Science, Technology, Society: Prologue

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Anyone who works as a scientist these days, irrespective of where and in which discipline, and who tries to explain what they do and why—setting aside their need to earn a living—will most likely find themselves in deep water. There is no longer any binding authority, any philosophy or religion that might help them to reflect critically on the point of their work and on its value to, and role in, society as a whole. These are questions the scientist has to grapple with alone.

The age of the great narratives is over, or so one great French philosopher has assured us. The proletariat as the subject of history has allegedly had its day and if critical inquiry and change are to be had at all, then only within the ambit of Postmodernism and not in opposition to it. Not only are the traditional criteria of critical inquiry and reflection fast losing their validity, but even conventional wisdom concerning who is responsible for these, who is the engine of social progress and who should be reflecting on the same—all these are now open to doubt in a way that they never used to be. Clearly new points of reference are needed if the authority, quality and coherence of critical inquiry are to be retained—to the extent that such inquiry is possible at all. It seems that in a functionally differentiated society, critical inquiry can make itself heard only as refutation or contradiction—such forms of communication as, lacking sure ground, are forced to keep moving from place to place. Process, change and disorder are now the norm, while the exceptions in need of explanation are permanence, continuity and order. A new age of confusion has dawned, as one German social philosopher has rather too hastily concluded, and the new paradigm of actor-network theory is still struggling to do justice to this dynamic of 'everything is connected' and 'nothing is sacred'. Yet we are at the same time using technology to perfect the globalization of human intercourse and interpersonal communications. What we are experiencing at present is the constitution of a global society. It now looks as though technology, being the only important social activity that is both targeted in intent and cumulative in

impact, irrespective of the consequences this ultimately has for mankind's wellbeing, is indeed mankind's last great narrative. Technology, which by definition is a synthesis of *technicus* and *logica*, of engineering and science, has proved such a potent force in terms not only of depth and reach, but of temporal scope, too, that it has forced philosophy, metaphysics and religion to become uncharacteristically modest. This in turn has made the voices of those speculative scientists who are not necessarily philosophers all the louder and more insistent. All in all, we may regard ourselves at present not only as onlookers, but also as participants and as persons affected—at least indirectly—by a very loud concert, the true nature of which was highlighted recently with devastating effect by the Sokal Affair.

Human beings communicate their material exchange with nature first through engineering and then through technology. The exact form this takes depends on the process with the aid of which the individual members of society relate to each other and with the aid of which something approximating to society is constituted. In bourgeois society, this function—which not only fosters cohesion, but for all its contradictions is also fundamentally civilizing—is performed by economic enterprise. Underlying all economic enterprise is of course the profit motive, which has always been both an engine of, and a crucial factor in, technological development. We have now arrived at a juncture, however, at which technological development can no longer be left to the short-sighted interests of an economy driven by the profit motive. What we need are institutions and procedures that make decisions on, or at least help prepare, the future of society in a way that is both democratically legitimate and scientifically binding. What we need to do is to initiate communications processes that can provide a qualitative justification for decisions which the economy tends to justify in quantitative terms: Whatever promises the most profit is done.

Decisions of far-reaching social consequence that rest on scientific certainty and are at the same time democratically legitimated will probably be possible only if a balance is struck between parliamentary democracy, grass-roots democracy and expert opinion. Participation in such a decision-making process, however, would have to be tied to certain preconditions that most average members of society are currently a long way from meeting, including a thorough understanding of the issues, financial independence,

sufficient spare time and interest. Nor could these be met in a one-off revolutionary act. What we are talking about here is rather a long-drawn-out process of social change, requiring a lot of patience on the part of those involved. Participation in those processes by which an intention takes shape and a decision is made upon it—whether in a 'planning cell', a 'future workshop' or an 'open space' scenario—certainly merits public recognition as work that is beneficial to society as a whole, even if it does not constitute gainful employment in the traditional sense of the term.

And what role will that traditional haven of science—the university—play in the process by which social practice is rendered more reflexive? There are signs even now that external objectives already hold more sway over scientific development and the pursuit of knowledge than do the regulatory factors immanent in science itself.

The genesis of the so-called secondary sciences highlights this trend. Their emergence has less to do with academic initiative than with its opposite, for what drives them in most cases are societal objectives that have their origins outside the university—such as noise research, cancer research, environmental research, urban planning and the energy economy. Society these days expects science to be relevant and this demand can no longer be ignored. Underlying scientific development today is something very different from the sustained application of previously acquired (basic) knowledge witnessed in previous years. Research that is directly linked to the problems society is facing does not so much endeavour to apply abstract standard knowledge to the specific problems of everyday life as to generate new knowledge in situ, meaning in cooperation with others. This in situ knowledge would be impossible to generate within the relatively closed system of the university, nor would it count for much even if it were. For some special areas of societal practice, theorization is fast becoming the standard vehicle through which science realizes its relevance to external objectives. Paraphrasing Marx's eleventh thesis on Feuerbach, one could say that whereas until now, scientists have merely *interpreted* reality and tried, in a process of isolating abstraction, to ascertain the laws to which it is subject, now they are at last beginning to change it: Truths are no longer found, they are created—through the productive efforts of scientists in situ. The dividing line between the societal subsystem of 'science' and

society as a whole is becoming increasingly blurred. Just as science is integrated in societal practice and consequently can be instrumentalized for external objectives, so society, in its everyday functions, is becoming increasingly oriented to such forms of communication, epistemological and problem-solving strategies as have long been typical of science.

Solving a societal problem scientifically these days has to mean adopting an interdisciplinary, process-oriented approach in which all the affected parties are involved in situ and the exact problem-solving strategies selected on the basis of the requirements and standards ascertained in the field. This inevitably has the effect of sensitizing science to the form in which its results are presented. The tools and methods used for teaching science are becoming increasingly important to communications not only between scientists and non-scientists, but also to those between scientists belonging to different disciplines. Yet the restructuring of science's function and value to society brought about by the ever greater influence of external factors on its internal development has far more serious consequences than those that have to do with science teaching alone, for what it does ultimately is to cast doubt on science's disciplinary division of labour, its function and hence its value.

I remember how in the early fifties, at a time when the role played by science and technology during the Third Reich was still very influential, some colleges of technology made philosophy a mandatory subject even for students of engineering. What was actually a very sensible plan turned out to be a failure in practice, however. Instead of learning how to philosophize, a skill that would have enabled them to adopt a certain distance to their everyday work as scientists or engineers, students were taught philosophy the way it was then taught at university—and still is now, incidentally: What they learned was the canon of a by and large self-centred and highly specialized discipline—a discipline like any other, in other words. They acquired a knowledge of philosophy that was doomed to remain superficial, that instead of being an integral part of their professional expertise, in fact constituted just another academic hurdle that all undergraduates had to take. There is a huge difference between being able to regurgitate the writings of the great philosophers and being able to philosophize 'in situ', which according to the eleventh thesis on Feuerbach is the ability to be an

active and legitimate participant in society's decision-making processes. To be able to teach such skills, however, the relatively self-contained institution of the 'university' would first have to be transformed into a place of scientific communication that is open and responsive to society's problems. Not only would traditional curricula have to be redefined in such a case, but traditional teaching methods would no longer be able to confine themselves to the question of how to change the culture of working and learning within the university, but would instead have to develop a grading system that took account of the said changes. After all, even the most progressive curricula are useless if, at the end of the day, a rigid system of examinations that flies in the face of all that has been learned is left in place.

Science and technology are now more inseparable than ever. The one presupposes the other. Cutting-edge scientific inquiry without the aid of technology is no more possible than is technology without a solid scientific basis. Both flourish in the presence of the other, as is implicitly acknowledged in such abbreviations as STS (Science and Technology Studies). At the same time, however, the dividing line between academic science as a subsystem of society and society as a whole is becoming increasingly blurred. These days, there is hardly any area of life that is not a legitimate subject of study, of systematic communication and formalized learning processes or, at the very least, the subject of some form of 'consultancy'. 'Research' is no longer a quest for truth conducted in one institution to the exclusion of all others, but is rather pragmatic in thrust and a 'business' like any other. Being involved in, and affected by, collective 'experiments', even ordinary people these days are becoming 'co-researchers'. Science and science policy, which until now were highly specialized and highly bureaucratic fields, are now numbered among the main focuses of public interest. The Inter-University Research Centre for Technology, Work and Culture (IFZ) in Graz, which is the host of the Institute for Advanced Studies on Science, Technology and Society (IAS-STS), is a particularly good example of how post-academic science is now being practiced and institutionalized in Austria.

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Graz and Klagenfurt, May 2008