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AGAIN AND AGAIN

Is a disaster what we call a "disaster"?

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Following Carr, who defined disaster äs the collapse of cultural protections, this paper develops a sociological approach to processes commonly called a "disaster." Epistemologically, the definitions used in science and practice are classified and redefined äs *programmatic declarations.* Defmers declare what they perceive äs a problem and how they intend to solve it. Given the fact that neither "problem and perception" nor "solution and exigency" neces-sarily match, the probability of mismatches increases when inconsistent conceptions prestructure the view one has of reality. Still, the transformation of nature into culture is interpreted within a premodern expression and false causal attractions: "Des Astro," "evil star," "bad luck" and "blind faith." In contrast, this paper suggests a conception that defines disaster äs an empir-ical falsification of human action, äs a proof of the correctness of human insight into both nature and culture.

Similar to the beginning of sociology äs a science, the subdiscipline of disaster sociology faces the problem of defining its object of study. To myself, already, the distinction between two different classes of objects, *natural* and *manmade disaster,* seems fairly unsociological. Moreover, the definition of disaster äs an event raises more questions than any sociological elucidation. In contrast to other scholars in the field, I suspect more dissent than consensus in the ways of conceptualizing the domain of our object of study. The vast number of definitions of "disaster" äs an event (Fritz 1961: 655) or äs an acting entity (Kreps 1993: 6) may be mistaken äs consensus. But it should be seen äs the outcome of a scientific tradition that is "concentrated in time and space." It is an American specialty, developed and elaborated during the postwar development of the sociology of disaster (see Andersen 1979). However, an emancipation of the field from everyday knowledge and from the practical needs of disaster management has been neglected during this phase of its establishment. Up to today, there is no epistemology of the sociology of disaster. Consequently, almost no sociological definition of disaster does

exist. Thus, instead of harmonizing the views in the field, I will explicate äs pointedly äs possible my understanding of a sociological definition of disaster, because from a European perspective there still is a lack of sociology in sociological disaster research (Pelanda 1982a; Gilben 1992).

WE SEE WHAT WE WANT TO SEE

In his epistemological attempt to conceptualize disaster, Quarantelli stated: "We all have a habitual way of looking at disaster phenomena" (1982: 453). So have I and so have all others. Westgate and O'Keefe (1976) analyzed circulating definitions and found that they were mere programmatic declarations. Those who define declare what they intend to do with the social processes called disaster. This is different from defining disaster. The German Red Cross, for example, defines disaster äs an "extraordinary Situation in which the everyday lives of people are suddenly interrupted and thus protection, nutrition, clothing, housing, medical and social aid or other vital necessities are requested" (Katastrophen-Vorschrift 1988: 2). The German law that states the laws of disaster protection itemizes phenomena (such äs storm, flood, blizzard, explosion, etc.) which are seen äs typical in releasing disasters. However, it defines "disaster" almost in the same tenor by saying it involves "such severe interference of the public order and safety that an intervention of the centralized, coordinated disaster protection units is necessary" (Seeck 1980:1). German insurance companies define disaster äs a Situation involving damage and/or loss of lives beyond one million German marks and/or 1,000 persons killed.

It is easy to add more examples of definitions that serve for nothing eise than to claim that the definers approach reality under specific conditions. For the Red Cross, a disaster is a large-scale lack of nutrition, clothing, housing, aid, etc., or roughly summarized, a Situation where the Services and offers of the organization are heavily demanded. Even more tautological is the definition of disaster by law: A disaster is what the intervention of disaster relief units makes necessary, and due to legal construction, what was called forth by coherent "triggers." For the state, the breakdown of public order and safety is the key, not the phenomena itemized. However, the speci-fication of possible disasters is required because of the need for an appropriate selection of countermeasures to reestablish public order and safety. If public safety is threatened by other triggers, other—yet appropriate—countermeasures have to be selected. The trigger determines the measure; thus, riots, the use of the National Guard; epidemics, the General Surgeon; terrorism, the Special Forces and Bomb Squads. The maintenance of public order and safety has to be guaranteed under all circumsrances, no matter what phenomenon has caused the trouble. The type of phenomenon is only the key for the use of the appropriate toolbox.

For other definers, the function of definitions is the same. For the Red Cross, disasters are large-scale situations that lack vital necessities and trig-gered by sudden interruptions of the everyday lives of people. But in contrast to the legal context that uses a trigger attributable to a phenomenon known äs disaster, and a specific activity to maintain the public order, the Red Cross does not even need a precise differentiation between trigger and activity. On the contrary, sometimes the wrong trigger produces a lack of vital necessities, which is the case when charity is hampered by repulsive pictures (of victims who have drowned in floods, for example) instead of being spurred by pitiful pictures (such äs children victimized by droughts and starvation).

TYPES OF DEFINITION

With all that in mind, a stränge conclusion may be drawn: the term "disaster" has only ephemeral significance. It is a trigger, a flag to signal a meaning, a Stimulus to produce a specific reaction. Yet it has almost no importance for the activities that are carried out under the label of a disas-trous event. Right here, different lines of argumentation have to be followed up. The first line is following the question of how language is structuring our perception of the world; the second line is following the question of how reality is transformed into the mechanics of problem-solving; and the third line is following the question of how disaster sociologists and their ways of conceptualizing disaster will be affected by all this.

Let us trace the first line of argument. I wonder at my own easiness in using the term *event* in the paragraph above. (Mis)using this term, the nesting of the concept of disaster äs an event in our minds becomes äs obvious äs the difficulty of avoiding such a view. It is much easier to freeze a complex social process into a static actor or a "thing," than to express adequately its dynamic complexity. However, a conception of casualty that describes nonhuman occurrences in terms of human activities is usually called animistic. Phrases such äs "a disaster hit the city," "tornadoes kill and destroy," or a "catastrophe is known by its works" are, in the last resort, animistic thinking.

Reflecting on this tenacity of lingual haziness, we should first clear our minds from metaphoric, pseudo-concrete, magical and animistic thinking. No disaster "works" and an earthquake is nothing more than shock waves, never a fist that hits a city. The expression that "a disaster strikes" is äs wrong äs saying "the winds blow," because there is no separate process that swells the cheeks to blow. Wind is air in specific motion, not a separate being that makes the air move. In a conclusive way, it is the same with disasters: there is no distinction between a disaster and ("its") effects. Disasters do not cause effects. The effects are what we call a disaster.

For tracing the second line of argument, the findings of organizational sociology will contribute. To my knowledge, the most pointed results about this have been presented by Crozier and Friedberg. On a very abstract level they characterize an organization äs a "coalition of human beings with the aim to solve their vital problems" (1979: 12). The capabilities of the organization for problem-solving, however, evolve step by step from those solutions that have been successful in the first place. Organizations, äs Crozier and Friedberg put it, then tend to organize themselves around their success. In the long run, the successful solutions especially have to be defended against competitors and envy. Thus, the Operation of organizations tends to turn into a hedgehog position. More and more, the Operation of the organization is shifted into the center of the efforts of its members. At that point, an organization has turned to selfishness. Its only interests are self-preservation; the organization is administering itself, with the original reason for its establishment being turned into a subordinate, accessory matter.

Simultaneously, the perception of reality changes from a creative, problem-oriented awareness, toward a defensive, solution-oriented persis-tence. Instead of scanning for upcoming problems, the self-preserving organization defines reality within the framework of its available solutions. The interest is less in focusing on possible solutions for upcoming problems, but more on the applicability of the available solutions. This shift is impor-tant because it marks a difference in the ways of perceiving the world. The first way is analyzing the problem in favor of finding an adequate solution.

The second way is defining the problem according to the solution at hand. Thus, the latter is not focusing on reality, but cutting reality into the parts that fit into the organizational capabilities to handle them. Most definers of "disasters" act in the way that Prometheus used his bed. In the first place, their definitions of disaster do not focus on the vital problems of the victims, but on the solutions they have at hand or can provide. Reality then is exclusively seen from one approach; the solution defines the problem, and deductively, reality. "Disasters" are predominantly defined this way. The cases where warm clothing was sent to African famines, or thousands of tons of contraceptives or cough mixtures were sent to mass casualty situations are not only mistakes, but the logical outcome of the internal dynamics of self-preserving organizations.

Tracing the third line of argument, one may question whether the area named science underlies the same dynamics of perceiving the world and their problems and, if so, how disaster sociologists may conceptualize the problern named "disaster." Instead of criticizing the attempts of others, I will try to categorize some types of definitions favored in the field. The absolutely most frequent type is the *event* concept with the subcategories "time," "space," and "severity" (or a mixture of them). Next most frequent is the *stage or phase model concept,* which is often a variant of the event concept,

but with an emphasis on a broader time scheme looking at the time and human activities before and after the event or the impact. A much simpler subvariant of the stage/phase type is the space-model that seems to be a derivation of the specific threats from bombing or explosions: zones of destruction, casualties, injuries, and rescue activities are drawn in concentric circles around the direct impact. The concept is typically used in disaster medicine and in emergency planning for nuclear accidents (see Suren 1982: 4l; Notfallschutz 1986: 9)- Also directly influenced by practice are those conceptualizations of disaster that are built along the typical planning and action schemes of emergency management. They use terms like "pre-emergency phase," "emergency-phase," "warning," "threat and evacuation stage," "dislocation stage," "relocation state," "post-emergency phase," and so on. I am sure that most readers will have identified Stoddard (1968: 11) behind the scheme just cited. He presented a wonderful table of the stage models used in the United States at the time he wrote his book.

A little different are those conceptualizations of disaster that use specific *ratios:* for example, the ratio between resources and demands. I will call these concepts the "lack-of-capacity" type. All of them define disaster äs an agent much too fast, severe or overwhelming in relation to the capacities available. Thus, the disaster was too fast relative to the warning or too spacious relative to the rescue capacities, etc.

Another type of conceptualization is explicitly influenced by the natural sciences and technology. I will call these concepts the *systemic catalyst* type. Disasters are defined äs the outcomes of misdirected energy or autodynamically colliding interactions between the components of complex Systems. Turner (1978) and Perrow (1984), who can both be easily identified with these approaches, define disaster either äs wrong amounts of energy at the wrong time and the wrong place, or äs a self-induced resonance between technical Subsystems leading to dangerous modulations and collisions. Both concepts have been transferred to organizational and human interaction to explain social failures äs well.

Analyzing all these concepts, we have to ask about the type of definitions in use. At first glance, all examples cited seem to use real definitions, i.e. the definiendum is explicated with a specific definiens. For example, a disaster *(definiendum)* is an event *(genusproximum)* concentrated in time and space *(differentia specifica).* In terms of logic, the method is correct, although inappropriate in terms of being sociological. The question is how the *genus proximum* and the *differentia specifica* should look if it is a definite sociological *definiens'?*

At this point, of course, no reformulation of sociology is intended. To avoid a misunderstanding, I am not talking about theoretical orientations, research designs or methodology. I am asking for the specifically social fabric of disaster. In other words: What is a disaster like if explicated in terms of human action? And if in trying to do so, will we find specific characteristics *(differentiae specificae)* which cannot be explicated in terms of human action?

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REALITY WITH FALSE CAUSALITY

To myself, one of the most interesting results of analyzing the definitions categorized above is the implicit false causality. Looking at some examples again, the cases of false causality can be detected easily. In sociological terms, the "lack-of-capacity" type is the most revealing one. Most of those who have used this concept identify a specific shortage, but almost never describe it äs a deficiency. Intentional or not, the shortage becomes masked by the turning of causality into false causality. The *event* was too sudden, instead of time was too short. Even if the lack of time is addressed, like saying that the warning period was too short, almost never will the warning System be systematically blamed äs inadequate or insufficient. At most, the lack-of-capacity approaches suggest improvements in training, equipment, and resources. But in doing so, the risky criticism of this type of conceptualization comes to the fore. If this definition of disaster is radicalized, nothing eise is a disaster but the lack of problem-solving capacities. Yet, that is exactly when we should become alert: Who is responsible for such a lacking? Instead of answering that question, it is much easier to turn causality toward the overwhelming forces coming from outside.

DISASTER AS COLLAPSE OF CULTURAL PROTECTIONS

At this stage of the argument, I will take time by the forelock to remind us of a disaster sociologist who never has found the appreciation he deserves. I am talking about Carr (1932), who was, äs far äs I know, the first in the field to try to understand disasters in terms of social action. I have certainly read his article on social change very selectively and I concede that my Interpretation may miss the original intention.

Nevertheless, this idea was the nucleus around which this article was written. This effort, in fact, is dedicated to this disaster Student. The idea that attracted my attention has not been developed systematically, yet it is evident in the following passage:

> Not every windstorm, earth-tremor, or rush of water is a catas-trophe.
> A catastrophe is known by its works; that is, to say, by the occurrence
> of disaster. So long äs the ship rides out the storm, so long äs the city
> resists the earth-shocks, so long äs the levees hold, there is no disaster.
> It is the collapse of the cultural protections that constitutes the disaster
> proper.
>
> (Carr 1932: 211)

Carr's conclusion signifies that disasters are the result of human activities,

not of natural or supranatural forces. Disasters are simply the collapse of cultural protections; thus, they are principally man-made. Deductively, mankind is responsible for the consequences of bis action äs well äs of bis omissions.

As far äs I can see, Carr interpreted the forces of nature äs some sort of challenge (the "precipitating event"), that comes up during time (the "preliminary or prodromal period") (1932: 209). "In every disaster there is a preliminary period during which the forces which are to cause the ultimate collapse are getting under way" (ibid.: 211). If the cultural protections do not collapse under nature's attack, they have been proved to be functionally adequate, otherwise they are inadequate and collapse. To Carr, this collapse is the disaster proper, not the prior infight of nature and culture.

Albeit, there are some confusing inconsistencies in bis argument. He often wrote that catastrophes "cause" disasters (1932: 210) or that a disaster "resulted from both earthquake and fire" (ibid.: 210), and he separates disasters and their consequences. Yet Carr has very clearly seen the problem of social causes and non-social causes that lead to disaster. His differentiation between disaster and catastrophe makes the point. Carr distinguished disasters not only on the basis of consequences, but also on the basis of (1) the character of the precipitating event, or catastrophe, and (2) the scope of the resulting cultural collapse (ibid.: 209). In bis preceding argument, he expli-cated catastrophic change äs: changes in the functional adequacy of cultural protections following catastrophes, i.e. the relatively sudden collapses of cultural protections resulting from catastrophes (ibid.: 207).

On the one band, Carr realized the predominance of human action in the production of disasters. Thus, he knew that the collapse of cultural protections might be so rapid and radical that its functional adequacy may be totally questioned. Then, society in its entirety is endangered, not only its cultural protections (Clausen 1992). Therefore, both the extraordinary scope of cultural collapse and the extraordinary outburst of natural forces can lead to catastrophic change.

On the other band, the helpfulness of Carr's differentiation must be doubted. In terms of logic, the introduction of extraordinary challenges does not alter the basic problem. If nature is too beastly or society too weak, and the loss of control too fast and complete, it is a human failure all the same. As a matter of fact, the breakdown of society or of some parts make a differ-ence in terms of härm and damage, but not in logic. Both have collapsed because of their inadequacy. One inadequacy was a lack of foresight in seeing the challenges the protections will have to survive; another inadequacy was not taking additional precautions to allow keeping control even during very rapid and radical changes.

To my mind, Carr's attempt to describe disasters äs social processes and äs interrelated exchanges between natural and cultural forces was an important step in sociological disaster theory. Nevertheless, bis concept of nature äs a

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permanent source of trials, äs a powerful adversary that continuously enforces acts of Submission (1932: 209), reflects the contemporary concep-tion of nature, instead of the inherent logic of his own approach. Thus, Carr turned causality the wrong way because of a wrong conception of nature. In his causal concatenation, a natural force would become a catastrophe the moment the cultural protections could not stand the challenge. Whether nature turns to catastrophe or not, can only be decided on the basis of cultural criteria and only the challenge of these criteria: Did the cultural protections collapse? If so, nature was catastrophic. Did they resist? Nature only tried to go berserk, yet conquered. If one remains consistent in terms of Carr's basic approach and its sociological and logical implications, a disaster is nothing eise than the failure of protection measures, and that is the inade-quacy of means (the cultural protections) in relation to given ends (to avoid their collapse).

FUTURE DISASTERS?

Seen that way, some major differentiations in the perception of "disaster" are necessary. The first problem is with the term "functional adequacy of cultural protection." If adequacy is decided after the extreme trial by natural or technological hazards, the question is how people will be able to create measurements in advance.

Logically, we know that knowledge in advance is impossible. Future modalities (possibilities) are only likely. Thus, the events that have not yet happened can only be anticipated in terms of probabilistic propositions, whereas for the events that have happened (the ex-post-facto-state) they are facts of the past. They can be documented defmitely and completely (at least in principle). Consequently, two different conceptions of logic become necessary: one for the facts or things that have happened, and one for the events that are likely to happen in the future. Thus, the Historiographie logic of facts has to be supplemented with a logic of probability.

Practically, humankind has to deal with future possibilities every day. Thus, the likelihood of the things to come has to be anticipated, which implies to think and to act under conditions of incomplete Information and uncertainty. Generally, the mixture of the logic of facts and the logic of probability is not noticed. For most people, continuance is the reasonable stance and, during one's individual life cycle, only extremely few are forced to learn by personal experiences that the facts of today may be valid but useless to handle the tomorrow. Even in science the idea is predominant that future developments can be anticipated by extrapolating from the past and the present. In principle, this is the only way to deal with an unknown tomorrow (aside from more sophisticated mathematical and statistical methods). As a matter of fact, under conditions of defmite and complete

Information, most developments will come true with a likelihood close to determination. On the other hand, man is not omniscient. In most cases, people decide under conditions of ambiguous and incomplete information and, knowingly or not, they bear the risk of failure. Altogether, very little is known about the totality of the world, the universe, the sum total of effects, and their interactions and the interferences they have already caused and will still cause.

Transferring these considerations to Carr's conception of disaster, "cultural protections" may be redefined äs realizations of warnings, or, more precisely, of prognoses. The aim to take protective measurements necessarily presupposes the expectation of future failures. But what is the material these expectations are based on? On the one hand, they are based on the experi-ences which have been generated during the evolutionary process of trial and error (Murphy's law represents the highest generalization). On the other hand, they are based on substantiated imaginations, pictures of possibilities, visualizations, and visions. In most cases, it is a mixture of both, and in the modern secularized society it is called prognostication, forecast, or futur-ology. To teil the truth, nobody knows for sure how the latter differ from Intuition, fortune-telling, soothsaying, prophecy, or revelation.

All this indicates the magic involved in anticipating the future. Yet, without extrasensory perception or supernatural guidance, the only way to look into the future is via probabilistic predictions. The difference from prophecies (such äs those of Nostradamus) is very small and, correspond-ingly, the risk of falling for charlatanism is high. That is the reason why most people like predictions that are äs close äs possible to their known reality (or wishful thinking). Thus, every Century has deciphered predictions and prophecies on the foil of common sense and empirical knowledge. An interpretation of the vision of doom by Nostradamus of the "holy fire that will fall from the sky" äs nuclear explosion, would have been impossible before the Manhattan Project had been finished.

With all this in mind, I should like to turn back again to Carr's argu-ment. Under certain circumstances, he had said, the forces of nature become a catastrophe. The test criterion for this change in state is the collapse of cultural protections. Consequently, nature becomes a catastrophe only when culture collapses. Thus, the prognosis of the forthcoming change of nature to catastrophe is verified after the collapse of cultural protections. In fact, a very stränge syllogism! Nevertheless, for the present position, the individual errors in reasoning are not significant—except for one: What exactly might a meaningful criterion be like which marks the change in nature's state (from a "force" to a "catastrophe")? Keeping this clue in argument, I cannot find such a criterion in objective scales (such äs the Richter scale for earth-quakes) or in speed classifications for air currents (such äs a scale from l to 12), because an earthquake in the desert or a heavy storm in the Arctic ice is meaningless (for our present state of mind at least). I do not exclude further

wisdom and insight in the interrelation of human existence with the life of animals, plants, and matter. One day, perhaps, we will care about the whole planet; today, we are selfish to the point of annihilation. However, the argument I want to make is this: in contrast to the facts of history, future occurrences cannot be described in terms of a logic of acts and cannot be tested empirically. Thus, a decision between true or false is only deducible from an appropriate logic, the logic of probability.

Theoretically, an applicable test criterion for probabilistic propositions is available. To put it on a simplistic level, an applied test program for prog-noses requires the complete and perfect duplication of our world on the basis of the algorithms that make it move and change. Similar to Computer simu-lations, the selection of algorithms and the conceptualization of trial runs is a most delicate problem. As Perrow (1984) demonstrated, in most cases the failures that happened later in reality have not been anticipated in theory. The same problem is to be found in the field of technology assessment. What are the likely effects of a new technique (a chemical compound, a medicine, a product, etc.) and on which level of effects should the assessment process be stopped?

Of course, Turing (1936) gave a hint; the Turing generator makes it possible to transform every argument (variable) into algorithms. Nevertheless, the transformation requires not only a unique basis of calcula-tion, but also a unique category of reference. Until now, a unique System of transferable references has not been developed. The attempts to do so (e.g. the transformation of everything into quantitative amounts of energy exchanges) are highly contested (see Rifkin 1980). Consequently, in the field of probabilistics no valid criterion is available that allows us to distinguish between true and false.

The lack of an empirical test criterion in the field of probabilistics (mis)leads for the reuse of even those arguments which are refutable or which have been refuted with the help of empirical facts. In the end, the transfer of arguments out of the System of the logic of facts into the System of the logic of probability irrationalizes every argument. Without a test criterion, every argument will become equivalent in the sense of indiffer-ence, because true and false become undecidable.

In the sphere of social interaction, indifferent and undecidable conditions are hardly bearable. Thus, many sociologists suppose that the most impor-tant objective of social action is to get control over the conduct of others and of nature (see Burns 1958; Elias 1983). To avoid dangerous surprises and uncertainties, social action is preferably transformed into reliable repetition and certitude. Consequently, perpetual action is offen firmly established by rituals, customs, norms, institutions, or organizations, which react upon human action like a silent but unchangeable force of circumstances. Accordingly, human action appears in process and in manifestation; both forms will influence interaction äs counterparts.

The most efficient way to get control over complex Systems and interac-tion is to manipulate their lodestar, or, in othet wotds, the algotithm with the highest complexity. In religious Systems, it might be the deity's will revealed by the priesthood. In feudal Systems, it might be the fief, distributed by the nobility, and, in modern times, it might be the Status based on the money that people have available. The advantage of controls by the top algorithm is the extreme efficiency: the alteration of one factor alters the whole System.

On the other hand, there is the risk that the subordinated algorithms will win an extensive autonomy. Similar to the rise of the city during feudalism, this autonomy may steadily undermine the efficacy of the top algorithm. On the surface, the whole System seems to be under the lodestar control, but underneath contraproductive effects thwart the original intentions. In most cases, the collisions of different intentions are not realized äs the outcome of social action or social change, because people mostly do not know the true intention of others. Thus, the collision of different intentions and planning is more often interpreted äs a disaster than äs loss of control.

Speaking more generally, the explication of disaster äs an unplanned and unintended result of human activities, which is a counterstroke to the planned and intended effects of action above a certain level of tolerable disturbance, can lead to a misleading sociologism. It is not only human interaction itself, or interaction with material culture and its autodynamics, that may generate failures, but also the interaction with nature and its own autodynamic and self-organizing processes. Most authors in the field (including Carr) have reflected on nature's influence on human interactions, but only a few have analyzed the significance of nature's autodynamics without treating nature animalistically or in categories of an acting subject. Nevertheless, äs a living System, nature is interacting with the effects of human metabolism. Thus, the human effects of first (planned and intended effects) and second order (unplanned and unintended effects) may also collide with the unforeseen response of the autodynamics of nature. Altogether, the chance to fail is increasing exponentially, because most effects of human interferences in natural and cultural processes are unknown.

From a statistical perspective, it must be foolishness or madness to inter-vene in Systems that people depend on without knowing how the Systems work and how they will react. Above a certain quality of intervention, the chance to destroy the basis of living becomes possible (and, in this respect, Chernobyl is a "good" proof). The dilemma we have to deal with is this: without the knowledge of the effects of our action, and without the knowl-edge of the functioning of all the Systems that are interfered with, the resulting risk of failures becomes very high. But without interferences, expe-rience and knowledge is impossible. Consequently, the most important parts of our journey of discovery are the failures, because only failures will unlock the secrets of the universe of the unknown. As in the philosophy of science,

which does not accept verification äs final proof, human praxis should not accept success äs final proof, because one never knows whether it was a lucky chance or proper application of applied knowledge.

Therefore, from my perspective, correct praxis is the key word in human action, but this cannot be completely defined in terms of technological success or of the correctness of the planned and intended action. As long äs the unplanned and unintended effects of human action and of the autody-namics of nature are not added to our concept of reality, we only believe in metaphysics, but not in rational knowledge. Separated from a defmite theory of the entire interplay of effects of all kinds, every epistemology remains pseudo-concrete.

From a very abstract level, regarding the investigation of disasters (fail-ures) starting after their occurrence, resembles the inductive method. From a unique and single "event" a universe of possible causes has to be concluded. Yet, without the imagination of this universe, of the totality of effects, the ränge and scope of possible causes cannot be anticipated. Mere description or vertigo in the circle of hermeneutics will be the alternative. Nevertheless, inductive disaster research is the step-by-step method to explore the totality of effects. Comparing the intended with the unintended, we will be able to detect the algorithms that lead to disaster at the same time. Vice versa, we will find out how we have to use the algorithms to avoid disasters. Seen that way, disasters are the only falsifications we have to prove the truth, i.e. the empirical correctness of our theories. Moreover, disasters are the proof of the knowledge of our knowledge. They are the key algorithm of our epistemolo-gies. In this sense, disasters are fairly well sociological.

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