

Part II: Theory of Knowledge

Chapter 6: Theory and Practice. Meta-science from the Perspective of Activity Theory

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6. Theory and Practice

Meta-Science from the Perspective of Activity Theory

In the preceding chapters, various problems concerning knowledge and knowledge production were presented. Chapter 5 was dedicated to the controversial relation between language and extra-linguistic reality. In a way, we now return to these problems, but with the aim of covering the very specific type of knowledge production that is called science.

This is akin to a Moliere leading character realising in the middle of the play that he, unknowingly, has been speaking in verse for a long time. The existence of science has been a basic presupposition in the previous chapters, especially in the first three, in which the cosmological, biological and anthropological fields were presented. However, the concept of science was not explicitly analysed in these chapters. In the present chapter, we will be dealing with the dialectics of ontology and epistemology in metaphysics. We cannot examine either one without presupposing the existence of the other.

In the early chapters, ontology was the starting point for the description of the various sciences, although we took for granted that we could use scientific vocabularies and theories to discuss these matters. Now, however, I intend to critically examine these theories, sincerely trying to avoid the circularity of having a specific theory built into an ontology that in the next turn is used as a platform for building the theory just mentioned. I shall try to avoid this kind of chicken-and-egg dilemma in science by examining the following three concepts: *science*, the *object field of science*, and *practice*. This point of view was presented in chapters 4 and 5 as well.

6.1 The General Relation between Theory and Practice

In the metaphysics described in chapter 2, I declared the reality principle as a basic assertion:

The Principle of *Reality*

There is a *reality* beyond the scope of or to a large degree independent of human activity.

In the introduction to the concept of activity in chapter 3, a principle of activity was inferred about the way Humankind deals with the world.

The Principle of *Activity*:

In dealing with the world, human beings *actively* change certain parts of it, especially by producing cultural entities, such as technical and meaning systems.

Bhaskar (1978) has stressed this duality by distinguishing between the *intransitive* and the *transitive*. The *intransitive* object of knowledge is an external entity, about which we seek knowledge. The *transitive* object of knowledge, on the other hand, is the knowledge produced in the process of knowledge seeking.

Bhaskar's first category can be elaborated on by introducing the concept of an **object field** that, in principle, is external and prior to science. Bhaskar works with only a unitary transitive object of knowledge. However, in my opinion, it is better to divide the transitive object of knowledge into two separate fields, **the field of practice** and **the field of theory**.

We will return several times to the concept of practice, but for now it is sufficient to identify practice with ordinary human activity. More precisely stated, practice is the residual of non-scientific human activity after the segregation of the particular kind of activity that is called theoretical.

Here I take for granted that science is a special societal institution. It has dominated our history since the sixteenth century, but really originated in the Greek Antiquities, with precursors in the knowledge production of ancient

Egypt and Mesopotamia. In this historical evolution, there has been a division of human activity, a separation into *practical* and *theoretical* activity. This partition originated in the fundamental division of labour in the high culture of the Bronze Age. The invention of script systems generated a caste of scribes, who were freed from manual labour (except that of writing) and dedicated to the production and maintenance of systems of meaning, externalised in written form.

This primordial organisation of work resulted in a partition of activity into *material* and *cognitive* components. Cognitive activity in the Bronze Age, however, was not yet separated completely from its material counterpart, as the former was still a commanding or supporting endeavour for the latter. The motive of the cognitive activity cannot be isolated from the motive of the material complement. The scribes of the ancient river states served the administrative infrastructure of their societies. Thus, the calculators of Mesopotamia were not really mathematicians, but rather taxators or accountants, and the star-watchers were astrologers, not astronomers.

The next step occurred in the antique Greece, where cognitive activity was decontextualised from the general societal enterprise. This was fundamentally a change in motive, the aim of the pre-Socratic philosophers of Jonia and their successors in Attica was purified or hypostacised to the intellectual activity itself. Thus, the core of theoretical activity was an activity of knowledge seeking, with a basic motive of seeking knowledge itself.

The search for knowledge was not just instrumental for some material goal, but constituted a goal in itself. This isolation of theoretical activity implies a residual societal activity that was not knowledge seeking for its own sake. This remainder was practical activity, or simply practice.

6.1.1 The Evolution of Knowledge

In this subsection, we will trace the path of knowledge evolution from its already segregated status in the Bronze Age to the birth of the institutionalised sciences. We will also develop a meta-scientific characterisation of the main branches of science.

Evolution of Knowledge

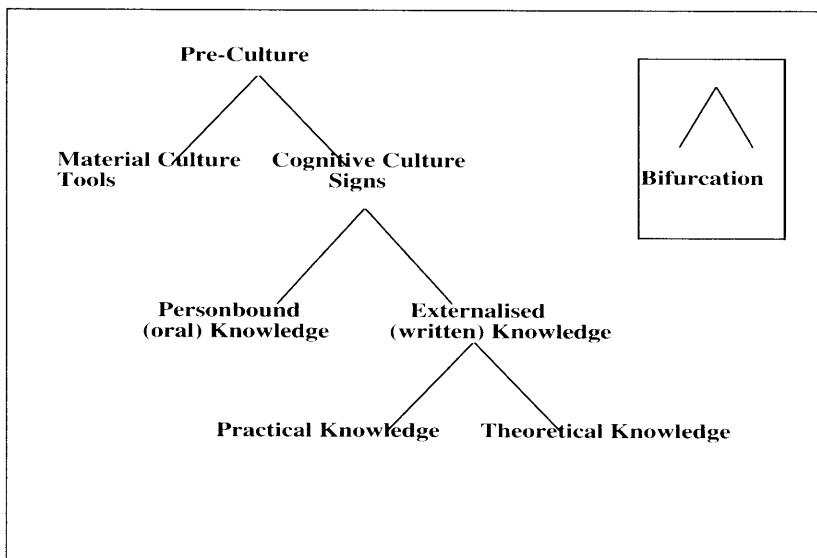


fig. 6.1

Popper (1963) distinguishes between practical and theoretical problems. Practical problems originate in general activity and are obstacles to goals relevant to the satisfaction of mundane needs. A practical problem is caused by a certain practical goal. At the time, the goal is out of reach, but whenever the impediment that has been blocking the goal is lifted, there is no longer any motive to think further about the problem. It does not matter which way the block is removed. It really does not matter whether the problem is eliminated by gratification or by an action of problem solving. The important point is that the pursuit of the primary goal can be continued.

For instance, most drivers faced with a car which had a dead motor would be completely satisfied if, by an act of fortune, the vehicle was suddenly capable of moving, even if the driver did not have the faintest idea of what had caused the motor to stop. If, however, the driver happened to be sincerely interested in the mechanics of cars, perhaps the problem was not solved, as it was not attached to the previous practical problem.

For such a motor freak, paradoxically enough, it would be a problem that *the car was suddenly running*. The mechanics enthusiast might be deeply frustrat-

ed that the problem vanished before he or she got a chance to understand why it originated in the first place.

In this case, apparently both the practical and the theoretical type of activity are directed toward the same material object. When scrutinising the two types of activity in their respective situations, the kinds of problems dealt with, however, are attached to different entities. The practical type of activity is directed purely toward the specific car, whereas the aim of the theoretical type is not the present vehicle exclusively. The theoretical activity is directed towards the class of automobiles, or rather towards the essential characteristics of this category.

In chapter 2, I suggested an ontological system that included categories for *phenomenon*, *object* and *essence*. Any kind of activity, however, must be based on phenomena that are generally associated with specific material objects. Practical activity is directed toward a specific object in order to subdue this entity to satisfy mundane needs. In contrast, theoretical activity is directed ultimately not toward this individual object, but toward the essentiality of this object. That is, the theoretical activity will be directed towards *the object field in general*, rather than towards the object in particular. Thus, *practical interest* is constituted in the *control of its specific object*. In contrast, the *theoretical interest* is constituted in *understanding the essential characteristics of the object class* to which a particular object belongs.

At a specific time, a theoretical activity often is directed toward a specific object, which, however, is merely the *concrete goal*, not the *real motive* of the activity. The real motive is the search for knowledge of the essence characterising the object field, of which the specific object is just one specimen. In this way, theoretical activity is logically connected to practice in being immediately directed towards specific objects. It is also linked to practice in a deeper way. Generally, an object field cannot be known without practical knowledge regarding its objects. Neither can we check the truth of theories by theoretical activity in itself. I maintain the epistemological principle of chapters 2 and 4, which is that the basic criterion of truth is the test of practical significance.

In chapter 4, I introduced the so-called *epistemic dimension*, that is, the scale constituted by the triad of object field, practice field and theory field. In this conception, there is a built-in presumption that practice is a mediating field between the object field and the theory field. Actually, there is a two-way mediation as shown in the diagram below

The Epistemic flow

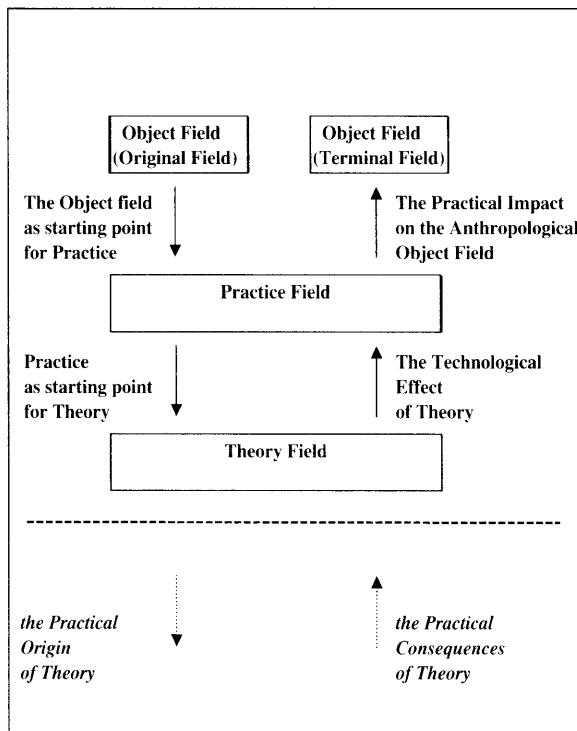


fig. 6.2

I have already introduced the flow on the left, which is the *practical origin* of all theory. The flow on the right is the feedback that concerns the effect of theory on the other fields. The first effect is the *practical consequence* of the theory, for instance the development of a technology derived from science. In this case, a part of the practice field is produced based on theoretical insight.

The construction of technological objects is, of course, a change in some object field. The object field changed, however, is not necessarily the original one. This is a distinction (already discussed in chapter 4) between the natural object field and the anthropological field.

In the former, the theory is a reflection of an intangible object field that cannot be changed by human intervention. In the latter, the theory is reflexive in relation to its object field, because it is an outgrowth of the object field to which it belongs.

For each of the three fields, the epistemic dimension reveals the path of knowledge. The path starts in the human perception of the phenomena and objects of a respective field, proceeds through the acquisition of experiences in the practice associated with the object field and eventually results in the evolution of a rather autonomous theoretical field.

Model of Knowledge

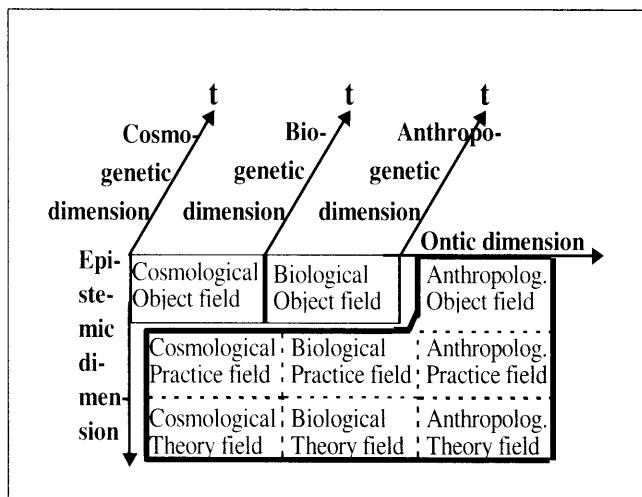


fig. 6.3

The next section will include a discussion of the methodological consequences of the heterologic status of the natural sciences.

6.2 The Reflective and Heterologic Nature of the Natural Sciences

The model of knowledge introduced in chapter 4 defined knowledge of the natural object field as *reflective* and *heterologic*. Thus, an objectively true picture of this field can be pursued, and although a final truth can never be obtained, our picture will come increasingly closer to this truth. The picture itself, however, when removed from its object, belongs to a totally different object field, the anthropological one. The relation between object field and its reflection in human knowledge is shown in the diagram below.

Reflection of Nature in the Model of Knowledge

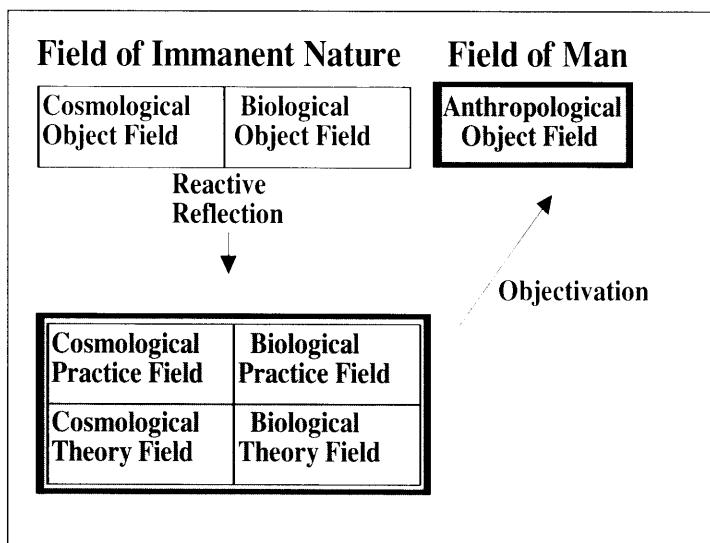


fig. 6.4

Cosmological and biological science are treated in the same way, as their basic epistemology, according to the thesis proposed, is determined by a relation between, on the one hand, the *object field*, and on the other hand, the *practice and theory field*. This relation is simultaneously characterised by segregation and correspondence.

I suggest that the essential structures and mechanisms of these two object fields are not inventions of human beings, but fundamentally outside the power of human intervention. The natural object field was in existence long before Humankind, and the greater part of the cosmological field is located in a space and time that can never be reached by any human (nor, for that matter, by any other creature subjected to the restriction of the velocity of light).

Reflection of Nature in the Model of Knowledge (unspecified for type of natural field)

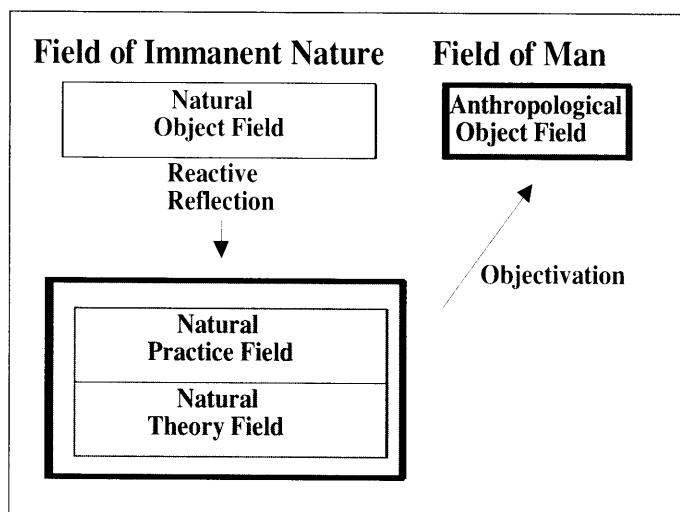


fig. 6.5

Evidently, there are some natural phenomena and objects that we can touch and are able to change in a more or less successful way. According to my thesis, however, we cannot change the essentialities of the natural field.

The basic build up of matter, the fundamental forces of nature and the structure and dynamics of the cosmos surrounding us are untouchable, immutable by human beings, and all other creatures subjected to the limitations defined by the modus of matter.

6.3 The Nature of Technology

I have primarily referred to pre-scientific activity (i.e., the original source of experiences functioning as the precursors of scientific knowledge) when discussing the influence that the practice field associated with the object field of natural science has on knowledge.

In figure 6.1, however, the reverse direction of influence is indicated, that is, from the theory field to the practice field and from the latter further on to some object field. The first influence is called the **technological effect of theory** and the latter the **impact of technology**. I will use the existence of this reverse theory-practice dialectics as a *conceptual criterion for technology*. In this way, technology can be defined as *practice created based on theoretical (i.e., scientific) knowledge*.

To make a distinction between ordinary pre-scientific and science-based practice, I refer to the former as **technique**. This is, of course, not the general use of the terms. Nevertheless, in this treatise I will try to keep the two concepts separate by this systematic discrimination.

6.3.1 The General Relation between Technology and Science

For example, one can distinguish between the evolution of water mills in medieval times as concerning *technique*, whereas a nuclear power plant is a piece of *technology*. The invention of a steam machine by Watts in the eighteenth century is a border case, as the originally practically trained mechanic James Watts was scientifically educated at the University of Edinburgh. He was thus a precursor of later generations of genuine engineers, who through systematic scientific training became the avant-garde of technology.¹

The creation of the hybrid category of technology as an offspring of the marriage between a practical and a theoretical field, however, had a secondary effect on the latter. With the founding of technological education for engineers and with the active purchase of scientific knowledge by this profession, a new kind of search for scientific knowledge was started, the so-called *applied science*.

Of course, this is not to suggest that pure science was not applied before that. Instead, the suggestion is that applied science is a hybrid category that can be seen as a symmetric counterpart to technology. Where the latter is a kind of practice based on theory, the former is a kind of theory directed towards practice. Judged by the daily work itself, there is hardly any difference between the work of pure and applied scientists. However, there is a difference that is determined by the aim of the work. Whereas the aim of pure science is sheer intellectual curiosity, the aim of applied science is to solve some problems of direct importance for the practical field.

The technological impact of theory thus goes from *theory* to *applied science* to *technology* to *general practice*, and consequently to the widely spread *anthropological object field*. Even this evolution of the intermediary sub-domains between the theoretical and the non-scientific practice field is hardly sufficient nowadays. The recent tendency is an amalgamation of the theoretical domain with technology into a huge societal system that is sometimes called the technological-scientific complex.² This evolution of technology is graphically presented in figure 6.6 below.

The Evolution of Technology

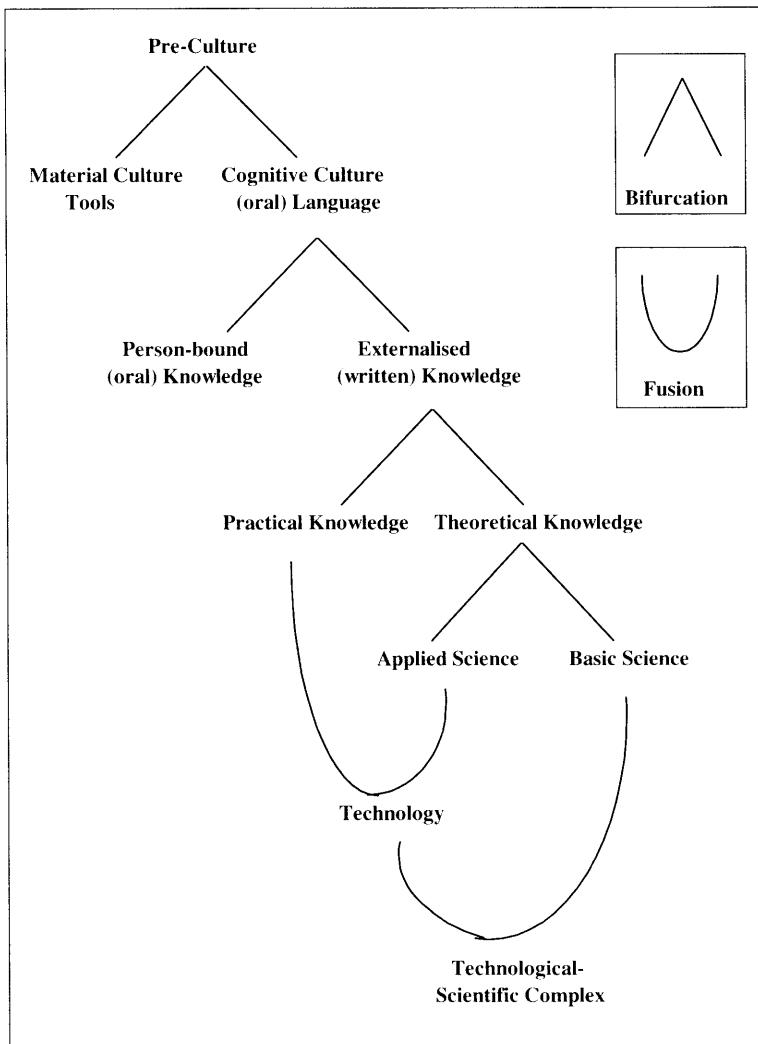


fig. 6.6

It is of paramount importance to distinguish between *natural objects* (cosmological or biological), *technological objects* (cosmo- or bio-technological) and *theoretical entities* (cosmological or biological theory or theoretical activity). Admittedly, the evolution of the technological-scientific complex makes

such distinctions ever more difficult, but they are still of fundamental importance.

For instance, in the debate some 20 years ago about the benefits and risks of introducing nuclear power, the experts of reactor physics often based their arguments on their scientific knowledge, that is, on nuclear physics, feeling rather insulted by the insolence of lay interference from the antagonists of nuclear plants.

Later experiences demonstrated that these experts, in fact, were confusing two different domains, the *cosmological* field to which the nuclear processes belong and, on the other hand, the technological field of reactors that do not belong to the natural field, but rather to the *anthropological* field.

The confounding of the cosmological object field, the cosmological theory field and technology is very wide spread and related to a lack of distinction between *physical1* and *physical2*, resulting in an imprecise concept of all three entities mentioned as “physical”. This distinction can be thought of in the following way:

Physical₁ (exclusive sense)

all objects, phenomena and essentialities confined to the cosmological object field.

Physical₂ (inclusive sense)

all objects and phenomena with constituents or aspects originating from the cosmological object field.

Thus, a nuclear plant is physical in the inclusive sense, that is, as physical₂, but not in the exclusive sense, as physical₁.

The basic distinction between the *natural* and the *anthropological* fields has to be considered when analysing the last part of figure 6.2, that is, the technological impact. In other words, one must consider the causal effect of technological practice on an object field, and thus ultimately the effect originating from the theory field. When such effects come from natural science, and accordingly even from cosmo- and bio-technology, this impact is not located in the natural field where the whole movement had its origin. The impact cannot be on the natural field, because it is considered immanent and intangible, thus outside the scope of human activity.

The object field subject to technological impact, and thus the victim of generally unintended and often rather regrettable change, does in fact belong to the same field as technology and scientific theory, namely the anthropological field.

This is illustrated graphically in figure 6.2, where the comprehensive character of the anthropological object field is shown to include all kinds of practical and theoretical fields. The distinction between the different sub-fields of the anthropological object field is thus rather difficult to make, a point to which we shall return in a later section on the anthropological disciplines. The use of the terms object, practice and theory field is epistemological and thus determined by the interrelations and processes associated with the evolution of human knowledge.

Technological impact, including its cause, the technology itself and its effect, falls within the anthropological object field, as is the case for the theoretical origin of technology. By systematically distinguishing the terms, however, I intend to make a distinction between *human activity as a process* and its results, that is, the *objectivations of this activity*. These objectivations are partly the intended products of technology and partly their unintended results. Further, as already mentioned, these results are sometimes not only unintended, but also have regrettable consequences for the singular and irreplaceable spacecraft on which we are all situated.

6.3.2 The Tendency to Progressive Externalisation in Tools and Knowledge

In the study of the history of humanity, there is an aspect of cultural evolution that is of particular interest. This is the tendency toward progressive externalisation. In chapter 3, this feature was the basis for my definition of culture; that is, the birth of culture is characterised by a threefold emergence of *tools*, *signs*, and *organisation*. In the current subsection, the evolution and interdependence of the first two of these constituents will be discussed.

The emergence of tools and of signs are logically bound to one another, as proposed in chapter 3. The tool (i.e., the material culture) presupposes that there is a language to express its *meaning*³ (i.e., the specific function of a specific tool), whenever the function of the tool is complicated above a certain, directly palpable level. In addition, the component of material culture related to tool production presumes that there is a way to transfer this know how. Thus, the material culture presupposes a cognitive culture, or preferably, a **knowledge culture**.

6.3.2.1 The Stone Age Culture

There was a remarkable difference between the initial status of *tools* and *signs* (the first two constituents of culture). From the beginning, that is, from palaeolithicum (the Early Stone Age), material culture was *externalised*. In other words, whenever a person produced a tool, this tool was transferred to another person, without the consent or even participation of the original tool maker. After having been produced, the tool was an objective, non-personal entity.

However, this was not the case for signs, the other constituent of material culture. A piece of knowledge, for example, the know-how of using and making a tool, is by definition **personbound**. This personal knowledge, of course, can be transferred to other people, which actually is the basic function of the sign-based knowledge culture.⁴ However, this transference is of a different kind than the material transference of a tool. **Personal knowledge** as a person-bound phenomenon has the meaning system as the prime vehicle of transference from one person to another. At the same time, the whole meaning system is, in itself, personbound, as long as the meaning system is limited to the original oral language.

The category of **personboundness** regarding the oral language (and the cultural meaning system) should not be confused with the category of subjectivity. The oral language and cultural meaning system produced in this medium are not subjective, but instead are objective entities. They exist and function in an objective societal way, as opposed to a subjective individualistic way. The *personbound* characteristic of a constituent belonging to the knowledge system is not attached to its societal function, but to its ontological foundation, and the ontological foundation is exclusively a personal bearer of linguistic and cognitive competence.

This limitation of being attached to a personal bearer is not very grave as long as the culture is homogeneous, with an organisational structure primarily consisting of a division of labour based on gender. This was the case for the hunter-gatherer Stone Age cultures and the Neolithic farming cultures. With the ascent of the high cultures in the Bronze Age, a complicated technical and organisational structure, however, arose in the Middle East.

6.3.2.2 The Bronze Age Culture

To co-ordinate the diverse contributions of the people in different occupations (e.g., farmers, artisans, soldiers, etc.) and to organise the flow of products and services from these more or less voluntary contributors, a specific class of administrators was needed.

The function of the administrators was to ensure the smooth transference of material goods produced and services delivered. However, to ensure that the organisers were properly organised, their sign-based work could not be limited to the oral language. This communication system is personbound, and thus severely limited to direct, person to person communication.

Therefore, the only way to ensure transference of meaning that is *not* person-bound is to develop a sign system that has the characteristic of *externality*. This *externality*, also a characteristic of tools from the start, is superior to oral language in this regard. In the Bronze Age cultures of Mesopotamia and Egypt, the leap from a personbound to an externalised sign system was characterised by a jump from oral language to script. In the parallel cultural evolution of the pre-Columbian cultures, the leap was associated with the invention of the Quippu system of representing numbers through knots.

The consequence (as well as the driving force) of the emergence of script was an additional division of labour, much more decisive than the initial diver-

sification into different types of material workers. Thus, a major split was instituted between the material or physical (physical), that is) work of the manual labourers and the cognitive or intellectual work of the administrative/ruling class.

The manual workers communicated by means of oral language alone. Even their training, the acquisition of the necessary skills, was simply learning by doing; it was a learning process partly based on the observation of the activities of the workplace, and partly on oral instructions.

However, for several reasons the administrative workers (e.g., the scribes) could not be trained in the same way. First, the object of their job was generally not present and therefore not visible. Second, the meaning of their job was not transparent, because it was itself a mediation. Finally, a script system, even a so-called iconographic one, is not immediately understandable. Therefore, the administrators had to be educated in a specific institution that was dedicated, not to direct production, not even to the mediation of information (i.e., administration), but to the *mediation of the skills and function of mediation*.

The very blossoming of the first high cultures was thus based on a categorial change of level for the knowledge part of culture.⁵ Knowledge was moved to the level of externalisation, which from the beginning was the birthmark of the material culture, that is, the tools. Thus, both parts of culture had externalisation to an equal degree, namely to the degree above the level of personboundness, to the degree of **passive externalisation**.

6.3.2.3 The Culture of Industry

The specification of passivity characterising the previous form of externalisation will be explained in this subsection presenting the next cultural leap, the transition to the Industrial culture. This “leap” materialised over a rather prolonged period that lasted from the late Middle Ages to the beginning of the nineteenth century. It was a new round in the competition between the material culture and the knowledge culture.

Once again, the material culture takes a leap that gives it the same lead over the knowledge culture as it had from the start (i.e., in the Stone Age). This leap is represented by the shift from simple tools to machines, that is, from the category of passive externalisation to what I call *active externalisation*.

A machine is not just an external product of a person’s activity or even of his or her skill. A machine is an addition; it is an *externalisation of human activity*,

that is to say an external version of an activity previously performed by a human being. A machine, in fact, externalises the operations of the original, pre-industrial worker who performed the activity before the creation of the machine. The operations of the machine are thus an external, mechanical imitation of the previous internal, human ones.

A hand tool, being a mere passive externalisation, is just a supplement to the activity of the worker. It is still the person who performs the job, with the tool serving as just a passive means for that performance. Machines, however, transcend this limitation by taking over the very operations of the now *former* worker. I am not asserting that the machine in itself usurps the activity. That is certainly *not* the case. Given that the definition of activity presupposes the presence of a motive (i.e., an intention to fulfil a certain objective), the activity must still be attached to the person working with the machines.⁹

It is important to note that when this cultural evolution happened during the Industrial Age, with the transition from passive hand tools to machines executing operations, there was a corresponding categorical upgrade in the status of the accompanying knowledge system. The knowledge system was not changed in respect to its degree of externalisation. This categorical constancy, however, does not imply that the knowledge system in itself was unaffected during this process of industrialisation. An important cofactor of the change to industrialism was the mechanisation of the very production and distribution of written material by means of typography, an increasingly externalised way of “manufacturing” printed matter. A combined cause and effect of the industrial revolution was the explosive growth of natural science, which has already been described.

Other societal changes, such as those happening in politics and religion, were also distributed quickly and widely by means of the printing machine.

Just as the invention of script was associated with basic changes in the class structure in the Antiquities, the invention of machinery was linked to an equally important transformation of the societal structure of the industrial culture. Marx suggested that this structure was constituted by two classes, the working class and the owners of the means of production (e.g., machinery). A feature of this class structure, separating it from the previous societal formations of slavery in the Antique and the feudalism of the Middle Ages, however, seems to have escaped Marx’s acute attention. This feature was the simultaneous process of, on the one hand, the *degradation and dequalification of mechanised labour*, and, on the other hand, the *elevation of “qualified” labour*.

This double movement was caused by a phenomenon that I have called the **technological threshold of qualification**.⁷ This is the threshold of valuable labour skills as defined by the momentary position of industrial externalisation within the area of work operation. As soon as a specific operation is externalised, the corresponding skill will be obsolete, useless and valueless, or to be more precise, its value will be reduced to a level at which the worker is ousted by the much faster and much more productive machine. It was this degradation of entire professions, such as weavers, that caused the class struggle of the machine strollers of *Luddites*, as this heroic, but unfortunate people were named, after their just as unfortunate leader.⁸

Thus, the dark side of industrialism is the annihilation of mechanised human labour, implying, at least in the beginning, the annihilation of human workers. The bright side of the industrial revolution is, however, a logical counterpart of the technological threshold of qualification. The residual type of industrial labour, the labour not disappearing because of mechanisation is not just yet pre-mechanised operations, not just skills that are above the momentary externalisation frontier, but knowledge necessary for any worker in charge of governing a specific machine.

Because industrial machines were nothing but mechanical assemblies of moving parts performing mechanised operations, they demanded “work leaders” in a way that resembles the stern superintendents supervising and, if necessary, physically animating slaves and feudal peasants of previous cultures. However, this was even more the case for these inanimate and mindless artefacts of industrialism.

Thus, the workers who could do nothing other than the activities that had become the province of the new machines ceased contributing to the work force. In order to stay within the category of *working power*, workers had to know much more than the machines, such as knowing how the machines functioned.

This meant that the industrial workers had to be not only trained, but also even *educated*. As the need for universal schooling in the industrial countries increased, the notion that schooling was a privilege for the leading classes of society had to be abandoned. In order to rise above the machine, above the technological threshold of qualification, the worker had to succeed in appropriating the kind of knowledge that had been the monopoly of the leading classes for the preceding 4,000 years. The division of labour, and of society, between the manual and the intellectual was not removed, but it was strongly diminished.

In this brief description of modern history, I have tried to describe the dynamics of the upward tendency of the working class, and with that, the movement of socialism and of the egalitarian features of modern Western societies until the great change of information technology that started around 1970.

6.3.2.4 The Culture of Information Technology

This change is a new transition, a change from the industrial society to the information society, from industrial culture to information culture. The crucial factor for this transition was the evolution of *information technology*. With the emergence of information technology, a whole new wave of automation began. This wave automated even the cultural skills and intellectual knowledge that during the industrial era had been the watermark of qualifications above the technological threshold.

How can this category of cultural products be understood? In the race between the material culture and the cognitive culture, or as I prefer to say, between the **technical system** and the **knowledge system**, another tie occurs. Once more, the knowledge system reaches the same level as the technical system. This advance of the knowledge system is caused by its elevation from the category of passive externalisation to the category of active externalisation.

Until this transition, the knowledge expressed in a book had been merely a passive means of performing a certain activity, just as with the hand tool of the Stone Age. Unlike the machine, the book was unable to perform any operation whatsoever. This, however, is *not* the case for information technology. Information Technology can even perform series of operations that externalise so-called intellectual labour.

The lack of a distinction between action and operation has led to the misunderstanding in the discipline of Artificial Intelligence that the new technology was a literal copy of a person, already possessing, or at least soon obtaining, the same intellectual abilities and other mental capacities. The old characterisation of a machine is still correct for the new technology; it is a system of externalised operations, which formerly were exclusively within the reach of people.

No constituent of Information Technology can perform any kind of activity, because the *intentional motive* is lacking. Nor is even a single action within its reach, because the *intentional goal* is also absent.⁹

The present state is, however, a sweeping change in the status of the material as well as the cognitive culture, a change of a radicality partly expressed in the

fact that the established difference in their degree of externalisation is eliminated. The very name of the phenomenon, *Information-Technology*, indicates that the present societal turmoil is associated with the fact that the two sides of culture, technical or material and knowledge, are now quickly fusing together.

Just as with the Luddites, we are now witnessing the annihilation of a whole stratum of human labour and a simultaneous degradation of the expelled workers. In contrast, the innovative and self-organising staff is now, by definition, elevated above the technological threshold of qualification. This qualification threshold at present is located in job functions that are suited for immediate automation, and, in my opinion, it will only be delimited by job functions that, in principle, cannot be automated.

Currently, the reverse movement of rising industrialism is also evident. This wave of information technology has a built-in tendency to crush the propensity toward equality as expressed in the ideology of enlightenment and of socialism, and in the evolution of democracy, public health, welfare and education. This anti-egalitarian tendency is a consequence of the devalorisation of common labour and the need for exceptional talent.

In 1982, shortly after the announcement of Japan's so-called fifth generation of computers¹⁰, I began to see this change. I witnessed the crumbling of values that were established by the rise of the working class and consequently a similar decline of the values associated with the now weakened movement of socialism. And in the end, the Marxist theory of history and society, which had been a personal foundation for most of my life, was also in decline. This was one of the factors delaying the present book. However, since then I have developed increasing confidence in the now generally discarded material conception of history. I realised that the prediction of the present cultural change, including the present low degree of interest in Marx, was itself produced by a Marxist method. Furthermore, for more than 15 years the prediction has proved to be correct to a degree that has often sent shivers down my spine.

The total evolution of culture according to the theory of externalisation is presented in the diagram below:

The Evolution of Tools and Knowledge

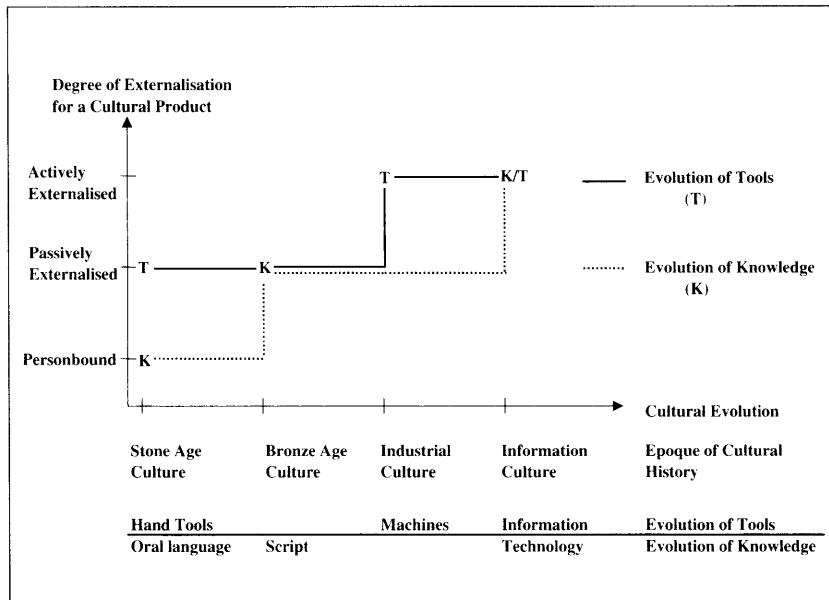


fig. 6.7

The race between the tool and the knowledge culture is here seen as a full drawn line “leading the race” and a dot-and-dash-line, which is related, compared to the former line, but catching up in the dawn of the Bronze Age, and even just now, the Era of Information Technology.

6.4 The Case of the Formal Sciences

Thus far in this chapter, I have tried to de- and re-construct what is generally conceived of as a coherent complex consisting of *nature*, *natural science* and *technology*. My intention has been to show that these three components really belong to quite heterogeneous areas. *Nature* is a part of the natural object field. The other two components, however, are situated in the anthropological object field; *natural science* belongs to the *natural theory field* and *technology* is included in the *natural practice field*.

Mathematics, however, is a fourth component, which, according to public understanding and even to the organisation of most universities, is placed within this already syncretistic complex. In the present subsection, I intend to show that this localisation is even more mistaken than the placing of technology into the complex, as mathematics and logic constitute a special kind of scientific discipline, the formal sciences, whose objective, function and evolution are quite different from the natural sciences.

The sciences of mathematics and of logic are considered twin disciplines belonging to the same category of the formal sciences. However, here I will focus on the birth and the function of mathematics. In my view, mathematics had its origin in human model making.

6.4.1 Model Making and Model Use

A model is an **intentionally simplified representation of an object**. The general concept of representation is associated with the category of signs as was presented in chapter 3.

The Varieties of References of Tools and Signs

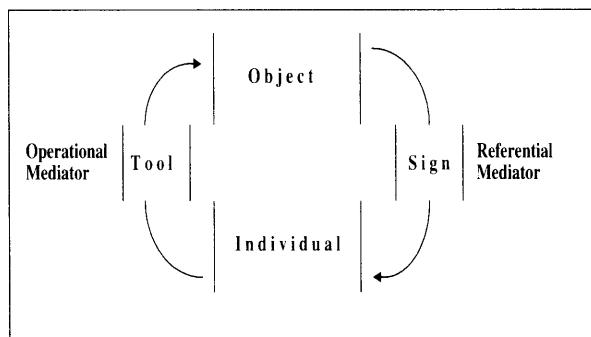


fig. 6.8

Let us imagine a person, whose activity is directed toward an object that is so complicated that it is impossible to fulfil the motive of the activity. For exam-

ple, let us examine a surveyor in ancient Mesopotamia and Pharaonic Egypt whose job was to map some area.

The Activity of Modelling

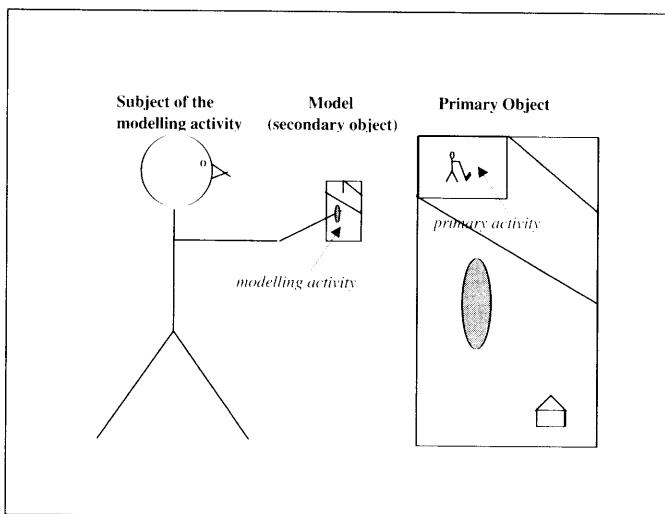


fig. 6.9

The diagram above exemplifies the basic constituents of the concept. The **primary object** is a farming area, showing a farmhouse, a lake, and different fields, in one of which a farmer is performing a somewhat ill-defined **primary activity** with a somewhat enigmatic tool. This farmer, thus, represents the **subject of the primary activity**, or let us just call him **the primary subject**.

Now enters the secondary subject, who happens to be the leading character of the present story. He (and historically this person was male) is a surveyor making a map for the government in the noble interest of preparing an adequate taxation scheme.

For the surveyor, the *object of activity* is the *map* he is drawing, but *semiotically*, of course, he is conceiving the *farming area* as his primary object, of which his map is defined as a *simplified representation*, that is a **model**. The activity of the surveyor is thus a **modelling activity**.

This means that he is not just representing the primary object, he is representing this object with *the specific intention of making a simplified representation*. That is, he devises a representation that includes the features that are relevant, and he eliminates the features that are not.

In this case, he is representing the area according to its farming potential. Thus, he must take into consideration the boundaries of the fields and the most important geographic entities, but not the temporary constructions, such as mud houses and certainly not such a transient figure as the farmer, who happens to be present during the surveying.

The Activity of Formalising

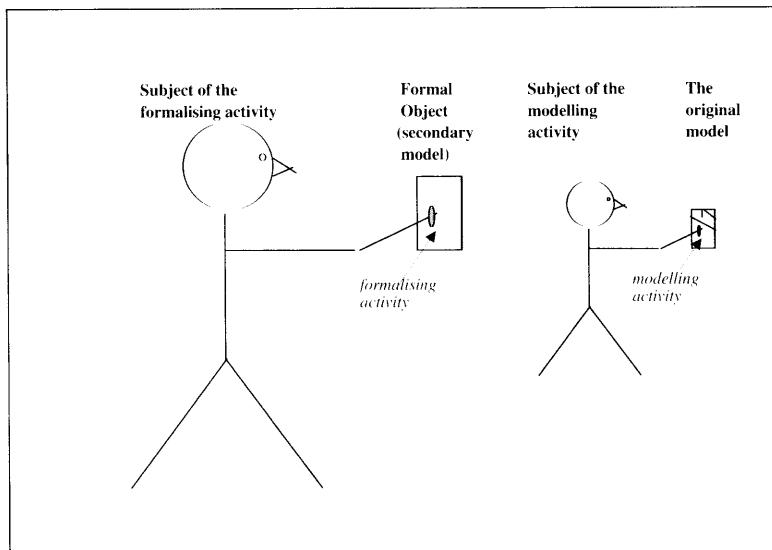


fig. 6.10

We now proceed to the next step in the evolution of formal science. One part of the primary object is a lake in the shape of an ellipse. We can imagine that the surveyor who has been taught to draw triangles, rectangles and circles has some difficulties drawing such a form. More specifically, he has a problem cal-

culating the area of the lake, an area that evidently is not a taxable part of the land in question.

Furthermore, we can imagine that these tasks and other problems of this kind generally are taken over by one of his colleagues, who has shown interest and talent for dealing with such brainteasers. For this colleague, the object of activity is even further removed from the initial object, which was the direct concern of the farmer. The person specialising in solving such “geometric” problems is no longer dedicated to the veridicality of the model, that is, whether it really represents the original object.

The “geometric specialist” is not concerned about whether his model is a model of a farming area or of a Pharaonic park (an area that certainly has no relevance for taxation whatsoever), nor is he concerned with the content of the original modelling activity, at least not while he is engaged in solving his geometric problem. In order to solve the special problem transferred to him, he has to proceed much further in the direction of simplification than was the case for the surveyor. His goal is to find a way to draw an ellipse and to calculate its area. To do this job properly and to develop skills as a specialist to do these specialised jobs for his surveying colleagues, he has to *formalise*, that is, to ignore the original source of his problem.

This means that when he has solved the problem, and thus found a way to draw an ellipse and to calculate its area, the specific problem delivered to him is of no concern to his solution. Neither the *initial modelling activity* of the person he is helping, nor the *original object* with the difficult elliptic shape enters the activity of the formaliser. Far beyond the uttermost limits of his consideration is the primary activity and primary subject that, in fact, was the very reason for the modelling activity, for which the specialist was providing his expertise.

This is my understanding of the historic birth of the formal discipline of geometry.¹¹

The Evolution of Models and of Formal Systems

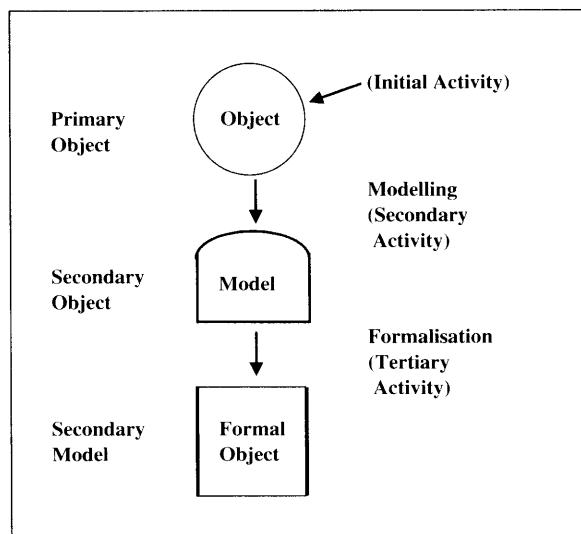


fig. 6.11

The diagram above is a kind of model representing this modelling process. Note that the formal object is *a model of initial model* (or of a part of this model).

Another important change implied by the shift in the activity from the *model maker* to the *formalist* is that the original context of the model maker, which was the initial reality from which he made his models, is replaced by a quite different context. The original context vanishes from the mind of the formalist, because it is his job to *decontextualise*, to solve a specific problem, irrespective of its particular initial context.

The model maker, however, is remaking a context, but this is a quite different one. The new context is the emerging formal system, which is the assembly of decontextualised problems that are related to one another. Thus, the scribe that started compiling what the Greeks later called *geometric problems*, but initially were *geo-metric* problems¹², discovered the relation between *the ellipse* and *the circle* (note the determinate article, we are here not dealing with specific, earth-bound figures anymore).

Even later, the relation between two evidently neighbouring members of the community of geometric figures and forms with an entirely different appearance, namely the parabola and the hyperbola, were discovered. At that time, however, Euclid had already defined this context of drawn figures to be a formal discipline called *geometry*.

The emergence of such a formal discipline, of course, had a profound influence on model making activity. Further, although model making was the starting point of the formal discipline of geometry, after the creation of its offspring, it is reduced to being a sheer application of the latter. Thus, the surveyor has to learn the formal discipline of geometry as a part of his education. In a way, his activity becomes only partly formalised. It is *not completely formalised*, because he still has to perform a practical activity in a most earthly context. However, it is *partly formalised*, as he has to undertake the same de- or rather re-contextualisation as his colleague, whose work was a precursor of geometry. These kinds of models I call **formalised models**.

The definition of a model defined above is applicable to two different kinds of models, the **ad hoc models** and the **formalised models**, which are produced according to the rules specified by a formal system.

More specifically, the formalised models can be characterised as follows:

The Concept of a (Formalised) Model

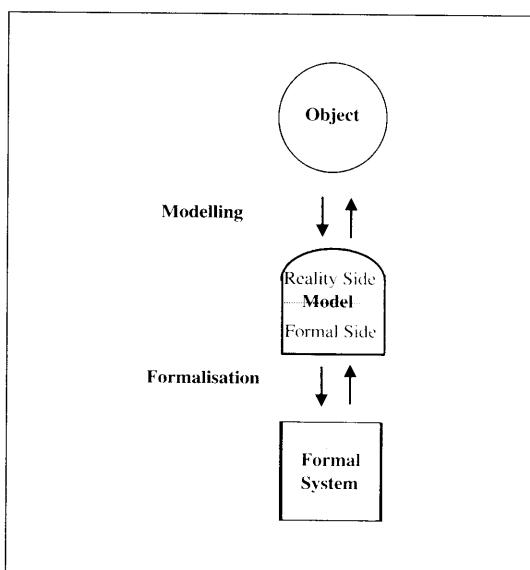


fig. 6.12

This diagram shows how a formalised model is spanned between two poles: the pole of the primary object and the pole of the formal system. This implies that a formalised model is characterised by an internal duality; it has two sides, the **side of reality**, referring to the primary object, and the **side of formality**, referring to the formal system.

This duality, in my view, is the cause of the erroneous conception of a model in the mathematical and logical model theory that was introduced in the previous chapter. In this so-called model theory, the *model is modelling the formal system, not the primary object*. In the next diagram, I have repeated the previous diagram, but added this understanding of a model to my own:

The Concept of a Formalised Model in Activity Theory and in Formal Model Theory

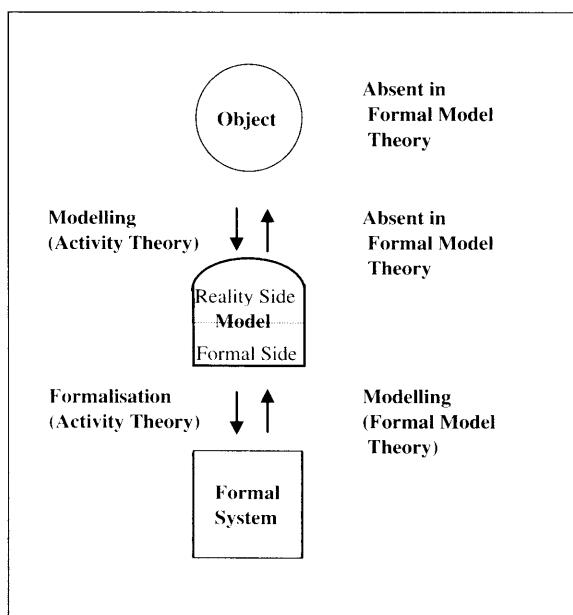


fig. 6.13

According to Activity Theory, in order to understand the nature of models and formal systems, we must start with the primary object and the primary activity. Only then can we safely proceed to the model, which initially is just an ad hoc simplification, but in due time is subject to certain rules that can facilitate the production, use and communication of the model. This is, in a way, an ad hoc formalisation creating a need for a segregation of these formal rules from the context of primary modelling in which they appear. Thus, the formal system is born.

In the logical model theory, this understanding is placed upside down.¹³ The logical model theory starts with the formal system, a concept defined in a more rigorous way in the next subsection. The formalised model is now defined as a *model of* this formal system, that is, the model is related to the formal system through a function that makes the model a *semantic* interpretation of the formal system. This is a faint memory of that part of reality that is represented in the model, but in a curious reverse form.

6.4.2 Formal Systems

I shall now try to give an overview by schematising the model theory according to activity theory that was just presented:

0. The Eden of Pure Reality

The initial subject performs his or her initial activity toward the initial object. The activity, however, is burdened directly or in some broader context by some problems that necessitate the use of a simplified representation of the object.

1. The Making of an Ad Hoc Model

The necessity of a simplification is often related to an infrastructural function in the complex organisation of a high culture, such as taxation, redistribution of commodities, construction of irrigation systems and major buildings.

The use of an ad hoc model facilitates the secondary activity by eliminating some of the multitudinous irrelevant features from the complex object of the activity that is in need of a model.

2. The Making of a Formalised Model

The infrastructural activity necessitating the model is itself generally developing in the direction of standardisation and bureaucratisation, a tendency that alone exerts a pressure for a similar standardisation of the model produced. This standardisation of the model implies a transition from ad hoc to formalised models, which are subject to certain rules determining their construction and use.

We now have a specific activity of model builders, and a corresponding profession of model building.

3. The Making of a Formal System

The rules of formalised models constitute a formal system, which unlike the models have no (at least no visible) reference to any real (that is primary) object. Instead, they are assemblies of conventional rules and regularities discovered by the makers of formalised models.

The constituents of the formal system are formal objects and rules that, at least on the surface, appear to be either *ideal objects* from a world of their own or *fictitious constructs* or *pure conventions*. This self-understanding of the formalist is based on the formation of a special group of people having the formal system as the object of their activity.

4. The Logical Model Theory

Seen through the reverse telescope of workers engaged in formal systems, the totality of the world is interpreted as one of two possibilities. It is either the weak and contaminated copy of the ideal objects of the formal system, or it is a separate field to which an insecure bridge is constructed by means of semantic interpretations of the formal systems, which are the petrified remains of what were originally formalised models.

It appears as if the distorted understanding of formal systems and formal models is the result of an alienation of the workers in the formal system. This alienation is caused by their isolation from the part of reality of which the formal system may not be a picture, but of which it is, at least, an offspring.

This alienation is comparable to similar distorted self-views in other professions. For example, linguists have a tendency to adhere to a *linguistic reductionism*, as demonstrated in the previous chapter. Physicists have a strong tendency to *physicalistic reductionism*, just as biologists often tend to *reduce psychological and social phenomena to biology*. Psychologists and sociologists instead favour *psychologism* and *sociologism*. The professional idiocy of the worker of a formal system is *formalism*.

6.4.2.1 Formalism is the Professional “Weltanschaung” of Formal Science

I suggest that alienation characterises the state of affairs for many mathematicians, but some modifying remarks should be added.

1. I have described the process of, firstly, modelling and, secondly, formalising as great cultural progress.
2. The distortion of formalism as a mathematical ideal is not associated with the process and method of formalising. Instead, it is associated with the reductionistic view; there is nothing more to mathematics than content-free formal structures and operations.
3. It should be noted that this distortion is not entirely harmful, as it is to a certain degree an understandable expression of the very motive of the for-

mal activity. The model builder has to ignore irrelevant features of the primary object, but the formal worker has to ignore the primary object all together. He has to perform as an *idealist*, believing that the formal objects are autonomous entities of their own, or as a *conventionalist* who envisages his formal system as the free and independent invention of his own profession

4. From a Hegelian view, this alienation is a necessary process of cultural evolution, in which alienated knowledge is a stepping stone in knowledge formation itself. My criticism, thus, is not directed against working with formal structures, not even against formalism, which is a certain historical stage in the struggle of mathematicians to understand their sublime, but elusive activity. The evolutionary perspective is, however, the following.
5. When the intermediary stage of alienated mathematics, formalism, no longer is able to make room for the autonomous activity of working with formal structures, it becomes a guard. It guards against a more comprehensive understanding of the historical evolution and social context of mathematics. Formalism thus functions as a reactionary custodian of a suppressive and cryptographic privilege of a suppressive elite, blocking a broader use and understanding of mathematics. This is not only a problem for the didactics in the teaching of mathematics, but also a hindrance for the proper use of applied mathematics.

A Hegelian program encouraging people involved in the formal sciences to become self-aware has been implemented already to some extent. Thus, two prominent scholars in the philosophy of mathematics Davis and Hersh write about formalism and its philosophical platform, analytical philosophy:

As a dominant style of Anglo-American philosophy, analytical philosophy tends to perpetuate identification of the philosophy of mathematics with logic and the study of formal systems.

From this standpoint, a problem of principal concern to the mathematician becomes totally invisible. This is the problem of giving a philosophical account of the actual development of mathematics, of preformal mathematics, the mathematics of the classroom and the seminar, including an

examination of how this preformal mathematics relates to and is affected by formalization.

The most influential example of formalism as a style in mathematical exposition was the writing of the group known collectively as Bourbaki. Under this pseudonym, a series of basic graduate texts in set theory, algebra and analysis was produced which had a tremendous influence all over the world in the 1950 and 1960s¹¹.

[...] in recent years, a reaction against formalism has been growing. In recent mathematical research, there is a turn toward the concrete and applicable. In text and treatises, there is more respect for examples, less strictness in formal exposition. The formalist philosophy of mathematics is the intellectual source of the formalist style of mathematical work. The signs seem to indicate that the formalist philosophy may soon lose its privileged status. (Davis and Hersh, 1986)

6.4.3 A priori and Posteriori in Mathematics

During the last two centuries, Kant's theory of mathematics and logic as expressions of *necessary*, although *transcendentally necessary, synthetic a priori* truths has proven to be wrong. Nevertheless, his idea regarding the synthetic a priori is too valuable to be discarded. Accordingly, I will present the falsity as well as the value of his theory.

6.4.3.1 The Falsity of Kant's Theory of Mathematics and Logic

In a most ironic way, almost all the synthetic a priori categories of Kant have been refuted during the history of mathematics and logic. He argued that the arithmetic structure of numbers was a synthetic a priori. Number theory, however, has changed immensely since Kant. There are now non-standard theories of numbers conflicting with the only one known to Kant, who mistakenly believed it to be the only one. He also argued that Euclidean geometry was a synthetic a priori. We have seen, however, that non-Euclidean geometries have been developed. He also claimed that the logic of Aristotle was a synthetic a priori. Nevertheless, quantum logic has been universally accepted in science as another type of logic that is just as legitimate as the Aristotelian logic is.

In addition, Kant's theory of the physical world has been refuted in the same way, for instance, as the theory of relativity has proven the postulate of the transcendental necessity of the classical concepts of time and space to be wrong.

Why do I still suggest that the idea of the a priori quality of our basic concepts is valuable? In my opinion, all science, whether investigating real object fields or formal systems, must have a solid foundation when beginning any investigation, which generally should not be brought into doubt. These basic concepts and theses are what I call *historical a prioris*, that is to say, paradigmatic conceptions that serve as the infrastructure of science.

Thus, nowadays the revised concepts of numbers, just as with our revised systems of geometry and logic, are historical a prioris that are used as a means to analyse the empirical data and the theoretical problems of science. Whenever problems arise, empirical or theoretical, our first reaction should not be to blame these historical a prioris that with due reason are conceived as nearly sacrosanct. After all, they are revised only after major scientific earthquakes, which delineate the major scientific époques.

After the conclusion of this section on the formal sciences, the reader may still be somewhat doubtful concerning the localisation of these mysterious disciplines within the general family of science. We will return to this question of systematics at the end of the chapter in the section on meta-science.

6.4.4 The Relation between a Formal System and an Empirical Discipline

Earlier in this section, the relation between a formal system and a material object or system was presented. The issue concerning the formal versus the informal attitude was introduced in chapter 4. Still, the status of mathematics, especially as an unintelligible discipline dealing with problems having a substantiality of thin air, is paradoxical and astounding. Why has this aloof and abstract mind game held such tremendous importance for science and technology? I shall here present a general frame for analysing the Formality-Reality Interface.

A Model of the Dialectics Relating Systems of Reality and Formality

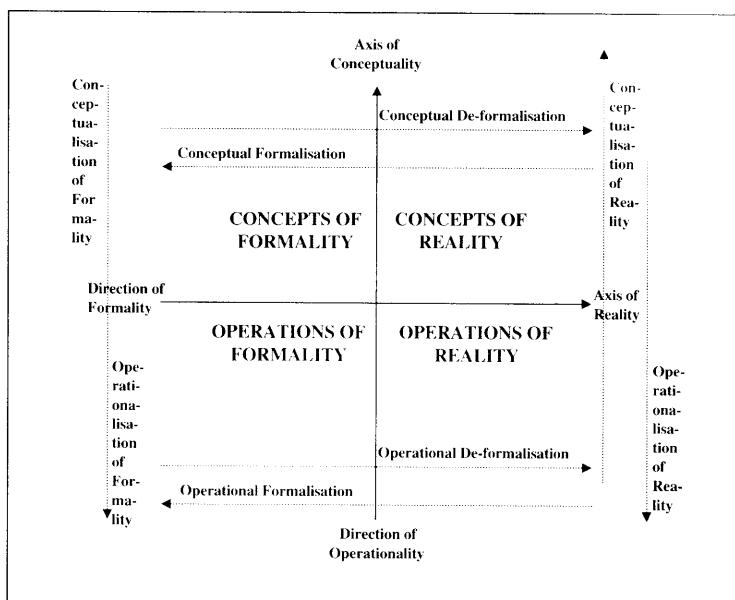


fig. 6.14

The model above, a Cartesian diagram, is composed of

A. 2 Dimensions

1. The Axis of Reality
2. The Axis of Conceptuality

These axes produce

B. 4 Quadrants

1. Concepts of Reality
2. Concepts of Formality
3. Operations of Reality
4. Operations of Formality

There are thus

C. 8 Transitions between these 4 quadrants

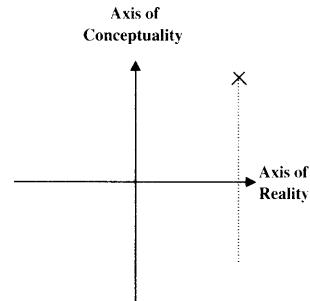
1. Conceptual Formalisation
2. Conceptual De-formalisation
3. Operational Formalisation
4. Operational De-formalisation
5. Conceptualisation of Reality
6. Conceptualisation of Formality
7. Operationalisation of Reality
8. Operationalisation of Formality

The following is a description of the total process of coding, computation and decoding, which characterises the use of formal systems. Let us imagine that a problem arises in some domain of human activity, be it a problem of practical life or of empirical science. The problem is too difficult to be solved immediately. The knowledge externalised in a formal system can be used to represent and attack the problem in a simpler and more standardised way. We can follow the path of solution through 3 phases:

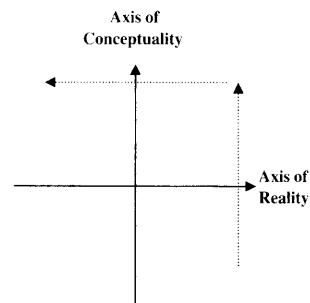
1. The initial phase in a domain of reality
2. The intermezzo within the formal system
3. The return to the initial domain of reality

The Problem Arises in a Domain of Reality

1. The problem arises in a primary object within a reality domain. It is here represented in the quadrant of conceptual reality, but the dotted line suggests its origin is in operational reality.

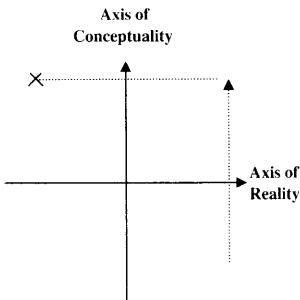


2. The primary object is translated into a formalised model, here placed in the quadrant of formal conceptuality.

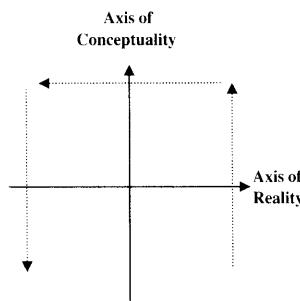


The Computational Intermezzo (Within the Black Hole of Mathematics)

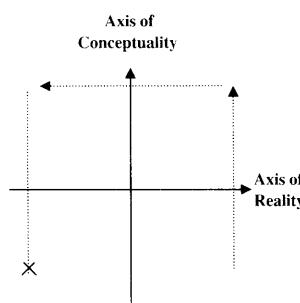
3. The problem of reality is translated into a formalised problem within the formalised model, here placed in the quadrant of formal conceptuality.



4. The translated problem can now be subject to computation, which is a formal operationalisation.

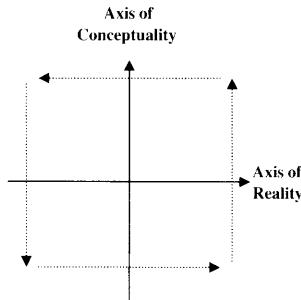


5. The result of the computation is a formal solution.

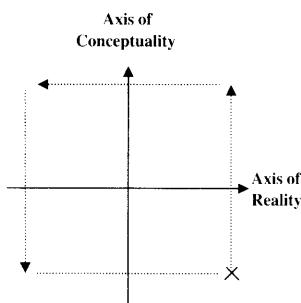


The Return to Reality (Back to Business)

- 6. The formal solution, which includes the series of formal operations necessary to carry out a solution in the formal system, is now translated into a real solution, i.e., to the series of real operations that are necessary to carry out a solution in the initial domain.**



- 7. The real solution is now carried out in the initial domain.**



I will present a problem from the infancy of arithmetic to give a simple example of this procedure. A peasant has 10 pigs and has just bought another 5. Planning to hand over his farm to his 3 sons, he wants to know the total number of pigs he owns. As the 5 new pigs have not yet arrived, he cannot count the number of his stock directly, instead he represents the animals by pebbles. He takes 10 black pebbles representing the old stock, 5 white pebbles standing for the new hogs. He then counts the total number of pebbles, which results in the number of¹⁵.

If he is literate, he can do it somewhat easier in the following way:

||||| ||||| Pigs + ||||| Pigs

Now he can make an abstraction that is, in fact, a transition to a formal system:

(||||| |||||) Pigs + (|||||) Pigs = (||||| ||||| |||||) Pigs

In a way, he is applying an analogue of the so-called distributive rule of arithmetic.

Thus the result is:

||||| ||||| ||||| Pigs = 15 Pigs

It should be noted that this way of representing numerical phenomena was available for arithmetical knowledge as soon as the distinction between numeral and semantic category signs was made. This was evident in early Sumerian cuneiform, where individual number signs were still missing, and only numerical magnitude signs existed, like 1, 10, 60, 110*60, 60*60.¹⁵ This system was also evident, in a less sophisticated form, in the Roman numerals. The crucial point is that the same number system is used for all kinds of countable objects, be it cups, pigs or slaves, and that mass quantities are measured in some unit of measuring.

The arithmetic problem concerning the pigs may seem somewhat simplistic, but it contains the entire process of formalising, deformalising and using the solution computed. This procedure of first removing a problem from its real localisation in its object field, depriving it of any meaning and of any real qualities, then distorting the poor remains by coding it into an alienated formal system, and in the end utilising a solution obtained in this magical way, appears rather irrational and irresponsible. That mathematics nevertheless has proved so useful in technology and science can be explained by two facts:

Two Hidden Causes of Formal Usefulness

1. The invisible factor of hidden origin

As pointed out previously in this section, formal systems, unlike what many formalists believe, are not sublime ideal objects coming down to this sordid earth from a heaven of Platonic ideas, but are fossilised and decontextualised remains of former pragmatic models.

2. The invisible factor of hidden selection

When a certain formalised model is a successful representation of the initial object, there is generally a long and hidden process of selecting an appropriate formal system and a specific design within this.

6.5 The Autology and Reflexivity of the Anthropological Sciences

In the first sections of this chapter, the natural sciences were discussed and their heterological character was emphasised, the asymmetry between the object domain and the domain of scientific knowledge. It was also stressed that the experimental methodology cherished in science is a *par force* strategy to overcome this asymmetry, by which human beings are placed outside the pure and immanent nature to be investigated.

We shall now turn to the other part of being and to the corresponding part of research that is dedicated to studying this other part.

6.5.1 The Autology of Anthropology

The anthropological object field encompasses human individuals and the effect of human activity. A part of this activity is found in the anthropological practice field, the part of human activity directed towards the anthropological object field itself. The cosmological and biological practice fields have their

basis in cosmological and biological objects, respectively, hereby transforming them into anthropological ones. However, the anthropological practice is directed towards genuine anthropological objects. Anthropological practice thus concerns, on the one side, human persons and their societal organisation, and on the other side, cultural products, such as artefacts and meaning systems.

Just as it was stated concerning the natural sciences, the anthropological disciplines have their origin in practical knowledge experienced and collected in the anthropological practice field. However, there can be no genuine evolution of a scientific anthropology before a distinction has been made between the object fields and their respective practice fields. Some anthropological disciplines were actually founded in Antiquity, such as the *study of political systems*, which was initiated by Aristotle, and *grammar*, which was intensively studied by the Latin grammarians in Antique Rome and in Mediaeval Europe.

In the Medieval university system, a split was made between, on the one hand, *quadrivia* (arithmetic, geometry, astronomy and music) and on the other hand, *trivia* (logic, dialectics, rhetoric). An origin of the split between natural science and humanities can be found in this division, especially considering that music was at the time heavily influenced by the Pythagorean discovery of the harmony of acoustics. Thus, *quadrivia* can be seen as an embryo of natural science and its handmaiden, mathematics.

The split was deepened after the break through of natural science in the seventeenth century. In England, natural and moral philosophy were divided. Thus, Newton's chair was restricted to *natural philosophy*. A corresponding founding father within the anthropological field, Adam Smith¹⁶, was professor of *moral philosophy*. In 1776, he published the book that simultaneously became the basis of economic science and of liberal economics.

In Italy, the philosopher Vico¹⁷ sketched an ambitious program for the study of humankind, a study he called The New Science, *Scienzia Nova*. Vico's arguments made him a precursor of the neo-Kantian rebellion against the predominance of the natural sciences over humanities. Vico argued that only God can have genuine knowledge of the natural world, whereas we as the creators of our own human world can develop first hand knowledge on such subjects as history, language and culture.

The Reflexivity of the Anthropological Field in the Model of Knowledge

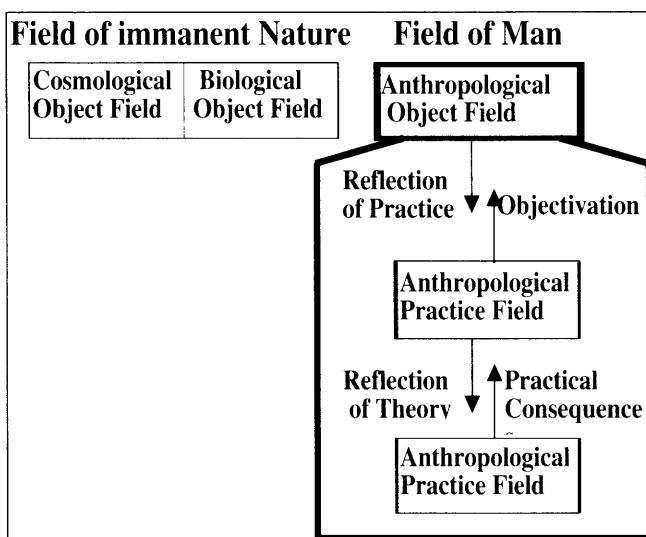


fig. 6.15

In the diagram above, I assert that the facts of the anthropological object field are first experienced in anthropological practice, and then eventually reflected in the anthropological theory field. Now, let us try to follow these steps.

A legal system was established by the Romans, and they even developed as a part of their cultural creation a legal profession, which in the medieval ages dominated the studies at the rising universities.

With the growth of the modern state, attempts were made to control the national economy. The schools of first mercantilism and later of the physiocrats certainly originated in the anthropological practice field before they eventually turned into genuine theoretical activity with Adam Smith.

The practical forerunners of sociology were the statistical bureaus developing first in England in the seventeenth century. This is already indicated by the curious name of what was later turned into a highly formalised discipline, *statistics*, a term that originally referred to the study of the *state*.

An early precursor of sociology was the attempted founding of a discipline of *ideology* in the Enlightenment period of France, ideology being the study of human ideas. Nevertheless, the first clear definition of sociology is associated with Comte¹⁸ in the beginning of the nineteenth century.

Since the founding of Rome, the mastery of languages was an important part of the anthropological practice field, and the study of grammar was here an established discipline, carried on through the Middle Ages and still a focal area of study in the Renaissance. With the discovery of the kinship among the Indo-European languages, a comparative philology was founded in the nineteenth century and thus the basis of a genuine linguistic science was laid.

The practical roots of cultural anthropology are based on the experiences of the European imperialists meeting foreigners and cultures that differed considerably from their own, in the American, African, Asian and Oceanic colonies.

I have here sketched the roots and founding of the anthropological disciplines that belong to the *sociological* half of the anthropological theory field. The other half of the anthropological theory field is the *psychological* one. This division of the anthropological theory field is based on the already asserted partition of the anthropological object field into sociological and psychological object areas. This division will be a main theme in the remainder of this chapter. The sociological objects are the supra-individual human collectives and the non-human products of human activity, whereas the psychological objects simply are human individuals.

As described, the following path was evident in the evolution of the anthropological disciplines. It started with the epistemic direction from the objects to the practice directed towards these objects, leading to the founding of a specific theoretical area, and ultimately having the search for pure knowledge as its sole objective.

As indicated in the diagram (figure 6.12), there is, however, also a feedback direction. This starts in the theoretical field, where new ideas on the nature of the human species are developed. These new ideas are brought into the field of practice and thus the anthropological object field is changed.

Accordingly, economics follows the path in the first direction by its examination of the production and transaction patterns in society. It thereby refines the practical knowledge of the agents of economic life into a systematic analysis of economic data¹⁹ and a systematic formulation of theories. The theories and even the empirical methods are used in the practice of economics, for better

or for worse, and through this impact on practice, theory can eventually have effects that go back to the original object field.

Although this resembles the previous descriptions of natural science, there is, however, a major difference between natural and anthropological science. This difference is the respective heterological and autological character of the two theory fields.

Natural science does not have an impact or influence on the original natural object field, the primary characteristic of which is its intangible position in relation to human subjects. Therefore, the impact through technology, based on scientific theory, does not terminate in the object field of study, but in a simulated or transformed *quasi- or post-natural* area that is a part of the anthropological object field.

Thus, natural science has an epistemic problem that is represented in the first part of this epistemic arc, namely the problem of interacting with its intangible fields. On the other hand, it does have the advantage of being free of problems in the second part of this arc, as long as it does not confuse the genuine object fields with the derived quasi- or post-natural ones. Through its technological implementation, natural science can cause serious pollution of the biosphere, but it can never cause any pollution in the *object field* that it studies.

6.5.1.1 Anthropological Autology as a Methodological Problem

The methodological circumstances are reversed in the anthropological disciplines. Being autological instead of heterological, there is no basic problem of interacting with their objects, which are *already* a part of our life space. There is thus no problem as represented in the first part of the epistemic arc. The basic problem in anthropology is solely associated with the second part of the arc. Being autological, anthropological theory is a part of its own object field and, therefore, is not only pestered by the logical problem of autoreference, but also even by the complications of what can be called *methodological pollution*.

This term refers to the objectivised impact of a theory that is no longer passively describing or predicting phenomena in an object field, but actively influencing or even transforming its field of study. In short, we can define the two major methodological problems of any science as:

Two Major Methodological Problems of Science

1. The contact problem
2. The separation problem

Both problems are related to the basic subject-object relation of epistemology. The first problem can occur while the researchers are discovering, localising and observing the object of study. The second problem concerns the determination of the extent to which the data are about the subject and the extent to which they are about the object of investigation.

In the natural sciences, there is, in principle, an insurmountable contact problem that can only be solved effectively by “domesticating” the originally transcendent objects or by replicating them as artificially produced models.²⁰

On the other hand, the separation problem is, in principle, easy to overcome, exactly because of the basic split between the subject and the object. The way of solving the contact problem creates, however, a new separation problem. In the anthropological field, this picture is reversed. There is, at least in principle, no contact problem, as the subjects of anthropological investigation are already placed in their object area. There is, however, a separation problem that is, in principle, insurmountable.

The Chiasm of Methodological Problems

Category of Science	Problem type	
	Contact problem	Separation problem
Natural Sciences	insurmountable	unproblematic
Anthropological Sciences	unproblematic	insurmountable

Table 6.1

Two different strategies have been developed to cope with the separation problem:

The Dual Strategies for Solving the Separation Problem in Anthropological Science

1. The Strategy of *Subject-elimination*
2. The Strategy of *Intersubjectivity*

With the first strategy, the researchers in charge of the investigation try to eliminate any subjectivity by making a clear-cut borderline between themselves and the object of study. In the second strategy, the researchers choose the opposite approach, by identifying or assimilating themselves as much as possible with the object or object area. Thus, in psychology, the experimental and psychometric methods belong to the first category and the psychoanalytic case study and the phenomenological interview belong to the second one. In the social sciences, the sociometric methods rely on the first strategy, whereas the field method of cultural anthropology uses the second one.

6.5.1.2 The Concept of Truth in the Anthropological Sciences

There is, however, an even more serious problem associated with the autology of anthropology. Besides the problem of empirical methodology, there is a question concerning the very nature of anthropological science. In the natural sciences, the object area is quite distinct from the practice area. In the anthropological sciences, the object area and the practice area will always belong to the same general object field, namely the anthropological object field. Actually, the starting point for any anthropological study is human activity itself.

This means that the relations depicted in figure 6.12 are rather elusive. When we ask whether a specific theory is a true reflection of its object area, we have to inquire whether the eventual concordance is due to their common origin in the same area of human endeavour. This is a possible, but by no means necessary, interpretation. Another possibility is that the theory has some practical consequences in the anthropological practice field, whereby it is objectivised into the anthropological object field, of which the practice field is, after all, just a part.

The validity of psychoanalysis as a psychological theory, therefore, should not be evaluated exclusively in the practice field of the professional psychoanalyst. Likewise, the truth of Marxian sociology was never proven by the impact of Marxian ideology in the now perished socialist states in Eastern Europe. Can we, under these circumstances, maintain the very concept of truth in the field of anthropology? Is it desirable, and is it possible?

If we conceive of truth from the perspective of a clear-cut separation-oriented methodology (e.g., as found in natural science), we can hardly defend the maintenance of a concept of truth. For better or for worse, the disciplines of anthropology are so intimately placed within their own area of study, that a theory of objective truth as a simple correspondence is certainly quite naïve.

There is, however, another possibility. We can characterise the difference between the anthropological theory field and the anthropological practice field as a disparity in respect to generality. The practice field is, by definition, specific and contextualised. The theory field should be specifiable and contextualisable, but it is not bound to a specific context like the practice field. Therefore, we have a general division of labour between the practical and the purely epistemic side of a certain subfield of anthropology. The practical side is the application of anthropological knowledge in order to intervene in the object field. In contrast, the theoretical side is directed toward epistemic goals. The former I call the *profession* of the subfield, the latter is the *discipline*. For instance, the subfield of psychology consists of, on the one hand, *professional psychology* and, on the other hand, the *scientific discipline of psychology*.

The same duality is found in economics and sociology(S), the latter understood in the traditionally narrow sense as the study of social structures and processes.²¹ The dialectics between the profession and the discipline is the following:

The Dialectics between Profession and Discipline

The Discipline has the advantage, as well as the disadvantage, of being decontextualised, detached in relation to its very object area. Detachment from social influence of, for instance, the power structure of the object area implies an independence that, whenever it is properly utilised, gives the scientist a freedom to choose the problem and the method he or she finds appropriate. The disadvantage can be the relatively greater distance to the object area investigated, a distance that can eventually imply a new kind of contact problem.

The Profession has, on the other hand, the advantage, as well as the disadvantage, of being contextualised, firmly integrated in its object area. Professional psychologists, economists and sociologists thus have less freedom to choose the goals and means of their work, but they have no contact problem.

This difference between the profession and the discipline suggests a division of labour as well as an exchange between them, which resembles the relation between technology and natural science (as described above). The practice area is very often the breeding ground for problems to be investigated in the theory area. It is also the practical testing ground for the results of scientific theory making. According to the general theory of truth presented in chapter 4, it is never enough to rely on internal testing within the science, because the ultimate criterion is the practical experience.

Why then should we make this complicated detour from the practice area into the theory area and back again? Why not stay in the practice area in the first place? Well, the practical experience is a necessary, but certainly not sufficient condition for something being proven as truth in the scientific sense.

The drawback of practice is precisely the binding it exerts on its members. Not only is there, most often, a political lack of freedom, as the power relation limits the possible choices. There is even a cognitive limitation of the perspective inherent in the narrowness of any specific kind of practical context.

I shall therefore suggest the following definition of truth in anthropology. The truth of an anthropological theory is to be understood as its general capacity to be contextualised into any specific area within its own delimited scope inside the anthropological object field. As the *criterion* of truth for an anthropological theory, I suggest the following:

Criterion of Truth for an Anthropological Theory

Ultimately, humanity has to accommodate in its own practical life to the facts described and explained by the theory in question, just as theory has to describe and explain the facts met in practical life.

This may sound rather close to a pure pragmatism, but it is not; at least, it is not close to a pragmatism identifying truth with usefulness. It should be noted that the definition above distinguishes between, on the one hand, the specific usefulness of applied science as a contextualised application of a discipline in a profession and, on the other hand, the general truth of theory.

Its general truth presupposes a theoretical generality attached to the universal contextualisability of the theory in question and a practical universality associated with the universal human necessity of accommodating the content of the theory in the general activity of humankind.

Thus, this definition of anthropological truth presupposes some universal qualities in the object field of anthropological theory, and that is, of course, the anthropological object field. These qualities can be called *anthropological invariants*. In chapter 3, I defined some of these anthropological invariants from the perspective of Activity Theory.

Further, it should be noted that these anthropological universalities are generally not fixed and constant attributes, as with the specific qualities of a biological species. Instead, an anthropological invariant is a disposition attached to every specimen of a certain category of the anthropological object field, the objects of which are, on the one hand, the category of human individuals and, on the other hand, the category of human societies and their constituents.

Although the disposition is so general that it has to be specified, this specification must take place in a given historical context for the anthropological object in question. Examples of anthropological invariants include *the development of a specific personality in an individual* and *the evolution of a specific culture for a human society*. Of course, some universalities cover all persons and all societies when considering personality and culture. The specific forms of emerging personality in a certain individual or emerging culture in a certain society are, however, non-universal processes.

It is therefore a basic prerequisite for any grand anthropological theory (a basic theory) or even for most theories applicable to a certain subsection of the general anthropological object field that they fulfil this combination of universality and specifiability. This is a prerequisite for the anthropological disciplines according to the meta-theoretical specification presented in this treatise.

On an even more abstract level, it is a meta-theoretical postulate that the meaning of truth in anthropology is a *theoretical* universality. It can be specified within a given empirical context, thus implying a *practical* universality based on the ultimate existential unacceptability of rejecting the theory in question.

How can I rationally defend this meta-theoretical position? I will here utilise the principle of autology, which is claimed to characterise the field of anthropology. This can be done in accordance with the principle of theoretical reflexivity in anthropology. In other words, the theory of this field is not just a picture of the field, but is itself a part of it.

This is true also for anthropological meta-theory. In this case, we have a specific kind of double reflexivity. The meta-theory of anthropology, apart from being a picture of this science, is also a constituent of the *object theory* and the *object field*. It follows from this topological quality that the very same preconditions claimed for the object theory should also be required for the meta-theory. Personally, I do not see any point in an object theory that does not ultimately matter in our daily lives. Likewise, I would be rather unaffected by any meta-theory that had no relevance for my daily work as a social scientist who works with object theories concerning every day life and thus ultimately with relevance for our daily lives.

To avoid a rather narrow-minded utilitarian pragmatism, it should be stressed that the bearing of theories on daily life must be understood as a qualified relevance.

Any ideology, however absurd or repressive, has of course an often quite impressive significance for daily life in a given society. It can also have a certain degree of universality in being globally widespread and in existence for a long time, as is the case for the great religions, in existence for millennia. Some totalitarian ideologies likewise claim a universality, which has a *postulated* scientific content, not a *transcendental* one.

What then is the point of making a blueprint for an anthropological theory, which is not yet in existence, and with hypothetical prerequisites that are of a most doubtful nature? The view of science according to Activity Theory is one of non-relativity. The course of science is a process of convergence. Such a postulated tendency of theoretical convergence seems to presuppose an underlying convergence of the different cultures existing on this planet. This convergence occurs in space between simultaneously existing cultures and occurs in time between the culture of one period and its successors. As a child of the Enlightenment époque, humankind according to Activity Theory is experiencing a semi-utopian convergence process moving toward an eventual unification of humanity. However, I will not advocate for a specific utopia in some future unified culture. I will even avoid the very postulate of any unification whatsoever. There is, however, one interesting argument for the proposed concept of anthropological truth.

Not only does this concept incorporate a logical presupposition of an actual unification of human culture, but the process of cultural unification may very well have a presupposition of such an anthropological theory. We may never find the truth about ourselves. We may never fulfil a process of cultural unification. What is worse, there is an already materialised risk that we may not prolong our somewhat unreflected existence, that we will not prolong the existence of humankind whatsoever.

The truth of *anthropological theory*, which is its correspondence to the anthropological object field, is tested in this meta-theory by its necessity for a generalised type of anthropological practice. However, it was stated that the relation between the specific practice and the theory areas within the anthropological field is organised by paired professions and disciplines. How is the specialisation of the applied professions and the scientific disciplines to be combined with a vision of a general human culture, where anthropology is a universal key of reflection? At first glance, it does not fit at all. On the contrary, the

first perspective suggests an increasing gap between the sophisticated people who know and the naïve people about whom the knowledge is formulated.

The potential for a global unification process in human culture already is compromised so much by its semi-utopian content of peace and brotherhood, that I will leave this utopian version. As such, I will proceed to the original, somewhat more modest heritage of Enlightenment, which encompasses the idea of *universal education* for all human individuals. If the universal knowledge of the basics of anthropology is in fact a necessity for the existence of our kind, then of course this implies that the majority of human beings should be educated about it. This certainly does not imply that all individuals should have exactly the same kind of knowledge. Just as a global economy does not presuppose that all people have the same work, a global culture does not require that all individuals have the same knowledge. However, they must *share a common basis of knowledge*.

In the previous chapter, Putnam's theory of meaning was presented. According to Putnam, meaning is a universal feature, but at the same time, it presupposes an epistemic division of labour. In other words, we may not ourselves have the specific expertise necessary to establish the objective facts of a certain object or phenomenon, but we can always find somebody with such a knowledge. Such a division of knowledge is also a prerequisite in the organisation of science itself. In an even more general way, we must have corresponding relations between the scientist and the laypeople, that is, the lay people with respect to knowledge concerning a certain subfield of anthropology.

6.5.2 The Reflexivity of Sociological Science

In the previous chapter, the *reflexivity* of a science was defined as a kind of relation between the *object* and *theory* field of a science. The theory field is characterised by the following attributes; it is at the same time a part of its object field, the attribute of *autology*, and it is a picture of it, the attribute of *reflectivity*.

This is comparable to the relation between a self-portrait of the painter and the painter him- or herself. Reflexivity implies that the picturing made in the anthropological theory field, is in principle, never a neutral description, in the way we find in natural science. The very act of picturing a part of the anthropo-

logical object field is an intervention into this object field. This is the way we introduced the problem in the former subsection on methodological problems. These problems are well known in the major branch of anthropology that I call sociology, generally called social sciences.

For example, the forecast of political opinion before a coming election may very well influence the result by the reactions of the voters to the forecast. It is evidently impossible to measure this disturbing influence of the forecast.²² Sometimes it may work as a positive feedback channel, reinforcing a tendency found in the opinion poll. An even more profound consequence of this band-wagon phenomenon can be the *self-fulfilling effect*, where the very publication of a false opinion poll changes the opinion of the electorate in the direction told.

In other cases, a forecast can function as a negative feedback channel; by its own influence on the electorate, it is destroying or diminishing the tendency predicted. A famous example is the 1948 presidential election in the U.S. In all opinion polls, it was predicted that the presiding president Harry Truman²³ of the Democratic Party was going to be beaten by the challenging Republican candidate Dewey. This very prediction, however, had a strong effect on the behaviour of the two candidates. Dewey being sure of a landslide victory slowed down in the final portion of his campaign, whereas Truman made a determined effort to beat not only his rival, but also even the polls. Both effects seem to have influenced the election, which was won by the dark horse, and lost by the favourite.

The peculiar epistemic relation of reflexivity can even be turned into a positive scientific claim. The theory is simultaneously a part and a picture of its object field, which has an interesting consequence. The theory must not only depict all the other parts of its specific object field, it also must represent itself. This means that a theory in the anthropological sciences, in order to fulfil the claim of reflexivity, must be a meta-theory. A theory within the sociological theory field is in itself a sociological object.

If the theory happens to be a grand theory covering the total range of the sociological object field, it must also be a theory of sociology, that is, a socio-logical meta-theory. In fact, most of the classic theorists of sociology like Comte, Marx, Durkheim and Weber took this challenge very seriously.

6.6 The Human Society and the Human Individual – the Relation between the Anthropological Sister Sciences: Sociology and Psychology

Both the object field of anthropology and the theoretical field of anthropology have now been presented. At this point, the relation between the two different objects of anthropology, the *human society* and the *human individual*, will be examined. Using the recurrent approach of going back and forth between an object and its corresponding theory field, the relation between the two major subfields of anthropological science, Sociology and Psychology, will be analysed.

The systematology of science has a rather bewildering map of disciplines and subdisciplines, divisions that often seem to reflect the particular science's history rather than its object field. Thus, in the cosmological field, astronomy, physics and chemistry are the main disciplines. The tendency, however, has been to make physics the general discipline, thus reducing the other two sciences to specific applications of general physical theories.

Recently, the chemists have staged a counterattack by arguing for the non-reducibility of chemistry. The argument is that chemistry is, at least, at a level of the organisation of matter, thus more complex than the theories of physics. The relation between physics and chemistry is then rather similar to the relation between chemistry and molecular biology. This relation has been discussed by Prigogine for instance²⁴

In biology, another major area of science, the idea of a general discipline is rather new.²⁵ Originally, botany and zoology were considered quite different disciplines, without much in common. Even for the diverse subdisciplines *within* these dual branches, there have been few attempts to find general theories encompassing them all. An attempt to form general biological theories first arose at the end of the eighteenth and during the nineteenth century. Thus, the discovery of the cell proved the existence of a common structure for plants and animals, and corresponding discoveries were later made in genetics, followed by great improvements in the theory of evolution.

An examination of the histories of the cosmological and the biological object fields makes two quite different features apparent. The first is the formation of ideas having merely transient, historical character, such as the peculiar mixture of empirical knowledge and metaphysical speculation in medieval alchemy, or

the status of Phlogiston as a real substance in the chemistry of Priestly.²⁶ This feature is scientific or pre-scientific meaning that I call **divergence**.

The second feature is the formation of theoretical concepts and theses that, in spite of basic subsequent transformations in the theory field, are connected to their theoretical successors through a relation of correspondence, and not through a relation of mere contradiction. This latter feature I call **convergence**.²⁷ If the thesis of scientific convergence defended in this treatise is correct, even the systematology of the sciences is due to changes in a convergent direction.

The object field of particular interest here, anthropology, has a peculiar collection of disciplines. First, in the Anglo-Saxon countries there is a tradition of dividing everything that in German tradition is called “Wissenschaft” into science and scholarly studies. Thus, the people working in the first discipline are called *scientists* and the people in the second are called *scholars*. This division is combined with a widespread tendency of individuals in the former category to consider the latter to be totally outside science, in fact to be quite unscientific. The totality of what I have defined as anthropology(G) is comprised of three major domains of knowledge and knowledge seeking: Psychology, Social Science and Humanities. As the internal relations between these main domains are somewhat different from country to country, and even from university to university, I will take the liberty of using this tripartite as a starting point.

When comparing psychology and the other two domains, an interesting difference between the former and the other two domains emerges. Psychology is generally considered to be a universal discipline, in spite of the disagreements among psychologists from distinct subdisciplines or different theoretical schools. This is not the case for the disciplines of social science and humanities.

Not only is there a considerable distance between social science and humanities, but also both domains are partitioned into a kaleidoscope of subdisciplines. Thus, social science has major subdisciplines such as:

sociology(S)²⁸, economics, politology, (cultural), anthropology, technology theory, theory of organisations, criminology.

Among humanities we find:

history, linguistics, theory of science, pedagogy, theory of literature, history of the arts, history of music, history of religion, archaeology, specific studies dedicated to single languages or cultures.

In psychology, in fact, there is just as much diversity, and to a certain extent, even many parallels to the other two disciplines. The difference is, however, that for psychology these divisions are considered sub-domains as opposed to independent disciplines:

social psychology, psychology of personality, developmental psychology, cognitive psychology, psychology of learning, psychology of language, psychology of motivation, psychology of emotions, comparative psychology, neuropsychology, psychology of organisation, (cross)cultural psychology, psychology of religion, psychological aesthetics, educational psychology, clinical psychology, psychopathology.

In chapter 3, I suggested that the anthropological object field could be divided into two major sections. The first consists of human individuals, the second of human societies and the constituents of these.

The idea is that the structure of the theory field should reflect the structure of the object field.

Activity as a Coupling Relation between Person and Society

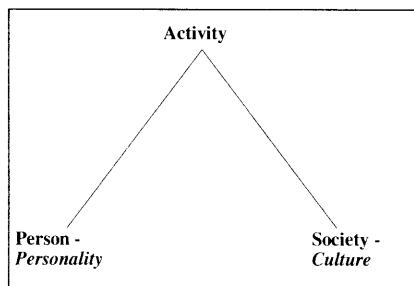


fig. 6.16

In this diagram, Activity is shown as the all-encompassing process that embraces individual persons and society in an indivisible totality. This ontological relation (the relation in the anthropological object field) is reflected on the meta-theoretical level. The theoretical picture of activity is what I call **basic anthropology** or **basic activity theory**.

The theory covering the individual is *psychology*, and the theory of society is *sociology*.²⁹ The organisation of the anthropological theory field should then be:

The 3 main parts of Anthropology

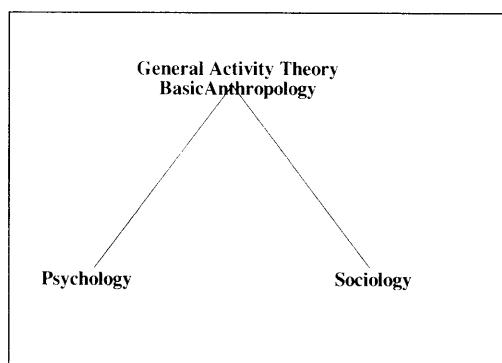


fig. 6.17

Basic Anthropology (Basic Activity Theory) is the common ground for Psychology and Sociology, which can be seen as the branches' origination in this common stem. The scope of the totality of Anthropology(G) will be discussed in the next section.

6.6.1 The Scope of Anthropology

The content of anthropology is shown in the diagram below:

Relations between general and basic anthropology to the sister sciences of psychology and sociology

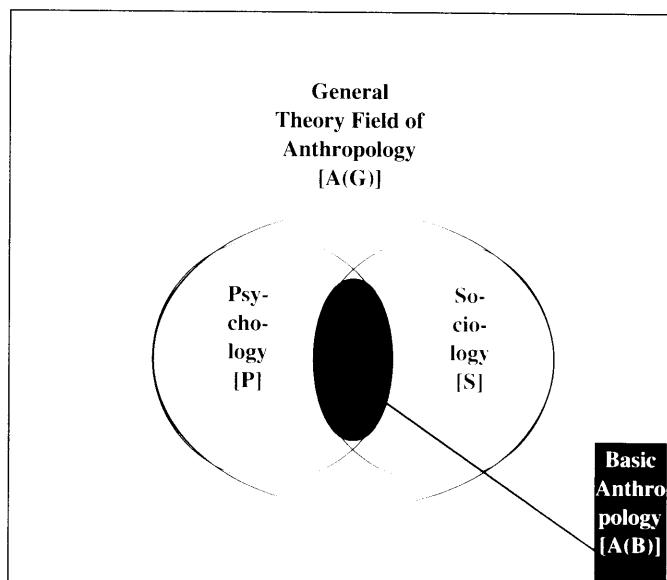


fig. 6.18

Anthropology was defined in chapter 3 as the study of Humankind. The term therefore can be understood as a super-concept referring to the totality of those sciences that are dedicated to the study of the strange attributes and accomplishments of our species. This is the broad meaning of the term, and when necessary I shall specify by adding a (G), for total, just as in the case of “cosmology” and “sociology”.

However, when Anthropology(G) is partitioned, psychology and sociology become separate components, although their common ground is anthropology(B) in the more specific sense of dealing with the essentialities of our species. In other words, it is not associated with either the individual or the societal component as a definite object, and certainly not related to the study of specific individuals and specific societies.

What then are the arguments for having this specific division of labour within the scientific domain of anthropology(G)?

I see two good reasons, which are both consequences of the existence of the separate disciplines of psychology and sociology. Firstly, basic anthropology, anthropology(B), provides a methodological platform for these sister sciences that defines the anthropological principles prior to a determination of the essentialities of, on the one hand, the human individuals and, on the other hand, the human societies. Secondly, anthropology(B) is a guardian against the everlasting tendencies of scientific separatism and scientific imperialism, the former destroying the very relation between the two disciplines, the latter destroying the integrity of its sister science.

What is the scope of anthropology(B) given that it is generously delegating the study of the person to psychology and the study of society to sociology? Its objective is the determination of the anthropological invariants, that is, the basic qualities attached to our species. According to the reflective relation between the object and the theory field, these anthropological invariants must be attached to the specificity of human activity. Therefore, the basic concept of anthropology(B), in fact, must be human activity. In chapter 3, the *specifica differentia* of human activity was defined as mediated intentionality, implicating as its essential traits the existence of tools, meaning, organisation and appropriation. All these invariants are defined on a more general level than either psychology or sociology.

We have moved from a non-paradigmatic definition of anthropology(B) as the area of discourse about our species to a definition specific to the approach of Activity Theory. The proposed organisation of the human studies, however, is not limited to this specific theory. In principle, it could be used with other theories as well. It should be noted, however, that this arrangement presupposes the acceptance of a specific relation between the sister sciences of psychology and sociology.

6.7 The Sociology of Activity Theory

The objective of this book is to analyse the status of the anthropological disciplines from the standpoint of activity theory. In the preceding chapter, I suggested an organisation of the theory field of anthropology(G) in accordance with the ontology of the anthropological object field as described in chapter 3. In the following sections, I will elaborate on the inventory of the sociological object field.

6.7.1 The Object Field of Sociology(G)

The object field of sociology is defined as all manifestations of Humankind that cannot be assigned to the human individual. This definition includes a dichotomy similar to the one suggested for the anthropological object field, dividing it into sociology and psychology.

In chapter 2, a metaphysical frame that included three ontological forms of existence (phenomenon, object and essence) was presented. This framework can also be applied here. The sociological object field is comprised of the products of human activity. In addition to these sociological objects, it also contains the phenomena (processes and aspects) and essential traits directly related to these objects. In regards to processes, a distinction should be drawn between *activity* and *act*. This follows directly from the definition of activity:

Activity is the societally organised life process, the constituents of which are individual acts.

Strictly speaking, we thus can assign only *Human Activity*, the basic concept of this treatise, to sociological, supra-individual processes.

One of the problems of sociology as a scientific discipline is that it has been fragmented, rather prematurely, into a plethora of subdisciplines, according to the most heterogeneous set of criteria. Thus, we have subdisciplines representing categories of activities:

Social activities	→ Sociology(S)
Economic activities	→ Economics
Political activities	→ Politology

Another criterion for division is the specific kind of human products that are studied, for instance:

Tools	→ Technology
Language	→ Linguistics
Objects of art	→ History of art
Literary work	→ History of literature

The criterion can even include the kind of empirical sources used by the discipline:

Material sources	→ Archaeology
Written sources	→ History

The most problematic result of this fragmentation is not so much the methodological diversification that to a certain extent is justified by the specific type of phenomenon or source studied, but rather the theoretical incoherence, as the subdisciplines are often unable or unwilling to coordinate their individual theoretical efforts. According to this brief survey of the sociological field, societal activity is considered to be *one integral process*, which is seen from different perspectives in the respective subdisciplines of sociology(G).

6.7.1.1 The Sociological Objects

In chapter 3, a sociological object was defined as an externalised product of human activity. These cultural products can be divided into the following 3 classes:

- Sociological collectivities
- Tools (artefacts)
- Signs (carriers of meaning)

These categories now will be described.

6.7.1.1.1 Sociological Collectivities

A sociological collectivity is any set of human beings that fulfil the requirements for the definition of an object (chapter 2): stability over time, a certain coherence over space, and an amount of independence in relation to other objects. Around the turn of the 20th century, there was a famous dispute between Durkheim and Tarde about the status of the existence of social collectivities.³⁰ This discussion, of course, is relevant for any suggested kind of sociological collectivity.

In the macrosociologies of Marx and Durkheim, society in its totality is the most important. Weber, on the other hand, is just as interested in collectivities of a minor rank. In social psychology and micro-sociology, there has been a basic division of groups into *primary groups* and *secondary groups*. I suggest that the term **group** should be used to refer to the former. However, for the latter, the concept of **formal collectivity** should be applied if the requirement of objecthood is fulfilled.

The greatest sociological objects are thus the **societies**. The smallest sociological objects are the **groups**, which are characterised by their ability to exist without formal rules and based only on the direct interpersonal relations among its members.

An **organisation** is a sociological object that is comprised of individual groups. Organisations, in contrast to groups, can be ordered on multiple levels. As such, a specific organisation can be formed by certain sub-organisations, which in themselves can be composed of sub-sub-organisations and so on, to the basic organisations that consist of groups only. **Maximal organisations** are

above organisations, and they themselves are not part of any major organisation. Just below the top level of society are the **maximal constituents of society**, such as the major administrative units (or possibly federate states in a union) or major sectors.

Activity Levels of the Sociological Object Field

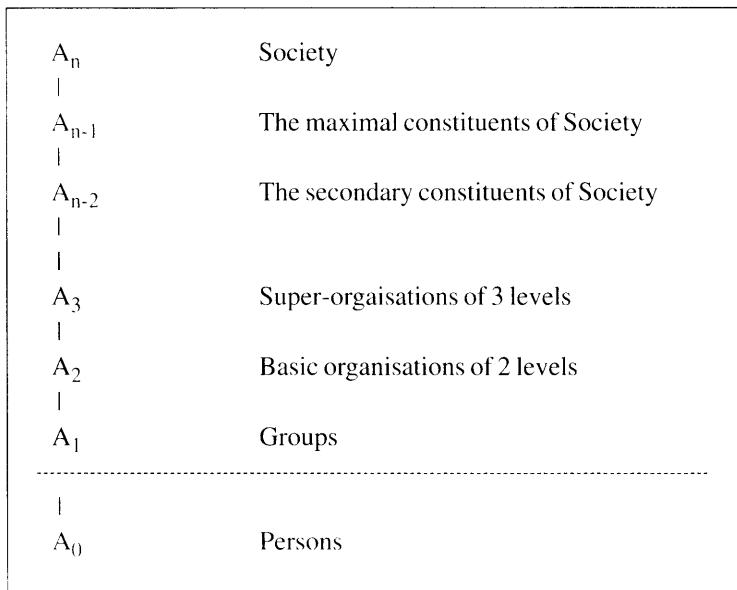


fig. 6.19

In this diagram, the different sociological objects are identified with their respective levels of activity. The total level of activity is presumed to be an empirical constant, dependant on the size and complexity of the society. This constant is for the sake of convenience called n . We thus have n levels of complexity.

At the top is society in its totality, which is the societal activity level of order n . Just below are the major subsystems of society, level $n-1$. Following are the immediate constituents of the major subsystems. Organisations can be of any order exceeding 1. Groups are of order 1, and below this level, there are no

more *societal* levels of activity. However, there is yet another level of activity, that is, the individual or personal level, where any activity has to be implemented. This level, which implements and complements the societal level, has been appointed the symbolic level of zero. The personal level of activity is thus beyond the societal or **external system of activity**. The personal level of activity is not just the limit of the external system; it is also the apex of a quite different system of activity, the **internal system of activity**. It belongs to another object field, the psychological one.

Society is not a totally ordered hierarchy. In fact, society is composed of several substructures that have different orders of complexity. For instance, the *state* in the developed part of the world is organised in a relatively well-ordered administrative hierarchy, whereas the *economic sphere* consists of more or less independent firms and enterprises of very different orders.

The third sector of society, the civil society, is a heterogeneous assembly of family structures, local society structures, and non-governmental organisations, such as civil associations. There are even overlapping sectors. Thus, political parties connect the state and the civil society, labour unions connect the economic sphere and the civil society, and lobby organisations connect the economic sphere and the state.

The societal objects that deviate from a hierarchical ordering are sometimes called *heterarchies*. Another tendency in social science is to abandon the very concept of objecthood or even any permanent structure. Thus, the fleeting, constantly changing networks of cooperative relations in an organisation have been characterised lately by the term "adhoocracy". However, I shall stick to the somewhat old-fashioned concept of hierarchical societal ordering, in this field as well in the three other major fields analysed in this treatise. It is certainly not an exhaustive description of societal structures. It is even often in contradiction to the societal realities, but nevertheless it models some decisive structures of society.

We have here moved into an empirical societal analysis that is, in fact, outside the scope of this treatise. The objective of this subsection is merely to set up a theoretical model for the societal collectivities, a type of societal object. According to this model, there are just three types:

Types of Societal Collectivities

1. Society in its totality
2. Organisations
3. Groups

This leads to two fundamental questions. The first is regarding the ontological status of a societal collectivity. The second concerns the taxonomic status of societal sectors.

The ontological question concerns the classical problem of concepts. When are concepts designators of real (extralinguistic) entities, and when are they expressions of mere conventions that are self-referring terms of societal meaning. In the case of the latter, they are not deprived of existence, but this existence is placed within another part of the sociological object field, the **societal meaning system**, which is to be treated shortly.

If they are real entities, there are two possibilities. They can refer either to *real objects* or to *essentialities*, that is to say essential traits of the sociological object field. A real object is a societal object belonging to one of the three types just mentioned. An essentiality is a trait of the societal essence.

The problem of the essentialities is, of course, that they are theoretical assertions that have to be scientifically tested or, at least, argued.

The objective of the previous chapter was to defend the standpoint that scientific theories are not just social constructions that are part of a specific kind of meaning system, but that they have the potential of approaching the essentialities of the object field in question. Marx's concept of *class* is a sociological term that, according to Marxian theory, refers to an essentiality. The working class or the class of capital owners thus are not sociological objects belonging to the subset of societal collectivities. In fact, they are not sociological objects at all. Whether they should be accepted as concepts referring to essentialities, of course, is a crucial matter for social science.

The second question concerns the taxonomic status of societal sectors. Characteristically, the modern pluralistic society of the western world is conceived of as consisting of sectors, such as the state, the economic sphere, and the civil society. The state itself has subsectors, such as the parliamentary system, the

governmental system, and the legal system.¹¹ Additionally, in the welfare type of states, there is even the social welfare sector, the educational sector and the health sector. The question is whether these sectors have an ontological status of a sociological object, (i.e., a societal collectivity) or whether they are merely a part of the societal meaning system, organising not society itself, but merely our *reflexions* about it.

If it is, in fact, a societal collectivity, according to the taxonomy suggested it should be an organisation that is a formalised system consisting of suborganisations and finally of real groups. This is certainly true for most, if not all, of the state sections. Is it also true for the economic sphere and for the civil society?

Is the totality of the economic sphere thus a societal collectivity of the type organisation? If not, what kind of ontological status does it have? I will not answer this question here, because that would be transgressing the limit of the conceptual analysis of this treatise, being a question of considerable empirical content.

In addition to the societal collectivities, there is the part of society that is *made by*, but not *made from* human beings. This part, according to the anthropology set up in chapter 3, should be divided into the material products and the meanings produced by human activity.

6.7.1.1.2 *Material Products (Tools)*

Any kind of material product that is the result of human activity is considered a sociological object of the type **material products**, according to the definition of **tools** introduced in chapter 3.

The idea that these products are a specific realm of reality is heavily inspired by Marx and his concept of *means of production*, and partly by the celebrated *third realm* of Popper, that is, the part of reality besides the physical objects and the mental entities.

Even though I have already *en passant* discarded Popper's specific ontology with its division into these 3 realms, I must admit that there is a kernel of truth in it. Namely, that societal activity produces objective entities, whether artefacts or *objective knowledge*, that are an extension of reality.

Popper defines his third realm or world in the following way:

By World 3 I mean the world of the products of the human mind, such as stories, explanatory myths, tools, scientific theories (whether true or false), scientific problems, social institutions, and works of art. World 3 objects are of our own making, although they are not always the result of planned production by individual men.

Many World 3 objects exist in the form of material bodies, and belong in a sense to both World 1 and 3. Examples are sculptures, paintings and books, whether devoted to a scientific subject or to literature. A book is a physical object, and it therefore belongs to World 1; but what makes it a significant product of the human mind is its *content*: that which remains invariant in the various editions. And this content belongs to World 3.³²

My reservation regarding Popper's ontology concerns two points. One reservation concerns *meanings*, which will be treated in the next subsection. The other reservation is regarding artefacts, the specific type of relation that Popper postulates for "physical object of realm 1" and "artefacts of realm 3". He proposes that realms number 1 and 3 are simply overlapping sets. Thus, artefacts belong to both realms. On the other hand, physical objects *merely belong* to realm 1, and human products *do not belong* to realm 1. It is not the logical set theoretical conception I am criticising, but rather the crudeness of Popper's ontological system. According to my terminology, the two meanings of the concept *physical* need to be distinguished. *Physical1* is to be understood in the dualistic way suggested by Popper, whereas *physical2* is to be understood within the ontology suggested in chapter 2, which is as the part of reality that is sub- or pre-biological.

In the same way, the part of reality that is post-biological is to be understood as anthropological, and sociology is a part of this object field.

Thus, artefacts are not *physical* in my ontology, or to be more specific, not *physical2*, but are *sociological objects*. Artefacts include all kinds of intentionally produced objects that are called *the material culture of a society* according to traditional ethnography. Apart from tools in this narrow sense, the concept artefact also includes buildings, roads, vehicles, ships and so on.

6.7.1.1.3 Meaning (Signs)

In chapter 5, **meaning** was defined as the functional value of a *sign*. This functionality was defined as the potentiality of referring to something else. The third category of sociological objects is *Signs* (societal collectivities and artefacts are the other two). This category corresponds in a broad sense to the cog-

nitive culture of a society, according to the terminology of traditional ethnography. It is also that part of Popper's *world 3*, excluding artefacts. As mentioned in the last subsection, I have reservations about Popper's depiction of *world 3* as his definition for artefacts. My other reservation is regarding his definition of meanings, which mainly falls in the direction of scientific knowledge. Although I have been deeply inspired and influenced by Popper's concept of objective knowledge, this concept has a certain idealistic tendency, which is connected to his dualistic splitting of theory and practice.

In the previous chapter, I tried to develop a theory of signs freed from idealistic and dualistic flaws. The confusing feature of meanings is that it is not the physical characteristics of their material carriers, their signs, that are important, but rather their ideal content, that is their specific functional value of potential reference.

This is, in my view, one of the reasons for the recurrence of idealistic or dualistic ontologies. Even the Leninist type of reductionistic materialism, where meanings are defined as reflections without materiality, has a dualistic flavour as I argued in chapter 4. Meanings are, however, not only anthropological invariants, they can also be defined as *specifica differentia* of the human kind. As meanings were discussed at some length in chapter 5, I shall restrict myself to the concluding analysis of the meaning systems of culture to be presented in the last section of this chapter.

6.7.1.2 Sociological Phenomena

A sociological phenomenon is any state or process that we observe and that must be recognised as a state or process of a sociological object. Sociological phenomena are thus predominantly societal activities and aspects of these. From a systematological perspective, problems only emerge when there is doubt about the localisation of a certain phenomenon. For example, there has been an extended discussion about the rise in the global temperature during the last century. Is this rise an intrinsic geological phenomenon, possibly subject to some long climatological cycles, or is it a sociological phenomenon, caused by human production of carbon dioxide and other hothouse gases?

Another area where localisation problems occur is at the boundary between sociology and psychology. This is the case concerning so-called mass psychological phenomena, like "mass hysteria", or other societal movements in which psychological processes clearly have decisive importance.³³

6.7.1.3 Sociological Essence

As stated in chapter 3, the essence of a society is proposed to be its culture. The two previously mentioned forms of existence, phenomena and objects, have by definition a more or less secure empirical status. They are observable objects or aspects of objects. The essence form of existence, however, is not only intangible, but also totally inaccessible without theoretical tools.

To deal with the real task of a discipline, determining the essence of its objects, a theory is needed. As the essence of a society has an integral nature, exceeding its different manifestations, we need a corresponding theory of the same integral nature. A theory is, after all, nothing but a system of concepts and statements dedicated to the understanding of the essence of its objects.

6.8 Person and Personality –the Psychology of Activity Theory

6.8.1 The Object Field of Psychology

The psychological object field serves as the ontological basis for all activities specified as *psychological*. This includes practical as well as theoretical endeavours concerning what are loosely called *psychological problems*. The philosophical standpoint of this treatise is that the object field is given before the theory field and mediated through the practice field. In principle, we should be able to distinguish between this ontological basis, the *object field*, and the specific way it is conceptualised in the *practice field* and the *theory field* of psychology. When referring to a problem or phenomenon from this ontological basis, the adjective *psychic* will be used for emphasis.

Thus, a post-traumatic depression is, as far as it is postulated as an ontological prior phenomenon, a *psychic* problem. It can be transformed into a *practical psychological* or *psycho-technical* problem by the practical psychologist or into a *theoretical psychological* problem by the psychological scientist. To be consistent, I should even use the adjective *psychic* for the object field. However, as the constellation *a psychic object* has a rather occult flavour, I have avoided such consistency in my terminology.³⁴

6.8.1.1 The Psychological Objects

In the preceding chapters, the anthropological object field was defined as consisting of two different objects, sociological and psychological objects. The former are sociological collectivities and human products, either artefacts or meaning. A psychological object is simply a person, a human individual. The relation to the sociological object field is demonstrated in the figure below.

The Upper Hierarchy Ascending from Psychological Objects and Personal Activity

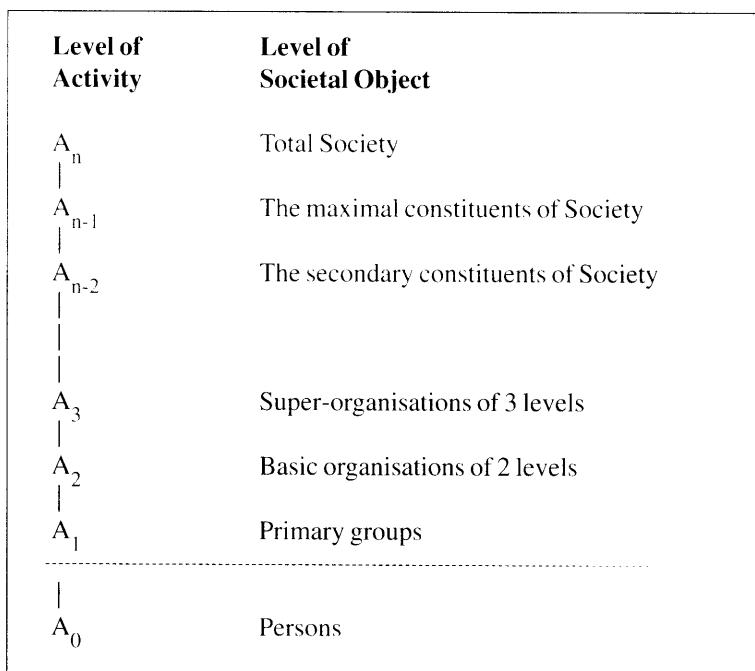


fig. 6.20

The person is the external limit of the sociological hierarchy. The base of the hierarchy of societal collectivities is the primary group. A person is not a sociological object, but rather a psychological object.

The level called A_0 is a boundary concept, as activity in my definition can never be exclusively assigned to the individual. However, the individual is certainly the ultimate agent of implementation for any activity, and in some cases, we can even limit the societal influence of an activity to being the context of a specific individual. Thus, the celebrated Great personalities of history have sometimes pursued and realised their projects more or less single-handedly. Newton had no direct co-operators when he wrote his Principles, neither did Kant hire any subcontractors for any parts of his 3 Critiques. On the other hand, we should not distort the endeavours of outstanding personalities to the abstraction of the A_0 in such cases as processes occurring in a societal vacuum.

Regardless of whether we analyse A_0 or an activity on a higher level of organisation, it should be remembered that the sociologistic conception of activity having society as its subject and the individual as its object is totally wrong. In fact, no activity can be performed without being constantly implemented as actions of a specific individual. This was presented in the definition of activity in chapter 3:

Human activity is the societally formed life process realised through the actions of the individuals participating in it.

Thus, the very intentionality supplying human activity with its dynamics and directedness is rooted in the action of specific persons. The project of reducing psychology to sociology is thus doomed to fail, as no part of society can exist without the constant performance of the actions of human individuals.

6.8.1.2 The Psychological Phenomenon

A *psychological* phenomenon, which in this context should strictly be called a *psychic* phenomenon, is any phenomenon attached to a psychological object, in other words a *human individual*, understood as being *simultaneously human object* and an *individual creature*. Thus, the overlying activity hierarchy in the figure above is not a *psychological*, but a *sociological* phenomenon.

6.8.1.2.1 The Boundary between Psychological and Sociological Phenomena

The activities in a group may be psychological phenomena, but only in so far as these phenomena are attached to individual members of the group, and not to real inter- or supra-personal states or processes. This is then the mistake of sociologistic or interactionistic positions, as for instance found in systemic psychology (Gustafson & Cooper 1990).

It is correct to suggest that the ongoing activities in a group are inter- or supra-personal. However, it is incorrect to suggest that all phenomena in a group are exclusively inter- or supra-personal and thus not to be attributed to a particular individual.

If, for instance, a person has a nervous breakdown in a group, this event may be influenced by the presence of the group, but it is still a process attached to the individual, and thus a *psychological* phenomenon. Likewise, if a person is generally incapable of co-operating because of a tendency to project personal feelings of inferiority to experiences of devaluation from colleagues, this phenomenon may be part of a greater complex of co-operational problems in the group. However, it is, after all, not the group as such, the sociological entity, but rather a specific individual in the group, who has a psychological problem.

Linguistic or semiotic theories in which individuals are reduced to being bearers of societal signs are examples of other kinds of sociologistic reductionism. In my own definition of signs presented in chapter 5, I stressed the psychological foundation of signs by referring to their functional value. Reference is a specific psychological phenomenon.

I propose that a **sign** is:

any object or phenomenon confined to the field of human activity
(naturally present to or produced by humans) if and only if it is referring to some object or phenomenon anywhere in the entire cosmos.³⁵

In my definition of **reference**, I do not use the extentionalistic position just criticised. Instead, I suggest that *reference* refers to the psychological processes of something being perceived or imagined by a person to be directing his or her thinking toward some other object or phenomenon (at least another aspect of the original sign), and thereby being a mediator or the mediated activity of humans.³⁶

We shall now proceed to the other boundary zone, the area between the psychological and the biological object fields.

6.8.1.2.2 The Boundary between Psychological and Biological Phenomena

By defining a psychological (psychic) phenomenon as a state or a process attached to a *person*, that is, as an entity that is simultaneously an *individual creature* and a *human object*, two crucial exclusions are made. The first exclusion is associated with what is non-individual, the second with what is non-human.

Let us examine the first exclusion that is associated with the adjective, *individual*. By insisting on an association with an individual, we are excluding all ontological levels *above* the individual (i.e., the *sociological* levels) and all levels *below* the individual (i.e., the *biological* levels). We have already discussed the sociological levels, and we shall now analyse the biological levels, which can be defined therefore as the *sub-psychological* levels.

The problem regarding the sub-individual levels of humans is due to an ambiguity of the term anthropological. Traditionally, the field of anthropology has been divided into physical and social anthropology. Physical anthropology concerns the human organism, the human body, and is, in my understanding, a biological discipline. It is an anthropological characteristic that the human brain has a much larger proportion of neocortical surface than any other vertebrates, but this is a purely biological phenomenon.

The same categorisation is true for the specific lateralisation of the human brain, or the development of the frontal lobe, and so on.

The demarcation between psychological and biological phenomena is demonstrated in the following diagram:

The Lower Hierarchy Descending from Psychological Phenomena

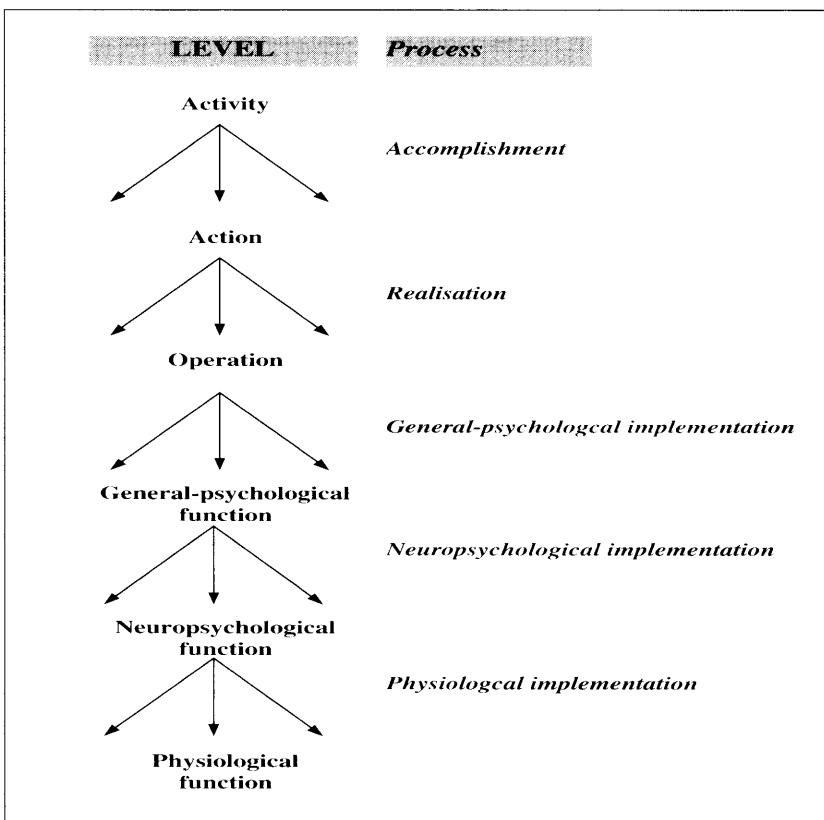


fig. 6.21

In the diagram above, I have followed the hierarchical analysis proposed by Leontiev.³⁷ The first level, the activity itself, is only marginally at a psychological level, as any activity is bound to be organised sociologically.

However, we can introduce the abstraction A_0 , that is, the part of any activity that is primarily attached to a specific person. Thus, a work activity may be almost exclusively individual, such as in pre-industrial craft and in many cases of creative activity, such as writing or painting. Therefore, the personal activity of an individual, that is the A_0 of such a person, is a psychological phenomenon.

The next level, the action, however, is almost without any doubt attached to a specific individual, although there may be instances of co-operative actions, making a boundary case. Apart from such instances of co-operative actions, an action is by intention and realisation the accomplishment of a human individual.

An action, as an intentional unit, generally has to be realised by units of behaviour that Leontiev called *operations*. Operations are attached to pre-formed behavioural dispositions of the individual and therefore they can be chosen as situation specific ways of realising the action chosen. An operation is sometimes *conscious*, that is, it is consciously chosen. In other cases, it is automatically carried out without being, in principle, excluded from consciousness, it is *pre-conscious* according to Freud's terminology.³⁸ A third possibility is that it has the status of being unconscious, in either the sense of what Polanyi³⁹ calls *tacit* knowledge or what Freud calls *subconscious*⁴⁰. Whatever the status of an operation in relation to consciousness, it is no doubt a psychological phenomenon, as it is attached to the person as such, and not to his/her biology.

On the next level, the operations presuppose some general, psychological functions. These processes possibly can be isolated as operations, for instance in a psychological experiment, but normally are automatic processes of the working psyche, and thus dispositions of the individual as an active being engaged in actions directed toward the environment.

These functions are often classified according to general psychological categories such as Perception, Memory, Arousal, Learning and so on. They are aspects of the operations just described.

6.8.1.3 The Psychological Essence

The concept referring to the essence of the psychological object is the *psyche*. This concept is, therefore, initially to be understood as *explanandum*, not as *explanans*. Since the psychological object has already been specified as the human individual, an alternative concept in this context with the same meaning could be *personality*. The reason for locating the essentiality concept in the section concerning the theory field is that it is the very function of theory to illuminate the problems of essence, which cannot be clarified via direct access to the object field.

6.8.2 The Practice Field of Psychology

My general theory of knowledge does not presuppose psychology to be a unitary entity, but instead a dichotomous entity; it is a *scientific discipline*, studying psychic phenomena, psychic objects (persons) and the psychic essence of the former (the psyche). It is, however, also a practical occupation, namely that of the *psychological profession*, a system. The constituents of this system are professionals whose training and work is directed towards intervention concerning psychic problems.

In my terminology, I distinguish between a *psychic problem*, a problem attached to psychological objects, and a *psycho-technological* problem, a problem concerning professional psychologists.

This may seem to be hair-splitting, but there has been a tendency to confound these two types of problems by calling both *psychological* problems. According to the knowledge theory presented in this treatise, it is, however, crucial to follow the path from the initial phenomenon in the object field to the way it appears for us in the corresponding practice field, until finally a preliminary clarification takes place in the theory field.

Thus, associated with the anthropological object field is the problem of reflexivity (as defined earlier in chapter 6), which means that the practice and theory fields are themselves parts of the object fields from which they are spin-offs.

When I refer to the psychological practice field, it should be understood as a field constituted by the psychological profession. In this way, the psychological profession and the psychological discipline become two intertwined approaches to the understanding of the psychological object field. In fact, the twin representatives of educated psychologists, the professional psychologist and the psychological scientist, are co-members of the all-embracing institution of the psychological *occupation*.

As an example, we could examine a psychological phenomenon such as anorexia nervosa. This appears as a psychic problem for the person who is in the process of starving to death in the course of a prolonged refusal to accept nourishment. It is thus an immediate problem for the subject concerned and for persons related to this anorectic person. Why do I call it a *psychic* problem? This is already a bit tricky, as there is certainly not a clear cut delimitation of the problem involved with such an attribution. For instance, this is the case for

demarcations that are not an exclusive medical problem or a political phenomenon, for example, a hunger strike. I willingly admit that there has to be a degree of cognitive osmosis from the psychological occupation to the public, enabling the emergence of the term "psychic". On the other hand, the very existence of the contemporary psychological occupation presupposes a relation between this establishment and the public.

This relation defines *psychic problems* as troubles appearing for the persons directly involved, as worries of such a complicated kind that they cannot be solved by the persons themselves, and therefore demand the assistance of a professional psychologist. With the entrance of this professional psychologist, the original psychic problem is transformed into a *psycho-technological* problem.

This means that it is now transformed into a professional problem for the professional psychologist. The anorectic person is having a psychic problem, with the implication that if this problem is not solved then she or he is possibly going to die, and that she or he will at least have a miserable existence as long as the problem persists.

The professional psychologist deals with psycho-technological problems. This implies that the psychologist has to find a way to make contact with the patient, to motivate the patient to be involved in therapy, and to develop a method of Psychotherapeutic intervention removing the original causes of anorexia, or in other words, offering the patient a non-anorectic way of coping with existence.

To make my concept of psychological phenomena and problems more precise, we have to return to the basic model of the dialectic between theory and practice:

The Epistemic Flow in Psychology

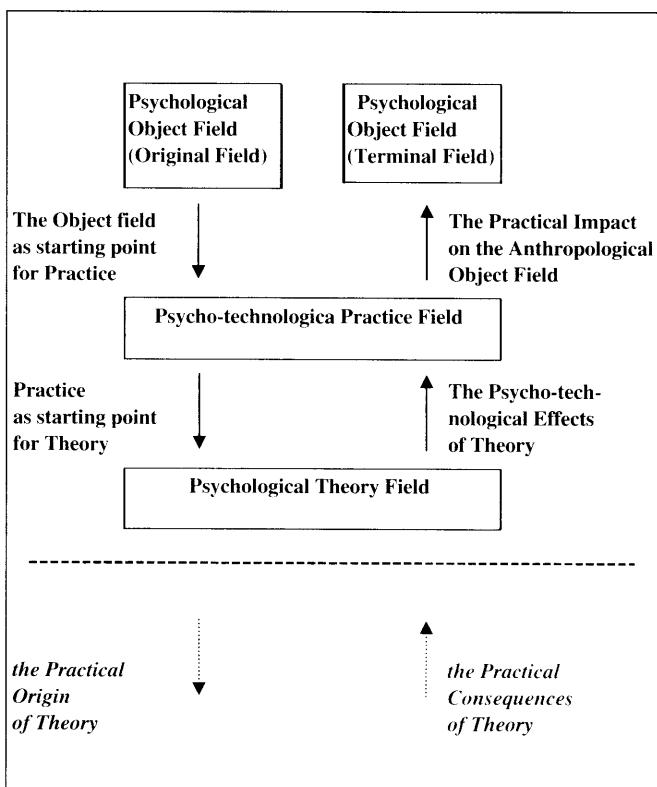


fig. 6.22

Whether a certain problem is considered fundamentally biological, psychological or sociological, according to my criterion, and of practical necessity, is ultimately *decided* in the practice field, but possibly *realised* in the theory field. Until one or two decades ago, many psychologists, and even some psychiatrists, were convinced that clinical problems such as infantile autism and schizophrenia were purely or predominantly a psychopathological manifestation of traumatic upbringing. In particular, Laing¹¹, who was a leading exponent of the antipsychiatric movement, and the Palo Alto group, with their theory of schizophrenia as a symptom of disturbed family communication¹², struggled to move such diagnostic categories from psychiatry to psychology.

These iconoclastic theories in antipsychiatry and systemic psychology have had a very modest degree of clinical success. Confronted with the responsibility of treating patients with these severe personality disturbances that are called psychiatric disorders, clinical psychology has had quite little to offer. On the other hand, psychiatrists had been rather powerless when treating eating disorders (such as anorexia) and borderline personality disorder (a recently quickly expanding diagnostic category of personality disorders).

Looking at the model of epistemic flow, these examples, however, should not be understood as a purely pragmatic criterion of demarcation. Whether a problem or phenomenon is to be localised as psychological or biological is *not* an isolated question of professional success. Such a criterion would make the concept of the field totally circular. Just as operationalists used to define intelligence as what was measured by an intelligence test, such a criterion would define psychological problems as those treated by psychologists. Defining a psychologist as a person with the job of treating psychological problems would complete the circle. To avoid such a *circulus viciosus*, we need a dialectic of the distinct field of practice and theory. As these fields need something more basic in common than their interaction, we also need an object field.

Thus, the discussion of the status of infantile autism has lately been dominated by growing evidence of a genetic disposition for deficient perceptions concerning emotive signals or other peoples' state of mind (Baron-Cohen 1995). There is likewise, although no evidence yet, a firm conviction among neuroscientist about the neurological foundation of schizophrenia. On the other hand, there is no evidence for a predominant biological basis of anorexia or borderline personality.⁴¹

This should not be understood as reduction to a simple criterion of success. In contrast to so-called "alternative therapies", a scientifically-based professional intervention has to be based on a rational theoretical framework of discourse. On the other hand, utter lack of psychotherapeutic success for a specific psychotherapy based on a certain theoretical framework is not evidence that the phenomenon treated has a different nature than postulated by the theoretical framework.

Thus, practical results, on the one hand, and the theoretical (disciplinary) confirmation of this practice through empirical investigations and attempts of theoretical explanation in the theory field, on the other hand, are a *sine qua non* for a profession based on a scientific discipline. Just as a living scientific disci-

pline needs the interaction with a profession, the profession needs the discipline to test its results and hypotheses and to set up new problems to be investigated.

There are two aspects of the psychological profession worth discussing. The first is the already mentioned relation between the profession and the discipline. The second aspect is the division of the profession into subfields or sections. For example, in the American Psychological Association, the leading U.S. association of psychologists, there are dozens of sections, some of which are of minor interest, from a practical as well as a theoretical point of view.

Generally, it seems that the practical division of the profession is a reflection of the societal structure and thus of the scenes where psychic problems appear. Thus, when psychic problems occur in a totally individualised form, it is natural to seek the psychotherapeutic service of a psychologist in private practice.

When psychic problems are associated with health problems, a psychologist trained in bio-psychology, such as a specialist in psychosomatics⁴⁴ or neuropsychology, is a more obvious choice.

In cases where psychic problems appear within a family, a psychologist having expertise in family psychotherapy may be necessary. The psychic problems associated with a whole organisation require the intervention of an organisational psychologist. The psychic problems appearing within education require an educational psychologist and so on.

Here there are no deep perspectives leading to a greater understanding of the psychological object field as such. Only when a specific professional section gets a counterpart by the emergence or the enrichment of an independent theoretical subdiscipline, will practical experiences have a direct implication for the analysis in question. I see this dialectic between profession and discipline as a methodological ideal for the development of psychology.

Notes

- 1 See (Sandfort 1962) and (Dijksterhuis 1961).
- 2 This tendency of a merging or at least a coalescence of the different domains is, no doubt, a main reason for the faulty conception of science in the so-called Frankfurt school, where primarily Habermas, a philosopher, has determined (and thus stigmatised) science by its postulated technical interest in knowledge. See (Habermas 1984-1989).
- 3 The conceptual relation between “sign” and meaning was defined in the previous chapter.
- 4 This is, however, not the only function of the category of signs. In addition there is an internal function, that of being the bricks to construct the internal representation of the personal knowledge system.
- 5 The cultural implication of script has been stressed by Goody (1986).
- 6 See (Karpatschhof 1990, 1999).
- 7 See (Karpatschhof 1985).
- 8 See (Cole & Postgate 1976, 184-189) and (Evans 1983, 160-162).
- 9 See (Karpatschhof 1992).
- 10 About the fifth generation of computers, see (Feigenbaum and McCorduck 1983), a triumphant announcement to the world, and (Winograd and Flores 1986), which offers a considerably more balanced discussion.
- 11 Høyrup thus writes about the relation between practical surveying and the emergence of an abstract algebra:

In principle, the difference between the two mathematical enterprises [the practical function and the pure virtuality of abstract algebra, remark of BK] could be explained in two ways. Surveyors borrowing and continuing the algebraic tradition of the Old Babylonian scribe school might change its character, leaving out what had little appeal within their professional environment. Alternately, the scribe school might have been inspired by a pre-existing surveyors' subscientific tradition and have developed a limited array of "algebraic riddles" dealing with real geometrical configurations into a mathematical discipline *sui generis*. (Høyrup 1993, p. 205)
- 12 Geo-meter is the Greek word for a person measuring the land (earth).
- 13 See for instance (Rogers 1971, 34ff) or (Schoenfield 1967, 22f).
- 14 This French reform group had, for better or worse, a lasting influence even on Jean Piaget, whose idea of knowledge is the elevation from concrete to the formal knowledge.
- 15 (Friberg 1979), (Høyrup 1991, 1993).
- 16 (Smith 1976).
- 17 (Vico 1968).
- 18 (Comte 1969).

- 19 There is a specific problem with economic data, as they are so to speak born as aggregates, summing up large numbers of individual microeconomic transactions. In a way, these macroeconomic data resemble the data from a macro-physical space like a gas. There are, however, important differences in the relation between, on the one hand, micro- and macro-physics and micro- and macro-economics, on the other hand. Thus, we do not have any direct phenomena corresponding to the macroeconomic data, which are totally dependent on the established statistical institutions. In addition, no one has ever developed an empirically founded theory of microeconomics, just as a convincing theoretical integration of micro- and macro-economics has never been established. Such a mediating discipline, with the same meta-theoretical status as that intended by social psychology to be the mediator between psychology and sociology, is lacking. In fact, there is scarcely any convincing specimen of microeconomics, which if existent, would actually be a part of psychology.
- 20 It should be stressed that *insurmountability* is an ontological and methodological concept, not an epistemological concept. It is not the acquisition of physical knowledge that is blocked, but our direct contact with the cosmological object field. The paradox of our heroic epistemic surmounting of the insurmountable ontological barrier to a field totally alien to us is witnessed partly by the enormous problems and expenses of high-energy physics and astronomy. This is partly because phenomena of physics are immediately incomprehensible to us. Examples from quantum mechanics are the dispersion pattern of a single photon, and lately the phenomenon non-locality and entanglement. Not to mention the not yet verified hypotheses of string theory, with a dozen dimensions, of which the majority are invisible.
- 21 Sociology(S) is already defined as sociology in the narrow, specific sense. It is only that part of the social sciences investigating social relations and social structure, thus excluding disciplines such as economics, palaeo- and evolutionary anthropology, cultural anthropology, linguistics, the humanistic study of culture and so on.
- 22 The impossibility of such a calculation of the effect of the forecast is alone evident from the circularity of the problem, as the very attempt of eliminating such a disturbance in itself could influence the political process.
- 23 (Jenkins 1986).
- 24 (Prigogine 1980) and (Prigogine & Stengers 1984).
- 25 (Overmier, Judith A. 1989).
- 26 (Bensaude-Vincent 1996).
- 27 The question about the existence of such convergent features of theory fields has been the centre of discussions in meta-science during the last third of the 20th century, as explained in the previous chapter.

- 28 The reader should remember that sociology is generally used in an inclusive, broad sense, covering all the social sciences, whereas the traditional sense is the exclusive one covering only the discipline investigation social structure and processes in the contemporary Western countries. The former sense is when explicitly expressed, the latter is when explicitly expressed supplemented by an S in a parenthesis.
- 29 A very close concept to my own use of sociology in this broad sense is found in Giddens (1990a, 1987). However, he has chosen to denote this all-encompassing discipline by the name "social science".
- 30 (Durkheim 1952, 318ff). (Tarde 1969, 113ff).
- 31 This division is related to the tripartite segmentation into the legislative, the ruling and the judiciary authority that was introduced by Montesquieu.
- 32 (Popper & Eccles 1977, 38).
- 33 I have discussed such mass psychological phenomena in (Karpatschof 1999).
- 34 Consistent terminology could maintain a distinction between phenomena of the object and of the theory field by the following duality in the terms:

Object field	Phenomena of Object field	Concepts of Theory field
Cosmological	Cosmic	Cosmological
Biological	Biotic	Biological
Anthropological	Anthropic	Anthropological
Psychological	Psychic	Psychological
Sociological	Societal	Sociological

- 35 Ch. 5, p. 378.
- 36 Ch. 5, p. 379.
- 37 (described in chapter 3).
- 38 (Freud 1923, 237-289).
- 39 (Polanyi 1958).
- 40 (Freud 1923, 237-289).
- 41 (Laing 1965).
- 42 (Bateson et al. 1956).
- 43 It should be stressed that the controversy about the nature of schizophrenia is, of course, no simple empirical question. Both the aetiological roots of this psychic disturbance, as well as its very definition and symptomatology are as yet most opaque. My wife and I have presented a case study of a (border) psychotic woman, whose problems, we argue, are purely the result of an extreme case of severe and

early abuse. This client possesses many of the classical symptoms of schizophrenia, and in our judgment could easily have been diagnosticised and treated as a schizophrenic patient. Our case study is intended to present aetiological and psychotherapeutic evidence for the personality disturbance to be of a purely psychological kind (Karpatschof & Karpatschof 1987).

- 44 In cooperation with a cardiologist, I have recently published an article dealing with the health psychology of angina pectoris (Karpatschof & Ballegaard 1999).