.

The account of Khokhlov's life by Grigoryev is not very good, at least by standards of biography to which I am accustomed. In the first part there is discourse (augmented by listings at the end of the book of his publications in radiophysics, quantum electronics, nonlinear optics, and nonlinear acoustics) about the science in which Khokhlov was engaged in his early years and, in fact, virtually to the end of his life. The author took upon himself the task of trying to describe sophisticated physics without equations or precise terminology, and I found that the physics I already understood was not particularly well explained and the science I had either forgotten or never understood was not well clarified. Nevertheless, there are items of historical interest and validity, particularly pertinent to the churning decade of the 1960's, in which the development of the laser gave rise to a torrent of scientific accomplishments. The text very much reflects a Soviet perspective of the major players, but I found no significant errors and learned some new things.

Khokhlov's untimely death is dealt with only briefly. Khokhlov was an avid athlete and an accomplished mountaineer who I understand actually led some of the major training expeditions in the Himalayas and in the Pamirs, as well as participated in several climbs as a member of the "first teams." It was during one such training expedition at some 20,000 feet that he suffered the pulmonary embolism that was to prove fatal. He was flown from the mountain heights by helicopter (a nontrivial feat!) down to lower altitudes for initial treatment and then almost directly on to the clinics in Moscow, where he died. It has been suggested to me by several Soviet friends that Khokhlov's seniority in the Soviet system was partly responsible for his death in that it led to his being treated by physicians who were less familiar with this particular illness than was the medical community nearer the site of the accident. I am disappointed that his biographer, who must certainly have attempted some research on this poignant matter, chose not to detail any of his findings.

My overall criticism of the book would home in on the point that the portrait of Khokhlov that is painted by Grigoryev is just too monochromatic—all rose. Khokhlov must have had his warts, his tension points, his harassabilities and intolerances, and many of the other imperfections that we all have to some measure.

The book has more of the flavor of a funeral oration than of a biography. It remains true, however, that the world lost an extraordinary man with Khokhlov's death, and Grigoryev's work is the only English material about him of which I am aware. For those of us who knew Khokhlov it is an important book that will remain in our libraries. Those readers who did not know him but have a curiosity about the achievements of Soviet physics and wish to get some of the flavor of research in optical physics in the past 30 years or so will certainly derive a great deal from it.



Rem Khokhlov at a blackboard, 1952. [From *Rem Khokhlov*]

PETER FRANKEN
Optical Sciences Center,
University of Arizona,
Tucson, AZ 85721

Seabirds

The Atlantic Alcidae. The Evolution, Distribution and Biology of the Auks Inhabiting the Atlantic Ocean and Adjacent Water Areas. DAVID N. NETTLESHIP and TIM R. BIRKHEAD, Eds. Academic Press, Orlando, FL, 1985. xx, 573 pp., illus. $40; paper, $19.95.

Two principal themes run through this collection of papers. One is the value of the comparative approach in elucidating reasons for the ways in which animals do things. The other is the importance of detailed data if one is to understand how to protect vulnerable wildlife from sharing the fate of species such as the great auk. As this book points out, alcids are particularly vulnerable to perturbations of their environment, whether natural or anthropogenic.

Alcid conservation is the central issue of the final chapter, but I feel that the authors somewhat overstate their case. The upper and lower limits for the estimates of Atlantic alcid population sizes given in table 10.2 and in an earlier chapter by the same authors seem far too precise by comparison with the literature from which they were derived. (Contrast the cautious estimates given by M. P. Harris in *The Puffin* [Poyser, 1984], who said that even many present-day estimates are no better than order-of-magnitude.) Later in the chapter we are told that razorbill, puffin, and murre population levels were "at least an order of magnitude greater during the 19th century than they are today." This implies a minimum of 38 million pairs of Atlantic puffins, which seems improbable since Harris's review of puffin status indicated that, in the major strongholds of Iceland and Norway, there is "no firm evidence of any change" or "if anything [the population] has increased since 1870." Clearly some alcid populations at the southerly extremes of the ranges have declined, often spectacularly, but we need a careful appraisal of historical records to assess whether any changes can be demonstrated for northern colonies. This is not to detract from the overall message of the book, that many alcid populations may be suffering at present from harmful influences