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modernization; as the risks of modernization are science, their latency is eliminated. The triumphant procession of the industrial system causes the boundaries between nature and society to become blurred. Accordingly, destructions of nature can no longer be shifted off onto the 'environment' either, but as they are universalized by industry, they become social, political, economic and cultural contradictions inherent in the system. Risks of modernization that have lost their latency and become globalized as a result of the system can no longer be dealt with implicitly under the assumption of conformity to the structures of inequality based on the model of industrial society. They develop instead a dynamism of conflict which withdraws from industrial society's pattern of production and reproduction, classes, parties and subsystems.

The distinction between risk and industrial society therefore not only coincides with the distinction between the 'logics' of the production and distribution of wealth and risk production, but also results from the fact that the *primary relationship becomes reversed*. The concept of the industrial society supposes the *dominance* of the 'logic of wealth' and asserts the compatibility of risk distribution with it, while the concept of risk society asserts the *incompatibility* of distributions of wealth and risk, and the *competition* of their 'logics'.

In Part III, these arguments will be developed further in two directions. In all conceptions of industrial society, the *specializability* of scientific knowledge and political action is assumed, that is to say, it is assumed they can be delineated and monopolized. This is expressed not least in the social systems and institutions planned for these two systems – the 'system of science' and the 'political system'. In contrast to that, the following perspective will be developed here: reflexive modernization which encounters the conditions of a *highly developed* democracy and an *established* scientization, leads to characteristic *unbindings* [*Entgrenzungen*] of science and politics. Monopolies on knowledge and political action are becoming differentiated, moving away from their prescribed places and in a certain, changed manner becoming more generally available. Thus it is suddenly no longer clear whether it is still family policy, or *already* human genetic science which has the primary authority for deciding how people live together *outside* democratic consent and voting. This means that in addition to the features already developed, the risks emerging today are distinguished firstly (Chapter 8) from all the earlier ones by their *society-changing scope*, and secondly by their particular *scientific constitution* (Chapter 7).

SCIENCE BEYOND TRUTH AND ENLIGHTENMENT?

If we were previously concerned with *externally* caused dangers (from the gods or nature), the historically novel quality of today's risks derives from *internal decision*. They depend on a simultaneously *scientific and social construction*. Science is one of the causes, the medium of definition and the source of solutions to risks, and by virtue of that very fact it opens new markets of scientization for itself. In the reciprocal interplay between risks it has helped to cause and define, and the public critique of those same risks, techno-scientific development becomes contradictory. This perspective can be illustrated and elaborated by way of four theses.

(1) Corresponding to the distinction between modernization of tradition and reflexive modernization of industrial society, two constellations can be differentiated in the relationship of scientific practice and the applied to a 'given' world of nature, people and society. At first, science is phase, the sciences are confronted with their own products, defects, and secondary problems, that is to say, they encounter a *second creation in civilization*. The developmental logic of the first phase relies on a *truth-knowledge* and enlightenment are still spared from the application to scientific skepticism to themselves. The second phase is based on a *complete* scientization, which also extends scientific skepticism to the inherent foundations and external consequences of science itself. In that way both its *claim to truth* and its *claim to enlightenment* are *densified*. The transition from one constellation to another takes place within the *continuity* of scientization, but precisely because of that, *changed* internal and external relationships of scientific work come into being.

Primary scientization gains its dynamism from the contrast of tradition and modernity, of lay people and experts. Only under the conditions of this demarcation can the *skepticism* in the internal relations of science be generalized at the same time as the application of scientific results is advanced in an *authoritarian* fashion in external relations. This constellation of an unbroken faith in science and progress is a characteristic of modernization in industrial society into the first half of the twentieth century (although certainty diminishes). In this phase, science faces a practice and a public sphere whose resistance it can sweep aside, supported by its success, with promises of liberation from constraints not yet understood. The situation changes fundamentally to the extent that the *reflexive* constellation gains importance and symptoms of this can be

traced back to the beginning of the twentieth century. With the development of cognitive sociology, ideology critique, fallibilism in the theory of science, the critique of experts, and so on).

When they go into practice, the sciences are now being confronted with their own objectivized past and present - with themselves as product and producer of reality and of problems which they are to analyze and overcome. In that way, they are targeted not only as a source of solutions to problems, but also as a cause of problems. In practice and in the public sphere, the sciences increasingly face not just the balance of their defeats, but also that of their victories, that is to say, the reflection of their unkept promises. The reasons for this are varied. As success grows it seems that the risks of scientific development increase disproportionately faster; when put into practice, solutions and promises of liberation have emphatically revealed their negative sides as well, and these have in turn become the objects of scientific analyses. And, paradoxically enough, in the scientifically partitioned and professionally administered world, the future perspectives and possibility for expansion of science are also linked to the critique of science.

The expansion of science presupposes and conducts a critique of science and the existing practice of experts in a period when science concentrates on science, and therefore scientific civilization is subjecting itself to a publicly transmitted criticism that shakes its foundations and its own self-conception. It reveals a degree of insecurity with respect to its foundations and outcomes which is exceeded only by the potential for risks and developmental perspectives it uncovers. In this way, a process of demystification of the sciences is started, in the course of which the structure of science, practice and the public sphere will be subjected to a fundamental transformation.

(2) As a consequence, a momentous *demonopolization of scientific knowledge claims* comes about: science becomes more and more necessary, but at the same time, *less and less sufficient* for the socially binding definition of truth. This loss of function is no accident. Nor is it imposed on the sciences from outside. It arises instead as a consequence of the triumph and differentiation of scientific validity claims; it is a product of the reflexivity of techno-scientific development under the conditions of risk society. On the one hand, as it encounters itself in both its internal and its external relations, science begins to extend the methodological power of its skepticism to its own foundations and practical results. Accordingly, the claim to knowledge and enlightenment is systematically scaled back in the face of the successfully advanced fallibilism. The access to reality and truth which was imputed to science at first is replaced by decisions, rules and conventions which could just as well have turned out differently. Demystification spreads to the demystifier and in so doing changes the conditions of demystification.

On the other hand, as science becomes more differentiated, the flood of conditional, uncertain and detached detailed results increases and

becomes impossible to overvey. This hyper-complexity of hypothetical knowledge can no longer be mastered by mechanical testing rules. Even substitute criteria such as reputation, type and place of publication, institutional basis also fail. Accordingly, as scientization proceeds, the systemically produced uncertainty spreads to external relations, and conversely turns the target groups and appliers of scientific results in politics, business and the public into *active coproducers* in the social process of knowledge definition. The 'objects' of scientization also become *subjects* of it, in the sense that they can and must actively manipulate the heterogeneous supply of scientific interpretations. And this not only means choices between contradictory highly specialized validity claims; the latter can also be played off against one another and must in any case be recombined into an image suitable for action. For the target groups and appliers of science, reflexive scientization thus opens up *new possibilities of influence and development* in the processes of production and application of scientific results. This is a development of great ambivalence. It contains the opportunity to emancipate social practice from science through science; on the other hand it immunizes socially prevailing ideologies and interested standpoints against enlightened scientific claims, and throws the door open to a feudalization of scientific knowledge practice through economic and political interests and 'new dogmas'.

(3) The new *taboos of unchangeability* which arise contrary to the triumph of scientific knowledge claims are becoming the touchstone for the independence of scientific research. The further scientization proceeds and the more clearly risk situations and conflicts enter public conscience, the greater becomes the pressure to act, and the more techno-scientific society threatens to metamorphose into a scientifically produced 'taboo society'. More and more sectors, agencies and conditions, which are all changeable in principle, are being systematically excluded from this expectation of change through the construction of 'objective constraints', 'system constraints' and 'auto-dynamisms'. The sciences can no longer remain in their traditional Enlightenment position of taboo breakers; they must also adopt the contrary role of taboo constructors. Accordingly, the social function of the sciences wavers between opening and closing opportunities for action, and these contradictory outside expectations stir up conflicts and divisions within the profession.

(4) Even the *foundations of scientific rationality* are not spared from the generalized demands for change. What was made by people can also be changed by people. It is precisely reflexive scientization which makes the self-imposed taboos of scientific rationality visible and questionable. The suspicion is that 'objective constraints', 'latent side effects', which stand for the 'auto-dynamism' of the techno-scientific development, are themselves *manufactured* and thus are in principle *solvable*. The project of modernity, Enlightenment, is unfinished. Its actual rigidification in the industrial understanding of science and technology can be broken open by

a revival of reason and converted into a dynamic theory of scientific rationality which digests historical experience and in that way develops itself further in a way that is capable of learning.

Of decisive importance for the issue of whether science will contribute in that way to the self-limitation and self-control of its practical risks is not whether it reaches beyond its own range of influence and makes a bid for a (political) voice in the application of its results. The essential thing is, rather, what type of science is conducted with regard to the measurability of its allegedly immeasurable side effects. Of decisive importance in this manner is whether the overspecialization that produces side effects on its own and thus seems to confirm their inevitability will endure, or whether the power for specialization in the context will be discovered anew and developed; whether the ability to learn to deal with practical consequences irreversible situations will be created that are based on the imputation of infallibility and hence make learning from practical mistakes impossible from the start. It is important as to what extent in dealing with risks of modernization the treatment of the symptoms can be replaced by genuine removal of the causes, and to what extent practical taboos on risks can be scientifically depicted or broken up through the variables and causes considered. That is to say, what matters is whether risks and threats are methodically and objectively interpreted and scientifically displayed, or whether they are downplayed and concealed.

Primary and Reflexive Scientization

The starting phase of *primary* scientization, in which lay people were driven out of their 'hunting grounds' and pushed back into 'reservations' like Indians, concluded long ago, and with it the whole myth of superiority and the gradient of power that characterized the relation of science, practice and the public sphere was created. The developmental logic of that period (which is, after all, a central theme of classical sociology) can be observed today only in marginal areas of modernization, if at all. Its place has been taken almost everywhere by the conflicts and relationships of reflexive scientization. Scientific civilization has entered a stage in which it no longer merely scientizes nature, people and society, but increasingly itself, its own products, effects and mistakes. Science is no longer concerned with 'liberation' from pre-existing dependencies, but with the definition and distribution of errors and risks which are produced by itself.

Different conditions and processes, different media and agents are characteristic of reflexive modernization than were typical of error management processes in the phase of primary scientization. In the first wave, scientists of various disciplines could rely on the superiority - sometimes real, sometimes only apparent - of scientific rationality and methods of thought with respect to traditional knowledge bases, folk

knowledge and lay practices. This superiority can hardly be attributed to a lesser degree of error in scientific work, but rather to the way the *treatment of mistakes and risks was socially organized in that phase*.

First of all, the scientific penetration of a world still untouched by science permits a clear demarcation between solutions of problems and causes of problems, where this boundary runs between the sciences on one side and their (actual and potential) 'objects' on the other. The application of science takes place with the attitude of a clear *objectification* of problems and errors. Wild, uncomprehended nature and the unbroken compulsions of tradition are 'to blame' for the sicknesses, crises and catastrophes from which people suffer.

This projection of the sources of problems and errors into the as yet unexplored no man's land of the sciences is obviously connected to the fact that the sciences did not as yet overlap significantly in the fields where they were applied. It is also connected with the fact the sciences' own theoretical and practical sources of error were organized in a systematic way. With good reasons one can proceed from the perspective that the history of sciences was always less a history of the acquisition of knowledge than one of mistakes and practical lapses. That is why scientific 'knowledge', 'explanations', and practical 'suggested solutions' contradict each other diametrically over time, at different places, in different schools of thought, cultures and so on. This need not imply any loss in the credibility of scientific rationality claims so long as the sciences can succeed in handling the mistakes, errors and criticism of their practical consequences essentially *within* science. In that way they maintain their monopoly claim to rationality against the non-specialized public sphere on the one hand, and on the other they prepare a forum for critical discussions within the discipline.

In this social structure it is even possible, conversely, to trace erupting problems, technical shortcomings and risks of scientization to previous insufficiencies in the *degree of development* of the scientific support system, which can then be converted into new plans and surges of technological development and thus ultimately into a consolidation of the scientific monopoly on rationality. This *transformation of mistakes and risks into opportunities for expansion and perspectives for the development of science and technology* generally tended in the first phase to immunize scientific development against the critique of modernity and civilization, and made it *ultra-stable*, so to speak. Actually, however, this stability is based on a truncation of methodological skepticism; inside the sciences (at least according to the pretension) the rules of *criticism* were generalized, while at the same time the scientific results were enforced towards the outside in an *authoritarian* manner.

Obviously, these conditions are also undermined to the extent that science directs its attention at science, in an interdisciplinary manner. Conversely, it is precisely the projection of mistakes and causes of problems that now must bring *science and technology* into view as

possible causes of problems and errors. The risks that move to the center of attention in reflexive modernization destroy the pattern of interdisciplinary transformation of mistakes into development opportunities. At the same time, they dissolve the model of primary scientization, broadly established in the late nineteenth century, with its harmonious power relationships between professions, business, politics and the public sphere.

The scientific discovery and research on modernization risks means that techno-scientific development – in an interdisciplinary mediation – becomes a problem for itself; here scientization is scientized *as a problem*. By virtue of that, all the problems and difficulties the sciences and professions have in dealings with each other will immediately burst forth. For here science is encountering science, and hence all the skepticism and contempt one science is capable of showing towards another. The often equally aggressive and impotent resistance of lay people is replaced by the opportunities sciences have for resistance: counter-criticism, methodological critique, as well as a clubbish 'obstructive behavior' in all the fields of professional competition for resources. In this sense, the consequences and risks of modernization can only be brought into view by passing through the *critique* (and counter-critique) of the scientific service systems from different sciences. The opportunities for reflexive scientization consequently seem to grow in direct proportion to the risks and the list of shortcomings of modernization, and in inverse proportion to the unbroken faith in progress of techno-scientific civilization. The gate through which risks can be scientifically opened up and treated is called the critique of science, critique of progress, critique of experts and critique of technology. Risks destroy the opportunities to work out mistakes internally, and force *new forms for the division of labor* within the relationship of science, scientific practice and the public sphere.

In this way, the revelation of the risks of previous modernization necessarily stirs up the hornets' nest of competitive relations between the scientific professions, and arouses all the impulses to resistance that a scientific profession will have built up over the generations with all of its powers (including its scientific ones) against 'expansionist encroachment' on its own 'pet problems' and on its carefully installed 'pipeline of research funding'. The social recognition and treatment of risks will run aground on the competitive problems that erupt here and the unresolvable conflicts between schools of thought, so long as the *public sensitivity* with regard to certain problematic aspects of modernization does not grow, turn into criticism and perhaps even social movements, articulate itself and discharge itself as protests against science and technology. Modernization risks, then, can only be 'forced on' the sciences, 'dictated to them', from the *outside*, by way of public recognition. They are based *not* on intrascientific but on *overall social definitions and relationships*. Even within the sciences they can only develop their power through the motives in the background: the social agenda.

This in turn presumes so far unknown power of the critique of science and culture, which is based at least in part on a *reception of alternative expertise*. With reflexive modernization, public risk consciousness and risk conflicts will lead to *forms of scientization of the protest against science*. The critique of progress and civilization that we are experiencing distinguishes itself from that of the past two hundred years. The themes of the critique are generalized; the critique is supported scientifically, at least in part, and now confronts science with the full definition-making power of science. In this way, a movement is set in motion, in the course of which the scientists will be forced more and more emphatically to display before the whole public their awkwardness, all their limitations and their 'birth defects', all of which have long been well known internally. Forms of 'alternative' and 'advocacy science' come into being that relate the entire 'hocus-pocus of science' to different principles and different interests – and therefore reach exactly the opposite conclusions. In short, *in the course of the scientization of protest against science, science forces itself to run its own gauntlet*. New public-oriented scientific experts emerge, the dubious aspects of the foundations of scientific argumentation are exposed with counter-scientific thoroughness, and many sciences are subjected through their applied practices to a 'politicization test' of a previously unknown extent.

In this way, science not only experiences a rapid diminution of its public credibility, but also opens *new fields of activity and application* for itself. For example, the natural and engineering sciences have taken up many of the public criticisms of themselves and been able to transform them into opportunities for expansion. These criticisms relate to the conceptual, instrumental and technical differentiation of 'still' or 'no longer' tolerable risks, health threats, labor stresses and so on. Here the self-contradiction that scientific development has got into in its reflexive phase becomes tangible: *the publicly transmitted criticism of the previous development becomes the motor of expansion*.

This is the developmental logic in which modernization risks are constituted through a tense interplay of science, scientific practice and the public sphere, and then played back into science, precipitating 'identity crises', new forms of work and organization, new bases for theories, new methodological developments and so on. The assimilation of errors and risk is thus connected to the circulation of overall societal discussions, so to speak, and occurs, among other things, in confrontation and amalgamation with social movements critical of science and modernization. Nevertheless, one should not be deceived here; through all the contradictions, a path of scientific *expansion* has been taken. Public discussion of modernization risks is the route for the transformation of mistakes into opportunities for expansion under the conditions of reflexive scientization.

This interpenetration of critique of civilization, interdisciplinary antagonisms and publicly effective protest movements can be clarified in

a particularly illustrative manner with the case of *environmental movement*.² Conservation movements have existed since the beginning of industrialization. Yet the selective critique expressed by conservation organizations (which in addition involved neither large costs for nor a fundamental critique of industrialization) was never able to shake off the nimbus of hostility to progress and backwardness that surrounded it. This only changed when the social evidence of threats to nature through industrialization grew and at the same time scientific interpretations completely detached from the old ideas of conservation were offered and accepted. These explained the growing public discontent with the obviously destructive consequences of industrialization, supported it, freed it from concrete individual cases and occasions, generalized it and joined in a broad protest against industrialization and technification.

In the United States this took place essentially through critical *biological* research that concentrated on the destructive consequences of industrialization for natural biosystems, and sounded the 'alarm' in the truest sense of that word. That is to say, using scientific arguments and language understandable to the general public, researchers investigated the existing and impending consequences of industrialization for life on this earth and concentrated these into images of a looming destruction.³ As these and other arguments were taken up by protest movements, the process began that was referred to above as the scientization of protest against certain forms of scientization.

The goals and themes of the environmental movement were gradually detached from concrete occasions and individual demands that are ultimately easy to meet (closing off a wooded area, protecting a certain species and the like) and brought into a general protest against the conditions and prerequisites of industrialization itself. The occasions for protest are no longer exclusively individual cases, visible threats that can be traced back to attributable offenses (oil spills, pollution of rivers by industrial waste and so forth). More and more, the center comes to be occupied by threats that are often neither visible nor tangible to the lay public, threats that sometimes will not even take their toll in the lifespan of the affected individuals, but only in the second generation of their offspring. They are in any case threats that require the *sensory organs of science* – theories, experiments, measuring instruments – in order to become visible and interpretable as threats at all.

Paradoxical as it might sound, in the scientized ecology movement the occasions for and the themes of protest have largely become independent of the agents of the protest, the affected lay people. In the limiting case the threats have even detached themselves from any possibility of perception, and are not only transmitted by science, but in the strict sense are *scientifically constituted*. This does not diminish the importance of 'lay protest', but it does show its dependence on 'counter-scientific' mediations. The diagnosis of the threats and the struggle against their causes is often possible only with the aid of the entire arsenal of scientific measurement,

experimental and argumentative instruments. It requires considerable special knowledge, the readiness and ability to engage in unconventional analysis, as well as technical facilities and measurement instruments that are generally quite expensive.

This example is representative of many others. One can therefore state that science is involved in the origin and deepening of risk situations in civilization and a corresponding threefold crisis consciousness. Not only does the industrial utilization of scientific results create problems; science also provides the means – the categories and the cognitive equipment – to recognize and present the problems as problems at all, or just not to do so. Finally, science also provides the prerequisites for 'overcoming' the threats for which it is responsible itself. Thus – referring once again to the example of environmental problems – little remains today among the professionalized segments of the ecology movement of that abstinence from acting on nature that was previously propagated by the movement.

Quite to the contrary, the relevant demands are founded on the newest and best results that physics, chemistry, biology, systems research and computer simulations have to offer. The concepts with which ecological systems research operates are highly modern and have the aim of comprehending nature not only as individual parts (and thereby running the risk of causing second- to *n*th-order damage and consequences due to the systematically produced ignorance) but as a totality . . . those eating mussels and carrying natural fiber bags are in reality the *precursors of a new modernity*, whose characteristic will be a much more perfected and efficient but above all more comprehensive scientization and technification of nature. (Weingart, 1984: 74)

It is precisely the awareness of its dependence on the object of its protests that produces so much bitterness and irrationality in the anti-science attitude.

The Demonopolization of Science

It is not their failure but their *success* that has *dethroned* the sciences. One could even say, the more successfully the sciences have operated in this century, that much faster and more thoroughly have their original validity claims been relativized. In this sense scientific development in the second half of this century is passing through a *rupture of its continuity*, and not only in its external relations (as has already been shown), but also in its internal relations (as will be shown here): in its view of itself, socially and theoretically, in its methodological foundations and its relation to application.

The model of primary scientization is based on the 'naiveté' that the methodical skepticism of the sciences can be institutionalized on the one hand, and yet be limited to the *objects* of science on the other. The foundations of scientific knowledge remain as exempt from skepticism as do all issues of the practical application of scientific results. What is subject

to challenging questions and internal skepticism is *dogmatized* externally. Behind this is concealed not only the difference between 'action-free' research practice and the constraints to action of practice and politics, where as a condition of the system skepticism must be cut short and replaced by clear plans of action. This bisection of scientific rationality along the boundaries between the internal and the external corresponds in particular to the *market and professionalization interests* of scientific expert groups. The consumers of scientific services and knowledge pay not for admitted or uncovered errors, falsified hypotheses, or self-doubt, no matter how cleverly advanced, but for 'knowledge'. Only those who succeed in asserting knowledge claims in the market against competing professional and lay groups can ever earn the material and institutional prerequisites to indulge in the 'luxury of skepticism' (known as basic research) internally. What must be generalized from the point of view of rationality, must be turned into the opposite in the interest of prevailing in the market.

Dogmatizing and the art of doubting complement and contradict one another in the process of 'successful' scientization. While internal success is based on the *demolition* of the 'demigods in lab coats', external success, on the contrary, relies on the deliberate *construction*, adulation and dogged defense of the 'infallibility claims' of those same demigods against all the 'suspicious of irrational criticism'. Results that are always 'errors subject to recall' according to the conditions under which they were produced, must simultaneously be styled into 'knowledge' with eternal validity, which it would be the height of ignorance to ignore in practice.

In this sense, *modernity and counter-modernity have always been fused in a contradictory way* in the model of primary scientization. The indivisible principles of criticism were divided; their range of validity was truncated. The absoluteness of the knowledge claims that were advanced in external relations contrasts oddly with the generalization of doubt which is elevated to the norm internally. Everything that comes into contact with science is planned to be *changeable, except scientific rationality itself*. These limitations of the illimitable are no accident, rather they are *functionally necessary*. Only they provide science with its cognitive and social superiority *vis-à-vis* prevailing traditions and lay practices. Only in this way can critical knowledge claims and *efforts at professionalization* be (contradictorily) bound together.

This assessment has two consequences. Firstly, the process of scientization from the nineteenth century until now must *also* be understood as a *dogmatization*, as practice for the unquestioned validity claimed by the 'dogmas' of science. Secondly, the 'dogmas' of primary scientization are *unstable* in quite a different way than those dogmas (of religion or tradition) against which science prevailed: *they carry within themselves the standards for their own critique and abolition*. In this sense, scientific development undermines its own delimitations and foundations through the continuity of its successes. In the course of the *triumph* and

generalization of the *claims* of scientific argument, a completely different situation arises. Science becomes *indispensable* and at the same time *devoid* of its original validity claims. In equal measure 'practical problems' are incited. Science's methodically pursued loss of security, in both its internal and external relations, brings about a *decline of its power*. The results are conflictual *equalization tendencies* in the gradient of rationality between experts and lay people (one good indicator of which among many, for instance, is the increase in 'medical malpractice' lawsuits). Furthermore, the usual concepts that reflect the power gradient *fail*: modernity and tradition, experts and lay people, or the production under the application of results. *This unbinding (Entgrenzung) of skepticism* lines of (a) the *theory of science* and (b) the *practice of research*.

Fallibilism in the Theory of Science

This transition from primary to reflexive scientization is for its own part conducted *scientifically and institutionally*. The *agents of rupture* are the disciplines of the critical application of science to itself – the theory of science and the history of science, cognitive sociology and the sociology of science, psychology and empirical ethnology of science, and so on – which have been gnawing at the foundations of the self-dogmatization of scientific rationality with varying success since the beginning of the century.

On the one hand these disciplines are conducted professionally and institutionally, and specifically under the claims of the *still* valid model of primary scientization; on the other hand, they cancel out the conditions of their application, and in this sense they are already forebears of the self-critical variant of reflexive scientization. In this sense, 'alternative to the program of science from the sixties or seventies. It has belonged rather of 'alternative expertise' in this sense, with long-term effects up to the present, was the Marxian critique of 'bourgeois science'. It already contained the entire contradictory tension between faith in science in one's own case and the generalized ideology critique of existing science, which was subsequently presented in ever new variations – in the cognitive sociology of Mannheim, in the falsificationism of Popper or in Kuhn's historical critique of normativism in the theory of science. The systematic 'nest-fouling' that occurs here step by step is the consistent application to this process of self-criticism did not proceed steadily, but in the consistent dissolution of repeated attempts to salvage the 'core rationality' of the scientific enterprise. This ultimately blasphemous process of 'conjectures and refutations' could be traced in many examples. Nowhere, however, is it practiced in such an exemplary fashion as in the course of the discussion of the theory of science in this century.

Ultimately, Popper had already used the same 'dagger' against foundation thought that is used against all his own 'attempts to give foundations' to the principle of falsification that he constructed to guard against charlatanism. All the 'remnants of foundations' in the falsification principle are gradually revealed and cleared away by consistent application to themselves, until the columns on which the falsification principle was to rest are destroyed. Feyerabend's famous phrase, 'anything goes', then only serves to summarize this situation worked out with so much scientific competence and scrupulous exactitude.⁴

Fallibilism in Research Practice

But one can say, and people do say in the practice of science: *so what?* What do we care about the self-evisceration of a theory of science that was nothing more than the 'philosophical fig-leaf' for a research practice that it did not care about? But after advocating the falsification principle, there must be some consequences in subsequently announcing its always-existent superfluity. Nothing has happened. Nothing at all. In its progress, science has just *lost the truth* – as a schoolboy loses his milk money. In the past three decades science has changed from an activity *in the service* of truth to an activity *without* truth, but which has to make the most it can socially of the benefits of truth. Scientific practice has definitely followed scientific theory into conjecture, self-doubt and *convention*. Internally, science has retreated to making decisions. Externally the risks proliferate. Neither internally nor externally does science still enjoy the blessing of reason. It has become *indispensable to and incapable of* truth.

This is neither coincidental nor accidental. Truth has taken the usual route of modernity. The scientific religion of controlling and proclaiming truth has been *secularized* in the course of reflexive scientization. The truth claim of science has not withstood penetrating self-examination, neither empirically, nor in the theory of science. On the one hand, science's claim to be able to explain things has retreated to the *hypothesis*, the conjecture subject to recall. *On the other hand* reality has sublimated into *data* that are *produced*. Thus 'facts' – the former centerpieces of reality – are nothing but answers to questions that could just as well have been asked differently, products of rules for gathering and omitting. A different computer, a different specialist, a different institute – a different 'reality'. It would be a miracle if it did not already exist, a miracle and not science. To provide another proof of the irrationality of (natural) scientific research practice would amount to mutilation of a corpse. Approaching a scientist with the question of truth is almost as embarrassing as asking a priest about God. Uttering the word 'truth' in scientific circles (like 'reality', by the way) signals ignorance, mediocrity, unreflected use of ambiguous, emotion-laden words from everyday language.

Certainly, the loss has an attractive side. Truth was a supernatural

effort, an elevation to the near-divine. It was a close relative of dogma. If once one possessed it, had pronounced it, it was difficult to change and yet it changed continually. Science is becoming human. It is packed with errors and mistakes. Science can be conducted even without truth, perhaps even better, more honestly, with greater versatility, more audaciously and bravely. The opposite attracts, it always has opportunities as well. The scene is becoming colorful. If three scientists get together, fifteen opinions clash.

The Feudalization of Cognitive Practice

The recourse to scientific results for the socially binding definition of truth is becoming *more and more necessary*, but at the same time *less and less sufficient*. This disparity between necessary and sufficient conditions and the resulting gray area reflect science's loss of functionality in its most central occupation, the representative determination of knowledge. The target groups and users of scientific results – in politics and business, mass media and everyday life – become more dependent on scientific arguments *in general*, but at the same time more independent of *individual* findings and the judgment of science regarding the truth and reality of its statements.

The transfer of knowledge claims to external agencies is based on the *differentiation* of the sciences – that is the apparent paradox. It lies first of all in the hyper-complexity and variety of findings, which, even if they do not openly contradict each other, do not complement each other either, but generally assert different, even incomparable things, and thus virtually *force* the practitioner to make his own cognitive decisions. In addition to that is their self-proclaimed semi-arbitrariness, which is usually denied in concrete situations, but appears nevertheless in the discord of the many findings and in the methodological recourse to conventions and decisions. In return, the 'yes, but', the 'on the one hand, on the other hand' in which hypothetical science always operates, offers options of choice in the definition of knowledge.

The flood of findings, their contradictoriness and overspecialization, turn reception into participation into an autonomous process of knowledge formation *with and against* science. Now one can say, that was always the case. The autonomy of politics or business with respect to science is as old as that relationship itself. In the process, however, two of the peculiarities mentioned here disappear under the table. This type of autonomy is *produced* by science. It arises in the *surplus* of science, which has simultaneously scaled back its own demands into the hypothetical, and offers an image of the self-relativizing pluralism of interpretations.

The consequences have a strong impact on the conditions of knowledge production. Science, having lost reality, faces the threat that others will dictate to it what truth is *supposed* to be. This is not only the case with

the flourishing 'court science', by way of direct influence. The approximate nature, the indecisiveness, the accessibility to decision-making of the results make this possible. Selection criteria that escape scientific scrutiny achieve a new and perhaps decisive meaning in the hyper-complexity that must be mastered in any case. These include the compatibilities of basic political views, the interests of sponsors, the anticipation of political implications; in short, *political acceptance*.

In view of the overcomplexity it produces itself, science is threatened with an *implicit feudalization of its cognitive practice* on its way into methodological conventionalization. Correspondingly, a new *particularism* arises in external relations: groups of scientists, large and small, who isolate themselves from each other and group around implicit priorities of application. The central point is that this occurs not only subsequently, in practical contacts, but already in the research laboratory, in the offices of scientists, in the inner sanctum of their production of scientific results itself. The more unforeseeable the risks of techno-scientific production become and the more emphatically they determine public consciousness, the more intense becomes the pressure for action on political and economic agencies, and the more important it becomes for social agents to ensure access to 'science as a definition-making power', whether for minimization, distraction, redefinition, or for the dramatization or blocking of 'external interference in definition-making' through critique of methodology.

But the process also has other sides. A bit of enlightenment can also be brought into reality with it. People are freed from the 'patronizing' cognitive dictates of the experts (Illch 1979). More and more people are able to play the role of assessors of science. There is something irritating for scientists about the functional transformation of science which occurs in this generalization of scientific argumentation figures, as Wolfgang Bonß and Heinz Hartmann (1985) show:

In this generalization, scientific arguments, recognized since the Enlightenment as the only authoritative agency of legitimation, seem to lose their aureole as rationally unassailable authorities, and to become socially available. From sociological perspectives this trend presents itself as the *result* of scientization processes. The fact that scientific statements are no longer sacrosanct, but can be disputed in everyday ordinary life, means nothing other than that systematic skepticism as the structure-bearing principle of scientific discourse is no longer a privilege of the latter. The difference between 'unenlightened mob' and 'enlightened citizens' or, in more modern terms, between lay people and experts, shrivels and transforms itself into competition between different experts. In practically all social subsystems the internalization of norms and values is replaced by reflection in the light of competing components of systematic knowledge. (16; see also Weingart 1983: 328)

In order to survive this interprofessional competition among experts, it is no longer sufficient to present 'tidy' tests of significance. At times one must appear personally and be convincing. Under conditions of reflexive scientization, the *production (or mobilization) of belief* becomes

a central source for the social enforcement of validity claims.⁵

Where science used to be convincing *qua* science, today, in view of the contradictory babble of scientific tongues, the *faith* in science or the *faith* in alternative science (or *this* method, *this* approach, *this* orientation) becomes decisive. Perhaps it is only the 'extra' of presentation, personal persuasive power, contacts, access to the media or the like which will provide the 'individual finding' with the social attribute of 'knowledge'. Where faith (helps) decide on scientific arguments, it can soon resume dominance – of course, no longer as faith in its external form, but as science. In the emerging interregnum, where science is necessary for the production of knowledge, but no longer sufficient, the broadest variety of doctrines will accordingly re-establish themselves. That makes many things possible: fatalism, astrology, occultism, ego worship and ego sacrifice, paired and mixed with scientific detailed findings, radical criticism of science and faith in science. These *new alchemists* are oddly immune to the critique of science, since they found their 'truth' and their supporters not before science, but in interaction with it.

This immunity of science does not apply only to these extreme cases. Quite generally, ideologies and prejudices, now scientifically armed, are able to defend themselves anew against science. They take recourse to science itself in order to reject its claims. One just has to read *more*, *before* the results, with advance notice as it were. Keeping a couple of this or that obstinate scientific news collapse in itself. Until the sixties, science could count on an uncontroversial public that believed in science, but today its efforts and progress are followed with mistrust. People suspect the unsaid, add in the side effects and expect the worst.

Techno-scientific civilization is swarming everywhere with *taboos of unalterability*. In this jungle, where the existence of things that result from actions is not permitted to be acknowledged, the scientist in search of a 'neutral' analysis of problems gets trapped in a new kind of *predicament*. Every analysis faces the decision of whether to research *around* the social taboos of action variables or to research *into* them. These decision-making possibilities affect the design of the investigation itself (even where they are dictated by the employer); they are therefore located in the most central realm of scientific practice in the type of inquiry, the selection of variables, the direction and scope of pursuing conjectures, the conceptual design, the methods of calculating 'risks', etc.

In contrast to the consequences of primary scientization, the consequences of these research decisions are inherently rather *estimable*. If the latter were *outside* industry and production in the (powerless) *latent* areas of society – the health of people and nature – determinations of risk today have a direct effect on the *central power zones* – business, politics, institutional control agencies. These certainly possess the 'institutionalized attentiveness' and the 'collective clout' to make audible any cost-intensive

secondary effects on themselves. The 'invisibility' of it is thus severely limited according to social situation. The same holds true for the 'secondary character' of the effects. The observation of development falls under the official competence of risk research (or an auxiliary division). The guidelines are known, as is the legal basis. Everyone knows roughly what concentrations of toxins and what exceeding of the allowable limits can be connected with what decisive (legal and economic) consequences.

But that means that risks are scientized; the assessability of secondary effects is transformed from an *external* to an *internal* problem, from a problem of *application* to one of *knowledge*. The external is gone. The consequences are internal. Contexts of origin and application push together. Thus the autonomy of research becomes *at the same time* a problem of knowledge and a problem of application. The possible violation of taboos becomes an inherent condition of good or bad research. This might still remain hidden in the gray zone of research decisions that could be made this way or that. From its institutional, scientific-theoretical and moral constitution, research must put itself in a position to accept and thoroughly investigate the political implications it has, if it is not willing to jump through all the hoops at the first crack of a whip.

At the same time it becomes recognizable here that the opportunities of scientific cognitive practice for influence and direction lie in its *scope for selection*, which has so far been excluded by the theory of science for reasons of validity and thus been subjected to no evaluation. According to the prevailing theories of hypothesis formation, the chain of causality can be projected in quite different directions, *without* colliding with any validity standards, so long as one's own conjectures are verified. In developed civilization, scientific cognitive practice becomes an *implicit, objectivized manipulation of latently political variables, hidden behind the pretense of elective decisions not subject to justification*. This does not mean that objectivization is excluded. Nor does it mean that the presumed causal relationships can be produced politically. Of course, causal and action analysis are intermeshed – quite independently of scientists' view of themselves. *The doubled, constructed reality of risk politicizes the objective analysis of its causes*. When science conducts research under these conditions in conformity with taboos from a misunderstood 'neutrality', then it contributes to the fact that the law of the unseen side effect still dominates the development of civilization.

On the Assessability of 'Side Effects'

We can no longer tolerate the fairy tale of the unforeseeability of consequences. The stork does not bring consequences – they are made. With and despite all the incalculability, they are made in the sciences *themselves*. This becomes visible when there is a systematic differentiation between the *calculability* of the actual external consequences and their *inherent assessability*.

According to the prevailing understanding, the incalculability of the secondary consequences of scientific work necessarily intensifies with the increasing differentiation of the sciences. Scientists actually are separated from the utilization of their work; they have no possibilities of influence at their disposal in that sphere; others are responsible. Consequently, scientists cannot be called to account for the actual consequences of the results they worked out from the analytic point of view. Even though people are beginning to speak a common language in many areas, the distances between theory and practice do not diminish but increase because of that fact, as do the possibilities for the application side to use the results according to their own interests.

This assessment rests on the concept of 'calculability' – a key concept in the classical theory of scientization, whose degree of significance and conditions of application are just beginning to become dubious today. The possibilities of estimating the secondary conditions only come into view when one sees that with *reflexive modernization the concept of calculable-incalculable itself changes*. Calculability no longer means only instrumentally rational controllability; nor does incalculability still mean the impossibility of an instrumental mastery. If that were so, then the 'incalculability of secondary effects' would still be preserved in today's organization of science; it would even grow, because the ends rationality is contextualized and the uncertainty grows.

If on the other hand one understands calculability in the sense of *estimability*, then this fits exactly the state of affairs that comes into being under conditions of reflexive modernization. In point of fact, the *actual* consequences remain *more incalculable than ever*. At the same time, however, secondary effects are robbed of their latency and thus become assessable in the following threefold sense. Knowledge of them is (in principle) available; nor is it possible any longer to make the classical excuses of uncontrollability, and to that extent one is under pressure to make a move because of the knowledge of possible effects. Decreasing 'calculability' is thus accompanied by increasing 'estimability', and what is more, the one is a *condition* of the other. The knowledge of secondary effects, by now a sufficiently differentiated branch of knowledge, is always (potentially) present. The broadest variety of consequences and recursive causal patterns must thus be weighed in their meaning for themselves and others. In this way, the *actual* consequences ultimately become more and more incalculable *because* the possible effects become more and more estimable and their assessment takes place more and more in the research process and in interaction with its inherent taboo zones, and determine those zones in the course of results. But that also means that within research itself, implicit dealings with *expected* consequences gain a greater and greater importance. On the level of expectations (and expectations of expectations) secondary effects are anticipated, which in that way impact on the research process directly, although at the same time the ultimate consequences remain invisible. This is the *extremely*

effective lobotomy of the scientists. The emphasis with which they insist on the absolute incalculability of the actual long-term consequences grows by the same extent as the expected consequences actually determine their work, the starting and stopping points of their questioning and explaining.

This only apparently contradictory double thesis of (a) the growing incalculability with (b) the simultaneous increasing estimability of what were 'secondary effects' will now be discussed. Only by opening up the entire argument can we see how far and in what sense this fatalism in techno-scientific civilization can be overcome.

The Autonomization of Application

In the phase of reflexive scientization the *places and participants* of knowledge production change. As was shown above, the target groups of the sciences in administration, politics, business and the public sphere become *coproducers* of socially valid 'knowledge' – in a confictual collaboration and opposition. But with that, the *relations of the transfer* of scientific results to practice and politics become agitated. The 'fellow shareholders' of the liquidated 'knowledge capital' of science intervene in a new and self-assured way in the transfer of science into practice.

In the model of primary scientization the relationship of science and politics is conceived *deductively*. Results worked out scientifically – according to the model – are *enforced* in an *authoritarian* way from top to bottom. Wherever this encounters resistance, irrationalities must still hold sway, according to the self-understanding of the scientists, and these can be overcome by 'raising the level of rationality' among practitioners. This authoritarian model of deductivist application can no longer be maintained under the conditions of the reflexive self-doubt of the sciences. Application is absorbed more and more in processes of external knowledge production, that is, in sorting and selection, in casting doubt on and reorganizing interpretations offered and in deliberately enriching them with 'practical knowledge' (chances of adoption, informal power relationships and contacts and the like). Thus arises the *end of the scientifically directed, instrumentally rational control of practice*. Science and practice once again split up under the conditions of dependency on science. The application side begins to make itself more and more independent of science *through* science. In a certain way, one can say that we are experiencing at the moment how the level of rationality *inverts*.⁶

The *new autonomy* here of the target groups is based not on ignorance but on knowledge, not on underdevelopment but on differentiation and the hyper-complexity of possible scientific interpretations. It is – and this only seems to be paradoxical – *produced by science*. The success of the sciences makes demand more independent of supply. An important indicator for this trend to autonomization is first of all the specific *pluralization of the knowledge sources* and the *critical-methodological*

reflection on it. As they become more differentiated (and not necessarily as a result of their deterioration or moral fletness of foot), the sciences, including the natural sciences, are transformed into *self-service shops* for financially well endowed customers in need of arguments. The hypertrophic complexity of individual scientific findings puts opportunities in the hands of customers for selection *within and between* expert groups. It is not uncommon for political programs to be decided in advance simply by the choice of what expert representatives are included in the circle of advisers. Not only are practitioners and politicians able to choose between expert groups, but those groups can also be *played off against each other* within and between disciplines, and in this way the autonomy of the customers is increased. Precisely as a result of successful learning in contacts with the sciences, this will be happening in an increasingly less amateurish way. Instead, from the experts and the fundamental controversies they have fought out (or not fought out) one can learn how unwelcome results can be blocked *professionally* (by methodological criticism, for instance). Since the starting points for this are likely to increase as a result of the self-doubt of the sciences, the opportunities for defensive criticism presented to the practical side through reflexive scientization will grow.

Of course, the sciences in that case are less and less capable of satisfying the need *for security* among the customers under pressure to make decisions. With the generalization of fallibilism, the scientific side shifts its self-doubt over to the practical side, and in addition forces upon it the alternative role of the *reduction of uncertainty necessary* for action. All of this – to stress it once again – occurs not as an expression of impotence or underdevelopment in the sciences, but, quite to the contrary, as a product of their highly advanced differentiation, hyper-complexity, self-criticism and reflection.

On the Manufacture of Objective Constraints

Those who stop at this point in the argumentation, conceal the *participation* of science, its structural division of labor and its theoretical program-matics in the unpredictability of the practical consequences of science. Specifically, they would be proceeding from the assumption that the route of the sciences into the *generalization of uncertainty is unavoidable*. At the same time, science is considered to be *constant* in its historical prerequisites and forms. Science, however, has changed the world as hardly any other power has. Why should the changing of the world not also force science into changing itself? Where everything becomes changeable, science, which brought change into the world, can no longer use the immutability of its foundations and work forms as an excuse. The opportunities to change itself grow along with the autonomy of the practical side. The separation permits and forces a rethinking and redefinition of scientific knowledge in the canon of interpretation and application claims

coming from the public sphere, politics and business. A number of questions arise: where are the starting points *within* scientific practice itself to lessen self-produced insecurity as the cognitive process continues and differentiates? Can the practical and theoretical sovereignty of science be refounded this way? How can the generalization of skepticism and the reduction of insecurity be reharmonized in their internal and external relations? Some exemplary reflections illustrating the general concept will be presented here.

The prevailing theoretical self-concept of science implies that the sciences cannot make value judgments with the authority of their rationality. They deliver so-called 'neutral' figures, information, or explanations which are to serve as the 'unbiased' basis for decisions on the broadest variety of interests. *Which* interests they select, however, on *whom* or *what* they project the causes, *how* they interpret the problems of society, *what sort* of potential solutions they bring into view – these are anything but neutral decisions. In other words: the sciences have developed their steering abilities *independently of* and *beyond* explicit value statements. Their possibilities of exerting practical influence lie in *how* they design scientific results. Thus the 'purely objective' interpretation of 'need' and 'risk' in the various fields of action provides a cloak behind which the directions of future developments are negotiated. What is considered 'need' and 'risk' is a central question in the decision between nuclear power plants, coal-based energy, energy conserving measures or alternative energy sources, just as it is in old-age insurance, social welfare insurance, the determination of poverty lines, and so on. And each of these problems contains implicit decisions on a *series* of related consequences which ultimately flow into the issue of a different form of social life. Value free or not, the determination and operationalization of consequences, hypothetical conjectures and the like are therefore levers with which fundamental decisions on the social future are carried out.

This means that the decisive factor for whether the sciences will contribute to the self-control and taming of their practical risks is not whether they reach out beyond their scope of influence and seek political consultation and cooperation in the application of their results. What is essential, rather, is *what kind of science is conducted with respect to the assessability of its allegedly immeasurable secondary consequences*. This does not mean that science should jump from one extreme to the other, and in a boundless exaggeration of its own powers should make itself the sole responsible party for what happens socially with scientific results. But it does imply that it should accept reports that come back on threats and risks as empirical challenges to its self-concept and for the reorganization of its work. In this sense what is essential to a reduction of external insecurity from within science is: (a) to what extent treatment of the *symptoms* can be replaced by elimination of the *causes*; (b) whether the *ability to learn from practice* will be preserved or created, or whether, by ignoring the practical consequences, *irreversible situations* will be created

that are based on the *imputation of infallibility* and make learning impossible from the start; (c) whether the isolated view will be preserved or whether the power for *specialization in the context* will be rediscovered and developed.

Removing the Causes or Fighting against the Symptoms

In the course of secondary scientization, the constructions of objective constraints, with which the conditions and products of primary scientization were removed from the reach of action, are fused together into opportunities for change. The more objective constraints become, the more difficult it becomes to maintain the character of an objective constraint, and the production of them bursts forth on all sides. 'Technological or economic determinism', declared and thought through under considerations of technological control, can no longer maintain its determining power and remain sealed against legitimization demands and other possible arrangements. Determinism itself becomes configurable – at least in principle. Even self-produced objective constraints are transformed by the reflexive approach of the sciences into *constructed, manufactured* constraints, according to the same principle by which recognized causes of a cold, for instance, can be used to overcome or prevent it. Toxic substances and pollutant emissions, which were first considered 'latent' and then 'unavoidable' side effects, are gradually related under the observation of the scientists to the decision-making party concealed in them, and reconnected to the conditions of their controllability.

In this way, the veil of 'objective constraints' that had been drawn over all the conditions and agents of modernization and industrialization during primary scientization is systematically researched away in reflexive scientization. In the process, all the conditions become, first, *structurable*, and second, *dependent on legitimization*. The idea 'it could be different' increasingly comes to dominate, overtly or covertly, all fields of action as a threatening possibility in the background with its insistence on argument. And this happens even where science tries with all the defining power of its theories and methods to put up new barriers of unchangeability for risks produced. But then the central issue becomes, not only *what* is investigated, but also *how* it is investigated, that is, with what approach, scope of thought, end points and so on with respect to the increase or avoidance of industrialization risks.

Thus there are fundamentally *two options* confronting each other in dealing with civilizational risks: removing causes in primary industrialization, or the secondary industrialization of consequences and symptoms, which tends to expand markets. To this point, the *second* route has been taken almost everywhere. It is cost-intensive, leaves the causes obscure and permits the transformation of mistakes and problems into market booms. The learning process is systematically foreshortened and

prevented. The self-origination of the threats of modernization is submerged under the selective consideration and treatment of symptoms. This can be illustrated with the example of the treatment of diseases of civilization, such as diabetes, cancer or heart disease. These illnesses could be fought where they originate: by reducing the stresses of work or the pollution of the environment, or through a healthy way of life and a nutritious diet. Or the symptoms can be alleviated through chemical preparations. The different schools of fighting illness do not of course exclude one another, but one cannot actually speak of a cure through the second method. Nonetheless, we have so far generally opted for the medical and chemical 'solution'.

In more and more areas, industry is beginning to profit from its secondary problems, ignoring its own role in their origin. This once again raises alternative decisions for science and its research: *either* it delivers the appropriate risk definitions and causal interpretations for this in its isolated specialization, *or* it breaks through this cost-intensive controlling of the symptoms and develops independent, theoretically sound alternative perspectives that demonstrate and illuminate the sources of problems and their elimination in industrial development itself. In the first case, science becomes the participant and the legitimating agency for continuing chains of 'objective constraints'; in the second case, it demonstrates starting points and ways to break these chains and thus gain a bit of sovereignty *within* modernization over modernization.

In this sense, the risk society is potentially also a *self-critical* society. Reference points and presuppositions of critique are always being produced there in the form of risks and threats. The critique of risks is not a normative critique of values. Precisely where traditions and hence values *have deteriorated*, risks come into being. The basis for critique is less the traditions of the past than the threats of the future. What is needed to recognize toxic substances in the air, the water and food, is not so much established values as, rather, expensive measuring instruments and methodological and theoretical knowledge.

Determinations of risk thus oddly straddle the distinction between objective and value dimensions. They do not assert moral standards openly, but in the form of a *quantitative, theoretical and causal implicit morality*. Correspondingly, in the investigation of risks with a generally conventional understanding of science, a kind of 'objectified causal morality' is being undertaken. Statements on risk are the moral statements of scientized society. All these things – reference points and object of critique, the possibilities of discovering and grounding – are themselves produced in the modernization process on a large and a small scale. In this sense, therefore, a *detrationalized and self-critical* society also comes into being along with the risk society, at least potentially. The concept of risk is like a probe which permits us over and over again to investigate the entire construction plan, as well as every individual speck of cement in the structure of civilization for potentials of self-endangerment.

Infallibility or Ability to Learn

If side effects are no longer to be accepted, techno-scientific development must guarantee the ability to learn at every stage, at its pace and through the ways it advances. This presupposes that developments which create *irreversible situations* will be avoided. What is important, in contrast, is that leave room for mistakes and corrections. Technological research and policy must proceed from the 'theory' that has to this point proven most confirmed and most attractive: *that of the entrapment of human thought and action in mistakes and errors*. Where technological developments begin to contradict this one certainty – perhaps the ultimate one, and basically comforting at that – they encumber humanity with the unbearable burden of *infallibility*. As risks multiply, the pressure grows to pass oneself off as infallible and thereby deprive oneself of the ability to learn. The most self-evident thing, the admission of human failure, then coincides with causing *catastrophes* and must be avoided by all means. In this way, risk multiplications join forces with the imputation of infallibility and set loose pressures for the minimization of risks that correlate directly with the extent of threats. All this must be concealed by hook or by crook through the 'adherence to objective law' in one's own actions.

Thus we must investigate practical developments as to whether they contain a 'monstrosity of risk' that would rob people of their humanity and *condemn them to perfection* for all eternity. Techno-scientific development is beginning to be trapped more and more within a striking new contradiction: while the foundations of knowledge are being explored in the institutionalized self-skepticism of the sciences, the development of technology has been isolated against skepticism. Just as the risks and the pressure for action grow, absolutist claims to knowledge, infallibility and security, which have long since become untenable, are being renewed in technological development. Dogma flourishes under the pressure on the engineering sciences to take action. The unleashed and systematically fomented skepticism encounters the *anti-modernity* of scientific infallibility taboos in the development of technology. These harden as the risks increase. The 'safest' thing is ultimately the immeasurable: nuclear bombs and energy with their threats surpassing all concepts and imaginative abilities. It is necessary, therefore, to free *fallibilism* from its test possible variants of technological development as a possibility and to that is their 'freedom from error'.

Nuclear energy in this sense is a highly dangerous game with the imputed 'infallibility' of technological development. It releases objective constraints from objective constraints, which are scarcely alterable and only capable of learning to a limited extent. It commits people for generations (in disposing of or storing atomic waste), for periods, that is, in

which not even the unchanged meaning of the key word can be assured. It even casts shadows of immeasurable consequences over quite different areas. This applies to the social controls it requires, which have found expression in the phrase 'authoritarian nuclear state'. It applies equally well, however, to the long-term biological effects, which cannot be measured at all today. By contrast, decentralized forms of energy supply are possible which do not contain this 'auto-dynamism of objective constraints'. Developmental variants can thus close off the future or they can keep it open. Depending on which we choose, we make a *decision* for or against a trip into the unknown no man's land of unseen but measurable secondary consequences. Once the train has left the station it is difficult to stop it. Therefore, we must choose developmental variants that do not close off the future, but transform the modernization process itself into a *learning process*, in which the revisability of decisions makes possible the revocation of side effects discovered later.

Specialization in the Context

A further central condition for the production of latent side effects lies in the *specialization* of cognitive practice. More precisely, the higher the degree of specialization, the *greater* is the range, number and incalculability of the secondary consequences of techno-scientific action. Not only does the 'unseen' and 'secondarity' character of the 'unseen secondary consequences' arise from specialization. The probability also increases that selective solutions will be conceived and implemented, whose intended main effects will be continually covered over by the unintended side effects. Overspecialized science thus becomes a 'shunting yard' for problems and the cost-intensive treatment of their symptoms. The chemical industry produces toxic wastes. What is to be done with them? The 'solution': dumps. Its consequence: the waste problem becomes a ground water problem. The chemical industry and others can profit from this through 'purification additives' to drinking water. If the drinking water with these additives impairs people's health, there are medicines available, whose 'latent side effects' can be intercepted and prolonged by an elaborate medical care system. In this way, *chains of problem solution and problem production* come into being - according to the degree of overspecialization - and these 'confirm' the 'fairy tale' of unseen secondary consequences all over again.

The genetic structure from which 'objective constraints' and 'auto-dynamism' arise is thus in essence the model of overspecialized cognitive practice in its narrow-mindedness, its understanding of methods and theory, its career ladders and so on. Division of labor pushed to the limit produces everything: the secondary consequences, their unpredictability, and the reality which makes this 'fate' appear inevitable. Overspecialization is an active model of social practice that concentrates the fatalism of consequences in a self-confirming circle.

A science that would *break* this 'fate' must *(learn to) specialize in the context* in new forms. The isolated analytical approach does not lose its justification, but it becomes *false* and a risk producer in practice when it becomes the guiding line for partial measures and a 'patchwork approach' that is seemingly founded scientifically. The center of a specialized context research could then be occupied, for instance, by *shunting yards* of problems (which are precisely typical of dealings with risks and environmental problems, but also appear to prevail in many areas of social welfare policy and of social and medical services), as well as by the tracking down of essential developmental alternatives and the *switch settings* they contain that will avoid or multiply insecurity.

Thus, in the relationship between food supply, agriculture, industry and science, variants of models of the division of labor are concealed, which by themselves can either produce or shorten chains of secondary problems. A central fork in the road is marked by the issue of whether the chemical way of working the soil and processing food will be pursued further, or whether there will be a return to ways of dealing with nature *that learn from nature itself*, for instance, how weeds can be combated and the power and fertility of the soil increased by the proper rotation of crops. If the chemical way is maintained, the center of research will be the manufacture of ever more effective 'biocides' and consequently also the study of the effects of such toxins, the determination of allowable levels, which in turn require research into their damage to health and therefore animal research (with the accompanying mistreatment), public protests, legal and police measures, etc. If the path of an ecologically conscious agriculture is chosen, it too will require support from research, but of a different sort. The latter would have to improve knowledge of crop cycles and the possibilities of using the soil without impoverishing it. At the same time, however, chains of consequences and objective constraints that draw wider and wider circles can be broken. In the connection between agriculture and nutrition there are *switch settings for alternative social futures* which would connect the realms of industry, research, politics and law through chains of risk-producing 'objective constraints' in one case, and would not do so in the other.

Plea for a Pedagogy of Scientific Rationality

The rationality and irrationality of science are questions never only of the present and the past, but also of the *possible future*. We can learn from our mistakes - which also means that an *alternative* science is always possible. Not only an alternative theory, but an alternative *theory of cognition*, an alternative relationship of theory and practice, and an *alternative practice* of this relationship. If it is correct that the present is nothing but a hypothesis that we have not yet surpassed, then today is the age of the counter-hypothesis. The 'touch stones' (or, better 'mountains') which such hypotheses must face are obvious: the project of modernity

needs first aid. It threatens to choke on its own anomalies. Science in its present form is one of these.

We need a theory of the objective constraints of techno-scientific action that will place the *production* of objective constraints and 'unforeseeable side effects' of techno-scientific action at the center of attention. The lever for the avoidance and cancellation of the fatalism of consequences must also be found in the framework of action, in the self-conception of the sciences themselves. Not according to scientific practice, but *in it*, in what it considers noteworthy or not, how it asks questions and casts the 'nets' of its causal hypotheses, how it decides on the validity of its conjectures: that is where criteria must be discovered for how the unpredictability of consequences is produced *and* can be avoided. By changing its self-conception and political arrangement, we must, as it were, install *brakes and a steering wheel* into the 'non-steering' of the racing techno-scientific development that is setting explosive powers free. That this is possible was assumed more by illustration than proven by the foregoing considerations. At least the requirements on this conception are clear in outline: science must be conceived as (one) originator of the objective constraints from which the general uncertainty arises. It must break up that uncertainty through the practically effective change of its self-concept. The hope remains that reason, which was silenced in science, can be activated and mobilized against it. Science *can change itself* and revive enlightenment theoretically and practically through a critique of its historic self-conception.

A key reason for the solution of this demand comes from the question of whether and how it will prove possible to *institutionalize such a transformed practice of science* – whether of data production or of the 'theoretical gymnastics on semantic branches' (Mayntz 1980) – and to reconnect scientific work at the level of its methodological reflection and self-criticism to *reality* in a way yet to be laid out. Against the background of the arguments presented, this certainly means that the demonstration of theoretical connections is essential for the autonomous-critical and practical potential of the sciences. It also means, however, that the concept of empiricism must be rethought and reetermined, precisely from a theoretical and historical understanding. Given the level of scientifically produced insecurity we can no longer presume what empiricism 'is', but must plan this out theoretically. The conjecture is that only in a *theory of empiricism* can the speculative power of thought be related again to 'reality' and at the same time the complementary roles of theory and empiricism be outlined and marked out in their collaboration and opposition.

Social scientists can make a contribution to this. It would be up to them to encourage the emancipation of science from its self-inflicted fate of immaturity and blindness with respect to risks. Nowhere is there a recipe for this, and there is scarcely even any advice. In the case of the social sciences the guiding question at least is: how can social science and social

experience be related to each other in such a way that the spectrum of unseen secondary consequences is reduced? And how can sociology – for all its fragmentation into individual fields of work – be made capable of producing a contribution to *scientific specialization in the context* (basically therefore its original goal)?

What is sought is a *pedagogy* of scientific rationality which will conceive of that rationality as changeable by discussion of self-produced threats. Different from the case of the theory of science, which presumes and attempts to reconstruct the rationality of science from its historical status quo, the knowledge claim of science becomes a *future project*, which can be neither refuted nor gained from the forms of the present alone. The proof of the irrationality of the prevailing practice of science no more means the end of science than the refutation of Newtonian mechanics meant the end of physics. The precondition for that proof is to transfer the substantive abilities for criticism and learning, which were traditional in research practice, to the foundations of knowledge and the application of it. At the same time, that would mean the elevation of the *actually latent* reflexivity of the modernization process into scientific consciousness. But where modernization encounters modernization, this word also changes its meaning. In the social and political application of modernization to itself, the interest in mastery that is spread in this way loses its technical grip and assumes the form of 'self-control' and 'self-limitation'. Amidst the tumult of contradictions and new doctrinal disputes, there will perhaps also arise the *opportunity* for practical self-domestication and self-alteration of the techno-scientific 'second nature', its forms of thought and work.

Notes

- 1 In the current wave of 'scientization of the family', for instance, as visible in the prominence of experts in family and marriage counseling, but even here, scientization encounters a field of practice that is professionally and scientifically pre-formed and influenced in multiple ways.
- 2 I rely here particularly on (I believe unpublished) discussions by Robert C. Mitchell (1979). See also, on the same subject, Novotny (1979), Weingart (1979) and Küppers et al. (1978).
- 3 I am thinking in particular of *Silent Spring* by Rachel Carson, which was published in 1962 and sold 100,000 copies in three months, as well as Barry Commoner's *Science and Survival* (1963).
- 4 The argumentation can be sketched in several steps. First, on closer inspection, empirical data are insufficient as a falsification agent of 'speculative' theory. The latter must be grounded. Grounding it in experience removes it from intersubjectivity. At the same time the *production* of data in the experiment (interview, observation, etc.) continues to be ignored. If the latter are included, then the boundary between theoretical and empirical statements, the point of the entire undertaking, is destroyed. How should the insistence on the search for falsifiers actually be understood? Let us assume an experiment does not satisfy the theoretical expectations. Has the theory then been *refuted* once and for all, or have inconsistencies between expectations and results simply been demonstrated, which

OPENING UP THE POLITICAL

point to different decision possibilities and to that extent can be worked out or blocked in very different ways (by suspecting an error in the experiment, ⁵instance, or by building up and developing the theory further along quite contrary lines). Lakatos (1974)? In the shift in the history of science initiated by Thomas S. Kuhn's influential essay (1970), the empirical basis is removed from reflection on the philosophy of science. In the process, however, the status of the theory of science as a theory without empiricism becomes problematic. Is the theory of science just a logically qualified theory of norms, a supreme censure authority for 'good' science, hence the scientific equivalent of the religious Inquisition in the Middle Ages? Or does it fulfill its own demands on an empirically testable theory? Then its validity claims must be drastically scaled down in view of existing contradictory principles of knowledge production and fabrication. Ethnologically oriented research on science finally 'discovers' even in the putative birthplace of natural scientific rationality – the laboratory – that the prevailing practices resemble modern variants of rain dances and fertility rituals, which are oriented to the principles of career and social acceptance (Knorr-Cetina 1984).

⁵ This may be one of the reasons why, precisely as an oversupply of interpretations develops, personality characteristics and personal networks tend to increase in importance for the practical application and utilization of these interpretations.

⁶ In the following I am referring back to arguments that I presented together with Wolfgang Bonß (Beck and Bonß 1984) as part of the conference of the Deutsche Forschungsgemeinschaft on 'Application Aspects of Social-Scientific Results'. See also Bonß and Hartmann (1985).

In contrast to all earlier epochs (including industrial society), the risk society is characterized essentially by a *lack*: the impossibility of an *external* attribution of hazards. In other words, risks depend on *decisions*; they are industrially produced and in this sense *politically reflexive*. While all earlier cultures and phases of social development confronted threats in various ways, society today is *confronted by itself* through its dealings with risks. Risks are the reflection of human actions and omissions, the expression of highly developed productive forces. That means that the sources of danger are no longer ignorance but *knowledge*; not a deficient but a perfected mastery over nature; not that which eludes the human grasp but the system of norms and objective constraints established with the industrial epoch. Modernity has even taken over the role of its counterpart – the tradition to be overcome, the natural constraint to be mastered. It has become the threat *and* the promise of emancipation from the threat that it creates itself. A central consequence connected thereto, which will occupy the center of this chapter, is that risks become the motor of the *self-politicization* of modernity in industrial society; furthermore, in the risk society, the *concept, place and media of politics* change.¹

Politics and Sub-Politics

This assessment of a transformation of politics in the risk society will first be sketched out by way of *four theses*.

(1) The relationship between social transformation and political direction was originally conceived in the project of industrial society on the model of the 'divided citizen'. On the one hand, as a *citoyen*, the latter avails himself of his democratic rights in all arenas of political will formation, and on the other hand, as a *bourgeois*, he defends his private interests in the fields of work and business. Correspondingly, a differentiation occurs between a politico-economic and a techno-economic system. The axial principle of the political sphere is the participation of citizens in the institutions of representative democracy (parties, parliaments, etc.). Decision-making, and with it the exercise of political power, follow the maxims of legality and the principle that power and domination can only be carried out with the consent of the governed.

The actions of the *bourgeois* and the spheres of techno-economic pursuit of interests, by contrast, are considered *non-politics*. This design is based first on the equation of technical and social progress; then on the

assumption that the direction of development and the results of technological transformation follow more or less inescapable techno-economic *objective constraints*. Technological innovations increase the individual and collective well-being. The negative effects (deskilling, risks of unemployment or transfer, threats to health and natural destruction) have always found justification in these rises of the standard of living. Even dissent over the 'social consequences' does not hinder the accomplishment of techno-economic innovation. That process remains in essence removed from political legitimization, particularly by comparison to democratic-administrative procedures and the long periods needed for implementation; indeed, it possesses a power of enforcement virtually immune to criticism. *Progress replaces voting*. Furthermore: progress becomes a substitute for questions, a type of consent in advance for goals and consequences that go unnamed and unknown.

In this sense the innovation process that is enforced by modernity against the predominance of tradition is *split in two democratically* through the project of industrial society. Only a part of the decision-making competencies that structure society are gathered together in the political system and subjected to the principles of parliamentary democracy. Another part is removed from the rules of public inspection and justification and delegated to the freedom of investment of enterprises and the freedom of research of science. Social changes in these contexts are *displaced* as latent side effects of scientific and technological decisions. People do something quite different: they assert themselves in the market, use the rules of profit-making, carry forth scientific and technical inquiry, and in so doing they turn over the conditions of everyday life.

With the globalization of the industrial society, then, two contrary processes for organizing social change interpenetrate one another: the establishment of political parliamentary democracy and the establishment of an unpolitical, non-democratic social change under the legitimating umbrella of 'progress' and 'rationalization'. The two behave towards each other like modernity and counter-modernity. On the one hand, the institutions of the political system – parliament, government, political parties – *functionally* presuppose in a manner *conditioned by the system* the production circle of industry, technology and business. On the other hand, this pre-programs the permanent change of all realms of social life under the justifying cloak of techno-economic progress, in contradiction to the simplest rules of democracy – knowledge of the goals of social change, discussion, voting and consent.

(2) As we can say retrospectively, this demarcation of politics and non-politics in the process of modernization rested in the nineteenth and the first half of the twentieth century on at least two essential historical presuppositions that have become dubious since the seventies in all Western industrial states. These are: (a) the *social obviousness of inequalities in class society* which has given meaning and impetus to the

expansion of the welfare state; (b) a level of development of the productive forces and of science whose potentials for change neither exceed the radius of possible political actions nor cancel the basis of the legitimization of the model of social change through progress. Both prerequisites have become fragile over the past two decades in the course of reflexive modernization. In establishing itself, the welfare state has sacrificed its utopian energies. Simultaneously, its limits and drawbacks have entered public consciousness. But whoever only laments and criticizes the ensuing *paralysis* of the political overlooks the fact the *opposite* is also true. Waves of current, announced or emerging changes pass through and convulse society. In their scope and depth, they will probably overshadow all the reform attempts of the last few decades. Thus, the political stand-off is being undermined by *hectic changes* in the techno-economic system that put human imagination to a test of courage. Science fiction is increasingly becoming a memory of past times. The key words are well known and have been sufficiently elaborated in this book, including the continuing destruction of external and internal nature; the systemic transformation of work; the fragility of status-based gender orders; the loss of class traditions and the intensification of social inequalities; the technologies balancing on the verge of catastrophe.

The impression of 'political' standoff is deceptive. It arises only because the political is limited to what is *labeled* political, to the activities of the *political system*. If one conceives it more broadly, then one sees that society is caught in a whirlpool of change that richly deserves the title 'revolutionary' – quite apart from how one evaluates it. This social transformation, however, occurs in the form of the *non-political*. In this sense the discontent with politics not only is a discontent with politics itself, but results from the misproportion between an authority to act which plays political and is becoming powerless, and a broad-scale change of society, closed off to social decision-making, that approaches unstopably but quietly in the guise of the non-political. Correspondingly, the concepts of the political and the non-political become blurred and require a systematic revision.

(3) Both developments – the waning of welfare state interventionism due to its success and the waves of large-scale technological innovation with as yet unknown future hazards – add up in a double sense to an *unbinding of politics*. On the one hand established and utilized rights limit freedom of action *within* the political system and bring about new demands for political participation *outside* the political system in the form of a *new political culture* (citizens' initiative groups and social movements). In this sense, the loss of governmental powers of structuration and enforcement is not the expression of a political failure, but the product of *established* democracy and the welfare state, in which the citizens are able to utilize all the media of public and legal control and consultation for the protection of their interests and rights.

On the other hand, techno-economic development loses its character as

non-politics in parallel to the increase in scope of its potentials for change and endangerment. Where the outlines of an alternative society are no longer seen in the debates of parliament or the decisions of the executive, but rather in the application of microelectronics, reactor technology and human genetics, the constructs which had heretofore politically neutralized the innovation process begin to break up. At the same time, techno-economic action continues to be shielded by its own constitution against parliamentary demands for legitimization. Techno-economic development thus falls between politics and non-politics. It becomes a third entity, acquiring the precarious hybrid status of a *sub-politics*, in which the scope of the social changes precipitated varies inversely with their legitimization. As risks grow, the places, conditions and media of their origin and interpretation are stripped of their techno-economic objective constraints. Legally responsible, governmental monitoring agencies and a risk-sensitive media publicity sphere begin to talk their way into and govern the 'intimate sphere' of plant management. The direction of development and the results of technological transformation become fit for discourse and subject to legitimization. Thus business and techno-scientific action acquire a *new political and moral dimension* that had previously seemed alien to techno-economic activity. If one wished, one might say that the devil of the economy must sprinkle himself with the holy water of public morality and put on a halo of concern for society and nature.

(4) In that way a movement is launched which runs counter to the accomplishment of the welfare state project in the first two-thirds of this century. Given that politics then acquired the power potentials of the 'interventionist state', now the potential for structuring society migrates from the political system into the sub-political system of scientific, technological and economic modernization. A precarious reversal of politics and non-politics occurs. *The political becomes non-political and the non-political political*. Paradoxically, this role reversal behind unchanged facades proceeds more emphatically the more unthinkingly the division of labor between political and non-political social change is adhered to. The promotion and protection of 'scientific progress' and of 'the freedom of science' become the greasy pole on which the primary responsibility for political arrangements slips from the democratic political system into the context of economic and techno-scientific non-politics, which is not democratically legitimated. *A revolution under the cloak of normality* occurs, which escapes from possibilities of intervention, but must all the same be justified and enforced against a public that is becoming critical.

This development is extraordinarily momentous and problematic. In the welfare state project, politics had been able to develop and maintain a *relative autonomy* against the techno-economic system for purposes of a political intervention in market events. Now, on the contrary, the political system is being threatened with *dismPOWERment* while its democratic constitution remains alive. The political institutions become the

administrators of a development they neither have planned for nor are able to structure, but must nevertheless somehow justify.

On the other hand, decisions in science and business are charged with an effectively political content for which the agents possess no legitimization. Lacking a place to appear, the decisions that change society become tongue-tied and anonymous. In business they are tied into investment decisions which shunt their potential for social change off into the 'unseen side effect'. The empirical and analytical sciences that plan the innovations remain cut off by their self-understanding and institutional ties from the social consequences of their innovations and the consequences of those consequences. The unknowability of the consequences, their indefensibility is the developmental project of science. The structuring potential of modernity begins to creep back into the 'latent side effects', which on the one hand expand into risks threatening existence, and on the other lose their veil of latency. What we *do not* see and *do not* want is changing the world more and more obviously and threateningly.

The game with the roles of politics and non-politics reversed, while the facade remains unchanged, is becoming ghostlike. Politicians have to be told where the path devoid of plan and consciousness is leading – and told by those who *do not* know either and whose interests are directed at something quite different and therefore *also* attainable. Then, with the practiced gesture of fading trust in progress, they must present this journey into the unknown alternative country to the voters as their own invention, and if one considers it carefully, for one single reason: because from the beginning there was and remains no alternative. The necessity, the non-decidability of technological 'progress' becomes the bolt securing the process to its democratic (non-)legitimation. The 'anarchy' (Arendt 1981) of the (no longer) unseen side effect takes over power in the developed stage of Western democracy.

The Political System's Loss of Function

The scientific and public debate on the potential for politics to exert influence over technological transformation is pervaded by a peculiar ambivalence. On the one hand, reference is made in many ways to the state's *limited* capacity for intervention as concerns modernization in industry and research. On the other hand, despite all the criticism of limitations on the political scope of action, whether imposed by the system or avoidable, the *fixation on the political system as the exclusive center of politics* continues to exist. Political discussion in science and in the public sphere over the past two or three decades indeed represents an intensification of this contrast. The advocacy of restrictive conditions on political action, which has gained new impetus with talk of the 'ungovernability' and the excesses of democracy, has never properly been questioned as to whether the *other society* might be coming into existence without plans, consent or consciousness from the workshops of techno-

economic development. What remains instead are lambs on the loss of the political, related to the normatively valid expectation that the decisions which change society should be concentrated in the institutions of the political system, even though they are no longer concentrated there.

Thus, already at an early stage the *decline of parliament* as a political center was criticized, and from quite different quarters. Decisions which according to the letter of the constitution were incumbent upon the parliament and the individual deputies, it was claimed, were increasingly being made either by the factional and party leadership, or by the governmental bureaucracy. This loss of parliamentary power is often interpreted as an inescapable consequence of the increasing complexity of conditions in modern industrial societies. At best, critical observers speak of a progressive autonomization of the state apparatus over against the will of the citizens, which however is already implicit in the principle of representative democracy.

With remarkable consonance they also determine that the shift of former parliamentary powers to factions and parties or the state bureaucracy would be overlain by two further developmental tendencies: the *technocratic* closing off of the scope for decision-making in the parliament and the executive, and the rise of power and influence groups organized *corporatively*. With the increasing scientization of political decisions, so the argument goes, political agencies only carry out what scientific expertise recommends (e.g. in the area of environmental policy, but also in the choice of large-scale technologies and their sites). In recent years attention has several times been called to the fact that the operative scope of the agents in question is still set too narrowly in this way. Politics is said to have migrated from the official arenas – parliament, government, political administration – into the *gray area of corporatism*. The organized power of the interest groups is said to produce prefabricated political decisions which others must then defend as their own creations.

The influence of such pressure groups, which in turn utilize bureaucratically organized offices, extends – as studies show – both to the decisions of the state executive and to 'will formation' in the political parties. According to one's standpoint, this process is in turn lamented as an undermining of the state by private pressure groups with a quasi-official character, or, by contrast, welcomed as a necessary corrective to the prior autonomization and consolidation of the governmental ruling apparatus.

In Marxist critiques and theory of the state, which after all do not have an autonomous concept of the political, this connection of state power to special interests is carried to the extreme. In the variants of this perspective the state, seen as the 'ideal total capitalist' in the sense of Marx's characterization, is completely reduced in scope to the function of a 'management committee of the ruling class'. The minimum of autonomy conceded to the state apparatus and its democratic institutions results in this view from the necessity of uniting the limited, short-term, conflicting and incompletely formulated 'individual capitalist' interests and enforcing

them against resistance in their own camp. Here too, the political system is seen as the center of politics, but it loses all autonomy. The argument was always made against this thinking in the all too simple categories of 'base' and 'superstructure' that it misapprehends the degree of autonomization of political action in the developed parliamentary democracies. Similarly, it misunderstands the experiences of modern political history, which indicate that the organization of production in developed capitalist industrial society is quite compatible with extremely varied forms of political rule (as represented, say, by Sweden, Chile, France, and Germany).

In the seventies the main historical evidence for the 'relative autonomy' of the political system with regard to the principles and interests of the economic system was provided by the expansion of the social welfare state in Western European post-war development. In political theories of 'state capitalism' this interventionist power of the state is traced back to the fact that in the development of industrial capitalism 'the formation of system elements alien to the structure' occurs 'as a necessary part of [the system's (tr.)] existence' (Offe 1972: 38). In this view, the power of political decision-making draws its influence not only from the dysfunctional side effects of the market mechanism, but from the fact that 'the interventionist state jumps into the functional gaps of the market' (Habermas 1973: 51) – by improving the material and intangible infrastructure, expanding the educational system, protecting against unemployment risks and so on.

In the past ten years, this discussion has clearly receded into the background. It is not just that the generalized concept of crisis (economic, legitimization, motivational crises and so on) has lost its theoretical and political acuteness. From different quarters it has been unanimously stated that the project of the interventionist welfare state has lost its utopian energy as it has become established. Internally, the more successful it is, the more clearly the welfare state meets the resistance of private investors, who respond to rising wage and benefit costs with a diminishing willingness to make investments or with automation, which increasingly displaces human labor. At the same time, the drawbacks and side effects of the welfare state's achievements emerge ever more clearly:

The legal and administrative means for the implementation of welfare state programs do not constitute a passive medium, without qualities, as it were. Rather, they are tied to a practice of the isolation of facts, normalization, and Foucault into the tiniest capillary branches of everyday communication... In short the contradiction between goal and method is inherent in the welfare state project as such. (Habermas 1985: 76)

Even externally, the nation state's scope of jurisdiction is overtaxed by historical developments – internationally interlocked markets and concentrations of capital – but also by the global exchange of pollutants and toxins and the accompanying universal health threats and natural destruction.

The more or less perplexed reactions to these developments are concentrated graphically in the phrase 'the new obscurity' (Dobermas 1985). It also applies to two other states of affairs: first, the *weakening of the social structure and of voters' political behavior* that has become a disturbing factor in politics over the past ten years; second, the *mobilization of citizens and citizen protest* as well as a number of *social movements* that have been speaking out quite effectively on all matters of interest to them (Brand et al. 1983).

In all the Western democracies, party leaderships are puzzled by the *growing proportion of swing voters* who are making the political business unpredictable. If one found roughly 10 percent swing voters in Germany in 1963, for example, today their number is estimated by various studies at between 20 and 40 percent. Electoral researchers and politicians agree on the diagnosis: in view of the narrow majorities any party has been able to achieve, the swing voters with their 'mercurial flexibility' (prominent pollster (tr.) Noelle-Neumann 1991) will decide future elections.

Conversely, it also implies that parties can no longer count on 'regular voters' and must use all the means they have at their disposal to court the citizens – and recently women in particular (in summary form, see Radunski 1985). At the same time the citizens' initiative groups and new social movements gain political momentum and broad support from this visible gap between the demands of the citizenry and their representation in the spectrum of political parties.

Although the evaluation of all these 'dissonant' developments varies according to the political standpoint and although elements of an 'unbinding of politics' often come up in this 'demystification of the state' (Wijkke 1983), these diagnoses continue to be related implicitly or explicitly, actually or normatively, to the notion of a *political center* which has or should have its place and means of influence in the democratic institutions of the political and administrative system. In contrast to that, the view developed here will be that the preconditions for the separation of politics and non-politics are becoming fragile in the course of reflexive modernization.

Behind the phrase 'new obscurity' is concealed a profound *systemic transformation of the political*, in two respects. The first of these is the loss of power experienced by the centralized political system in the course of the *enforcement and utilization of civil rights* in the forms of a *new political culture*; the second lies in the changes of social structure connected with the transition from non-politics to sub-politics, a development that seems to lose its conditions of application in the hitherto prevailing 'harmonizing formula' – technical progress equals social progress. Both perspectives add up to an 'unbinding of politics', the possible consequences of which will be finally explored in three scenarios.²

Democratization as the Disempowerment of Politics

Not the failures of politics but its successes have led to the loss of state intervention power and to the delocalization of politics. One can even say, the more successfully political rights were fought for, pushed through and concretely realized in this century, the more emphatically the primacy of the political system was called into question, and the more fictitious became the simultaneously claimed concentration of decision-making at the top of the political and parliamentary system. In this sense political development is undergoing a rupture of continuity during the second half of this century, not only in its relationship to the fields of action of techno-economic development but also in its internal relationship. The concepts, foundations and instruments of politics (and non-politics) are becoming unclear, open and in need of a historically new determination.

The centering of decision-making authority in the political system, as planned in the relationship between *citoyen* and *bourgeois* in the project of the bourgeois industrial society, is based on the naive view that it would be possible on the one hand to enforce the democratic rights of the citizens, and on the other hand to preserve hierarchical authority relationships in reaching political decisions. Ultimately, the monopolization of democratically constituted decision-making rights is founded on the contradictory image of a *democratic monarchy*. The rules of democracy are limited to the choice of political representatives and to participation in political programs. Once in office, it is not only the 'monarch for a term' who develops dictatorial leadership qualities and enforces his decisions in authoritarian fashion from the top down; the agencies, interest groups and citizens' groups affected by the decisions also forget their rights and become 'democratic subjects' who accept without question the state's claims to dominance.

In the course of reflexive modernizations this perspective is undermined in several ways. It becomes increasingly clear that finding political 'solutions' becomes *contingent* precisely as democratic rights are established. In the fields of politics (and sub-politics) there is neither a single nor a 'best' solution, but always several solutions. As a consequence, political decision-making processes, no matter on what level they occur, can no longer be understood as the enforcement or implementation of a model determined in advance by some wise man or leader, whose rationality is not open to discussion and must be enforced even against the will and 'irrational resistance' of subordinated agencies, interests and citizens' groups. Both the formulation of the program and the decision-making process, as well as the enforcing of those decisions, must rather be understood as a process of *collective action* (Crozier and Friedberg 1979), and that means, even in the best case, collective learning and collective creation. This implies, however, that the official decision-making authority of political institutions is necessarily decentralized. The political-administrative system then can no longer be the only or the

central locus of political events. In tandem with the democratization, networks of agreement and participation, negotiating reinterpretation and possible resistance come into being across the formal horizontal and vertical structure of authorizations and jurisdictions.

The notion of a center of politics, as cultivated in the model of the industrial society, thus rests upon a peculiar *bisection of democracy*. On the one hand, the fields of sub-political action are exempt from the application of democratic rules (see above). On the other hand, even internally, politics still displays monarchical traits, according to the systematically incited external demands. The 'political leadership' must display a strong hand and dictatorial powers of enforcement over against the administration and the interest groups. With respect to the citizens, it must be an equal among equals and is supposed to listen to their voices and take their concerns and fears seriously.

This more than just reflects the constraint on all action to cut off questions, to shorten discussions and consultations. It also expresses inherent tensions and contradictions in the structure of the democratic political system: the relationship between parliamentary debate and the public sphere on one side and an executive branch on the other, which is responsible to the parliament and yet has its 'success' measured by the power with which it is able to carry out its decisions. The electoral campaign system in particular *forces* the mutual attribution of decision-making authorities – whether in proclaiming the successes of previous policies or in condemning them – which constantly nourishes and renews the actual *fiction* of the quasi-democratic 'dictator for a term'. Here the system *causes* the assumption to emerge that a government and the parties supporting it, once elected, are responsible for everything good and bad that happens during their term of office, which would obviously only be possible if this government were precisely not what it is – democratically elected and active in a society where all the citizens and the agencies possess numerous opportunities for consultation due to the establishment of democratic rights and obligations.

In this sense, democratization and *de-democratization*, modernity and *counter-modernity* have always been fused together in a contradictory way through the model of the specializability and monopolizability of politics within the political system as propagated in the project of industrial society. On the one hand, the centering and specialization of the political system and its institutions (parliament, executive branch, administration, etc.) is *functionally necessary*. Only in that way can processes of political will formation and the representation of citizen interests and citizens' groups be organized at all. That is also the only way it is possible to practice democracy in the sense of choosing a political leadership. In that respect, the staged events of politics bring about the *fiction of a steering center for modern society*, where the threads of political intervention ultimately run together through all the differentiations and interconnections. On the other hand, this authoritarian understanding of political

leading positions and leadership becomes systematically *eviscerated and unreal along with the establishment and observance of democratic rights*. In this sense, democratization ultimately amounts to a kind of self-disempowerment and delocalization of politics, in any case to the differentiation of consultation, monitoring and possibilities of resistance. Even if this path has by no means been followed to its end here, it is still valid in general to say that wherever rights are protected, social burdens redistributed, consultation made possible, wherever citizens become active, politics is unbound and generalized a bit more. Parallel to that, the notion of a centering of hierarchical decision-making power at the top of the political system is becoming a memory of the pre-, semi- or formal-democratic past. Crucially then, feedback effects also apply under certain conditions in legally protected democracies. The incremental amount of utilized democracy continually produces new standards and demands, which cause opinion to turn to dissatisfaction with the 'stand-off' and the 'authoritarian character' of the prevailing conditions, despite any expansions of democracy achieved. In that respect, 'successful' politics in democracy can lead to a situation where the institutions of the political system lose importance and see their substance vitiated. In this sense, *established* democracy, in which the citizens are aware of their rights and fill them with life, requires a different understanding of politics and different institutions than the society on the way to it.

Observance of Civil Rights and the Differentiation of Cultural Sub-Politics

In the developed democracies of the West a number of checks have been built up to limit the display of political power. Already in the nineteenth century, at the beginning of this development, there was the *separation of powers*, which ensures control functions for the *judiciary* alongside the parliament and the government. With the development of Germany the *autonomy of collective bargaining* has gained social and legal reality. The central questions of employment policy are thereby turned over to the regulated discussions of the competing parties in the labor market, and the state is obliged to be neutral in labor conflicts.

One of the last steps in this direction until now is the legal protection and substantive fulfillment of *freedom of the press*, which, in combination with the mass media (newspapers, radio, television) and new technological possibilities, brings about multiply graduated *forms of publicity*. Even if these certainly do not pursue the exalted goals of the Enlightenment, but are also and even primarily 'servants' of the market, institutionally fabricated information), and even if they possibly produce an actual or potential monitoring function which media-directed publicity can perform with regard to political decisions. In this way, centers of sub-

politics are created and stabilized along with the establishment of basic rights, and in the very same degree to which these rights are substantively completed and protected in their autonomy against the encroachments of political (or economic) power.

If one conceives of this process of the realization of civil and constitutional rights in all its stages as a process of political modernization, then the following seemingly paradoxical statement becomes comprehensible: *political modernization disempowers and unbinds politics and politicizes society*. More precisely, the modernization process furnishes the gradually emerging centers and fields of action it makes possible for sub-politics with opportunities for extra-parliamentary monitoring with and against the system. In this way, more or less clearly defined regions and means of partially autonomous cooperative and alternative politics are separated out which are based on rights that have been fought for and are now protected. And that also means that the power relationships within society have changed somewhat through the observance, expansive interpretation and elaboration of these rights. The 'heads' of the political system are confronted by cooperatively organized antagonists, with a 'definition-making power' of media-directed publicity, and so on, which can essentially codetermine and change the agenda of politics. Even the courts become omnipresent monitoring agencies of political decisions; paradoxically, this occurs in exactly the degree to which, on the one hand, the judges exercise their 'judicial independence' even against the grain of politics, and on the other, citizens transform themselves from the loyal addressees of political decrees into political participants and attempt to sue for their rights in court *against* the state, if need be.

It only seems paradoxical that this type of *structural democratization* occurs alongside the parliament and the political system. Here the *contradiction* entered into by democratization processes in the phase of reflexive modernization becomes tangible. First, against the background of *established* constitutional rights, opportunities for democratic codetermination and monitoring in diverse fields of sub-politics are differentiated and elaborated. Second, this development passes by the original home of democracy, the parliament. Rights and decision-making authorizations that continue to exist *pro forma* are diluted. Political life in the originally provided centers of political will formation loses its substance and threatens to become paralyzed.

Put another way: alongside the model of *specialized* democracy, forms of a *new political culture* are becoming reality, in which heterogeneous centers of sub-politics have an effect on the process of politically forming and enforcing decisions, on the basis of utilized constitutional rights. All of that obviously does not mean state politics is becoming devoid of influence. It retains its monopoly in the central areas of foreign and military policy and in the application of state power for the maintenance of 'internal security'. That this is a central area of influence of state politics becomes clear from the fact that since the revolutions of the

nineteenth century there has been a *relatively close relationship between citizen mobilization and the techno-financial equipping of the police*. Even today it can be confirmed – with the example of disputes over large-scale technologies, for instance – that the exercise of state power and political liberalization are by all means mutually related.

New Political Culture

Constitutional rights in this sense are hinges for a decentralization of politics with long-term amplification effects. They offer multiple possibilities for interpretation and, in different historical situations, new starting points to break up formerly prevalent, restrictive and selective interpretations. Thus far, the final variant of this was demonstrated in the *broad political activation of citizens* from initiative groups to the so-called 'new social movements', to forms of alternative critical professional practice (among physicians, chemists, nuclear physicists, etc.). With this multiplicity of forms undermining all previous political plans they took advantage of their previously only formal rights in extra-parliamentary direct action and filled them with the life they considered worth striving for. This very activation of the citizens on all sorts of topics receives a special meaning because the other central forums of sub-politics – the judiciary and media publicity – are also open to them. As the developments have shown, these can at least sometimes be used very effectively for protecting citizen interests (in environmental protection, in the anti-nuclear movement, or in the confidentiality of data).

In this, the 'amplification effect' shows itself: that the basic rights can be observed *successively* and expanded in a *mutually reinforcing way* and thus can amplify the 'resistance power' of the 'basis' and the 'subordinate agencies' against unwanted interventions 'from above'. The growing self-confidence and participatory interest of the citizens, which is reported just as impressively by numerous demographic surveys as by the variety of changing citizens' initiative groups and political movements, may look like 'resistance against state authority' to an authoritarian understanding of democracy. It may also appear to be an inadequate attempt at exerting political influence to the eyes of scientists who have followed their good old habits and fixed their gaze on the political system as the locus of politics. But it is the logical next step that follows the establishment of democratic rights and leads in the direction of *concrete* democracy. In these manifold developments, the *generalization* of political action announces itself, whose themes and conflicts are no longer determined only by the fight for rights, but also by their elaboration and utilization for the entire society.

Basic rights with a universalist validity claim, as established in Western societies over the past two centuries or more by fits and starts, but in a generally *directed* process (so far), thus form the hinges of political development. On the one hand, they have been fought for in parliaments;

on the other hand, centers of sub-politics can develop and differentiate themselves parallel to the parliaments, and through the new page in the history of democracy can be opened. This can be shown firstly for two of the previously mentioned sites and forms of sub-politics: the judiciary and media publicity.

In the professional position of the judge as protected by civil service law in Germany, partially autonomous ranges of decision-making are coming into view, in part through new forms of observance and interpretation, in part through external changes. And as an astonished judiciary and public has been seeing recently, these are also being used in controversial ways. The rights reside originally in the long-standing legal principle of 'judicial independence'. Only recently, however, probably due among other things to generational changes and scientization processes, have the freedoms been actively used and self-confidently fleshed out by judges.

Among the many conditions which are decisive for this, two will be selected here: through reflexive scientization of the objects and decision-making processes of reaching verdicts, originally prevailing objective constraint constructs have begun to crumble and have been opened to individual decisions, at least partially. This applies first of all to scientific analysis of legal interpretation and judicial decision-making. These make visible and usable the variants of the administration of justice, within the framework provided by the letter of the law and the rules of interpreting it; these variants had hitherto been covered over by recruitment and the prevailing fundamental convictions. Thus, scientization has revealed usable techniques of argument here and in that way subjected the judicial profession to previously unknown, internal pluralization in terms of professional policy.

This tendency is supported by the fact that many topics and cases of conflict that are taken to court have lost their social clarity. In many central fields of conflict – particularly in reactor technology and environmental questions, but also in family and marriage law or labor law – experts and counter-experts confront each other in an irreconcilable battle of opinions. In this way the decision is handed back to the judge – partially because the choice of expert witnesses already contains a decision in advance, partially because it is his duty to weigh and reorder the arguments before reaching a verdict. The systematic cultivation of self-doubt in the sciences through the overproduction of hypothetical, isolated and detailed results (see Chapter 7) leaves its mark on the judicial system and opens up decision-making leeway for the 'independent' judge; that is to say, it pluralizes and politicizes the process of reaching a verdict.

The consequence for the legislature is that it finds itself on the defendant's bench more and more frequently. By now judicial review procedures have become almost a part of the normal course of a controversial administrative action (e.g. deciding on if, how and where nuclear power plants will be built). Additionally, it is becoming more and more

uncertain and more and more difficult to calculate how these procedures will arise on the way through the courts and above all, how long they will last. Correspondingly, gray areas of insecurity arise, which strengthen the impression of the state's lack of influence.

In a broader sense, this applies to legislative initiatives in general. No matter what, they soon collide with the limits of equivalent or higher jurisdictions, on the provincial, federal or European Community level. The judicial review procedures to be expected in cases of conflict provide the judge's potential verdict with an omnipresence in the political system (strengthening, it should be noted, the lawyers' monopoly on the administration) and narrow the leeway for arrangements.

Even the right to freedom of the press, with all its opportunities and problems of interpretation, offers numerous occasions for the differentiation of large and partial public spheres (from the global television network to the school newspaper) with individually very particularized, but overall considerable opportunities to influence the definition of social problems. These are limited and checked by the material conditions on the production of information and the general legal and social conditions. But they can also achieve considerable significance for the public – and thus the political – perception of problems, as the political boom of environmental issues and the rise and fall of social movements and subcultures illustrate. For instance, this becomes clear in the fact that expensive and extensive scientific investigations are often not really noticed in the agency that ordered them until television or a mass-circulation newspaper reports about them. People in the political administration read *Der Spiegel*, not investigation reports, and not only because the report would be unreadable, but because society is so designed that politically relevant matters are in *Spiegel*, quite independent of the contents and arguments. Suddenly the result loses any trace of research for private consumption; it haunts thousands of minds and thus demands personal responsibility and public (counter-)statements.

The power to define problems and priorities that can be developed under these conditions (and should under no circumstances be confused with a 'power of the editors', but coincides rather with the editorial work of employees) certainly relies at heart on circulation figures and ratings and the resulting fact that the political sphere can only ignore published public opinion at the risk of losing votes. It is therefore strengthened and stabilized by television viewing habits and new information technologies, but it also gains importance through the demystification of scientific rationality in risk society. From the wealth of hypothetical findings, publication in the mass media selects specific examples which thereby achieve the addition of familiarity and credibility that they can no longer attain as pure scientific results.

The consequence for politics is that reports on discoveries of toxins in refuse dumps, if catapulted overnight into the headlines, change the political agenda. The established public opinion that the forests are dying

compels new priorities. When it has been scientifically confirmed on the European level that formaldehyde has carcinogenic effects, the previous chemical policy is threatened with collapse. It is necessary to react to all of this with staged political events – arguments or bills or financial plans. This defining power of media publicity can obviously never anticipate the political decision; and it remains for its part connected into the economic, legal and political presuppositions and concentrations of capital in the news business.

A final field of sub-politics should at least be mentioned here, that of *privacy*. The number of births is a key quantity for all areas of politics; likewise, the question of how people handle parenthood, for instance, whether the mother wishes to remain in her career or to withdraw completely back into the family. By nature, all the questions to which men and women must find an answer in their living situations have a political side. In that respect, the 'problem indicators' – rising divorce rates, declining birth rates, the increases in extramarital living situations – not only depict the situation of the familial and extrafamilial relationships between men and women, but also signal rapidly changing parameters for all political plans and directions. Decisions taken here (whether to have children, the number and the timing, for instance) are removed from external interventions even if serious turning points for retirement policy, labor market policy, welfare law and social policy are connected to them. And this is so precisely because according to the constitutionally guaranteed arrangement of family and privacy these decisions fall exclusively within the responsibility of the couples living together.

Legal protections for the private sphere have long existed. But they have not weighed so heavily for a long time. Only with the *detratization* of lifeworlds do these free spaces come into existence, and along with them the uncertainty in the social foundations of politics. Women's achievement of equality in education and their rush into the labor market signify on the one hand only an extension to a previously excluded group of the equal opportunity that had always been guaranteed. The consequences, on the other hand, are that the situation is *changed all around*: in the family, marriage, parenthood, in the development of births and of unemployment; in welfare law; in the employment system; and so on. In this sense, individualization processes broaden the scope for sub-political structuring and decision-making in the private sphere, below the level where state influence is possible. In this sense too, the claim of the women's movement 'the personal is political' hits upon a state of affairs that is emerging more and more in history.

These different partial arenas of cultural and social sub-politics – media publicity, judiciary, privacy, citizens' initiative groups and the new social movements – add up to *forms of a new culture*, some extra-institutional, some institutionally protected. Such a politics escapes categorization, yet even in its fluid forms, or especially because of them, it has become an

important factor influencing policy and the techno-economic development in Germany over the last two decades. The effectiveness of this political culture relies on filling the abstract rules of the law with social life; more precisely, on breaking open and overcoming the selective interpretation of universally valid basic laws piece by piece. A code word for this development is floating around in many disciplines of social science and in political discussion: *participation*. It is by no means necessary to glorify the development that has begun; one can decisively criticize its excesses tending toward a new mysticism and yet surmise with good reason that the quality and dissemination of this thinking have already changed the political landscape in Germany permanently and will do so even more clearly in the future.

Nor has the social and cultural differentiation of politics in the wake of its successes in the parliamentary system passed by political sociology without a trace. The rational-choice, hierarchical means-end model of politics (which was probably always fictitious, but was cultivated for a long time by bureaucracy research and decision theory) has begun to crumble. It is being displaced by theories that emphasize consultation, interaction, negotiation, network; in short, the *interdependency and process character* in the context of the responsible, affected and interested agencies and actors from the formulation of programs through the choice of measures to the forms of their enforcement. While the traditional understanding of politics proceeded with a certain naïveté from the assumption that the goals set can be reached by politics, provided the proper means are taken, politics in newer approaches is now viewed as the collaboration of different agents even *contrary* to formal hierarchies and across fixed responsibilities.

Thus, research has shown that the system of executive administrative agencies is often characterized by the lack of strict authority relationships and the dominance of horizontal connecting channels. Even in the case where formal hierarchical dependency relationships are present between superior and subordinate authorities, the possibilities of vertical influence are often not fully utilized (Mayritz 1980). In different stages of the political process quite different agents and groups of agents attain opportunities for consultation and cooperation. All of this emphasizes the *contingency* of the political sphere which has externally remained consistently hierarchical in the formal sense. At the same time this fluidization of politics into a *political process* is only being half-heartedly appreciated by social science. The directedness and structure of this process (in program, for instance, or in measures, enforcement, etc.) is still *assumed* (simply for reasons of the practicability of political science analysis). The fiction of the political-administrative system as the center for politics likewise continues to exist. In that way, however, the development which occupies the center of attention here cannot come into sight: the unbinding of politics.

Political Culture and Technical Development: the End of the Consensus on Progress?

Modernization in the political system constricts the scope of action in politics. Political utopias (democracy, the welfare state) that *have been established constrain us*, legally, economically and socially. In parallel to that, and alternatively, entirely new opportunities for intervention are opened up through modernization in the techno-economic system. Cultural constants and basic prerequisites of life and work to this point can be made inoperative with these. Microelectronics permits us to change the social constitution of the employment system. Gene technology puts humankind in an almost godlike position, in which it is able to create new materials and living creatures and revolutionize the biological and cultural foundations of the family. This generalization of the principle of design and constructibility, which now encompasses even the subject whom it was once supposed to serve, exponentiates the risks and politicizes the places, conditions and means of their origin and interpretation.

That the 'old' industrial society was obsessed with progress has often been emphasized. For all the criticism of that fact – from early Romanism until today – there has never been a questioning of that *latenti* faith in progress which has grown so precarious today with the growth of risks: the faith in the method of trial and error, the possibility of a systematic mastery of external and internal nature that was being gradually constructed. (Despite all the setbacks and secondary problems and all its critique of 'capitalistic faith in progress', this myth was obligatory until quite recently for the political left as well.) Additionally this background music of the critique of civilization has not deprived the social changes occurring under the sails of progress of *one iota of their momentum*. This points to the peculiarities of the process, in which social changes can occur 'incognito' as it were. 'Progress' is much more than an ideology; it is a 'normal' institutionalized *extra-parliamentary structure of action for the permanent changing of society*. Paradoxically enough, in the extreme case it can even push through the overthrow of previously prevailing relationships with the police power of the state against resistance that wishes to preserve the status quo.

In order to be able to understand this legitimating power of the consensus on progress, it is necessary to recollect a by now almost forgotten connection, that of the *relationship of social and political culture to techno-economic development*. At the beginning of this century the cultural influence on the system of labor, technology and business was the focus of a series of classical studies in social science. Max Weber demonstrated how important the Calvinist religious ethic and the 'inward asceticism' contained in it were in the rise and establishment of 'professionalism' and capitalistic business activity. More than a half century ago, Thorsten Veblen argued that the laws of economics are not constantly valid and cannot be understood independently, but are instead completely

connected into the cultural system of society. If social forms of living and values change, then economic principles must also be transformed. If, for instance, the majority of the population rejects the values of economic growth (for whatever reason), then our thinking about the structuring of labor, the criteria of productivity and the direction of development will become dubious and a new type of pressure for political action will arise. In this sense, Weber and Veblen were arguing (each in his own way) that work, technological change and economic development are tied into the system of cultural norms, the prevailing expectations and the value orientations of people.

This basically evident insight, which was also advocated by a number of other authors, has hardly attained any practical importance in the meantime beyond lip service. First of all, this is probably due to the fact that, to put it in an oversimplified way, social and political culture remained *stable* from the post-World War II period into the sixties. A 'variable' that is constant does not enter the field of view; in that sense it is no longer a variable and can remain unrecognized in its significance. This changes instantly where the stability begins to crumble. Only retrospectively, so to speak, with the breakup of the normative background cultural consensus, does its significance for the development of the economy and technology become visible. In the boom of the post-war period in Germany (but also in other Western industrial states), *economic, technical and individual progress were obviously interlinked*. 'Economic growth', 'increases in productivity' or 'technological innovations' were not only economic objectives that suited the management's interests in the increase of capital. They also led, in a way visible to everyone, to the reconstruction of society, to growing opportunities for individual consumption, and to a 'democratization' of previously exclusive standards of living. The intermeshing of individual, social and economic interests in the pursuit of 'progress', understood in economic and technological terms, was successful against the background of the destruction left by the war to the extent that on the one hand the boom actually took hold, and on the other the extent of the technological innovations appeared calculable. Both conditions remain tied into the political hopes for the welfare state, and in that way they stabilize the spheres of policy and non-policy of 'technological transformation'. In detail this *social design of the consensus on progress in technology policy* is based on the following three preconditions, which have begun to crumble since the rise of a new political culture in the seventies, among other reasons (Braczyk et al. 1986).

Firstly, the consensus has its foundation in the harmonizing formula *technical progress equals social progress*. The assumption goes that technological development produces obvious use values that can literally be felt by everyone in the form of labor saving devices, improvements of life, rises in the standard of living, and so on.

Secondly, only this equation of technological and social progress

permits negative effects (such as deskilling, restructuring, threats to job security, dangers to health, or destruction of nature) to be treated separately, and retrospectively, as 'social consequences of technological change'. 'Social consequences' are characteristically *injuries*, specifically, particular secondary problems for certain groups, which never call the socially evident value of the technological development itself into question. The talk of the social consequences here permits two things. For one, any claim for social and political structuring of the technological development is fended off. Additionally, controversies on the 'social consequences' can be fought out without harming the execution of the technological change. It is only possible and necessary to talk about negative 'social' consequences. The technological development itself remains undisputed, is closed to decision-making and follows its own inherent objective logic.

Thirdly, the carriers and producers of consensus on progress in technology policy are the industrial *bargaining parties*, the trade unions and the employers. Only indirect tasks fall upon the state – absorbing the 'social consequences' and monitoring the risks. Only the 'social consequences' are an object of controversy between the collective bargaining parties. Antagonisms in the assessment of the 'social consequences' always *presume* a consensus on how the technological development is carried out. This consensus over the central questions of technological development is fortified by a well rehearsed *common opposition* to 'harred of technology', 'Ludditism', or 'critique of civilization'.

All the supporting pillars of this consensus on progress in technology policy – the separation of social and technological change, the imputation of systemic or objective constraints, the consensus formula that technological is equal to social progress, and the primary responsibility of the collective bargaining partners – have begun to disintegrate over the past twenty years, and not by chance or because of the machinations of cultural criticism, but in *consequence of reflexive modernization*. Latency and secondary effects have been ended by research on this matter (see above). As risks grow, the prerequisites for the harmonizing formula on the unity of technological and social progress have been canceled (see above). At the same time, groups enter the arena of the conflict over technology policy which are not provided for in the inter-organizational structure of interests and its forms of perceiving problems. In the conflicts over nuclear power plants or reprocessing facilities, for example, employers and labor unions, the supporters of the traditional technology consensus, have been forced into the spectators' gallery. The conflicts are now carried out directly between the state power and citizens' protest groups, and therefore in a *completely changed social and political scenario* and between agents who at first glance seem to have only a remoteness from technology in common.

Even this change between arenas and opponents is not coincidental. First off, it corresponds to the development of risk-intensive large-scale

technologies – nuclear power plants, reprocessing facilities, the universalization of chemical toxins – which enter into a direct mutual relationship to collective lifeworlds, outside the industrial arena. Additionally, the growing interest of a new political culture in participation is expressed there. From the conflict over reprocessing plants

it is possible to learn that numerical minorities (e.g. 'opposing citizens' on the spot) must not be dismissed as trouble-makers and grumbler. The dissent they express has an *indicative value*. It indicates . . . a sweeping change of values and norms in society, or previously unknown differentiations between social groups. The established political organizations should take these signals at least as seriously as the election dates. A new form of political participation is announcing itself here. (Braczyk et al. 1986: 22)

Finally, science also falls as a source of legitimization. It is not the uneducated or advocates of a new Stone Age culture who are warning of the dangers, but more and more these activists are people who are themselves scientists – nuclear engineers, physicians, geneticists or computer scientists and the like – as well as countless citizens, for whom subjection to danger and competence overlap. They know how to make arguments, are well organized, in some cases possess their own periodicals, and are in a position to provide the public and the courts with arguments.

Thus an open situation is gradually coming into being: *techno-economic development is losing its cultural consensus*, and at a point when the acceleration of technological transformation and the accompanying social changes are assuming an extent without parallel in history. This loss of the previously accepted faith in progress changes nothing, however, of the *course* of the technological transformation. This very misproportion is what is meant by the concept of the *techno-economic sub-politics*: the scope of the social changes varies inversely with their legitimization, without changing anything of the enforcement power of the technological transformation that has been transfigured into 'progress'.

The fear of the 'advances' in genetic technology is widespread today. Hearings are held. Churches protest. Even scientists faithful to progress cannot shake off their uneasiness. All of this takes place, however, like an *obituary* for decisions taken long ago. Or rather, no decision ever occurred. The question of 'whether' was never waiting at the door. No committee ever let it in. It has always been on the way. The age of human genetics, the reality of which people are debating today, actually started long ago. One can say 'no' to progress, but that does not change its *course at all*. Progress is a blank check to be honored beyond consent and legitimization. The sensitivity of democratically legitimated politics to criticism contrasts with the relative *immunity* to criticism of techno-economic sub-politics which, unplanned, and closed to decision-making, only becomes aware of itself as social change at the moment of its realization. This special structuring and accomplishment power of sub-politics will now be pursued in an extreme case, medicine.

The Sub-Politics of Medicine – an Extreme Case Study

According to its avowed self-understanding, medicine serves health. In fact it has created entirely new situations, has changed the relationship of humankind to itself, to disease, illness and death, indeed it has changed the world. In order to recognize the *revolutionary effects* of medicine, it is not at all necessary to enter the thicket of evaluations ranging from medical promises of salvation to visions of immaturity.

One can argue whether medicine has actually improved the well-being of humanity. It is indisputable, however, that it has contributed to an increase in the number of human beings. The population of the Earth has risen by a factor of nearly ten. This is to be traced back primarily to a falling infant mortality and a rising life expectancy. Unless living conditions deteriorate dramatically in the coming years, members of socially unequal groups in Central Europe can count on reaching on average the age of seventy, which was still considered 'biblical' in the last century. This essentially reflects improvements in hygiene, which would have been unthinkable without the results of medical research. Mortality rates fell because nutritional and living conditions improved, and for the first time effective means were at hand to master infectious diseases. The consequences are a dramatic population growth especially in the poor countries of the Third World with the associated crucial political issues of hunger and misery, as well as radically growing inequalities on the world scale. Quite a different dimension of the society-changing effects of medicine comes into view with the *divergence of diagnosis and therapy in the current development of medicine*.

The apparatus of scientific diagnosis, the psycho-diagnostic theories and nomenclatures that have grown in great numbers, and a scientific interest that is penetrating ever further into the 'depths' of the human body and psyche – it is now obvious – have decoupled themselves from therapeutic competence, and have gradually... condemned it to 'lagging behind'. (Groß et al. 1985: 6)

The result is a *dramatic increase of so-called chronic illnesses*, that is to say, illnesses that can be diagnosed thanks to the more acute medical and technical sensory system, *without* the presence or even the prospect of any effective measures to treat them.

In its most advanced stage, medicine produces pathological conditions it defines as (for the time being or permanently) incurable, which represent totally new conditions of life and danger and cross the existing system of social inequalities. At the start of this century, 40 out of 100 patients died of *acute* illnesses. In 1980 these constituted only 1 percent of the causes of mortality. The proportion of those who died of *chronic* illnesses, on the other hand, rose in the same period from 46 to over 80 percent. In such cases, the end is preceded more and more often by a long period of illness. Of the 9.6 million West German citizens who were registered as having impaired health in the micro-census of 1982, nearly

70 percent were chronically ill. A cure in the original sense of medicine becomes more and more the exception as this development proceeds. Yet this is not the expression solely of a failure. Because of its successes, medicine also discharges people into illness, which it is able to diagnose with its high technology.

This development contains a medical and socio-political turn, which today is only beginning to become conscious and perceived in its far-reaching consequences. With its professionalized development in nineteenth century Europe, medicine has taken illness away from people by using technology, monopolized illness and administered it. Disease and illness were delegated wholesale to the institution of medicine for external mastery and were 'operated out' in one way or another by doctors in barracks-like 'hospitals', with the sick people largely remaining ignorant. Today, conversely, the sick, who were systematically made and kept ignorant in dealing with their illness, are being left to themselves and other institutions, also totally unprepared for them: the family, the occupational world, schools or the public sphere. AIDS, the rapidly spreading immune system disorder, is only the most spectacular example of this. As a result of diagnostic 'progress' also, disease is being *generalized*. Anything and everything is 'sick' or can actually or potentially make one 'sick' – quite independently of how a person actually feels. Accordingly, the image of the 'active patient' is being brought out again: demands are being made for a 'working alliance' in which the patient becomes the 'auxiliary doctor' for the state of illness ascribed to him by medicine. The unusually high suicide rates show how poorly this about-face is being tolerated by the afflicted people. Among those suffering from chronic kidney disease for instance, whose lives depend on dialysis at regular intervals, the suicide rate is six times higher for all age groups than in the general public (on this see Stössel 1985).

The possibilities of *in vitro fertilization* and *embryo transplantation* that have recently been put into practice quite justifiably heat up emotions. The discussion is conducted in public under the misleading term 'test-tube baby'. This 'technological advance' consists essentially in the fact that

the first forty-eight to seventy-two hours of human embryonic development, from the fertilization of the ovum to the first cell divisions, are transferred from the Fallopian tube of a woman to the laboratory (*in vitro* = in glass). The required ova are removed from the woman by an operative procedure. Prior to menstrual cycle (superovulation). The ova are fertilized in a solution containing sperm and cultivated until the four- to eight-cell stage. Then, so long as their development is apparently normal, they are transplanted into the uterus. (Daele 1985: 17)

The origin of the application of *in vitro* fertilization was the strong desire of many infertile women for children. To date, the treatment in most clinics is offered only to married couples. This restriction seems

rather anachronistic in view of the frequency of non-marital living relationships. On the other hand, opening this technological single women will lead to completely new types of social relationships, whose consequences cannot be predicted today at all. We are no longer dealing here with the type of mother who is single following a divorce, but rather with *deliberate fatherless motherhood*, which is historically unknown. It presupposes male sperm donation *outside* any relationship. In that sense, *fatherless children* would result, whose parents would be reduced to a mother and an anonymous sperm donor. Ultimately this development would lead to the retention of biological and the *abolition of social fatherhood* (where all the equally social questions of *genetic* paternity would be completely unresolved, such as descent, the inheritance of traits, claims for support and inheritance, and so on).

An additional avalanche of problems is set free when one considers the simple question of how the embryos should be handled *before* the implantation. When is the development of an embryo considered 'apparently normal', so that it can be implanted into the uterus? From what point are the embryos *not yet* or *already* unborn human life? *In vitro* fertilization makes human embryos available outside the body of a woman, and that opens up a broad field of technical operations, some already realizable, others which could become possible through further development' (Daele 1985: 19). Thus, following the example of the already existing sperm banks, deep-frozen embryos could be stored and sold(?) in corresponding 'embryo banks'. The availability of embryos provides science with long-hoped-for 'experimental objects' (language fails) for embryological, immunological and pharmacological research. 'Embryos' – the word stands for the beginning of human life – can be duplicated by division. The resulting genetically identical twins can be utilized for determining the sex or for the diagnosis of congenital or other diseases. Here are the starting points for new disciplines and practices: genetic diagnosis and therapy on embryos, with all the associated fundamental questions. What constitutes a socially and ethically 'desirable', 'used' or 'healthy' genetic substance? Who will perform this 'quality control of embryos' (this is difficult to write) (Bräutigam and Mettler 1985), and by what right and with what standards? What will happen to the 'low-quality embryos' which do not satisfy the requirements of this prenatal 'entrance examination for the world'?

Many of the *ethical* problems raised by these developments in medical technology (and others not mentioned here) which are nullifying traditional cultural constants have been recognized and competently discussed (see also Jonas 1984; R. Löw 1983).⁵

A different aspect, however, will occupy the center of our attention here, one that has so far been touched on only peripherally in the discussion: that is, *the analysis of medical progress as itself institutionalized*, as *the institutionalized revolution of the lay public's social living conditions without its consent*. How is it possible that all this can happen and that

only *subsequently* the questions regarding the consequences, goals and dangers of this *noisy social and cultural revolution* must be pursued by a critical public against the professional optimism of the small clique of human genetic specialists, without real influence of their own and fixated entirely on their scientific conjecturing?

On the one hand, something incomparable is created here from what is seemingly comparable ('progress in medical technology'). One can admit that a degree of self-creation and self-change is inherent to human development. One can see that history presupposes and develops the ability to change and influence human nature, to produce culture, to manipulate the environment and to replace the constraints of natural evolution with self-created conditions. Still this should not deceive us that thrusts into new areas are occurring here. The talk of 'progress' presumes the subject whom all this is ultimately supposed to benefit. Unleashed thinking and acting in feasibility categories are oriented to the opposite, the object, the *mastery of nature* and the increase of social wealth it makes possible. When the principles of technological feasibility and arrangement encroach upon the subjects themselves in that way, then the pursuit of its own interests destroys the conditions of existence for the *citoyens*, who are ultimately supposed to hold all the democratic strings of development in their hands, according to the popular image of the division of labor in industrial society. *Surreptitiously, the mastery of nature becomes technical control of the subject in the truest sense of that word* – although, however, the cultural standards of enlightened subjectivity that this mastery was originally supposed to serve no longer exist.

This secret farewell to an epoch of human history takes place, on the other hand, without the necessity of crossing any barriers of consent. While the expert commissions all over the world are still drawing up their final report on the possible and unpredictable consequences of this step – which also means that political and social consequences lie far in the future – *the number of children produced in vitro is growing rapidly*. In Germany alone, more than seventy births were registered from 1978 to 1982. By early 1984 there were already over 500 with a total of more than 600 children. The clinics that conduct *in vitro* fertilizations have long waiting lists.

Thus, medicine possesses a *free pass* for the implementation and testing of its 'innovations', on the basis of the structure of its activity. The practitioner of medicine has always been able to undermine public debate and criticism of what a researcher may or may not do with a *policy of the fait accompli*. That no doubt also raises questions of scientific ethics. But such questions alone *foreshorten* the problem, like the attempt to reduce the 'power of monarchy' to the 'morality of the royal house'. This becomes even more important when one relates the *approach* and the *scope* of decision-making that changes society in politics to that in the sub-politics of medicine.

Despite all the criticism and skepticism regarding progress, what continues to be possible, even taken for granted, in the area of medicine would, if transferred to official politics, be equivalent to the scandal of simply implementing epoch-making fundamental decisions on the social future, while *bypassing* the parliament and the public sphere, and making debate on the consequences *unreal* by virtue of their realization in practice. This need not even express a failure of the moral quality of science. According to *medicine's social structure*, there is no parliament in the sub-politics of medicine, and no executive branch where the consequences of the decision could be investigated *in advance*. There is not even a social locus of decision making, and thus ultimately no firm decision and none that could be made firm. One must keep in view the fact that in the thoroughly bureaucratized, developed democracies of the West, anything and everything is scrutinized as to its legality, jurisdiction and democratic legitimation, while at the same time it is possible to abrogate the foundations of traditional life and living and bypass all bureaucratic or democratic monitoring and decision-making. This occurs under a storm of broadening criticism, but otherwise in extra-parliamentary normalcy.

In this way a complete *disequilibrium between external discussions and controls and the internal definition-making power of medical practice* comes into being and is preserved. According to their position, the public sphere and politics are always and necessarily 'uninformed', lagging hopelessly behind the developments, and thinking in terms of moral and social consequences which are alien to the thought and action of medical people. The most significant thing is, however, that they are of necessity talking about *unreal things*, about what cannot yet be seen. The consequences of external fertilization can indeed only be studied with empirical certainty *after* its implementation; beforehand everything remains speculation. The *direct* implementation on a living subject, which follows the inherent criteria and categories of 'medical progress', is confronted by fear and conjecturing on social consequences whose speculative substance rises in direct proportion to the depth of the encroachment on the prevailing stock of cultural certainties. Translated to politics, that means that deliberation over laws occurs *after* they take effect; only then are their consequences visible.

The collaboration of effectiveness and anonymity increases the structuring power of medical sub-politics. In this sphere it is possible to exceed limits with a self-assurance whose scope for social change on the one hand far surpasses the radius of influence of politics, and on the other could only attain realization in the realm of politics by passing through the parliamentary purgatory. In this sense the clinic and the parliament are quite comparable, even *functionally equivalent* with regard to the structuring and changing of social living conditions, but on the other hand they are not at all equivalent, since the parliament has *no* decisions of similar scope and *no* comparable opportunities for practically implementing them at its disposal. While the foundations of the family, marriage

and relationships are being destroyed through research and practice in the clinics, the parliament and the government debate the 'crucial questions' of reducing costs in the health system, oriented to limitation and avoidance, although it is clear in any case that well intentioned plans and their actual implementation belong to two different worlds.

In the sub-politics of medicine, by contrast, the possibilities for thoughtless and unplanned exceeding of limits lie in the logic of 'progress'. Even *in vitro* fertilization was first tested in animal experiments. One can very well argue over whether that should be permitted. But certainly an essential barrier was crossed in applying this technique to people. This risk, which is after all not a risk for medicine, but for the next generation of people, for all of us, could and can be taken purely *immanently* in the circle of medical practice, and under the conditions and needs of a (global) competition for reputation which prevails there. This only seems to be a central 'ethical' problem of medicine, and is publicly perceived and discussed in such categories, *because* there already exists a social structure for the implementation of medical knowledge in practice without public consent or decision, which virtually excludes external monitoring and consultation.

One can formulate this central distinction between politics and sub-politics as: democratically legitimated politics, with its means of influence consisting of the law, funding and information (e.g. for consumers), possesses *indirect* sources of power, whose long 'implementation periods' offer additional possibilities for monitoring, correction and mitigation; the sub-politics of progress, by contrast, enjoys a *directness without implementation*. In it one could say that the legislative and executive branches lie united in the hands of medical research and practice (or related to industry, of management). It is the model of an undifferentiated authority to act, which does not yet know the separation of powers, and in which social goals only need be conceded to the affected parties retrospectively, as secondary consequences that have already become a reality.

This structure is of course most 'purely' defined in the medical profession. The doctors do not owe their structuring power to their special rationality or to their particular successes in the protection of the highly valued commodity, 'health'. Rather, it is the product and expression of a *successful professionalization* (at the turn of the twentieth century), and as a corresponding limiting case it is likewise of general interest for the conditions that give rise to the sub-political structuring power of professions (or in an 'incomplete' form, of occupations). There are several prerequisites. First, a professional group must succeed in protecting its access to *research* institutionally and thus opening for itself the sources of innovation. Second, it must succeed in essentially (co)determining the standards and contents of *training* and assuring in that way the transmission of professional norms and standards to the next generation. Third, the most essential and least often surmounted hurdle is taken where even

the *practical application* of the knowledge worked out and the trained abilities occurs in professionally controlled organizations. **O**ne then does a professional group possess an *organizational roof* under which *research, training and practice are interconnected*. Only in this constellation can substantively oriented structuring power be developed and affirmed without the necessity for social consent. The paradigm for this 'professional power circle' is the *clinic*. There the sources of influence for professional sub-politics are connected together in a historically unique manner in mutual affirmation and confirmation. Most other professional groups and organizations either do not control research as a source of innovation (social workers, nurses), or are cut off by nature from the application of their research findings (social sciences), or must apply them under extra-professional, industrial standards and controls (technology and the engineering sciences). Medicine alone possesses in the form of the clinic an organizational arrangement in which the development and application of research results to patients can be carried out and perfected autonomously and according to its own standards and categories in isolation from outside questions and monitoring.

In this way, medicine as a professional power has secured and expanded for itself a fundamental advantage against political and public attempts at consultation and intervention. In its fields of practice, clinical diagnosis and therapy, it not only controls the innovative power of science, but is at the same time its own parliament and its own government in matters of 'medical progress'. When it has to decide on 'malpractice', even the 'third force' of jurisprudence has to take recourse to medically produced and controlled norms and circumstances, which according to the social construction of rationality can ultimately be decided only by medical people and by no one else.

These are the conditions under which a 'policy of *fais accomplis*' can be conducted and extended to the cultural foundations of life and death. The medical profession thus finds itself in a position to subvert criticism, doubts and dictates from outside by the production of 'new facts'. Social expectations and standards of judgment are no longer pre-existent, but rather *reflexive*, that is to say, they are to be produced and defined in part by physicians in research, diagnosis and therapy, and are thus *changeable*. What is socially considered 'health' and 'disease' loses its pre-ordained 'natural' character in the framework of the medical monopoly and becomes a quantity that can be produced in the work of medicine. 'Life' and 'death' in this view are no longer permanent values and concepts and beyond the reach of human beings. Rather, what is considered and recognized socially as 'life' and 'death' becomes *contingent in and through the work of medical people themselves*. It must be redetermined with all the foreseeable implications – and *against the background and on the foundation of circumstances, problems and criteria produced by medicine and biology*. Thus, following the advances in heart and brain surgery, it must again be decided and established whether a person 'is

dead if the brain fails but the heart is still beating, if the functioning of the heart can only be **O**rganized artificially by corresponding complicated apparatus, or if certain brain functions fail (so that the patient is permanently 'unconscious') while other bodily functions remain intact, and so forth.

On the basis of the possibilities for genetic technology opened up by *in vitro* fertilization, life is no longer equal to life, and death is no longer equal to death. Once rather unambiguous fundamental categories and evident circumstances in humankind's understanding of itself and the world are being overrun by matters of fact that can be and have been produced, unasked, by medicine, and they then become contingent and changeable. New situations requiring a decision that were not present during the earlier evolution are being continually produced and (at least in part) they have always been answered in advance in medical practice for the benefit of research-oriented medicine. The decision patterns can themselves be 'mastered' politically and legally only on the basis of medical diagnoses (certainly in collaboration with other professions). In this way the medical view of things *objectivizes* itself and expands ever more deeply and broadly into all aspects of life and areas of human existence. In more and more fields of action a *reality* defined and thoroughly structured by medicine is becoming the prerequisite of thought and action. A medically shaped law, 'medically evaluated' labor technologies, environmental data, and norms for environmental protection or eating habits come into existence. In this way, not only is the spiral of medical formation and decision-making twisted deeper and deeper into the second reality of the risk society, but an *insatiable appetite for medicine* is produced, a permanently expanding market for the services of the medical profession whose ramifications echo into the distant depths.

An occupational group that has managed such an interconnection of science, training and practice possesses more than just a certain 'professional strategy' to protect the market for its offerings – a legal monopoly or exclusive access to training or certification and the like (on this see Beck and Brater 1978). Far beyond that, it possesses a golden goose, so to speak, 'laying' possible market strategies. This professional organizational setting is the equivalent of a *reflexive market strategy*, because it puts the professional group in a position to *produce continually new professional strategies* from its control of the cognitive development in the field of activity it monopolizes. Thus it is able to profit from self-produced risks and hazardous conditions and to extend its own area of activity continually through related techno-therapeutic innovations.

This professional dominance of medicine must *not*, however, be confused with or equated to *personal* power of the physician. Medical structuring power is exercised instead in professional form and there is a characteristic built-in barrier between the private interests of those active in the profession and the maintenance and exercise of political and social functions. The police, judges, or the administrative officials are also not

able to employ the powers of domination delegated to them like a prince in his kingdom in order to increase their personal power and not only because legal regulations, monitors and supervisors prevent them. They are also unable to do this because in the very form of the profession there is an embedded indifference of their private economic interests (income, career and so on) with respect to the substantive goals and side effects of their work. Individual doctors are cut off from the socially transforming scope of their interventions. The latter do not even fall within their horizon of reference; they are shifted off in any case into the side effects of medical practice. What is of primary and central importance for physicians is 'medical progress', as internally defined and controlled within the profession. Of course, successes in this direction do not register directly, but only *translated*, into career opportunities, salary, or position in the hierarchy. In this sense, salaried physicians conducting research into human genetics are *dependent like every other employee*. They can be discharged, replaced, monitored by others as to the 'professional' performance of their task, and they are subject to external directions and regulation (Beck 1979).

A further characteristic of sub-politics expresses itself here, which is elaborated in different ways in different fields of activity. Whereas in politics consciousness and influence can coincide, at least in theory, with the functions and tasks performed, *in the field of sub-politics, consciousness and actual effects, social change and influence systematically diverge*. To put it differently, the scope of the social changes set loose need not be correlated at all with commensurate gains in power, but conversely can even coincide with a lack of influence. Thus a relatively small group of researchers and practitioners of human genetics are promoting an upheaval in social circumstances, unconsciously and unplanned, in the apparent normalcy of their professional practice as employees.

The Dilemma of Technology Policy

Now one can say that the justification of techno-economic sub-politics is *derived from the legitimacy of the political system*. The fact that no direct decisions are made about technology in the political system ought to encounter little controversy. The side effects for which responsibility must be shared there are not caused by the politician. Nevertheless, technology policy controls the levers of financial support and the legislative channeling and cushioning of undesirable effects. Decision-making on technological development and its economic exploitation, however, escapes the reach of research policy. In relations to the state, industry possesses a double advantage, that of the *autonomy of investment decisions* and the *monopoly on the application of technology*. The strings controlling the modernization process in the form of economic planning, of the economic yield (or risk) and of the technological structure in the firms themselves all lie in the hands of economic sub-politics.

This division of labor in the power structure of modernization discharges the state in multiple belatedness. First it struggles to catch up with the technological development, which was decided upon elsewhere. Despite all its support of research, its influence on the goals of technological development remains secondary. No votes are taken in parliament on the employment and development of microelectronics, genetic technology or the like; at most it might vote on *supporting* them in order to protect the country's economic future (and jobs). It is precisely the intimate connection between decisions on technological development and those on investment which forces the industries to forge their plans in secret for reasons of competition. Consequently, decisions only reach the desks of politicians and the public sphere after being taken.

Once decisions on technological developments under the cloak of investment decisions have been taken, they acquire and develop, of course, a considerable weight of their own. Now they come into the world with the constraint that investments have about them – they must *make money*. Fundamental objections would endanger capital (and, of course, jobs). Anyone who now points out the side effects harms the enterprises that have invested their future and that of their employees in these plans, and thus ultimately endangers even the economic policy of the government.

Therein lies a double limitation. Firstly, estimation of side effects occurs under the pressure of investment decisions taken in order to make a profit. Secondly, this is relieved by the fact that consequences are difficult to assess in any case, and governmental counter-measures require a long path and a long time for implementation. The consequence is the typical situation that 'industrially produced problems of the present, being based on yesterday's investment decisions and the technological innovations of the day before yesterday, will at best meet with counter-measures tomorrow', which will perhaps become effective *the day after tomorrow*' (Jaenicke 1979: 33). In this sense, politics therefore becomes specialized through the legitimization of consequences it has neither caused nor really been able to avoid. According to the design of the division of powers, politics remains responsible in a double sense for decisions taken in industry. The pseudo-political, industrial 'sovereignty' in matters of technological development possesses only borrowed legitimacy. It must be socially restored in retrospect again and again in the eyes of a public sphere grown critical. This need for the political legitimization of decisions that were not made is strengthened by the political and official responsibility for side effects. The division of labor thus leaves the industries with the primary decision-making power but *without* responsibility for side effects, while politics is assigned the task of democratically legitimating decisions it has *not* taken and of 'cushioning' technology's side effects.

At the same time, the demonstration of side effects (at least at an early date) collides with the economic and economic policy interests that are invested in the chosen path of technological development. The more the

side effects (or public sensitivities to them) grow and the greater the interest in economic recovery becomes (also in view of mass unemployment), that much narrower becomes the freedom of action for technology policy, which is caught between the millstones of a critical public and economic priorities.

Relief is offered here by the model of progress. 'Progress' can be understood as *legitimate* social change *without* democratic political legitimization. *Faith in progress replaces voting*. Furthermore: it is a substitute for questions, a type of consent in advance for objectives and consequences that remain unknown and unmentioned. Progress is a blank page as a political program, to which wholesale agreement is demanded, as if it were the earthly road to heaven. The fundamental demands of democracy have been turned on their heads by the model of progress. Even the fact that one is concerned in progress with social change must be pointed out retrospectively. Officially, one is dealing with something quite different and always the same – economic priorities, competition in the global market, or jobs. Social change takes place only in *displaced* form. Progress is the inversion of rational action as a 'rationalization process'. It is the continuous changing of society into the unknown, without a program or a vote. We assume that things will go well, that in the end everything we have brought down upon ourselves can be turned back into progressiveness. But even asking about why or wherefore has something heretical about it. Consent without knowledge of wherefore is the prerequisite. Everything else is heresy.

Here the *counter-modernity* of faith in progress becomes clear. It is a type of *secular religion of modernity*. All the features of a religious faith apply to it, such as trust in the unknown and the intangible or trust against one's own better judgment, without knowing the way or the 'how'. Faith in progress is the self-confidence of modernity in its own technology that has become creativity. The productive forces, along with those who develop and administer them, science and business, have taken the place of God and the Church.

The fascination the ersatz god of progress exercises on people in the epoch of industrial society becomes all the more astonishing, the more closely one examines its earthly design. The non-responsibility of science corresponds to the *implicit* responsibility of the businesses and the *mere responsibility for legitimization* of politics. 'Progress' is social change institutionalized into a position of non-responsibility. The fatefulness of the faith in an absolute imperative transfigured into progress is, however, *manufactured*. The 'anarchy of side effects' corresponds to a governmental policy which is only able to give its blessings to prescribed decisions, to an economy that leaves the social consequences in the latency of the cost-intensifying factors, and to a science that introduces the process with the clear conscience of its theoretical attitude and wishes to remain oblivious to the consequences. Where the belief in progress becomes a *tradition* of progress that subverts modernity just as it created it, the non-

politics of the techno-economic development transforms itself into a sub-politics in need of legitimization.

The Sub-Politics of Industrial Automation

Functionalism and neo-Marxist analyses, as well as those of the sociology of organizations, are still thinking in terms of the 'certainties' of large organization and hierarchy. Taylorism and economic crisis, which have long been undermined by the developments in plants and the development possibilities in the enterprises. Along with the automation possibilities of microelectronics and other information technologies, with the environmental issues and the politicization of risks, *uncertainty* has even penetrated into the cathedrals of the economic dogmas. What seemed solid and mandated only a short while ago is becoming mobile: temporal, spatial and legal standardizations of wage labor (on this see Chapter 6 for a detailed discussion); the power hierarchy of large organizations; the possibilities of rationalization; all of these no longer conform to the traditional plans and relations. They reach across the rigid limits of divisions, plants and sectors; the structure of the production sectors can be reworked electronically; technical production systems can be changed independently of human labor structures; in view of the requirements for flexibility dictated by the market, ecological morality and the politicization of production, notions of profitability are becoming fluid; and new forms of 'flexible specialization' (Piore and Sabel 1985) compete effectively with the old 'hulks' of mass production.

This surplus of possibilities to change structures need by no means be applied as part of organizational policy immediately, all at once or in the near future. And yet this confusion on future development among the interwoven influences of ecology, new technologies and a transformed political culture has already changed conditions today.

In the prospering fifties and sixties it was still possible to predict the development of national economies with relative precision. Today it is no longer even possible to forecast the changing directions of economic indicators from one month to the next. Corresponding to the uncertainty about changes in the national economies is the confusion on the outlooks of individual sales markets. Management is unsure which products should be produced and what technologies should be employed for that purpose – indeed, it is not even certain how authority and jurisdiction should be distributed within the company. Anyone who talks with industrialists or reads the business press will probably reach the conclusion that many corporations would have difficulties arriving at comprehensive strategies for the future, even without governmental intervention. (Piore and Sabel 1985: 22)

Of course, risks and uncertainties are a 'quasi-natural' constitutive element of economic activity. But the present confusion displays new traits. It

is all too clearly different from the Great Depression of the thirties. In those days, fascists, communists and capitalists were striving everywhere to emulate the technological example of one country: the United States. Ironically, at that time, when society as a whole appeared extremely fragile and susceptible to change, no one seemed willing to doubt those very principles of industrial organization which appear exceedingly dubious today. The current confusion over how technologies, markets and hierarchies are to be organized is the visible sign of the collapse of decisive, yet scarcely understood, elements of the familiar system of economic development. (Piore and Sabel 1985: 22f.)

The range of organizational social changes that are becoming possible through microelectronics is considerable. Structural unemployment represents a major fear, but only an intensification that still meets the criteria of the traditional categories for the perception of problems. In the medium term it ought to become of equal importance that the use of microcomputers and microprocessors falsifies the traditional organizational premises of the economic system. To put it bluntly, microelectronics is introducing a stage of technological development which *refutes technically* the myth of technological determinism. For one thing, computers and control devices are programmable, that is they are functional for the broadest variety of purposes, problems and situations. Thus, technology no longer prescribes how it is to be employed in detail; quite to the contrary, this can and must be fed into the technology. Hitherto existing legitimacy possibilities for arranging social structure according to 'objective technical constraints' are diminishing, or even being reversed. One must know what type of social organization in its horizontal and vertical dimensions one wants, in order to use the networking possibilities of electronic control and information technologies at all. On the other hand, microelectronics permits the *decoupling* of labor and production processes. That is to say, the system of human labor and one system of technological production can be varied *independently* of one another (Kommissionsbericht 1983: 167ff.).

In all the dimensions and on all levels of the organization new patterns are becoming possible – across the boundaries of divisions, plants and sectors. The basic premise of the industrial system on this point, that cooperation is *spatially bound* in an 'organizational structure' serving that purpose, is losing the technical basis for its necessity. But that implies, however, that the 'building blocks' upon which traditional notions and theories of organization are based are being exchanged. The latitude for organizational variations being opened up in this way cannot yet even be imagined. That is not the least important reason why they certainly will not be exhausted overnight. We are living at the beginning of an *experimental phase of organizational planning*, which hardly takes a back seat to the constraints to experiment with new ways of living in the private sphere.

It is important to assess the dimensions correctly. The model of *primary* rationalization, which is marked out by changes in the categories of job, skill and technical system, is being displaced by *reflexive* rationalizations

directed at the premises and invariants of change to this point. The emerging latitudes for organizational arrangement can accordingly be circumscribed by the traditionally prevalent guiding principles of industrial society, among others, the *plant paradigm*, the *arrangement of production sectors*, and the constraint to *mass production*.

In discussions on the social consequences of microelectronics, a certain view is still predominant in research and the public sphere. It is asked and investigated whether in the final account *jobs* are lost or not, whether *skills* and their hierarchies change, whether new *professions* arise and old ones become superfluous, and so on. People still think in the categories of the good old industrial society and can hardly imagine that the latter no longer capture the emerging 'possible realities'. Often enough, such investigations issue a sort of 'all clear bulletin' such as that jobs and skills will change within an expectable range. The categories of the plant and the division, the assignment of the labor and production systems, and the like are held constant in this process. But the specific potential of 'intelligent' electronics for automation which is only gradually becoming visible, falls through this grid in which industrial society and sociology think and conduct research. We are concerned with rationalization of the *system*, which makes the seemingly ultra-stable organizational boundaries *within and between* plants, divisions, sectors, etc. appear malleable.

The characteristic of the impending waves of rationalization, then, is their *boundary-crossing* and *boundary-changing* potential. The paradigm of the firm and its embedding in the sectoral structure are up for grabs, including the structure of divisions in plants, the interaction of organization and cooperation, the coexistence of plant organizations – quite apart from the fact that entire divisions (in assembly for instance, but also in administration) can be automated, brought together in data banks and even directly connected electronically to the customer. In this is concealed an important opportunity for company policy to change the *governance of the workplace with an (initially) unchanged job structure*. The intra- and interorganizational structure can, so to speak, be changed under the cover (now more abstract) of the corporation around the jobs – thus bypassing the trade unions (Altmann et al. 1986).

The *organizational configurations* that can be produced in this way are not so 'top-heavy', consisting of fewer elements which can perhaps be recombined in a quite different way at different times. Each individual 'organizational element' then possibly possesses its own relations to the external world and pursues its own 'organizational foreign policy' specific to its function. The prescribed goals can be pursued without consulting the central organization about everything in advance – so long as certain effects (e.g. profitability, quick adaptations to changed market conditions, attention to market diversification) are met in a way that *can be monitored*. 'Domination', which was organized in the large industrial plants and the bureaucracy as a chain of command that could be directly experienced socially, is being delegated here to the united functional

principles and effects. Systems come into being in which 'perceivable rulers' are becoming a rarity. The place of orders and obedience is being taken by the electronically monitored 'self-coordination' of 'functional elements' under presumed and that much more strictly enforceable principles of efficiency. In this sense the *transparent organization* with respect to performance monitoring and personnel policy may exist in the foreseeable future - probably with the effect, however, that this change in the form of monitoring mechanisms will accompany a *horizontal autonomization* of subordinate, subsidiary and coordinate organizations.

The microelectronic metamorphosis of the control structure will make the direction and monopolization of information flows a central problem in the 'plants' of the future. It is the case not only that the employees could become 'transparent' for the plants (management), but also that the plant could become 'transparent' for the employees and the interested environment. To the extent that the localization of production becomes worn and frayed, information becomes the central means that enables the connection and coherence of the production unit. Thus it becomes a key question who gets what information, by what means, and in what order, about whom and what, and for what purpose. It is not difficult to predict that in the organizational disputes of the future these *power struggles over the distribution and the distribution coefficient of information flows* will become an important source of conflict. This significance is further emphasized by the fact that, as a result of decentralized production, first the legal ownership of the means of production, and then the actual disposition over them is beginning to become more differentiated and the control of the production process is coming to hang by the thin thread of the manageability of information and information networks. This would only reinforce the monopolization of decision-making authority due to control of ever more concentrated capital.

The continuing constraints in the direction of concentration and centralization can be seized and organized in a new way through the help of telecommunications. It remains correct that modernity is dependent on the concentration of decision-making and on highly complex possibilities of coordination for the exercise of its tasks and functions. But these need not be carried out in the form of mammoth organizations. They can also be delegated through information technology, worked on in decentralized data, information and organizational networks, or provided by the (semi-)automatic services in direct 'interactive cooperation' with the receivers, as has already been exemplified by automated teller machines. Here a completely new sort of trend arises, one that is contradictory according to conventional concepts. The concentration of data and information is accompanied by the *dismantling* of hierarchically organized mega-bureaucracies and administrative apparatus based on the division of labor. The centralization of functions and information interpenetrates with *decentralization*. Concentration of decision-making authority and the decentralization of labor organizations and service institutions

both become possible. ¹Respective of distances, the 'middle' level of bureaucratic organizations (in the administration, the service sector and the production sphere) is fused together in 'direct' interaction via video display terminals made possible by information technology. Numerous tasks of the welfare state and the state administration - but also of customer service, jobbing, and repair shops - can be transformed into a type of electronic self-service store, even if all this means is that the 'chaos of the administration' is transmitted in objectified form by electronic means directly to the 'mature citizen'. In this case the person entitled to a service no longer interacts directly with an administrative official, customer adviser or the like, but rather chooses the desired treatment, service or authorization according to a procedure whose rules can be looked up electronically. It may be that this objectification via data processing technologies is not possible, sensible, or socially realizable for certain central areas of service. For a broader realm of routine activities, however, that is not the case, so that in the near future a large part of the administrative and service routine can be performed in this way - saving personnel costs.

At least two organizational premises of the economic system in industrial society have been shown in these semi-empirical trend forecasts, in addition to the plant paradigm and the sectoral structure. The first is the *outline of the production sectors*, and the second is the basic assumption that industrial capitalist production must of necessity follow the norms and forms of *mass production* in the long run. It can already be foreseen today that the impending rationalization processes are taking aim at the sectoral structure as such. What is emerging is *neither* industrial *nor* familial production, *neither* the service *nor* the informal sector; it is a *third entity*, a blurring or a subversion of the boundaries in sector-spanning forms of combination and cooperation, for the peculiarities and problems of which we have yet to develop a conceptual and empirical sensitivity.

Already through self-service shops, and in particular through automatic teller machines and services provided via video display terminals (but also through citizens' or self-help groups and the like), there has been a redistribution of labor across sectoral boundaries. At the same time the labor force of consumers is mobilized *outside the labor market* and integrated into the commercially organized production process. On the one hand, this inclusion of unpaid consumer labor is certainly part of the free-market plan to lower wage and production costs. On the other hand, areas of overlap arise at the boundary of automation which can be understood neither as self-help nor as a service. The machines permit banks, for example, to delegate paid labor of tellers to the consumers who are 'compensated' with access to their accounts at all times.

In the redistributions between production, services and consumption, which are made possible by technology and are socially desirable, there is a bit of *clever self-abrogation of the market*, to which economists

committed to the market turn a blind eye. One often hears talk today of 'shadow labor' or the 'shadow economy' and so on. It ~~generally~~ goes unrecognized, however, that shadow labor is spreading *within* market-mediated industrial and service-sector production, not just outside of it. The wave of automation sparked by microelectronics produces *hybrid forms* between paid and unpaid labor, in which the proportion of labor mediated by the market is *decreasing*, but the proportion of unpaid consumer labor is increasing. The wave of automation in the service sector can thus be understood as a transfer of labor from production to consumption, from the specialist to the general public, from compensation to self-participation.

As insecurity and risks increase, the interest of employers in *flexibility* is growing – a demand that has always existed, but is gaining competitive urgency today in view of the intermeshing of political culture and technical development on the one hand, and the possibilities for electronic organization of work, developments in production and market fluctuations on the other. The *organizational prerequisites of standardized mass production are beginning to crumble*. This overproduction model of industrial society still retains its spheres of application (e.g. long production runs in the cigarette, textile, electric lamp or food industries), but is supplemented and displaced by new types of hybrids, mass-produced and individualized products, as can already be observed in the electrical industry, among certain automobile firms and in communications. Different circuits or different combinations are produced and offered here, following a modular principle.

The adjustment of plants to the *destandardization* of the markets and to internal product diversification, as well as the accompanying requirements for rapid organizational adjustments in view of markets that are saturated or change due to the identification of risks, can either not be accomplished, or only awkwardly and cost-intensively with the traditional rigid plant organization. Such changes must always be pushed through from the top down, with a great expenditure of time, following a plan and in the form of orders (against resistance). In mobile, loose or fluid organizational networks, by contrast, these varying adaptation feats can be *incorporated into the structure*, so to speak. But then the struggle between mass and craft production, which history seemed to have decided, starts a new historical round. The victory of mass production, presented as eternal, could be revised through new forms of 'flexible specialization' on the basis of computer-controlled, innovation-intensive products in small production runs (Piore and Sabel 1985).

The era of the factory, the 'cathedral of the industrial age', is probably not coming to an end, but its monopoly on the future is being broken. These gigantic, hierarchical organizations, subject to the dictates of the machinery's rhythms, may have been suited to produce the same products and reach the same decisions over and over again in a comparatively stable industrial environment. But, to borrow a word from the language

that grew up with those organizations, they are becoming 'dysfunctional' today for a number of reasons. They are no longer in harmony with the demands of an industrialized society in which the development of the self encroaches on the world of work. As 'organizational giants' they are incapable of reacting flexibly to the rapidly changing, self-revolutionizing technologies, product variations and politico-culturally conditioned market fluctuations in a public sphere that is sensitized to risks and destruction. Their mass products no longer meet the needs of the sub-markets that are splitting off. They are also incapable of properly utilizing the great inventive gifts of the most modern technologies for individualizing products and services.

The decisive point here is that this turn away from the 'giant organizations' with their constraints to standardize, their chains of command and the like *does not* collide with the fundamental principles of industrial production – maximization of profits, property relationships, ruling interests – but rather is forced by them.

Not all of the 'pillars' of the industrial system – the plant paradigm, the outline of the production sectors, the forms of mass production and the temporal, spatial and legal standardizations of wage labor – are being loosened or abolished all at once and across the board. Still, there remains a *systemic transformation* of labor and production which is putting the compulsory unity of industrial society's organizational forms of the economy and capitalism into its relative context as a historically transitory intermediary phase of roughly 100 years' duration.

This development – if it does indeed occur – will cause spring to break forth in the 'Antarctica' of the organizational premises from organizational sociology and (neo-)Marxism. Expectations for the change of industrial labor that had appeared to be cast in iron are being turned on their heads,⁶ not of course as a new edition of a legalistic evolution of organizational forms with seemingly 'intrinsic superiority' on the road to capitalist economic success, but as the *product of struggles and decisions about forms of labor, organization and operation*. That one is always centrally concerned here with power in production and the labor market, its presuppositions and the rules for exercising it, is obvious. As a result of the sub-political organizing spaces that open up in the operational *politicized*, less in the sense that a new 'edition of class struggles results, but more in the sense that the apparent 'single way' of industrial production becomes configurable, sacrificing its organizational unity, becoming *destandardized and pluralized*.

In the disputes between management, works council, trade unions and the rank and file workers, decisions on alternative models of work relations will be on the agenda in coming years. These models of work relations will be conceived along the lines of visions of everyday life. They will afford the possibility of a democratic socialism of everyday life – or the alternative of an authoritarian rule, the basis of existing property

relationships. What is characteristic here perhaps lies in the fact that these two alternatives no longer exclude one another since *conceptualizations* in which they are formulated no longer apply. The essential thing is that from one enterprise to another, from one sector to another, different models and policies can be propagated and tested. This could simply mean the proliferation of a succession of meaningless 'fads' in labor relations policy. All together, the tendency towards pluralization of forms of living is spreading to the production sphere. A *pluralization of the milieus and forms of labor* results, in which 'more conservative' and 'more socialistic', or 'more rural' and 'more urban' variants are locked in competition.

But that means that operational activity comes under *pressure for legitimization* to a degree previously unknown. It acquires a new political and moral dimension, which had seemed alien to economic action. This *moralization of industrial production*, which reflects the dependence of operations on the political culture in which they produce, ought to become one of the most interesting developments of the coming years. It is based not only on external moral pressure, but also on the intensity and effectiveness with which opposing interests (also those of social movements) have organized themselves, on their skill in presenting their interests and viewpoints to a public that is becoming more sensitive, on the market significance of risk definitions and on the competition of the plants with each other, where the legitimization problems of one party become the advantages of the other. In a certain way, the public gains influence on the plants in the course of the 'tightening of the legitimization screws'. The organizational power of the plants is not abolished, but it is *deprived of its a priori objectivity, its necessity, and its charitable nature*; in short, it becomes a *sub-politics*.

This development is what must be understood. Techno-economic action remains shielded from the demands of democratic legitimization by its own constitution. At the same time, however, it loses its non-political character. It is *neither politics nor non-politics*, but a third entity: economically guided action in pursuit of interests. This pursuit of interests, for one thing, has attained the scope to change society as the latency of risks has disappeared, and additionally has lost its facade of objective necessity in the pluralism of its decisions and revisions of decisions. Risk-laden consequences and alternative possible arrangements are bursting forth everywhere. The *one-sided* interest relation of operational analysis stands out in equal measure.

Wherever *several* decisions with quite *divergent* implications for *different* affected parties or for the general public are possible, business activity in all its forms (even extending into details of technical production and cost accounting) becomes liable to public accusations and therefore in need of justification. Even business activity thus becomes discursive – or it suffers in the market. Not just packaging but *arguments also* are part of the basic prerequisites for self-assertion in the market. If one wished,

one could say that Adam Smith's optimism that self-interest and the public welfare would *automatically* coincide in market-dependent activity has been thrown out the window. The changes in political culture already mentioned are also reflected here! Through the influence of various centers of sub-politics – media publicity, citizens' initiatives, new social movements, critical engineers and judges – operational decisions and production methods can be publicly denounced instantaneously, and forced with the cudgel of lost market shares to give a *non-economic, discursive* justification of their measures.

If this has not yet appeared today, or done so only in embryonic form (for instance in disputes with the chemical industry, which has by now seen itself forced to issue full-page whitewashes in answer to public accusations), then that is once again a reflection of mass unemployment and the relief and market opportunities it offers to corporations. In that respect, the effect of the alternative political culture on techno-economic decision-making processes in the firms remains concealed in the abstract primacy of economic recovery.

Scenarios of a Possible Future

The modern religion of progress, no matter how contradictory it might be, has had its era and still exists in those areas where its promises encounter conditions that prevent their fulfillment. These were and are tangible material poverty, underdeveloped productive forces, or class-based inequities which determine political disputes. Two historical developments ended this epoch at the end of the seventies in the developed Western countries. While politics runs up against inherent limits with the expansion of the welfare state, the possibilities for social change from the collaboration of research, technology and science accumulate. *In this way, with institutional stability and unchanged jurisdictions, the organizational power migrates from the domain of politics to that of sub-politics*. In contemporary discussions, the 'alternative society' is no longer expected to come from parliamentary debates on new laws, but rather from the application of microelectronics, genetic technology and information media.

Political utopias have given way to speculation about side effects. Correspondingly, the utopias have turned negative. The structuring of the future is taking place indirectly and unrecognizably in research laboratories and executive suites, not in the parliament or in political parties. Everyone else – even the most responsible and best informed people in politics and science – more or less lives off the crumbs of information that fall from the planning tables of technological sub-politics. Research laboratories and plant managements in the future-oriented industries have become 'revolutionary cells' under the cloak of normality. Here the structures of a new society are being implemented with regard to the ultimate goals of progress in knowledge, outside the parliamentary system, not in opposition to it, but simply ignoring it.

The situation threatens to turn ugly with non-politics beginning to take over the leading role of politics. Politics is becoming a policy financed advertising agency for the sunny sides of a development it does not know, and one that is removed from its active influence. The general unawareness of this development is exceeded only by the necessity with which it impedes. With their gestures of preserving the status quo, politicians promote the transformation to an alternative society of which they cannot have even an inkling, and at the same time they blame 'anti-cultural agitation' for the systematically incited fears of the future. Businessmen and scientists, who occupy themselves in their everyday work with plans for the revolutionary overthrow of the present social order, insist with the innocent face of objectivity that they are not responsible for any of the issues decided in these plans.

But it is not just the people who lose their credibility, but also the role structure in which they are trapped. Where the side effects take on the extent and the forms of an epochal social change, the naturalness of progress comes into view with all its threatening character. The division of powers in the modernization process itself is becoming fluid. Gray zones of a political arrangement of the future are coming into being, which in conclusion will be sketched in three (by no means mutually exclusive) variants. The first is *back to industrial society* (reindustrialization); the second is the *democratization of technological transformation*; and the third is *differential politics*.

Back to Industrial Society

This option is being pursued today by the overwhelming majority in politics, the sciences and the public sphere – across the lines of political opposition and across the borders of nations. And in fact a number of solid foundations can be cited for it. First of all is its *realism*, which believes it has drawn the lessons from the past 200 years of criticism of progress and civilization, and is also based on an assessment of immutable market constraints and economic conditions. Arguing or acting contrary to these presumptions – in this assessment – massive ignorance or masochistic character traits. According to this view, we are dealing today with a revival of 'anti-modernist' movements and arguments, which have always accompanied industrial development like a shadow – *without* ultimately being able to hinder its progress. At the same time, the economic necessities – mass unemployment or industrial competition – drastically narrow any room to maneuver politically. The consequence is that things will carry on in the same way anyway (with a couple of 'ecological corrective measures') as the knowledge of 'post-history', of the inevitability of the developmental path of industrial society, appears to confirm. Even the relief that counting on 'progress' has always offered seems to speak in favor of this option. The question 'What should we do?', which is asked anew by each generation, is answered by faith in progress: 'The same as

ever, only bigger, faster, and more.' In that respect there is much to suggest that in this scenario we are dealing with the probable future.

The scenario determining action and thought is clear. It is a reprint from the experiences of industrial society since the nineteenth century, projected onto the society of the twenty-first century. According to this script, the risks produced by industrialization do not really represent a new threat. They were and are the self-made challenges of tomorrow; they mobilize new scientific and technological creative forces, and in that way they represent rungs on the ladder of progress. Many people sense the market opportunities opening up here, and trusting the old logic, they consign the dangers of the present to the status of items to be mastered technically in the future. They misunderstand two things here: first, the character of industrial society as a *semi-modern* society; second, that the categories in which they think – modernization of the *tradition* – and those in which we live – modernization of *industrial society* – belong to two different centuries, in which the world was changed as never before. In other words, they fail to see that in modernization – i.e. the putative constancy of innovations – a qualitative discontinuity appears in the guise of continuity. Let us look first at the consequences implied if we carry on in the present epoch with the mentality of the initial century of modernity.

Economic priorities occupy the foreground here. Their imperative radiates out into all the other issues and problems. This is even true where the leading role is given to economic expansion *for the sake of* employment policy. Now this basic interest seems to force one into a blind march with investment decisions that are made, through which the technological opportunity to make decisions, and with no knowledge of why and where things are going. This throws two switches. In the fields of technological sub-politics that power potential to overthrow social conditions accumulates which Marx had once ascribed to the proletariat – except that it can be used under the protection of state power (and under the critical eyes of the labor union alternative power and an uneasy public). On the other hand, politics is shunted off to the role of legitimating protector of external decisions that change society from the bottom up.

This cutback to mere legitimization is strengthened under conditions of mass unemployment. The more emphatically economic policy sets the course and the more clearly the combating of mass unemployment gains the impetus, the greater the discretionary possibilities of the plans become and the less room the government has to act in economic policy. The consequence is that politics moves onto the slippery slope of *self-disempowerment*. At the same time its inherent contradictions sharpen. Even in the full brilliance of all its democratic powers it limits itself to the role of advocacy for a development, whose official tendency to euphemism has always been called into question by the unchallenged elemental force with which it comes over society.

In dealings with risks, this public advocacy of something that one

cannot know at all becomes open to doubt and turns into a danger for voter approval. The risks fall under the jurisdiction of governmental action, and that would, if applied, in turn require interventions in the contexts from which they originate, industrial production – interventions one has just forsworn as part of the coordination of industrial policy. Accordingly, one advance decision determines another so that actual existing risks are not supposed to exist. To the same degree as sensitivity to risks *grows* in the public, a political need for *minimization* research arises. This is supposed to guarantee the legitimacy of representative role of politics scientifically. Where risks nevertheless pass the social process of origination (e.g. the dying forests) and the cry for politically responsible remedies gains a significance that could perhaps decide elections, the self-prescribed impotence of politics emerges openly. It constantly stays the hand with which it claims to want to create a political remedy. The tug of war over the introduction of the catalytic converter, speed limits on freeways, or legislation to reduce pollutants and toxins in food, air and water provide numerous exemplary illustrations.

This 'course of things' is by no means so unalterable as is often alleged. Nor does the alternative lie in the antagonism between capitalism and socialism, which has dominated this century and the last. What is decisive is, rather, that both aspects in the transition to the risk society, dangers and opportunities, have been misunderstood. The 'original mistake' of the reindustrialization strategy, which attempts to prolong the nineteenth century into the twenty-first, lies in the fact that the *antagonism* between industrial society and modernity remains unrecognized. The indissoluble equation of developmental conditions of modernity in the nineteenth century, which are gathered together in the project of industrial society, with the developmental program of modernity, blocks the view of two different things: first, that in central areas the project of industrial society amounts to a bifurcation of modernity in many respects; and second, that the adherence to the experiences and maxims of modernity offers the continuity and the opportunity to overcome the restrictions of industrial society.

Concretely, this means that in the rush of women into the labor market, in the demystification of scientific rationality, in the disappearance of the belief in progress, in the changes of political culture accomplished outside parliament, the demands of modernity are asserted *against* their bifurcation in industrial society even in those areas where thus far new livable, institutionalizable answers are not in the offing. Even the potentials for danger which modernity has systematically set free as industrial society, without any foresight and counter to the demand for rationality to which it is itself subject, *could* represent a challenge to creative fantasy and the human ability to shape the world, if they were finally taken seriously.

This historical misjudgment of situations and developmental tendencies now takes effect in detail. It may be that in the epoch of industrial societies the previously mentioned 'blind march' between business and politics was

possible and necessary. Under the conditions of the risk society, acting like this would be confusing the basic multiplication table with a polynomial equation. The *structural* differentiation of situations across the institutional boundaries of business and politics would then be as invisible as the *distinct* interests of particular sectors and groups. In this way, for instance, it is impossible to speak of a *uniformity of economic interests with respect to the definition of risks*. On the contrary, risk interpretations drive wedges into the business camp. There are always *losers*, but also *winners*, from risks. But that implies that risk definitions do not deprive us, but rather make political decisions *possible*. They are a highly effective instrument for steering and selecting economic developments. In that respect the statistically well documented assessment is correct that perceptions of risk contradict economic interests only *selectively*, so that an ecological alternative would not necessarily run aground on its high costs.

The division of situations that cause risks between economic interests and politics lies along the same line. As side effects the risks fall under the responsibility of politics and not business. That is to say, business is not responsible for something it causes, and politics is responsible for something over which it has no control. As long as this remains the case, the side effects will also persist. This rounds to the structural disadvantage of politics, which not only heightens frustrations (with the public, health care costs and the like) but is also continually being held responsible for something that is becoming more and more difficult to deny, but whose causation and change lies outside of the scope of its direct influence.

This circle of self-disempowerment and loss of credibility, however, can be broken. The key lies in the responsibility for side effects itself. Alternatively, political action gains influence in parallel to the *detection and perception* of risk potential. Risk definitions activate responsibilities and create zones of *illegitimate* systemic conditions, which cry out for change in the interest of the general public. Thus they do not cripple political action and need not be covered up at all costs against a systematically upset public with the help of a science that is either blind or externally controlled. On the contrary, risk definitions *open up* new political options which can be used to win back and strengthen democratic parliamentary influence.

Conversely, denial does not eliminate risks. On the contrary, what was intended as a policy of stabilization can very quickly turn into a general *destabilization*. The concealed risks themselves can suddenly change into social risk situations of such seriousness that it becomes inconceivable how the thoughtlessness of industrial society could have been handled so poorly – politically, and not just techno-scientifically. The sensitivity for appropriate action which has grown as democratic rights have become internalized cannot be satisfied in the long run by demonstrations of political futility and cosmetic, symbolic operations. At the same time, insecurities are growing in all regions of social life: professions, the family, gender relations, marriage and so on.

A society attuned to minimizing the problems is without preparation when the 'future shock' (Toffler 1980) hits it. Under the influence of that shock, political apathy and cynicism can grow rapidly in the populace, and the already existing gap between the social structure and politics, or the political parties and the electorate, can widen rapidly. Perhaps the rejection of 'politics' will then tend to affect not just individual representatives and parties, but the system of democratic rules as a whole. The old coalition between insecurity and radicalism would be revived. The call for *political leadership* would once again resound ominously. The longing for a 'strong hand' would grow to exactly the degree as people see the world crumbling around them. The hunger for order and reliability would revive the spectres of the past. The side effects of a politics that ignores side effects would threaten to destroy politics itself. Ultimately, it could not be ruled out that the still undigested past [of Germany (tr.)] might become a possible developmental option for the future although in a different form.

The Democratization of Techno-Economic Development

In this model of development, a connection is made to the tradition of modernity, which aims at expanding the degree of self-determination. The starting point is the assessment that in the innovation process of industrial society the opportunities for democratic self-determination were *institutionally truncated*. From the outset, techno-economic innovations as a motor for permanent social change have been excluded from the possibility of democratic consultation, monitoring and resistance. Therefore a number of contradictions are built into the design of the innovation process, and these are opening up today.

Modernization is considered 'rationalization', although something is happening to the system here that is beyond our conscious knowledge and control. On the one hand, industrial society can only be conceived of as a democracy; yet on the other hand, it has always held the possibility that the society may turn from the lack of knowledge, which moves it, into the opposite of its assumed claim to enlightenment and progress. To the degree that this is a threat, faith and skepticism in the progressiveness of the unleashed movement once again come into opposition to a social form that more than any other has made knowledge and the ability to get it the basis of its development. Doctrinal conflicts and the associated tendencies to brand some as heretics and rebuild the piles for burning them come to determine a social development that had once relied on the rational solution of conflicts.

Science, which played an essential part in setting everything in motion, has excused itself from the consequences and takes refuge for its own part in decision-making, into which modernity transforms everything anyway. Therefore, what matters now – the conclusion goes – is to make this basis for decision-making publicly accessible, according to the rules provided

for such things in the recipe book of modernity: *democratization*. The proven instruments of the political system are to be expanded to conditions outside it. Many variants of this are conceivable and under discussion. The palette of suggestions extends from parliamentary checks on corporate technology development, to special 'modernization parliaments' in which interdisciplinary groups of experts would look through, evaluate and approve plans, all the way to inclusion of citizens' groups in technological planning and the decision-making processes in research policy.

The basic thought runs like this: the auxiliary and alternative governments of techno-economic sub-politics – science and research – could be brought under parliamentary responsibility. If they are to function as an auxiliary government by virtue of their freedom of investment and research, then they should at least be compelled to justify themselves before the democratic institutions on basic decisions of the 'rationalization process'. But this simplistic transfer is precisely where the *cardinal problem* of this cognitive and political approach is located. In its prescription it continues to be related to the epoch of industrial society, even through the opposite demand of the reindustrialization strategy. The nineteenth century understanding of 'democratization' presumes centralization, bureaucratization and the like, and thus connects up to conditions which have historically become to some degree antiquated and to some degree questionable.

The goals that are to be achieved through democratization are clear enough; the practice of having public political discussions only after research and investment decisions are made is to be broken up. The demand is that the consequences and organizational freedom of action of microelectronics or genetic technology belong in parliament *before* the fundamental decisions on their application have been taken. The consequences of such a development can easily be forecast: bureaucratic-parliamentary obstacles to plant automation and scientific research.

This is, however, only one variant of this model of the future. For the other one, the expansion of the welfare state serves as the exemplar. In crude terms, one argues in relation to the poverty risk of the nineteenth and the first half of the twentieth century. Poverty risks and technological risks are side effects of the industrialization process in different historical phases of its development. Both types of industrialization risks follow a similar political trajectory – shifted in time – so that it is possible to learn from experience in dealing with poverty risks socially and politically for the treatment of technological risks. The political and historical trajectory of the poverty risk – bitter denial; the struggle for perception and recognition; the political and legal consequences of the expansion of the welfare state – seems to be repeating itself in the case of global risk situations on a new level and in a new field. Precisely as the expansion of the welfare state in this century shows, denial is not the only option with regard to industrially produced risk situations. They can also be converted into an

expansion of opportunities for political action and of democratic rights to protection.

The representatives of this development envision an *ecological variant of the welfare state*. This can even provide answers to two fundamental problems, destruction of nature and mass unemployment. Appropriate legal regulations and political institutions will be created along the pattern of welfare policy laws and institutions. Agencies would have to be created and equipped with the appropriate jurisdictions in order to combat the exploitation of nature effectively. By analogy to old-age insurance, an insurance system could be established against health damage from environmental and nutritional pollution. Of course, for that it would be necessary to change the legal basis so as not to afflict the victim with the difficult burden of causal proof, on top of all his or her other problems.

The limitations and collateral problems of welfare state interventions that have by now appeared need not necessarily apply equally to the extension to ecology. Here too, there will be resistance from private investors. In the case of welfare state protections, these had their objective basis in the rising wage and fringe benefit costs. Similar wholesale burdens that affect all enterprises are absent in technology policy initiatives. They also register as costs for some, but they open up new markets for others. The costs and opportunities for expansion are unequally distributed between sectors and plants, one might say. From that fact, opportunities result for the establishment of a correspondingly ecology-oriented policy. The interest bloc of business falls apart under the impression of risk selectivity. Coalitions can be created which in turn help politics to bring the anonymous creative power of progress into the realm of political democratic action. Whenever the presence of toxins threatens the lives of people and nature, or where the foundations of traditional social life and cooperative work are threatened by automation measures, expectations of politics are systematically produced that can be converted into an expansion of political democratic initiatives. The dangers of such an ecologically oriented state interventionism can be derived from the parallels to the welfare state: *scientific authoritarianism* and an excessive *bureaucracy*.

In addition to that, this way of thinking is based on an error that also characterizes the project of reindustrialization in that it is assumed that modernity has, or should have, a guiding political control center, through all its reproductions and obscurities. The control strings ought to be pulled together in the political system and its central organs – that is the argument here. Everything that runs counter to that is viewed and valued as a *failure* of politics, democracy and the like. On the one hand, it is implied that modernization means autonomy, differentiation, or individualization. On the other hand, the 'solution' of the sub-processes that fall apart there is sought in a *recentralization* in the political system, according to the model of parliamentary democracy. In the process, it is not only the dark sides of a bureaucratic centralism and interventionism

which are excluded (they have by now become clear enough). Even before that, the *state of affairs is ignored, to wit, that modern society has no control center*. One may ask of course how the autonomization tendencies are to be prevented from being or becoming larger than the possible self-coordination of the subsystems or units. This question should not deceive us, however, as to the reality of the lack of a center or direction in modernity.

Neither is it necessary for alternatives produced in the process of modernization to lead down the one-way street of anomie. It is also possible to conceive of new intermediate forms of mutual control that avoid parliamentary centralism and yet create comparable compulsory justification. The development of political culture in Germany over the past two decades provides models for this, such as media publicity, citizens' action groups, protest movements and the like. The latter remain meaningless, as long as they are related to the premises of an institutional center of politics. Then they seem unsuitable, insufficient, unstable, or they may even appear to be operating on the margins of non-parliamentary legality. But if one puts the fundamental state of affairs at the center of analysis, the *unbinding* of politics, then the meaning of those phenomena as forms of experimental democracy reveals itself. Against the background of established basic rights and differentiated sub-politics, they are exploring new forms of direct consultation and shared control beyond the fictions of centralized direction and progress.

Differential Politics

The starting point for this plan of the future is the *unbinding* of politics, that is, the spectrum of mainstream politics, secondary politics, sub-politics and alternative politics that has arisen under the conditions of developed democracy in a thoroughly differentiated society. The assessment is that this lack of a center for politics can no longer be reversed, even by the demand for democratization. Politics has *generalized itself in a certain sense*, and has therefore become 'centerless'. The unalterability of this transition of executive politics into a *political process*, which has lost its uniqueness, its opposite number, its concept and its mode of acting all at the same time, is, however, not only an occasion for sadness. In it a *different epoch of modernization* announces itself, one which was characterized here by the concept of *reflexivity*. The 'law' of functional differentiation is subverted and nullified by *dedifferentiations* (risk conflicts and cooperation, the moralization of production, the differentiation of sub-politics). In this *second-degree* rationalization the principles of centralization and bureaucratization, along with the associated rigidity of social structures, come into conflict with the principles of *flexibility*. The latter gain increasing priority in the situations of risk and uncertainty that are coming into being, but also presuppose new, as yet unforeseeable,

forms of *externally monitored self-coordination* of subsystems and decentralized units of action.

Starting points for a much more manageable *structural democratization* lie concealed within the historical transformation. This had its beginnings in the principle of the separation of powers (and in that sense it is already contained in the model of industrial society) and was further extended by freedom of the press, among other things. Today at the very least it is becoming obvious that the economic system also is a field in which not only are advances produced as the unseen results of self-interest and technical constraints, but also concrete sub-politics is conducted, in the sense of social change that could also go differently. Suddenly the 'techno-economic necessity' of pollutant emissions is shriveling under public pressure into one decision among several.

The historically aware person suspected that the conditions inside the walls of the private sphere need not follow the traditional patterns of marriage and family, or male and female roles, but not until the general detraditionalization was he or she given the knowledge of this or, what is more, the decision for it. The legislature has neither the right nor the opportunity to intervene governmentally here. The 'auxiliary government of the private sphere' can change the conditions of how people live together *here and now*, without proposed laws and resolutions, and is doing so, as the rapidly increasing variety of shifting modes of living illustrates.

Our view of this development is still being obstructed by the façade of intact reality which has been preserved from industrial society. The assessment presented here is that, today, monopolies which arose with industrial society and were built into its institutions are breaking up. *Monopolies are breaking up* – the monopolies of science on rationality, of men on professions, of marriage on sexuality, and of politics on policy – *but worlds are not collapsing*. All these are beginning to crumble for the most varied of reasons with manifold, unpredictable and ambivalent results. But each of these monopolies also stands in contradiction to the principles that were established along with modernity. Science's monopoly on rationalism excludes self-skepticism; the professional monopoly of men stands in contrast to the universalist demands for equality, under which modernity entered the scene; and so on. This also means, however, that many risks and issues arise within the *continuity* of modernity and are asserted *against* the bifurcation of its principles in the project of industrial society. The other side of the uncertainty that the risk society brings upon tormented humanity is the *opportunity* to find and activate the increase of equality, freedom and self-expression promised by modernity, *against* the limitations, the functional imperatives and the fatalism of progress in industrial society.

Perceiving and understanding the situation and the development has been essentially distorted because the external and the internal, the arranged and the actual role-playing, *systematically* diverge. In many

areas, we are still *acting out* the play according to the script of industrial society, although we can no longer play the roles it prescribes in the actual conditions under which we live; and we act them out for ourselves and others although we know that everything actually runs quite differently. *The gesture of 'as if' has ruled the scene from the nineteenth to the twenty-first century*. Scientists act *as if* they held a lease on truth, and they must do this for the outside world, because their entire position depends on it. Politicians are obliged – especially during campaigns – to simulate a decision-making power which they know better than anyone else is a *myth created by the system*, and one that can be thrown right back in their faces at the next opportunity.

These fictions have their reality in the functional role-playing and the power structure of industrial society. But they also have their *unreality* in the jungle of obscurity which is precisely the *result* of reflexive modernizations. Whether misery is caused or alleviated by this is difficult to decide, not least of all because the defining system of concepts is affected and begins to blur. In order to describe or understand the achieved level of differentiated (sub-)politics at all, a *different understanding of politics* is required than that which is the basis for the specialization of politics in the political system. Politics has certainly not been generalized in the sense of a widespread democracy. But in what sense is this true? What losses and gains does the unbinding of politics signify for the political sphere and the networks of sub- and alternative politics, or, to put it more cautiously, might it imply?

The initial insight is that *politics must catch up with the self-limitation that has been carried out historically*. Politics is no longer the only or even the central place where decisions are made on the arrangement of the political future. What is at stake in elections and campaigns is not the election of a 'leader of the nation' who then holds the reins of power and is to be held responsible for everything good and bad that happens during his term of office. If this were so, we would be living in a dictatorship that elects its dictator, but not in a democracy. One can go so far as to say that all notions of centralization in politics are inversely proportional to the degree of democratization of a society. It is so important to recognize this because the compulsion to operate with the fiction of centralized state power creates the background of expectations against which the reality of political interdependence appears as a weakness, a failure, which can only be corrected by a 'strong hand', even though it is the exact opposite, a sign of universalized citizen rebelliousness in the sense of active cooperation and opposition.

The same applies to the other side of the same relationship, the varied fields of sub-politics. Business, science and the like can no longer act as if they were not doing what they are doing, that is, changing the conditions of social life and hence making policy *by their own means*. There is nothing disreputable about this, nothing that need be hidden or kept secret. Rather, it is the conscious arrangement and use of the scope of

action that has been opened up by modernity. When everything has become controllable, the product of human efforts, the *age of excuses* is over. There are no longer any dominant objective constraints, unless we allow them and make them dominate. That certainly does not mean that everything can be arranged exactly as we like. But it certainly does mean that the cloak of objective constraints must be discarded and thus interests, standpoints and possibilities must be balanced. Nor can the accumulated privileges to create *faits accomplis* that were previously shielded behind the optimistic promises of progress continue to hope for transplanetary validity. That raises the question of how research that redefines death and life, for instance, is to be controlled, if not through regulations or parliamentary decisions. To put it concretely: how can we prevent human genetic escapism in the future without choking off freedom of inquiry in research, which we cannot live without?

My answer is, *through the extension and legal protection of certain possibilities for sub-politics to exert influence*. Essential background conditions for this certainly include strong and independent courts, as well as strong and independent media, with everything that presumes. Those who one might say, two of the main pillars in the system of sub-political controls. But as the past teaches us, they are not sufficient in themselves. A supplementary step is required. The possibilities of self-control that are held up by all possessors of monopolies must be supplemented by opportunities for *self-criticism*. That is to say, things that until now have only been able to make their way with great difficulty against the dominance of professions or operational management must be *institutionally protected*, alternative evaluations, alternative professional practice, discussions within organizations and professions of the consequences of their own developments, and repressed skepticism. In this case, Popper is really correct: criticism does mean progress. Only when medicine opposes medicine, nuclear physics opposes nuclear physics, human genetics opposes human genetics or information technology opposes information technology can the future that is being brewed up in the test-tube become intelligible and evaluable for the outside world. Enabling self-criticism in all its forms is not some sort of danger, but probably the *only way* that the mistakes that would sooner or later destroy our world can be detected in advance.

What kinds of regulations and protections this will require in individual cases cannot yet be foreseen in detail. Much would be gained, however, if the regulations that make people the opinion slaves of those they work for were reduced. Then it would also be possible for engineers to report on their experiences in organizations and on the risks they see and produce, or at least they would not have to forget them once they leave work. The right to criticism within professions and organizations, like the right to strike, ought to be fought for and protected in the public interest. This institutionalization of self-criticism is so important because in many areas neither the risks nor the alternative methods to avoid them can be recognized without the proper technical know-how.

For research, this *old* certainly have the consequence that it would be necessary to engage in *controversial and alternative* discussions on the risks of certain steps and plans in advance, and not only in interdisciplinary circles but also in *interdisciplinary partial public spheres* that would need to be created institutionally. Considering that this is as yet a completely unwritten page, it seems unnecessary to think in detail about the form in which this could be organized or what monitoring possibilities these interprofessional and supraprofessional agencies would be capable of carrying out.

Considerable opportunities to exert influence would be connected to this in turn, for official politics. Imagine how the discussion on reducing costs in health care could be enlivened, if we possessed an effective alternative medicine with strong arguments. Of course, that would also mean that politics could not re-establish its monopoly either. There would nevertheless exist a decisive difference from the various fields of sub-politics, which would probably increase in importance. While the battles over particular interests and viewpoints rage and should rage in business (and also in the sciences), politics could lay down the overall (juridical) conditions, check the general applicability of regulations and produce consensus.

That means that the *preserving, settling, discursive functions of politics* - which quietly are already dominant, but remain overshadowed by fictitious power constructions - could become the core of its tasks. By comparison with the centers of sub-politics, then, politics would exhibit a more *preserving* effect. The level of social and democratic rights already achieved would have to be protected from encroachments (even from the ranks of politics itself) and expanded. Innovations, by contrast, would have to continue down the paradoxical path of self-disempowerment, in which legal and institutional conditions would be created to enable ongoing processes of social learning and experimentation to continue against existing restrictions. Such processes include the development of new forms of living in the course of individualization processes, or pluralization and criticism within professions. Behind the façades of the good old industrial society that are still being propped up, could it be that, alongside the many risks and dangers, forms of this new division of labor and power between politics and sub-politics are already beginning to stand out and be practiced today?

Notes

Beck (1988: Part II) the *politics of risk* has been further developed, especially the politics of institutions and organizations.

2 Here the argument of this chapter is based on a *limited* concept of politics. The center of interest is occupied by the *structuring and changing of living conditions*, while politics as conventionally understood is viewed as the defense and legitimization of domination, power and interests.

3 Alongside Weber and Veblen, one should also mention here, among social scientists, Emile Durkheim, Georg Simmel, and more recently, John Kenneth Galbraith and Daniel Bell.

4 In the scientific experiments made possible in this way, the development *in vitro* is not limited *technically* to the stage at which the implantation in the uterus normally takes place. 'Theoretically, complete embryonic development *in vitro* could be attempted, with the goal of making a genuine test-tube baby possible. Embryonic cells could be utilized to make *chimeras*, hybrids with twins of other species. Chimeras are especially well suited for the experimental investigation of embryonic development. Finally, it is conceivable that one could 'clone' human embryos, perhaps by replacing the nucleus of the embryonic cell with the cell of another individual. This has already been done successfully with mice. For people, it could serve to produce genetically identical offspring or embryonic tissue that could be used as organ transplantation material without danger of an immune reaction in the donor of the cell nucleus. Of course, all of this is mere fantasy so far' (Daele 1983: 21).

5 To cite only one additional example, completely new complexes of problems and conflicts have also been created by *prenatal diagnosis and foetal surgery*, that is, the possibility of performing operative procedures on the embryonic child inside its mother's body. *The vital interests of mother and child are already split apart in this way before birth, while they are still corporally united*. As diagnostic and surgical possibilities grow, the definition of illnesses is extended to unborn life. Quite independently of the consciousness and volition of the therapists and their object, the risks of the operation and its consequences create *contradictory states of risk* for the mother (or the paid surrogate?) and the growing child in her womb. This is also an example of how, through developments in medical technology, social differentiations can be extended beyond the limits of the unity of the body into a psycho-physical relationship.

6 This applies, for instance, to the 'functional necessity' of fragmented industrial labor. As is known, it found its prophet in Fredric Taylor, who surrounded it with the aura of 'scientific management'. Even the Marxist critics of Taylor are deeply convinced of the inherent systemic necessity of this 'philosophy of the organization of labor'. They criticize the resulting meaningless, alienated forms of labor; paradoxically, however, they *defend* its 'realism' at the same time against the 'naive utopianism' of trying to break through this Tayloristic 'magic of necessity' and fully exploiting here and now the existing scope for 'more humane' organizations of labor. To put it rather pointedly: by now Taylor's Marxist critics are among the most resolute *advocates* of Taylorism. Blinded by the total penetrating power of capitalism, they fail to see that where Taylorism is still flourishing (or flourishing again) – which is the case in all too many places – this must by no means be interpreted as a confirmation of a 'governing necessity of the system'. Instead it is an expression of the unbroken power of a conservative managerial elite, whose historically obsolescent Tayloristic monopoly claims they are implicitly helping to stabilize.

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