

of budget reduction; in contrast, the interest at the state level remains very high because of the benefits such programmes produce for regional development. The science parks initiative is another form of industry-government (including university) involvement aimed at promoting development in particular localities. The two main functions of the STPCal (Science and Technology Park of Calabria) in Southern Italy described by Corti *et al.*, are to supply a variety of services, a lot of them information based, and to contribute to the creation of new innovative enterprises. The way the park's information system operates is not only to distribute information but also to help in solving problems of individual occupants of the park. Botteghi sees local development as a remedy to short falls in traditional policies and as an opportunity to search for new strategies.

The three papers forming the group of science and technology policy are very different in nature. Daukcev's technology transfer policy recommendations for Kazakhstan are based on a diffusion model taken from the physics of the solid state and require more discussion of its limitations and interpretation. Coletti's paper is about the underlying policy concepts behind planning and designing of major national infrastructures, such as information networks. In the case of the Internet, for example, the main priority has been openness; data transmission and data integrity being secondary features and security the final one. His view for science and technology policy is that it is important to identify realistic R&D goals. Issues, such as moral standards, production and quality criteria, management and necessary infrastructure should be considered in advance. Szántó's paper deals with definitions for technology policy and science policy. His belief is that they are separate, with science policy creating conditions for 'human curiosity and compassion' (p. 102) and technology policy assisting 'the continuous creation of technological advantage and its market implementation' (p. 101). He does recognise, however, that there are links between the two and gives the example that when technology policy does not exist, science policy can often lack real content and aim.

The usefulness of NATO's Science and Technology Policy workshops is reflected in the number of interesting individual contributions in the book. The informal discussions held in Moscow were probably just as valuable. As the reader cannot benefit from the latter ones, the editors should put more effort into bringing the publication of the proceedings up to the expected academic standards.

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Scientific and Technological Achievements Related to the Development of European Cities

Sergei Radautsan and George Parissakis (Eds)

Dordrecht, Kluwer, 1997, xxi + 323 pp., US\$185.00, ISBN 0-7923-4340-9

This book, the ninth in NATO's 'Science and Technology Policy' Series, contains the proceedings of a NATO Workshop focused on the problems of contemporary cities and the role of science and technology in their development. The workshop, held in Kishinev, Republic of Moldova, on 22–24 May 1996, was sponsored by NATO's Science Committee within NATO's Science & Technology Partnership in Priority Areas. NATO's program is aimed at the dissemination of advanced scientific and technological knowledge between NATO countries and its Cooperation Partners, and at strengthening

the links between respective scientific communities. The Workshop also benefited from the support of the Centre of Semiconductor Materials of the Institute of Applied Physics of the Moldavian Academy of Sciences.

The proceedings, covering a wide range of topics mostly related to the sustainable development of cities in the context of new economic and technological conditions, is the result of various contributions from scientists, engineers and economists, with 26 papers presented by researchers from 14 countries. The book is forwarded by an opening address from the President of the Republic of Moldova and prefaced by the president of the Moldavian Academy of Science.

Some of the main themes discussed during the workshop included the role of science in the sustainable development of cities; technogenic safety problems; the use of energy and the promotion of alternative energies; and the evolving of new high-end technologies and their leading role in solving the needs of the city. The impact of human activities has reached a high level during this century and issues such as atmospheric pollution, fuel requirements and transportation are mainly affecting the ever-growing urban areas. Eastern European countries, like Moldavia, have had significant urbanisation rates over a relatively short period of time. Moreover, the collapse of the previous political system makes the search for a framework for new policies for solving the problems of cities even more acute.

The complexity of the subject as well as its imperativeness requires a comprehensive treatment. This explains, but only partially, the discourses of a broad range of scientists who give their views on intra-city problems on spheres such as construction, economy, environment, physics, education, as well as proposed inter-city connections and international programmes in order to achieve ecological safety and promote innovation. But because of the required comprehensiveness, some delineation between topics was necessary to help the reader to manage the material on offer. However, the book is not well organised and no attempt has been made to group the contributions according to subject matter or approach. Unfortunately there is also no attempt to draw together the different strands into overall conclusions concerning all the processes happening in and around the city. Hence, the book gives a very fragmentary impression. For example, some contributions are quite general (e.g. social engineering and education) while others are engineering solutions to very specific practical problems. Also, in terms of length and depth, there is a significant imbalance between individual contributions.

Although not attempted by the editors, it is possible to categorise the approaches presented during the workshop into three main categories: (i) technology oriented toward city problems; (ii) the interface between technology and policies; and (iii) social sciences aspects.

In the first category, industrial development seen as an integrated and inevitable aspect of city life, is mentioned in many contributions. Bucher *et al.* review recent developments in energy technology with a focus on new forms of electricity (i.e. use of solar electric cars, photovoltaics and thermoelectricity). Prohorov *et al.* review the impact of modern energy technology from a laser application perspective (long distance communication using optical fibres and diagnostic technologies). We also find out about complete and simplified models for energy-technological processes that can significantly improve the design and construction of energy-technological units typical for industrial cities (Lisienko). Damelicour's discourse spans from the light requirements of the human eye to emphasising the cultural heritage in European cities to compose technical guidelines for city illumination. Finally Aliev enumerates the industrial fields and the related policies pursued in Azerbaijan, and Vlad lists the achievements in chemistry

that assist in solving problems such as drinking water analysis and purification, galvanic production, sewage, air purification and the use of industrial by-products.

In the second category (i.e. the interface between technology and policies) some papers discuss the energy management of cities arguing for the introduction of more regulatory frameworks and planning and financial tools to address urban pollution and to improve energy efficiency in buildings (Brendow, Divone). A group of authors share the experience of the US Department of Energy relevant to Eastern European countries, presenting selected strategies for R&D market transformation and standards (Brendow). Simionescu *et al.* sketch a scheme for regulatory improvement and standards regarding earthquake-proof design on the basis of technological understanding of building materials. The crisis of public services at the city level (the controversial subject of privatisation of the basic needs and regulations for public services) is concisely treated by Thibodeau. Higher education institutes are influential factors and affect the welfare and the cultural and scientific life of communities and they impact on the development and socio-economic life of communities. Their role is even more important in the transition from communist to open market societies through the policies adopted for high technology and technological innovation (Bostan, Chiriacescu). Finally, on a more general level, measures are proposed for a better understanding of the city as a complex entity that has to be economically viable and benefit from R&D achievements to solve its problems and promote decentralisation (Thibodeau, Radautsan).

The third category of papers (social sciences aspects), brings together different perspectives on municipal management and the role of scientific achievements and their impact on living standards. The main contribution of the book is the introduction of the sociopolis concept developed by Urekian from the perspective of the dialectics of individuals and interest groups. Although proposed by one researcher only, this concept was labelled the spirit of the workshop, bringing forward the interests of the state, the city and the inhabitants. The sociopolis concept, as complementary to the Japanese technopolis concept, consists of a new approach to the city management system as an integrated part of the state system and within the international framework. The sociopolis concept emphasises the importance of social and economic innovations as adjacent to the scientific and technological ones. One nostalgic (Vartic) brings an historical air into discussion, talking about ancient Dacian metallurgy, before slipping into an over-romantic image of the past. Finally, the modern city with the most advanced telecommunication means (Petrov) is a continuation of the old city as reported by Vartic with traditions in building and architectural skills as well as with a natural adaptation to the environment.

In summary, the themes discussed at the workshop are unnecessarily varied and no attempt has been made to unify or organise the contributions along their common perspective, or at least to aggregate them under some section headings. Some presentations also contain unnecessarily long technical digressions. The objectivity, depth and capacity of synthesis are not uniform and an attempt to assess them on the same scale would fail. As informational reports for the educated reader they might be useful, particularly for those interested in knowing more about Eastern Europe. Several mistakes in the manuscript surpass what might be categorised as typographical errors (e.g. one table gives the percentage of some ethnic groups in Moldova exceeding 100% with a grand total of around 200%). Reflecting the entropy of the book, its index does not bring much order or enlightenment. To this end, the main impression the reader is left with is a bewildering diversity. But then again, this may be just an expression of the complexity of the issues presenting a composite perspective on the problems of the city as kaleidoscopic as the subject of study. On this line we agree with the preface that, 'to

sum up, in this book there is something for everyone: scientists, engineers, economists, managers, city authorities, investors'.

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Public Science and Public Policy in Victorian England

Roy MacLeod

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Probably the most significant development in the history of science and technology as a discipline over the past two or three decades has been the emergence and growth of what has been called the 'sociological turn' in the discipline.¹ Roy MacLeod, formerly of the Science Policy Research Unit (SPRU) at Sussex University, foundation editor of *Social Studies of Science*, and currently Professor of History at Sydney University, has been one of the pivotal people in this development; and this collection of papers, originally published between 1965 and 1983 in such respected journals as *Isis*, *Minerva*, *Technology and Society* and *Notes and Records of the Royal Society of London*, not only demonstrates the extraordinary range and depth of MacLeod's scholarship, but also provides a telescoped view of the expansion of the sociological perspective over the period. The papers also convincingly demonstrate the continuing relevance of this revolution in historiographic thinking.

Roy MacLeod's specific focus in this collection is on the unprecedented growth of government involvement in science and technology in England from around the mid-nineteenth century, and certain antecedent developments in the earlier part of the century, notably the 'reform' of the Royal Society in the 1830s and 1840s following claims of a 'decline' in science by Charles Babbage and others. MacLeod succinctly summarises his case in the opening sentence of the penultimate paper in the collection, 'The Royal Society and the Government Grant: Notes on the Administration of Scientific Research, 1849–1914', in these words: 'The development of government participation in the support of research is one of the most significant characteristics of nineteenth century science' (VIII: 323—the pagination system will be described below), and the papers leave the reader in little doubt as to the accuracy of this assessment. The first three papers provide detailed and fascinating case studies of government involvement in three diverse areas in the 1860s–1880s—Alkali Acts administration, salmon fisheries and lighthouse illumination—and one of the interesting themes that emerges from these studies is the important role of certain prominent personalities of the period, well-known in conventional histories of nineteenth century science but usually presented as 'great men', somehow standing outside their institutional settings. MacLeod, in these papers, provides a corrective to this view.

Two familiar figures here are 'Darwin's Bulldog', T. H. Huxley, and his friend, the physicist, John Tyndall. Huxley, who had written to his sister in 1852, when despondently looking for a job, that '[s]cience is, I fear, no purer than any other region of human activity' and '[m]erit alone is very little good; it must be backed by ... knowledge of the world' (quoted VIII: 329) had, by 1880, learnt to play the system well enough to have been a long-standing professor in the Royal School of Mines and to have been invited by the Home Secretary, Sir William Harcourt, to accept the position of Inspector of Fisheries at £700 p.a. (in addition to his existing emoluments). Shortly after taking on