

Society, Culture and Technology
at the Dawn of the 21st Century

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Edited by

Janusz Mucha and Katarzyna Leszczyńska

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P U B L I S H I N G

Society, Culture and Technology at the Dawn of the 21st Century,
Edited by Janusz Mucha and Katarzyna Leszczyńska

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SOCIETY, CULTURE AND TECHNOLOGY AT THE DAWN OF THE 21ST CENTURY¹

INTRODUCTION

Janusz Mucha and Katarzyna Leszczyńska

Relationships between social structures, symbolic culture (in all possible contexts), natural sciences and technology have long been a subject of systematic analysis: in this introduction, we shall briefly present some recent contributions to the scholarship. However, this discussion will be preceded by an outline of the broad context of the major currents, in our opinion, in the analysis of the abovementioned relationship. We shall also pay attention to the dominant topics of the respective panels at large international sociological congresses, such as the recent “Conference of the European Sociological Association” and at the “World Congress of Sociology”, organised by the International Sociological Association. Our aim is to help to fill the gap between the so called “two cultures” (see Snow 2008), which means linking the humanities, and theoretical and practical natural sciences. Historical and contemporary research within the areas of philosophy of science, general methodology, sociology, socio-cultural anthropology, cultural studies, communication studies etc. is greatly diverse in the issues in which we are interested, and we are not able to refer to all strands of this research.

The controversy between “positivism” and “anti-positivism” regarding the hypothetical ontological and methodological specificity of social sciences started in the mid-19th century, with Auguste Comte and anti-positivist reaction in German idealistic philosophy of culture (Wilhelm Dilthey, Heinrich Rickert, Wilhelm Windelband). It was followed by classics of sociology of the late 19th and early 20th centuries (like Max

1 In some paragraphs of this introduction, we partly draw upon the first author’s publication on mutual relations between social structure, culture, and natural sciences and technology (Mucha 2009, 16–38).

Weber and Florian Znaniecki), and continues until recently (see, e.g., Coser 1977): one chapter of our collection is devoted to this controversy.

Archaeological, historical, sociological and anthropological comparative research on civilisations, including material and technological aspects, has been conducted for a long time, and the results are very well known. Therefore, we cannot agree with Tim Dant, who is of the opinion that classical social sciences, in particular classical sociology: “has largely overlooked the importance of social relations with the material world in shaping the form of society” (2006, 289). Dant himself gives very significant contrary examples, referring to the very well known works of Fernand Braudel, Norbert Elias, etc. The problem of relationships between “material civilisation” and “symbolic culture” is very interestingly analysed by Gerard Labuda, a respected Polish historian. He simultaneously ties up and contrasts “culture” and “civilisation” in a way which forms a very good context for research on natural (including technical) sciences and their discoveries and inventions. The scholar is interested in the nature of creativity within the material, social and spiritual activities of humans. Creativity, according to him, has got two major faces. First, in the stronger sense, it means the “creative acts” that are of an individual, one-time and unique character. Second, in the weaker sense, it means the imitative, reproductive and applicable acts of the collective character. “The nature of creativity in the first sense is innovation. Each innovation is born and grows in three stages. First, an idea or project is born in the head of its author and this is an invention; the executed idea gives birth to the result, work (*ars* in Latin) or accomplished action (*opus, actum, praxis* in Greek) and this is the innovation in the strict sense of the term. When the work is appreciated by the public, it becomes disseminated in the form of imitative works [...] Creative and innovative works mean ‘culture’ in the strict sense of the term, while the disseminated imitative works mean ‘civilisation.’ [...] In the area of material life, such innovations are called ‘inventions’” (Labuda 2008, 229).

The second theoretical perspective that is important to note here is the various types of neo-evolutionism and cultural materialism in macro-sociology and socio-cultural macro-anthropology. During the last decades, the works of Leslie White, Marvin Harris or Julian Steward (see, e.g., Turner 2003; Hicks and Gwynne 1994; Harris 1985) could be cited as very good examples. We are of the opinion that research on geological processes and global climate changes (both generated by human activity, and beyond

this factor) is important for our understanding of demographic trends, and then structural, political and cultural processes. This is a very hypothetical way of reasoning but should not be neglected.

The “technocracy perspective” has been present for a long time in modern social sciences. Claude-Henri de Saint Simon, one of their founders in the early 19th century, was of the opinion that society should be ruled by those who think in a particularly rational way, meaning scientists and “technicians”. In Saint-Simon’s opinion, this was not a novel idea: since the Middle Ages the kings of England and France supported the advance of sciences and raised the political position of their practitioners. According to the scholar, only scientists should have full citizenship rights. The freedom of the masses should basically depend upon their acceptance of the laws discovered by scientists and their submission to these scientists. This kind of viewpoint has been, in a more or less radical version, quite often presented by both social and natural scientists. A very interesting example of the contemporary critical analyses of “technocracy” is the “pamphlet against technology” by Neil Postman, an American philosopher of culture. Observing contemporary tendencies in intellectual life, he concludes that in this technocratic world the material instruments become increasingly important for the shaping of intellectual symbolic culture. Everything else must allow the growth of material technology. Moral values are being separated from the intellectual values. Most people take it as read that science and technology improve the human life: “technopoly” is, in Postman’s opinion, a “total technocracy”. Here, the deified technology totally rules the people. They have to accommodate it, rather than the other way around (see Postman 1992).

When debating technologies and technocracy, it is worth remembering that in contemporary, both sociological and everyday language, the term “technology” does not have to imply only the “manipulating of material objects”. We often put the equation between “sociotechnics” and “social engineering”, therefore, the manipulation goes beyond material objects and it can be an intentional dealing with cultural and structural human matters. Likewise, the “technocrats” are not only people who believe in the “natural” supremacy of natural sciences and “material culture”. They can be people who apply the “manipulative techniques”, often based on scientific psychological and sociological findings, to individual human beings and to their collectivities, small or large ones. Joanna Kurczewska, a Polish sociologist, noticed that the debate on the merits of technocracy is necessary

not only at times of crises that dominate Western civilisation concepts of democracy, but also in well functioning systems of representative and procedural democracy. Many social actors demand more efficient rule by professionals, more efficient administration (they are often ready to pay the cost of limiting democracy), and a stimulation of “rational mentality” which would speed up the modernising processes. People who wish for the limiting of chaos which seems to be a “natural feature” of liberal democracy, demand more order, which is, (in their opinion), characteristic of technological processes and research in natural sciences (Kurczewska 1997, x–xi). We may sum up that many technocratic ideas are based on the conviction that natural scientists and technicians are always—or at least very often—competent, impartial, “objective” and politically neutral.

A broad field of “new” sociology and anthropology of knowledge, including scientific knowledge, is another important scholarly context surrounding our collection. The classical sociology of knowledge based on the ideas of Karl Marx and later Emile Durkheim and Karl Mannheim, intended to find the social (group) determinants of various kinds of social knowledge, like political economy, ideologies, even common, everyday mentality. Moreover, it focused on the “sociology of scientific error”, meaning the analysis and explanations of the ways the group interests lead people (including social scientists) to false ideas. Classical sociology of knowledge rarely, if at all dealt with social aspects of natural and technical sciences; (this cannot be said of the works of Robert K. Merton, one of its main representatives in the mid–20th century. See Merton 1968, 493–681; 1973).

“New” sociology of knowledge approaches knowledge, including science, in a different way. It intends not only to find group determinants of the way scientific research is conducted and of its results, but also to uncover broad “social contexts” of scientific production. It assumes that structural and cultural contexts are significant not only in the case of popular forms of mentality, social ideologies, social sciences and humanities but also in the case of empirical natural sciences and even analytical sciences such as logics and mathematics. It assumes that not only false, but also true—or rather those which are considered to be true at that time—results of scientific efforts are socially implicated (see, e.g., Barnes 1974; Bloor 1976; Zybertowicz 1995).

Recent sociology of knowledge is not liked by many natural scientists and “objectivistically” oriented sociologists because most of them consider

themselves to be the impartial and sometimes perfect “instruments of measurement” who correctly “read” the “objective” features of nature. In their opinion, there exist the “objective” laws of the progress of science: the social context of scientific discovery has nothing to do with it, whether in a macro-social context (for instance in the sense of economic and political interests) or in a micro-social context (in the sense of particular schools of thought or the structure of laboratories). Scientific propositions are true or false, independent of the structural or cultural context.

Among non-classical sociologists of knowledge we could find scholars working within the paradigm called “Science and Technology Studies” (or alternatively “Science and Technology in Society,” “Science, Technology and Society”), hereinafter STS. These, actually interdisciplinary research programs, started in the late 1960s. The journal “Science Studies” (later “Social Studies of Science”) emerged in Edinburgh in 1971. “Society for Social Studies of Science” was founded in 1975. Scholars (sociologists, anthropologists, philosophers, physicists, engineers) working within this paradigm are of the opinion that science and technology are social (structural) and cultural phenomena and should be studied as such. Since the mid-1970s, “ethnography” of research teams became a part of the STS. This is the detailed observation and analysis of the proper ways in which scientific laboratories function, what kinds of working relationships dominate within them, and examination of what is the real contribution of different categories of team participants. According to the representatives of STS, social institutions (academic, but also political, religious, etc.) decide which research programs will be financed, which scientific discoveries will be considered significant, which technological innovations will be applied. Group interests (in the macro– and micro scale) decide on the directions of scientific research projects, dissemination of scientific discoveries, etc. Within the strand called “Actor-Network-Theory” (ATN), which combines elements of philosophy of science with elements of sociology of science, the role of “non-human” actors in the growth of science and technology as well as of social relations in general, is stressed. Technology is very important according to the ATN practitioners, in order to shape social relations on their various levels (see, e.g., Bauchspes, Croissant and Restivo 2006, vii–xiii and 1–18; Fischer 2006; Heath, Knoblauch and Luff 2000; Kleinman 2005, 1–14).

At the end of the 1960s there emerged another interesting perspective on social studies of natural sciences and technology, which became very

influential in the 1980s (see Douglas 1985, 19). It can be called sociology and anthropology of the risks and dangers of civilisation. Sociology of risk was preceded by anthropological studies presented by Mary Douglas, a British and American socio-cultural anthropologist: let us summarise the main results of her cultural analysis of risk.

Risks and dangers are inevitable in human life. However, in the pre-industrial era they were much more often than now of a natural character (however it is hard to forget about numerous wars as well as about much easier previously tolerated brutal aggression in public and in everyday life and about many fatal accidents in everyday life). According to modern scholars of risk, in industrially developed countries it is rather a consequence of human activity, mostly of a technological character than of nature, independent of humans. Risks and dangers became the unexpected, but real and durable consequences of all scientific and technological activity. New technologies make our life easier, they solve many problems but also create a lot of new expectations and many of them cannot be met. The consequence is the growing sense of disappointment. The social confidence of the general population in the institutions of authority and power is another factor. The more we trust that these institutions will solve our problems, the lower our sense of danger and the higher the acceptable risk. For various problems and failures in our life, we are starting to blame in this situation, nature and other groups or institutions, such as adolescents (who are always considered as a source of danger for the social order) or social minorities (ethnic-religious, sexual, migrant) or big corporations—in other words, the “others” (see Douglas 1985, 5; Douglas 1992, 13, 16, 44–59). Risk is usually, says Douglas, treated by a community as danger caused by unacceptable strangers (1992, 30).

People tend to consciously ignore many life dangers (situations which they know are dangerous) and they deny the presence of risk in its many forms. They smoke, drink alcohol, take drugs, drive too fast, climb high mountains, etc. They are their life choices, and they are often entitled to them. Communities construct what they believe is their natural environment and what they will believe to be dangerous within it. Social routine and social interests will decide which particular problems are considered to be natural and inevitable, or to be human artifacts for which communities can easily blame some individuals, groups or institutions. Dangers are usually related to the “moral sense” of a community. These dangers will be considered particularly powerful and potentially avoidable, (therefore

caused by somebody), something which can be morally criticised based on our value system (Douglas and Wildavsky 1982, 7–9; see also Peretti-Watel 2003).

Ulrich Beck, in his—now classic—book of the mid–1980s, says that we have to get used to the situation in which we live – that of the “risk society.” In many of his works he stresses the fact that the development of natural science and high technology mean an increasing new kind of “risk production”. Irreversible dangers become global—they go beyond the national and class borders. It does not mean that they ignore local and structural contexts. Different kinds of risk are important for different social groups: social distribution of risk also means the possibility to “export” it (for instance wastes) to other, poorer, countries and subsequently to the next generations who will have to deal with them. In line with the thoughts of Mary Douglas and Aaron Wildavsky, Beck discusses the problem of responsibility for the risk situations, as well as issues of control over scientific and technological growth and confidence. He is more sociologically than anthropologically oriented, and analyses late, reflexive modernity more deeply than other kinds of cultures. He says that we cannot (and do not want to) trust the experts since they make mistakes too often. In addition, different experts often have different opinions on the same matter (see, e.g., Beck 1992).

We have to accept the fact that it is not possible to avoid all kinds of risk, that risk is permanently being produced and reproduced. It does not mean that we cannot control it however, and attempt to minimise it. Edwin Bendyk, who writes mostly about science and high technology, and who is very far from having a “technocratic mentality,” says that many people still believe that “engineers are our hope”. He quotes the “neo-ecologists” in whose opinions there is no other chance to protect what is left of the natural environment other than the growth and dissemination of advanced high technologies. Moreover, what we know about the risks and dangers caused by human activity comes very often from the research done by representatives of natural, including technical sciences (Bendyk 2006, 80–82). On the other hand, as we have already mentioned, experts make mistakes too often and in many cases opinions of different experts are not similar.

There also exists “non-Beckian” sociology of risks and dangers. We can see it for instance in the works of Niklas Luhmann, a famous neo-functionalistic who analysed the post-industrial society. His own ideas,

rarely referring to Beck, were much more abstract and philosophical. He stressed the fact that in the above mentioned type of society social situations are so complicated that each choice made by an individual (and we cannot refrain from choosing since there are always numerous options) means a risk of disappointment and inefficiency. The task of a social system is, therefore, to search for ways and means to reduce this risk, to simplify the world. Every sociology of risk should, in Luhmann's opinion, be based on an idea of "normalcy" and of borders between what is considered to be normal and abnormal. In this sense, sociology of risk is always a critical sociology. Similarly to Douglass, Wildavsky or Beck, he says that defining the acceptable thresholds of risk has a social character, and that a kind of blame attribution is always involved, which means that sociology of risk is a sociology of morality. Like other authors, he discusses the problem of "exporting" risk to the next generations and the ambivalence of social estimation of risk. For Luhmann, "exaggerating" is a "natural" attitude in social approach to risk (see 1993).

Zygmunt Bauman practices another example of "sociology of risk." This analysis is much closer to cultural studies and anthropology. His sociology of postmodernity (see, e.g., Bauman 1993, 2000) is, like in Luhmann, a study of ambivalence and necessity of choosing under conditions of permanent or even increasing uncertainty. Natural sciences and technology are not, however, as important in Bauman as they are in the authors discussed above.

Sociological analysis of technological risk seems to be a "speciality" of German scholars. There may be some cultural reasons behind this situation. In the late June 2009 issue of "Newsweek International", we find an interesting story by Stefan Theil (2009) on the waves of "technophobia" in Germany during last few decades and on the very recent turn towards high but "clean" technology. Until the late 1970s, says the author, Germany was the leading nation in the field of advanced technologies. From the early 1980s on, the situation had been changing. "[A] powerful coalition of environmental activists, church leaders, politicians, and journalists mobilised fears against medical technology as a dangerous meddling with nature, an attack on human dignity reminiscent of Nazi eugenics. [...] Germany is the only leading economy to have banned nuclear power despite a world-beating safety record, and in the process killed off a once thriving civilian nuclear industry" (Theil 2009, 24). Germany has been curtailing not only applied, but also basic academic research in nuclear physics,

biotechnology like GMO, etc. What is ironic, says Theil, is that “ignored in the public debate is the fact that Germans are already eating GMO –derived foods very day [...] imported from North and South America. Similarly, despite the decision to abandon nuclear power, few German environmentalists have ever protested the fact that they are surrounded by nukes around their borders, or that their electric companies import atomic power from neighboring France” (2009, 27). Until a few years ago, the German textbooks were full of warnings that personal computers would be devastating for the job market, weaken interpersonal communication and would “dehumanise” it. The good news is, according to Theil, that Germany companies are still world leaders in information and alternative energy technologies. What changed very recently is the definition of what is “good” and “bad” in technology. Culture change came again, and with it, redefinition of nature and “nature friendly technologies.” Even nuclear energy and GMO became clean and good since “by cutting emissions and creating better biofuels, both help fight global warming” (2009, 27).

In our collection, we do analyse the technological risks and dangers and their social perception, and in particular, we are interested in the social aspects of the new computer and Internet based communication.

Relatively briefly we would like to present another trend in the research on science and technology. The problem is when, and to what extent the growth of natural sciences has contributed to technological innovations and to economic growth. Even if we limit our discussion to the industrial period and Western societies, the answer is not simple. Conventional wisdom supports the view that both the relationship and influence are strong. Findings of an international research program of 1970–1990 suggest a more balanced, or even a skeptical opinion. Discoveries in the field of natural sciences and following applications can weaken economic growth. For instance, new technological inventions must correct former mistakes and dangers, previously invisible and now surfaced by natural sciences (mentioned earlier); investments in science and technologies are directed increasingly into the fields which are socially very important but do not easily translate into economic growth, like medicine and health care, environment protection (see, e.g., Schofer, Ramirez and Meyer 2000). Historians and sociologists give many examples of great technological achievements and periods of economic bloom completely unrelated to science in today’s sense of the term (see, e.g., Mumford 1934).

As we have shown, there is a large number of contexts in which the content of our collection could be put. In this introduction, we shall mention one more classic idea. Forty years ago, Margaret Mead, an icon of American cultural anthropology, published a book (1970), on the subject of the generation gap, which immediately became very influential. She discussed the so called “prefigurative” cultures in which socialisation is reversed. Older generations learn from the younger ones. This situation often happens in cases of migration, but also in the world, which in the late 1960s was only emerging, hence times of enormously quick technological transformations. New technologies are much more easily absorbed by young people than by their parents, raised in another, much “slower” culture. This is particularly visible in information society, in the civilisation of the internet and other new communication technologies, to which we devote one part of the collection.

Before we briefly present the book, we would like to mention the last context of its content. In addition to internationally recognised periodicals like “Science, Technology and Society,” “Bulletin of Science, Technology and Society,” or “Science, Technology and Human Values,” the programmes of international conferences where these issues are present seems to us to be important. One of the reasons of the following presentation is that most of the chapters of our book originate from the international part of the conference on “society, culture and technologies” held at AGH University of Science and Technology in Krakow, Poland, in May 2009. Research Committee 23 “Sociology of Science and Technology” of the International Sociological Association organised fourteen paper sessions at the 16th World Congress of Sociology in Durban (South Africa) in 2006; (the next Congress is scheduled for July 2010). The topics of the sessions were: standardisation of science policies, commercialisation of science and science ethnics in the market society, globalisation impact on the functioning of science and technology, social and ethnical implications of biotechnologies, paradigmatic changes in the public image and acceptance of science and technology, women in science and technology, futures of science and technology, processes of re-organisation of work in the knowledge professions and the use of information technologies, the role of science and technology in the world’s food production: the case of transgenics, risks and potentials. Research Network 24 “Science and Technology” of the European Sociological Association organised fourteen paper sessions at the 9th Conference of this organisation held in Lisbon (Portugal) in 2009.

The topics of the sessions were: expertise and the public in Europe, science and innovation systems, dynamics of research networks and collaboration, patenting and knowledge transfers, knowledge flows and mobility in science and technology, evaluation and assessment of scientific systems, science and research policies, disasters and social crises, research systems and networks, organisational aspects of science and technology, emerging technologies, gender and science and technology careers, scientific careers and productivity, communicating sciences. The same topics are clearly visible at both of these grand international conferences. In our collection of papers, we are able to discuss only some of these themes.

The goal of our collection is to focus on the issues of the relations between modern sciences, both natural and social, and between new technologies (high and low) and culture in the local and global dimensions. The main matters presented and discussed in the chapters are the following: methodological similarities and differences between natural and social sciences; new technologies, high and low, and their cultural and structural contexts; communication technologies in the social and individual life of humans; culture and economy in the knowledge-based societies; technocracy and democracy; relations between new media and contemporary culture and art; science and technology as culture.

The book consists of three parts: “New Science, New Technologies and Social Life”, “New Low-tech Social Life” and “Information Technology Social Life”.

In the first part, Krzysztof Kułakowski (physicist) and Maria Nawojczyk (sociologist) of AGH University of Science and Technology in Krakow, Poland, devote their chapter to the unusual status of the “sociophysics” —a new interdisciplinary branch of science, situated between physics and sociology. The authors claim that the direct relation of physical theory to experimental data, well established procedures of measurement, and the seemingly eternal validity of physical laws make, in popular opinion, physics to be a basic reference point for other sciences including social sciences such as sociology. The authors are of the opinion that the differences between social sciences and physics are actually smaller than they appear to be in the social consciousness. Maria Nedeva of the Manchester Business School at the University of Manchester in the United Kingdom critically explores existing notions conceptualising the dynamics of science across its different aspects (e.g. knowledge, epistemic communities, practices etc.). It is focused on conceptual developments that are mainly relational,

and that aim to incorporate in the understanding of science influences (actors and relationships) a certain degree exogenous to it: examples are provided by the notions of National Innovation Systems, National Research Systems, actor networks (in different guises) and actor constellations. Building upon the critical analysis of existing notions conceptualising the dynamics, it is proposed that a concept of research space might be better suited. Conceptually and empirically, the research space is defined by the “essential” relationships of the research organisations and by layered notions of utility of knowledge. In turn, the “essential” relationships of research organisations are outlined by the essential exchange in which these engage. At the most general level this is the exchange of resources for knowledge; in terms of resources the organisations of science engage predominantly in exchanges involving money. Although the organisational actors are likely to vary between different research spaces these would broadly be state/government organisations, industrial and commerce organisations and possibly charity organisations. Finally, it is argued that the proposed notion of “research space” has several implications for the analysis of science and its dynamics. Piotr Stankiewicz, a sociologist from Nicolaus Copernicus University in Torun, Poland, concentrates on the most controversial issue of scientific development in the recent time—biotechnology. He analyses the controversies in Poland about the use of genetically modified organisms in agriculture and assumes that knowledge (as well as ignorance) is not a result of purely scientific procedures but in fact emerges from a weave of science, politics, industry, business and university relations. Attila Bruni from the “Research Unit on Communication Organisational Learning and Aesthetics” at the University of Trento in Italy, is also interested in biotechnology. He addresses the question of the coordination and institutionalisation of knowledge in the biotechnological sector, as a prime field in which to observe the intermingling and interaction of scientific, professional and technological knowledge, and of a plurality of organisational actors and practices. According to the author, the biotechnological sector is configuring itself nowadays as the point of confluence of a plurality of knowledge and organisational practices, whose common denominator is a strong technological orientation. It occupies a privileged position from which to observe the encounter amongst an array of expert knowledge, technologies and organisational and professional memberships. Observing the constitution and stabilisation of an Italian biotechnological network (involving ten departments of three universities, two national research

institutes, two hospital research centres, and two science and technology parks), the article focuses on the coordination and stabilisation of a web of knowledge and organisational practices. The conclusions critically reflect on the presented case study, highlighting how elements involved in enacting forms of interorganisational collaboration are not necessarily the same ones that stabilise a network in itself.

In the second part, Hartmut Hirsch-Kreinsen, a specialist in the field of economic and industrial sociology at the Technical University of Dortmund in Germany, in his paper about so the called “low-technologies”, shows that many established sectors and companies that are normally labelled as low-tech are interlinked with high-tech and service companies, and provide an important basis for growth and employment in the developed countries. Based on this contribution, it opens a differentiated perspective on the concept of knowledge based society. The main topic of the chapter by Magdalena Żadkowska, a sociologist from Gdansk University in Poland, is the cultural transformation of household and social relations caused by low-tech devices. She observes that such actions as doing the laundry and washing dishes are the two crucial actions of contemporary couples. She shows the mechanics of household integration that take place in our families and partnerships, and with the help of these observations it can be seen how domestic roles are being constructed and reconstructed at the beginning of the 21st century. The last chapter in this part of the book, written by Adam Choryński (a specialist in agriculture and forestry from Polish Academy of Sciences, Poznan Branch) and Piotr Matczak (a sociologist from Adam Mickiewicz University in Poznan in Poland), is dedicated to the phenomenon of permeability of urban areas, which has been diminishing in the last decades due to human intervention. The authors focus on the regulative part of the supplied side, and they also investigate how the process of decision making is undertook when the idea of a porous pavement would be relevant. Finally, it is considered what may be the obstacles when applying the new technology.

In the last part of the book, Giuseppe Caforio, an Italian sociologist and general, President of the “International Sociological Association’s” research committee on armed forces and society, explains the changes in the nature of war in the contemporary information society. He analyses two new instruments of “new war”. The first one is “globalisation-communication” which has already demonstrated its “military” power in the favour of terrorist groups, showing the role that the media played in

influencing the world environment. The second one is the coordination of group members through the use of email or by visiting a secure web site that can also function as an easy and trusted source of recruitment of new adherents. Ana Nunes de Almeida, Ana Delicado and Nuno de Almeida Alves, sociologists from the University of Lisbon and the CIES-ISCTE Institute in Lisbon, Portugal, focus on the issue of childrens' internet usage. This paper presents and discusses the data of a survey launched in 2008, rolled out to children studying in Portuguese public and private schools and located in different areas of the country. It is particularly focused on the results of a cluster analysis, through which three user profiles emerged: "the diligent student", "the tenacious player" and the "all-round cybernaut". Marek Jakubiak, a social scientist from Warsaw University of Technology in Poland, describes the role of the internet in interpersonal communication. The paper outlines various forms of using the internet as a channel of interpersonal communication, with particular attention paid to the activity of students of Polish public universities. The author's aim is to carry out an historical analysis of the process of popularisation in Poland of IT forms of communication as mentioned above, and to show their positive and negative aspects in relation to university students who use them. Duru Arun Kumar, a sociologist from Netaji Subhas Institute of Technology in New Delhi in India, discusses whether communication technology adds a new dimension to the individual's concept of leisure activities. They present a survey that was conducted amongst engineering students between 18–21 years of age at a State funded engineering college in India. They carried out an analysis to understand the sociological impact of these "individual oriented", digital technology based means of leisure activities. Finally, Corporate Social Responsibility (CSR) as the ideology of global capitalism is the main issue of the chapter written by Robert Geisler, a sociologist from University of Opole in Poland. He tries to find the answer to the question of whether theoretical framework and ideology of global capitalism are examples of postmodern thought. On analysing this subject, Geisler used the poststructuralist social thought of Michel Foucault with his discursive formations and the role of this formations in the building of the social world and social space. The main goal of the analysis is to show how the model of Corporate Social Responsibility (CSR) has been established as the ideology of global capitalism in the 20th and 21st century. In the era of globalisation and global capitalism of the past twenty years, Corporate Social Responsibility has acquired special significance. One of

the important issues in the field of responsibility is technology with regard to creation innovation, the distribution of knowledge and technology. Foucault's social theory, which defines ideology as a form of knowledge and discursive practice, will be particularly useful for diagnosing the research problem.

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Part I

New Science, New Technologies and Social Life

CHAPTER ONE

SOCIOPHYSICS: AN ASTRIDING SCIENCE

Krzysztof Kułakowski and Maria Nawojczyk

Many of today's intriguing puzzles are due to our lack of knowledge of human behaviour. We remain surprised how voters in a well-developed country can be cheated and put to war by their president and yet reappoint him to the position; how another society brought up in the fine ideals of love and freedom rolls from the eve of democracy down to authoritarianism; how an experienced politician, deceived by the propaganda of his own advisers, self-destructs (see Podhoretz 2005; Binyon 2007; Lucas 2007).

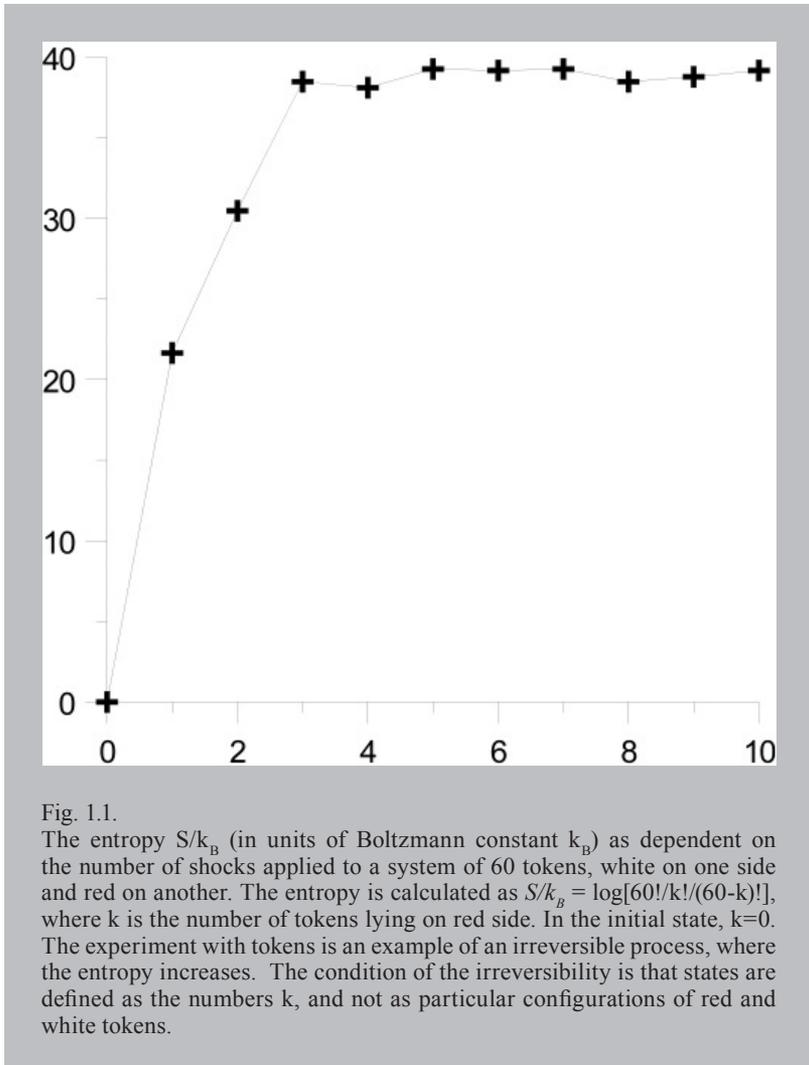
There is a continuous need to discover laws in the social world. However, even the tentative status of this target remains unclear (Brown 1984; Kincaid 1990; Weinert 1997). A fundamental disagreement lies at the heart of social science about whether social phenomena can be subject to the same explanatory goals as physical phenomena (Williams and May 1996). A positivist, Emile Durkheim, claimed that the methods used to study the social world did not differ in any important way from the methods used to study the physical world (Durkheim 1984). However, Max Weber offered a serious empirical alternative to positivism in the form of hermeneutics and held the view that there were crucial differences between the physical and social worlds (Weber 1949). Thus, in our discussion, we put forward the following questions: Can social research share the goals of prediction and explanation with physical sciences? Do social laws differ in nature from those of natural sciences? How universal should they be? Do they allow for predictions?

In these discussions, physics is sometimes quoted as a reference point (Merton 1968). Moreover, physicists are recently more and more involved in research on social systems; the so-called sociophysics is a new branch of interdisciplinary studies (Chakrabarti, Chakrabarti and Chatterjee 2006; Stauffer 2003). It is well known that sociology started from the "social physics" and "law of three stages" (Marshall 1994). Social research is a child of the scientific age; as an investigative discipline, its origins are to

be found in the 19th century model of physical science. Thus, empiricism may be defined as the idea that all knowledge has its origins in experience derived through the senses. However, observation is not a straightforward affair since it contains two dimensions, the cognitive and the social, which interact in complex ways. Therefore, there is a constant relationship between theory and data. Today the set of methods applied to investigate social systems covers a large area between philosophy, anthropology, economics, history, linguistics, psychology and literature. Is there still a place for physics? In this article we will demonstrate that once physics is applied to a system described with many variables, the concept of law becomes fuzzy. Our example is the second law of thermodynamics, which has a long-standing special status in physics. Our second aim is to comment on the predictability, the ideal most desired in social sciences. Here again, however, modern physics reveals its weakness.

If any branch of physics can be applied to social systems, statistical mechanics would seem to be first in line. It has a special status among other branches of physics since it deals with systems with as many as 10^{23} variables. It is obviously impossible to tackle so much data, so we limit the description to two or three macroscopically measurable parameters, the others being averaged out. The cost of this step is that the system dynamics reveals new properties which were absent in microscopic theories. Namely, for each macroscopic state A there is some number $N(A)$ of microscopic states, which are qualified as A during the macroscopic measurement. As we know, the entropy of the state A is defined as proportional to $\ln(N(A))$. The problem is that more often than not we can distinguish “disordered” and “ordered” states, say A and B , where $N(A)$ is dramatically larger than $N(B)$. Let us, then, prepare the system in an initial state B —what will happen? The system spontaneously evolves from B to A and will not revert in a time period shorter than, say, the age of the Universe. This is the core of irreversibility, of entropy increase (Fig.1.1.), and of the second law of thermodynamics, the subjects around which discussion is still engaging (Dawkins, 2006).

But as we see, the effect of irreversibility appears because our macroscopic measurements are inaccurate. Every microscopic state X is unique and $N(X)=1$, so its entropy is exactly zero. Therefore, the second law of thermodynamics is just a consequence of our way of performing measurements. Most philosophers of science have argued that the method used is the only guarantee that the knowledge obtained is scientific



(Chalmers 1982); in this sense, “science is method”. Yet, some questions still remain. Is it objective? Is it an inherent property of nature, or just a consequence of our theoretical description?

In a purely macroscopic theory, i.e. phenomenological thermodynamics, we not only ignore information on the values of the internal variables, but also their existence. An example of state A is the state of a metallic rod, both ends of the same temperature. This state happens as a natural consequence of a specially prepared state B, when one end is heated and the other end remains cold. The process of heat flow is irreversible, macroscopically measurable, and real. If we were able to follow the time evolution of the microscopic variables, i.e. the coordinates and velocities of atoms in the rod, the trajectory of the system would drive it from one microscopic state to another. In this case there is no need to introduce entropy; if one does so, one finds that it is equal to zero and it does not vary in time. The second law of thermodynamics is thus entangled with our axioms.

Maybe we should add that the second law of thermodynamics is at the root of our understanding of physics. As it was sarcastically formulated by Arthur Eddington, the famous astrophysicist:

If someone points out to you that your pet theory of the universe is in disagreement with Maxwell's equations then so much the worse for Maxwell's equations. If it is found to be contradicted by observation well, these experimentalists do bungle things sometimes. But if your theory is found to be against the second law of thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation. (Dawkins 2006)

This example of the second law of thermodynamics teaches us that a theory is accepted if it reflects the results of our measurements. As such, it depends on the measurement method. By employing the correct method, the scientist may be sure that their findings are true, repeatable and can be used to form generalisations. These logical attempts to build a justificatory framework for scientific knowledge were ruined in social sciences by Karl Popper (1992). According to him, a scientific theory, as opposed to a pseudoscientific theory, is one open to falsification. If the theory passes the tests it was not confirmed, it only meant that it was not proven false on that occasion. By eliminating untruth through the falsification process, science moves closer to the truth. The question of whether or not a theory is true moves us too far.

The same law, though atypical to physics, provides a bridge to other sciences. Let us take into account that infinite sources of heat do not exist: each will run out after some time. The more engines there are working