

CONSTRUCTION AND FICTION The Prospect of Constructionism in the Study of Science and Beyond'

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1. Introduction

In the last ten to fifteen years, constructivism has been central to the discussion of essential themes of modern thinking in many areas - how we know what we know, what we take to be real, what constitutes an individual or a subject, how we arrive at the meaning of a text, etc. Within the context of these discussions, several variants of constructivism have been developed. In this paper, I want to first draw attention to different brands of constructivism which have their strongholds in different areas. None of them are homogenous doctrines of course, all overlap somewhat with each other, yet all are also marked by a distinctive history and by resulting specific features. I shall then offer my opinion on where constructivism points to in the area in which it has been most profitably deployed in empirical research - the area of the study of science. I shall argue that constructivism points, among other things, to the centrality of fictions in modern institutions, and thereby to a critique of modernism which holds that imaginary works have been bred out of technical, instrumental and bureaucratized action.

The present paper, then, starts from philosophy to turn to social science: it takes its lead from constructivism as a philosophical statement that challenges realism in order to point out the implications constructivist claims have for our assessment of modernity. While constructivism has long been discussed - and criticized - with respect to the anti-realism it implies, it has not been discussed with respect to what it implies for our understanding of modern society. I want to maintain that constructivism's future lies with the latter rather than with the former. More specifically, it lies with understanding the fictional underpinnings and elements of modern institutions like science (see section 3).

2. Variants of Constructivism

Four brands of constructivism stand out in today's empirical and theoretical research in different areas. They have different historic origins, and play to different audiences:

1. Best known to sociologists is the *social constructivism* which takes its lead from symbolic interactionism, negotiationism, and the text of Bergcr and Luckmann on the Social Construction of Reality (1967). It tends to document the social origin of seemingly 'objective' social events and structures through pointing out the interactional work accomplished by participants in bringing these events about, and the meanings and definitions continuously infused in the respective outcomes and situations. For social constructivism, the concept of 'negotiation' is a central analytic resource. If you show that some outcome is socially negotiated among participants, for example that it is challenged, resisted, and changed as a consequence of the resistance, you show how it is socially constructed. Social constructivism today is **the** weakest form of constructivism for different reasons: first it is often concerned with the constitution of social and subjective realities — whose social origins not many people doubt; and second because it keeps its analytic resources at a minimum and keeps them loose - for example, social constructivists do not offer a description of the systematic features of negotiations, or of the social mechanics of interactional work.² Another criticism of this approach has been that it remains unreflective toward its own constructions and the privileging of social factors as tools in constructive work.
2. The second perspective I shall call *constructionism* to distinguish it from the first; it is empirical, knowledge oriented constructionism developed in the last ten years in the sociology of scientific knowledge.¹ Constructionism derives its relevance from the phenomenon that the very things which we consider the most real in our society are also the most scientific, *hence to study the construction of reality today means to study epistemic practice*. Constructionism has been reinvented in the study of science rather than to be imported into it from other areas. Consequently, some authors never called their work "social" constructivist (e.g. Knorr Cetina 1981), and some later dropped the term "social" from their self-description (Latour and Woolgar 1986). For these authors the point about constructionism seems to be that knowledge is thoroughly constituted by

constructive processes rather than to be passively "observed", or objectively "found" - irrespective of the nature of the constituting processes. In other words, this kind of constructivism rests more upon a critique of (scientific) representation than upon Berger and Luckmann's phenomenology or upon social interactionism; even though, with the pursuit of microstudies, the concepts which inform social constructivism also came to be deployed in science oriented constructionism. The shift from the individual to social groups as factors which potentially explain, via interests, the shape and content of our knowledge, is the defining characteristic of the sociology of knowledge as represented by authors such as Barnes (1977). Constructionist studies also brought in the social as an alternative to purely methodological and rationalist accounts of science, but they focussed more on social processes in knowledge production, and they also introduced other shifts. These were, on the one hand, the shift from a notion of science as essentially consisting of representations (the knowledge of the world produced) to a notion of science as action (work) and from the scientist thought of as a (passive) observer of nature to the notion of the scientist as an actor and intervener in nature. They consisted, on the other hand, in a shift from the individual as the creator of knowledge to the locale in which knowledge is produced, i.e. to the scientific laboratory. Concomitantly, the methodological notion of an experiment as the vehicle through which knowledge is created was also replaced by the notion of a laboratory as an instrument from which epistemic dividends can be derived. In addition, the received idea that a small number of universal standards govern the production of knowledge was replaced by growing awareness of the local anchorage and variability of these standards (see exhibit I).⁴ Thus constructionism in science studies is built not so much on 'socializing' than on *localizing* concepts, on the idea that construction appears to be construction within bounded spaces which draws upon local resources and the reversals brought about by local practice.⁵

3. In recent years, a further perspective has sprung up that concerns itself prominently with knowledge, though it is rather the knowledge and cognition produced by the brain of living systems than by social communities. *Cognitive constructivism*, as I shall call this perspective, derives from the biology of cognition and perception. By extension and analogy, cognitive constructivism currently informs systems theory in general, including the kind of neo-institutional social system differentiation theory

<i>Received conception</i>		<i>Constructionism</i>
	Science perceived in terms of	
<i>Representations</i> (Knowledge of the world produced by science)	→	<i>Action/intervention/work</i>
<i>Individual as creator of knowledge</i>	→	<i>Laboratory as a productive locale</i>
<i>Experiment as vehicle of knowing</i>	→	<i>Laboratory as a cultural context of knowledge production</i>
<i>Universal standards as regulating knowledge production</i>	→	<i>Laboratory as the space which breeds local standards and the 'Reversals of practice'</i>

Exhibit 1: Shifts brought about by constructionist studies

which we inherited from Parsons and Mcrton, as well as some literary theory, notably in Germany. The central doctrine of cognitive constructivism is that the brain, and, by extension, all living systems, including, on a societal level, institutional systems defined in terms of specific communications, are informationally closed toward their environment. They respond to the environment based on recursive self-organization and internal reconstruction, but they cannot be directly influenced by it. Nor do the 'observations' or descriptions these systems produce of the environment correspond to the world 'as it really is' (see Maturana and Varela 1980). Unlike constructionism in science studies, cognitive constructivism outside the biology of cognition from which it derives has not so far inspired much empirical research. If all 'knowledge' is internal reconstruction of an essentially inaccessible external world, there need be no attempt of - and no pretense of- getting to know this world through experience. However, cognitive constructivists do not reject empiricism, they just redefine it

(e.g. Luhmann 1990): internal reconstructions can and should be changed in response to irritations and resistances provided by the external world when we try to impose our construction upon it. This model of the world as a 'resistor' that makes an impact on our accounts through stimulating modifications in response to the resistance it offers accords well with the above constructionist studies within science. These studies never denied the existence of an external world; however, they limited its role to the resistance offered by external objects, and maintained that the shaping and interpretation of resistances was part of the constructive work of science.

4. The last constructivism I want to consider goes, by the name of deconstructionism. Deconstructionism is a kind of marriage between post-structuralist, neo-Freudian (Lacan) thought and new literary criticism, all culminating in a critique of representation and a movement called post-modernism in the social sciences.⁶ It is influenced by Foucault, though I doubt that Foucault would like to be characterized as a deconstructionist or post-modernist. The writers most often associated with deconstructionism are Lacan, Derrida, and perhaps Lyotard. Deconstructionism's most significant feature is its concern with language and discourse and the notion that the meaning of a text is impossible to recover unambiguously. References to the 'multiple', to 'noise' (as a theoretical model in Michel Serres' writings⁷) and to 'undermining' (Vincent Leitch⁸) authoritative meanings are frequent deconstructive gestures. For deconstructionists,⁹ the very impossibility of unambiguous meanings may become 'the only "meaning" literally recoverable.'¹⁰ In its consequences, deconstructionism is an anti-interpretationism. In this sense it runs against some of the more interpretative micro-approaches which social constructivism latches on to. Deconstructionism has proclaimed the death of the author whose intended meanings are irrecoverable from a text, the death of the human subject which is seen as itself a literary construction produced by a signifier chain (Lacan), the impossibility of truth since truth is also not more than a linguistic construction, and in a sense, the death of language itself as a tool of information since language is considered fundamentally rhetorical and poetic. Most deconstructionists, however, never provide empirical evidence for these death sentences, and do not offer anything like a coherent theoretical or philosophical analysis of the puzzles they raise and address their disagreement to. Deconstructionism, like post-modernism in general, can therefore easily be dismissed as gibberish taken

over from French intellectuals who derive their quasi-empirical insights from surveying the world from their Paris desks or worse still, from their brief travels to 'La Californie'. But it can also be seen, especially in what Rosenau (1992) calls its 'affirmative' version, as sustained by other forms of constructionism which do have an empirical basis in the microanalyses they produce, as well as by such super-empiricist approaches as ethnomethodology (which pointed out the indexicality and reflexivity of interpretations), and symbolic interactionism which has long cast doubt on the existence of 'selves'.

It is useful to realize that science studies today features not just one kind of constructionism. For example 'Reflexivity', the program promoted by Woolgar and Ashmore (1988), is, in a sense, science studies' version of deconstructionism, and elements of social constructivism can be found in many constructionist studies, as indicated before. All brands of constructionism, however, tend to send messages which are often received as problematic and which breed gloom. First, constructionist studies destabilize singular, coherent, globally valid findings, the kind of results one expects from a science. The possible deconstructionist reading of all constructionist studies leads to complaints against the 'powerlessness' of such inquiries, a powerlessness sometimes recognized and embraced by the analyst." Second, constructionisms which imply a new theory of knowledge find themselves embroiled in struggles with realist and positivist beliefs which see the results of these studies as a threat to scientific procedure and an expedient of arbitrariness and relativism in the social world.¹² The ultimate explanation of the sacred is that this is how the universe is constituted' Mary Douglas (1978: xv) says. Constructionism threatens our beliefs in this constitution, in the assignment of things to specific categories which we hold to be 'sacred'. It poses a threat to the larger moral structure which sustains our cherished classifications, without promising a return, as modernist theories of enlightenment or critical theory have done, to a more truthful truth and a better nature.

2. A Strong Notion of Culture and Practice

However, constructionist studies, by the very questions they pose about nature, facticity, and meaning, also open another possibility. They have something to offer to a strong notion of culture and practice that has become feasible in

sociology in recent years together with the rise of post-modernist thought (compare Featherstone 1988).¹³ What constructionist studies suggest is the pervasiveness and relevance of *fictionally* as a *routine aspect of social life*. Suppose we recognize the excess meanings and actions constructionist studies unearthed in connection with their distrust in facts, objectivity and meaning. Yet we recognize them not as a threat to scientific procedure or an expedient of the dissolution of all order into contingency but as a routine feature of the social world. Suppose we stand, so to speak, the constructionist message on its head and consider its negative findings as itself worthy of analysis. If science, and modern institutions in general, do not run on facts, this is no reason to throw up one's hands and give up - it is rather cause to investigate the ways in which these institutions, if they do not run on facts, *run on fictions*.

Modes of fiction are instruments of cultural imagination. When we talk about cultural imagination, we come close to the notion of culture fostered by symbolic anthropology. Clifford Geertz defines culture as the ensemble of texts which the anthropologists strains to read over the shoulders of the natives, the social semantics through which a society displays to itself its own social order (1973: 442, 452). Sociology, on the other hand, has no such notion of culture. One dominant direction in sociology defines culture in terms of the lay notion of (high) 'culture'¹ as an object domain, the domain of art, literature, music, the movie industry etc. It thereby avoids a more systematic definition of culture that would also be applicable to other areas, for example to law, science, or the economy. A second prominent approach defines culture in Parsonian terms as the area of values and norms. For this approach, culture refers to no more than a sub-category of variables in the totality of factors that play a role in social life, variables essentially explicable by other factors. A third concept of culture uses the term a bit like the Maoists used the term 'cultural revolution' - as a metaconcept suitable for references to major transformations in Western and non-Western societies. With all three notions sociology lacks a systematic concept of culture associated with imaginative works or with excess meaning. This has been noted before (Featherstone, 1988; Robertson 1988), but it has hardly changed.¹⁴

What then about the interpretative approaches which have made inroads in sociology in recent years, and what about the long existent tradition of symbolic interactionism and its notion of the symbolic? The problem is both the notion of the symbolic and the location of the analysis. The notion of the symbolic

tends to be translated into symbols in the sense of units of meaning of essentially decorative use which can easily be dismissed as non-essential to understanding the modern world. Symbol systems also tend to be equated with 'language', an aspect of social life of tremendous importance which however leads away from imaginative works. The second problem is *where* the respective approaches have their stronghold. Symbolic interactionist studies are safely tucked away in their own professional society; with respect to their territory, they have got the province of everyday life, which is far from the province of the supra-individual institutions populating organized society. The 'dramas' of social life are often left to what passes between personae in their spare time or in informal settings, but they count as little when it comes to assessing the master processes of modernization. The most prominent theoretical perspectives have looked upon these processes as major transformative trends toward greater commodification, rationalization, technization, and they have linked these trends not to excess meanings but to a 'loss of meaning'. Weber, best known of all, held the trend responsible for the 'diminution of freedom' in contemporary society, and for the general 'dis-enchantment' of the world that grows out of the expansion of instrumental action. Other transcriptions of the theme cast modernity as a process of alienation (Marx), as a loss of personal and interactional culture (Bourdieu, Luhmann) or as a loss of 'substance' and cultural traditions (Habermas). These 'losses' are replaced by a gain in abstract, formal and technical systems, a gain in legal principles, abstract values, and expert or scientific procedure.¹⁵

Yet from the constructionist perspectives which document the life-world of modern institutions, it is clear that everyday practice still runs counter to the perceived disenchantment of the world. They testify to the presence of 'meaning' and 'tradition', of the 'body', of 'intimacy', 'local knowledge' and everything else that is often thought to have been bred out of 'abstract' and 'rationalized' systems. But is this assessment enough? I think not. I am not arguing for an upgrade or better recognition of symbolic and interpretative approaches - which exist after all - but for a specific notion which is keyed to the development of modern institutions, and which can catch up some of the features which have been noticed by constructionist perspectives.¹⁶ In a sense we can still work with a notion of enchantment, but it has to be more specific and precise than the general terms 'meaning', 'text'¹, or 'interpretation' which Hood the literature. It also has to be more specific and precise than the view of cultural forms as symbolic forms.

3. What are fictions?

I have proposed that we stand the constructionist message on its head and learn from it the relevance of fictions. Can we link a strong notion of culture to the analysis of fictions operative in science and modern institutions in general? What are (operative) fictions? Those sustained by the development of modern institutions, entangled in their practices, those which come into play when these institutions fulfill their goals and engage in instrumental action. Such fictions are imaginative works, but they are not quite the pleasurable art forms Geertz has in mind when he compares the Balinese cockfight with a performance of King Lear. The Balinese cockfight is a cultural figure that catches up themes close to the heart of a society and some of its subcategories of members - themes like death, masculinity, rage, pride, loss or chance (Geertz, 1973:443). It displays these categories, provides, to the natives, a metaphor of themselves, but it has no other reality nor function.¹⁷ Although some forms of fiction in modern institutions are like that others are not. What interests me is a wider notion of fiction as registers which are constitutive of and transformative of modern institutions like science.

In everyday usage fictions are, roughly, objects which are not literally true, which are not the real thing, which are possibly shams or simulations. Etymologically, fictions derive from 'fingere' the act of fashioning and shaping which includes imitating and inventing. Etymologically, fictions carry only a weak factor-loading on the truth-falsity dimension and a stronger one on the dimension of shaping and forming. Yet the notion of fiction I want to propose draws more on the relational character of the concept; on the notion of different registers and repertoires provided with different, and sometimes clashing, accents of reality. Fictionality arises from the *transformations* of these repertoires with respect to cultural attributions of what is 'really real', 'literal', or 'normal'. It rests on a difference between a discourse and a counterdiscourse, between behavioral and other behavioral or symbolic repertoires, between different definitional frames sustained by participants in an environment. It is a phenomenon of two or more registers or regimes which may alter the dimension of phenomena, bring them into a different medium, take them out of time and out of a specific place. Representations institute such alterations in dimensions; they install a second module which changes the perspective, the resources, the technology brought to bear on the thing that is represented.¹⁸ Fictionality refers to the inflationary introduction of layers of or-

der and referents which increase the viscosity and texture of modern institutions like science, and of the construction machineries which operate in these institutions.¹⁹ It implies multiple voices and different regimes which are brought to work with or upon each other. These are secondary and tertiary codings which explain heterogeneity and the methodological difficulties we have with it.

Modern institutions, it seems, continually produce fictions, steer their way through fictions, work with fictions and become founded upon fictions. It is particularly interesting that this holds all the more for the most highly technicized domains, those on which the greatest accent of *rationality* is conferred by participants and observers. Fictions are central to how these institutions conduct their business; yet they are not central in the same manner. There are types of fictional forms which need to be distinguished. I shall draw your attention to three types: instrumental fictions, symbolic ('primitive') classifications, and fictionally operating systems.

3.1 Instrumental fictions

Consider first instrumental fictions. Instrumental fictions are distinguished as such by participants and introduced to serve a specific purpose or solve specific problems. They are best exemplified by the law and its use of fiction to hide, sustain or complement the principles according to which it operates.²⁰ Take the example of English and Roman law in which a variety of legal fictions apply which serve different functions in legal applications. Some of these fictions are condensed versions of legal rules, as the fiction in English law that husband and wife are *one* person, or the equivalent in Roman law, which says that the wife is the daughter of the husband. Other fictions appear to be links to a competing moral order, like the legal fiction that everybody knows the law. Older authors saw these fictions as '*marvelous*' means for connecting legal rules with reason and justice: for example, the fiction that everyone knows the laws brings the rule that lack of knowledge is no excuse for an offense in accordance with the moral value that it's unfair to punish someone for an offense against a law he or she doesn't know. Even the idea of adoption was originally introduced into law as a legal fiction: the fiction that family bonds can be created artificially. The law uses fictions as instrumental constructs which serve to bridge gaps in the body of legal rules or between law and justice.

3.2 Primitive Classifications

The second class of fictions (fictional forms) is at once more systematic and more opaque. These are symbolic (re)classifications (secondary codings) of categories in terms of metaphors and analogies from the natural and social order. When Dante calls hell a like of ice, it is quite clear that this is a fictional re-classification. In contrast to instrumental fictions which often comprise isolated principles what we have to do with here are often whole systems of symbolic categories which display a certain coherence and elaboration. Such systems of classification have interested social scientists at least since Durkheim and Mauss wrote their famous essay on 'Primitive Classifications' (1903). Yet until today, primitive classifications have no satisfactory interpretation.

For Durkheim and Mauss, primitive classifications were social projections. They looked at symbolic classifications of natural objects by native tribes, such as the division of all things in nature as belonging to one or the other 'totemic' animals. Durkheim and Mauss wanted to prove the social origin of these classifications. They did not believe that the human mind had the innate capacity to classify the things surrounding it spontaneously and by sort of natural necessity (1963:7). Instead, they thought the mind needed a model, and this model was society: If the society was divided up in a certain way, then the rest of the universe would be divided up analogously and related to the categories established by social organization. 'The classification of things reproduces the classification of men'. This was Durkheim' and Mauss' great thesis, whose singular value it is, as Needheim pointed out, to direct the attention of sociology to the topic of classification.

The thesis itself proved untenable, but the question of category derivation remained and has stimulated further thought. Today the more interesting case of primitive classifications are those we find in modern institutions. Why are fictional categories employed in modern institution although technical vocabularies and literal descriptions usually exist to circumscribe the same phenomena? The most prominent answer comes from a modern Durkheimian, Mary Douglas (1987). Institutions, she argues, are conventions, and conventions need some stabilizing principle which points away from the fact that they are socially contrived arrangements. This stabilizing principle is naturalization, the links an institution established with 'natural categories' through metaphor and analogy. The convention of the sexual division of labor, for example, may be justified in terms of an analogy with the complimentary of the right and the left hand, and the analogical relation of head to hand can be used to justify such diverse social

arrangements as the class structure, the inequality of the education system and the division of labor between manual and intellectual work.

Science, a paradigmatic modern institution, also enlivens its universe through symbolic classifications. Consider the jewel in the crown of basic disciplines, high energy physics. Like in any other science, the definition of things is accomplished by technical vocabularies. A huge measurement instrument such as a detector and, presumably, all of its thousands of parts can be classified or paraphrased in a technical language. Moreover, physicists seem to share enough of this vocabulary to make themselves understood and to communicate with each other within this technical language. Yet there exists, in addition to the technical language, imaginative terminological repertoires which re-classify technical objects and distinctions. These constitute a *symbolic universe superimposed upon* the technical universe; a repertoire of fictional categories and distinctions from the everyday world which are extended into science where they reformulate, elaborate and at times fill in for technical categories and distinctions.

Consider an example. Some areas of physics, especially experimental high energy physics, are known for their massive requirement of technology - of three-story high detector complexes seven stories underground, of 30 mile-diameter beam pipes and magnets, of tens of thousand of yards of cables and wires, of rooms full of electronic crates, and so on. Advances in high energy physics are often presented in terms of energy regimes, and energy regimes are regimes of machines: of colliders and accelerators which provide higher and higher energies, of detectors which can deal with ever higher luminosities, and of computers which are fast enough to handle huge amounts of information within fractions of a second. It is this technology which consumes the huge amount of money high energy physics requires, and which necessitates, by its sheer size and complexity, the formation of large and long lasting international collaborations. Seen from this perspective, these areas of physics are indubitably branded by, driven by, and dominated by machines. Yet seen from within the vocabularies in terms of which the physicists frequently address these technical devices, these are less machines than biological organisms with a life and a life time of their own. One example is the 'aging' of a detector. Why involve a biological process such as aging in a technical event? Moreover, 'aging' is just one term in a much larger system of categories which fit to each other, supplement each other, and in which two features stand out: the terms are physiological and refer to the qualities of an organism, and they

suggest an autonomous being which, in the aggregate, can also be a social being.

I cannot, in this talk, go into the details of this taxonomy.²¹ What I want to raise is the question how we interpret such classifications. For Mary Douglas, the message would be clear. A machine is itself a convention and an artifact. The analogy from biology and physiology confers natural status on the crystallized social relations represented in the machine. The analogy builds strength for a physical instrument that does not in itself have legitimacy, consumes huge amounts of money and manpower, and would be, without the analogy from life, an a-moral, a-social, non-natural being.

On the other hand, is it really plausible that the spark of legitimacy is conferred so easily to things in modern institutions? In physics anyway, quite a bit of organizational work goes into purchasing legitimation. There are special units at the big laboratories set up to cultivate and promote the cause of high energy physics, and these units continually produce a stream of linguistic events which display and celebrate the achievements and relevance of these organizations' work. The job of the general director of a large laboratory is to a significant degree to pursue, with government agencies, ministers of science and prime ministers ('Mitterand at CERN'), questions of the relevance of, usefulness of, and need for a particular research and development. Building new detectors is justified in this context in terms of the harvest of new particles they bring, in terms of spin off effects, industry development, the training of physicists potentially needed by this industry or by the military, and in terms of international competitiveness and international relations. There is indeed a discourse of legitimation, but this does not include analogies such as the above. Nor are these analogies made public such that they could provide legitimation. More generally in our societies, conventions such as organizational structures are often justified in terms of efficiency, or they are. Like conventions within the education system, grounded in law, and the legal provisions are justified with respect to democratic principles such as equality of opportunity and freedom of choice.

In view of the complex machineries modern societies install for purposes of image building and legitimation the belief that the above classifications do this work is not plausible. It ignores the social mechanics of economic action and political calculation in industrial societies. But what if we broaden the thesis to make it more compatible with a Goffmanian view²² of the symbolic as a dramatic construction, perhaps, as Geertz suggests, a dramatic construction parti-

cipants place upon the grand themes everyone is confronting in daily life (1973:445)? Are the themes of life, death, illness/disease, of aging, physiologies etc. encoded in machine classifications not also the topics we experience in dealing with ourselves, but put into dramatic shape? The answer is yes. yet the interpretation is unsatisfactory. Why the need to identify routine features of a machine with these topics? What do we do with the quite different classifications of other aspects of participants work, how do we explain which symbolic repertoire is chosen for which area? Is it possible to construct symbolic classifications and not catch up the common themes of our everyday experience?

I believe there is, for the fictional classifications of the above kind, a better interpretation. These classifications owe their divisions much more to their capacity to model the concrete interactions of the members of an institution than to participants' disinterested curiosity about the working of individual lives or about the workings of nature. They codify something that lies at the heart of the working of these environments. They codify who, within the walls of the institution and independent of external definitions, is an organism and who is a machine, who are agents with powers and dispositions to react, who is a life and who is not, who is a human and who is a nonhuman being. In other words, they catch up the *ontologies* instituted in local settings and the social relations which flow from these ontologies and which include relations to non-human participants. The ontologies are specific to the type of locale; they are reconfigurations of, to borrow a term by Merleau-Ponty, Self-other-things, of the relations of subjects to objects in the external environment, or of its relation of the social order to the natural order.²³ For the social order established in these institutional settings a detector is not (just) a mechanical device, nor a 'dead' machine, nor a sophisticated information technology but a physiological being with needs and requirements *like* other physiological beings. It must be treated like one and interacted with like one. The epistemic procedures participants use with respect to this object, differ markedly from the epistemic procedures used in fields like molecular biology in which real organisms (e.g. mice) are reconfigured as machines.

3.3 Fictionally operating machineries of knowing

Consider now a last type of fictional forms in modern institutions. These are systems which operate entirely within their own medium of representation. Modern physics, too, operates as a closed system. Such systems cannot build,

with the environment of interest to them, a shared life-world. They lack the possibility of co-presence postulated by Schütz as an important feature of face-to-face situations. They equally lack co-temporality, the possibility of conjoint time, and the possibility of conjoint status as a substance, object or being. The paradox is that such systems are observer systems which 'don't see', and which are thrown back on their own complicated machineries for rebuilding the external world.

High energy physics institutes several layers of representations between itself and the natural objects it examines. The objects themselves, sub-atomic particles, are, as the physicists themselves say, 'phantasmatic' - they are too small, too fast and too dangerous collectively to ever be handled directly. Moreover, they are always history, always already transformed into another entity. The ontology of these objects is an ontology of the past, the absent, the decayed and transfigured. Through myriads of internal operations, representations of these objects in an instrument that catches the signs of these objects are transformed into representations of the catching instrument, and these into representations of physics. But the layers of representation between internal operations and the environment are but one aspect of these systems. Another is that the signs which are registered and transformed into other signs are themselves highly fictitious, they are mostly shams and simulations. Through another level of reconstruction and representation, the real signs of interest must be extracted from a sea of deception. A third feature of the system is the fictionality of measurement. Because of the hypercomplex and idiosyncratic measurement apparatus, measurements are said to be meaningless in themselves. Hence even quantitative measurements must be seen as fictitious; to turn them into real measurements, they have to be supported through simulations of the measurement apparatus and through simulations of physics theory. Measurements walk, as one might say, always on simulation crutches. They are not the stand-alone arbiters of progress and theoretical predictions which they are, supposedly, in other fields (they become real through the unreal).

Machineries such as the above are driven by a certain relation between epistemic subject and object that puts into question received models of knowing. The interesting question is of course how closed systems nonetheless derive truth effects from their fictional operations. In a nutshell the answer is that they shift their operations from observing the world to observing themselves, and from gaining positive knowledge to gaining negative, liminal knowledge (knowledge of the errors and limits of knowing).²⁴

4. Conclusion

Two things should be noted about the forms of fictionality I discussed. First, I am not suggesting that the notion of fiction be used for all processes in evidence in modern institutions. The closed system description, for example, fits a science that is most extreme in the degree in which it points beyond received mechanisms of operation to one that sums up modernity and thrusts it forward - it does not fit, among other cases, molecular biology, for which an open systems conception is more adequate. In other words, I have introduced the notion of fiction not as a marker in an epistemic narrative about the general status of knowledge, but as an analytic concept suitable to describe - and theorize - concrete modern institution and construction machineries like the ones we find in science. Second, it is important to realize that in all cases the fictions are not idle rhetoric, not symbols reduced to essentially decorative use. Instead, what is apparent is a gain in behavioral and symbolic repertoires which adds to the viscosity of modern institutions and fuels and represents new levels of locally reproduced order. Fictionalities of the above kind lift modern institutions out of the purely technical, but also of the purely social, and transform them into viscous systems. On the second level, they install new forms of local order which represent, for participants, coherent and viable frameworks of activities - new epistemic regimes of self-observation and self-understanding in an institution that deals with the real, new ontologies resulting from reconfigurations of self-other things, new harmonies established with the moral order through legal fictions. The non-literal, the 'non-real' level of order is also the one on which institutions place their bets and stake their money. Fictions institute and suggest a play upon orders, a progress from one arrangement and from one disciplinary framework to another. They demonstrate not a horizontal but a hierarchical multiplicity of patterns which are themselves not of the same order (not all social) on which the functioning of these institutions depends. The notion of culture can be associated with this hierarchical multiplicity of patterns and the play upon orders.

The phenomenon that highly technicized systems, if you strip them of their massive instrumentality, display themselves as highly semiotic and fictionally operating systems, can lead to a notion of the re-enchantment of the world which takes its lead not from the status of religious traditions and belief systems but from the local practices of participants in situations. For Durkheim and Mauss, the sacred was nothing more mysterious than shared, deeply cherished classifications (Douglas 1987:97). For us, they need not be anything

more mysterious than the manifold presence and functioning of operative fictions. Such fictions document a continuity with the baroque, perhaps archaic coding of the life-world, but they also document a continuity with the technical, formal, and instrumental (Was the sacred always hybrid?). The sacred, in the form of operative fictions deeply entrenched and embedded in the technical, instrumental and formal manipulations of modern institutions seems to be present today more than ever before, and more than ever in need of being introduced into social theory and the investigation of culture.

Notes

1. Parts of this paper are published under the title "Primitive Classifications and Postmodernity" in *Theory, Culture and Society* (1993; forthcoming).
2. Lest someone think that interactional work does not have any systematic routine features let me mention the rule system *ethnomethodologists* have worked out, for example, for the working of turn-taking in conversations (e.g. Sacks et al. 1974).
3. Constructionism in science studies developed within the so called laboratory studies, i.e. studies of knowledge in the making through direct observation in scientific laboratories. For the first characterizations of knowledge production as constructive see Knorr Cetina (1977, 1981) and Latour and Woolgar (1979 (1986)). For a brief history and critique of constructionism in science studies see Sismondo (1993). See also my reply to Sismondo (Knorr Cetina 1993c).
4. For an account of the role of the laboratory in bringing epistemic dividends to science see Knorr Cetina (1992). For the laboratory as a localizing concept see also Knorr Cetina (1993a).
5. These reversals, for example the reversals of rules through local power, or of standards of experimental performance through locally developed preferences, are summarized already in the first laboratory studies (e.g. Knorr Cetina 1981: ch. 2). For a philosophical treatment of the importance of the local "discovered" by constructionism see Rouse (1987).
6. For an overview over deconstructionism, see Berman (1988).
7. See particularly Serres (1969).
8. See Leitch (1983).
9. This does not hold for Foucault, who also pointed out the unrecoverability of definitive meaning.
10. See Paulson's work on "The Noise of Culture" (p. 931T).
11. See for example Woolgar and Ashmore (1988).
12. Cognitive constructivism is struggling to get its transfer of images which depict the closure and functioning of the brain accepted when it comes to social systems of interaction and communication.
13. For an elaboration of what I mean by a strong notion of practice in relation to a notion of culture see Knorr Cetina (1993b: ch. 1).
14. An exception is the "new institutionalism" (see Powell and DiMaggio, 1991).
15. Husserl, for example, associated rationalization with the rise of the scientific method which, according to him, "abstracts" from all cultural and spiritual aspects of human practice (1976). And only recently Habermas, in refashioning Weber, Husserl and other theorists, linked ratio-

nialization to what he calls the "colonialization" of the life-world by technical systems, or in alternative language, to the residualization and marginalization of everyday taken-for-granted knowledge, personal forms of communication, and everything else that can be associated with "substance" and "substantive experience" rather than formal procedure (1983).

16. To repeat, the problem with sociology's relation to the symbolic is not that the discipline simply ignores the phenomenon; it is rather that the phenomenon is either translated into something as common and untelling as "language" or "communication" (both are treated by master process theorists, such as Habermas), or that it is separated out as the domain of perspectives which are held to have not much to do with the movement and development of modern societies, such as interpretative approaches.
17. As Gcertz points out, the cockfight is "really real" only to the cocks - it kills them (1973: 443).
18. What cannot be ignored is what happens between the forms installed. For an observer, this means that he or she must not side with one version or smooth out discrepancies, but rather consider the discrepancies as part of the analytic message.
19. For a description of these construction machineries in experimental high energy physics and molecular biology, see Knorr Cetina (1993b).
20. For a brief overview over legal fictions see the respective entry in the Encyclopedia Britannica.
21. For the details, see Knorr Cetina (1993b: ch. 5).
22. Neither Geertz nor Goffman might agree with such a view in the present case. I am not referring to what these authors might actually come up with, but to possible interpretations derived from the approaches for which they stand.
23. See K. Knorr Cetina (1992).
24. See Knorr Cetina (1993b: ch. 3).

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