14 years in Munich, where, as an officer of the State of Bavaria, he was constantly faced with the problem of providing for the needy in more efficient hospitals and social-welfare programs.

This volume also presents interesting experimental results on the physical properties of silk, on the moisture absorbed by various cloth and furs and general consideration on more efficient use of fabrics, all showing Rumford's broad interest in the properties of materials. One of the papers carefully explains the advantages of broader wheel rims for carriages, which in his day were the major source of transportation throughout Europe. An interesting paper at the end of the book gives a design for a frigate prepared by Rumford for the British Admiralty. This shows the imagination, concern for quantitative engineering details and the thoroughness that are evident in all Rumford's work.

The fourth volume of the series, *Light and Armament*, is divided into two distinct parts. The first discusses the physics of light and illumination and is of real interest even though Rumford's contributions to these subjects were not as outstanding as to the science of heat. However, he made important advances in methods of light measurement and in optical instrumentation. Rumford developed a shadow photometer which is known by his name, and defined the first "standard" candle, which continued to serve as an international unit for light intensity until recent times. These papers on optics report quantitative studies of translucent diffusing screens and demonstrated procedures whereby glare can be eliminated without an appreciable loss in overall light intensity. Specific applications include ground-glass window panes, translucent lamp shades and other devices. There is an interesting paper on experiments with colored shadows that clearly reveals his skill as an experimenter, and a rather fanciful paper on the harmony of colors.

The second part of this book is on gunpowder, the ballistics of cannon, the velocity of projectiles from guns, and related ordnance studies. These are thorough and detailed in their quantitative evaluation. It is a curious fact that when Count Rumford was elected to the Royal Society he was chosen for his work on armament rather than for his basic researches in heat and optics.

The papers presented in *Public Institutions*, volume 5 on these collected works, demonstrate Rumford's concern with the humane application of science and technology. They show a remarkable foresight into present-day problems in these areas of public concern.

Throughout his life and especially during his residence in Munich, Rumford was closely associated with the ruling class and became deeply concerned with the serious social problems confronting Bavaria. Much of his work on improvements in the efficient utilization of heat for cooking, heating buildings and in industrial processes, was designed to alleviate the conditions of the underprivileged. At that time there were veritable mobs of unemployed hungry people, and Rumford exerted a major influence in providing work, food and housing for these people and in setting up effective programs to teach them useful trades and to educate their children. An interesting item is his great effort to interest people in the use of coffee as a substitute for alcohol. How successful this was in Bavaria is not reported!

The last part in this final volume recounts Rumford's ideas in founding and endowing the Royal Institution of Great Britain. This organization, which has been one of great leadership in education and scientific research, incorporates even today many of his original concepts for such an institution.

R. S. Shankland
Ambrose Swasey Professor of Physics, Case Western Reserve University

new books

CONFERENCE PROCEEDINGS

Biological Aspects of Radiation Protection (Conf. proc. International Symposium, Kyoto, Japan, Oct. 1969). T. Sugahara, O. Hug. eds. 273 pp. Springer-Verlag, New York, 1971. $18.50

IEEE Transactions on Nuclear Science (Conf. proc. 1971 Particle Accelerator Conference Accelerator Engineering and Technology, Chicago, Ill., 1-3 March 1971). 1161 pp. IEEE, New York, June 1971, Vol. NS-18, No. 3. $20.00 for nonmembers of IEEE; $10.00 for members.

Lecture Notes in Physics, Vol. 8: Proceedings of the Second International Conference on Numerical Methods in Fluid Dynamics (Conf. proc. Berkeley, Calif., 15-19 Sept. 1970). M. Holt, ed. 462 pp. Springer-Verlag, New York, 1971. $7.70

Modern Optical Methods in Gas Dynamic Research (Conf. proc. International Symposium supported by the New York State Science and Technology Foundation, Syracuse, New York, 25, 36 May 1970). D. S. Dosanjh, ed. 295 pp. Plenum, New York, 1971. $14.50

Fundamental Aspects of Dislocation Theory, Vols. 1 and 2, National Bureau of Standards Special Publication 317 (Conf. proc. National Bureau of Standards, 21-25 April 1969). J. A. Simmons, R. deWit, R. Bullough, eds. 1376 pp. US Department of Commerce, National Bureau of Standards, Washington, D.C., 1970. $8.25 □