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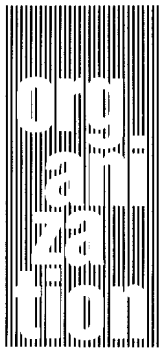

articles

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Abstract. *This is an edited and translated transcript of a lecture by Niklas Luhmann in which he outlined the foundation of his systems theory based on the notion of difference and distinction. After a brief introduction to early theories of distinction, the central ideas of Spencer-Brown's* Laws of Form *as the most radical form of differential thinking are presented. For Luhmann's systems theory, this has four important consequences. First, the system is the difference between system and environment. Second, the system can be defined through a single mode of operation. Third, every (social) system observes internally (i.e. within the system) its own system/environment distinction; there is a re-entry of the system/environment distinction into the system. Fourth, every social theory is part of the social domain and as such part of what it describes.* ***Key words.*** *George Spencer Brown; social systems; systems theory; theory of distinction*

In this lecture, I will discuss a topic that I consider the most important and most abstract part of my theory of social systems, namely, the differential or difference theoretical approach. This approach is based on recent insights in systems theory. Speaking generally, we can divide the development of systems theory into three stages: (i) the theory of closed systems; (ii) the theory of open systems; and (iii) the theory of observing or self-referential systems (cf. Luhmann, 1995: 5–11). My considerations derive especially from the third and last stage of the development of systems theory.

The transition from the theory of closed systems to the theory of open systems drew increased attention to the environment. This change

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concerned not only the knowledge that there is an environment, but also the insight that an open system is based on the relations between system and environment and that these relations are not static but dynamic; they are, as it were, channels that conduct causality. On these grounds alone, it was already obvious that no system can exist without an environment. Such a system would end in entropy or not come about in the first place, since it would revert immediately to a state of equilibrium without difference.

Already Parsons had spoken of 'boundary maintenance' and thus changed the definition of a system; he shifted from a system definition that relies on an essence, essentials or other unalterable structures to a definition that depends on the question of how the difference between system and environment can be maintained, possibly even at the same time that structures are being replaced. In this case, the identity of a system requires only continuity without requiring any minimal or essential elements at the structural level. This change was important precisely because one can no longer account for death when one moves from a biological model to questions of social theory; instead, one must presuppose continuity in the development of extremely varied societies; that is, structural developments that go beyond anything that permits us to typify different societies or categorize them historically. Already here, the reproach of conservatism that is often levelled against systems theory and aims at the structural level had become meaningless.

What else could be added to this state of affairs? What has changed compared to the situation that was reached at the end of the 1950s or beginning of the 1960s? What has been added, in my opinion, is the possibility of a more radical formulation of the system definition. Now one can say: a system *is* the difference between system and environment. You will see that this formulation, which sounds paradoxical and perhaps even is paradoxical, needs some explanations. I thus begin with the claim that a system *is* difference—the difference between system and environment. In this formulation, the term 'system' occurs twice. This is a peculiarity to which I will return in a roundabout way.

To begin with, my claim is founded on a differential or difference theoretical approach. Theory, insofar as it is intended to be systems theory, begins with a difference, the difference between system and environment; if the theory is intended to be something else, it must be based on a different difference. Therefore, such theory does not begin with a unity, a cosmology, a concept of the world or of being, or anything comparable. Instead, it begins with a difference. For at least 100 years or so, precursors of such a procedure have existed. I will enumerate some of them in order to show that such considerations did not originate only in the 1970s and 1980s, but had already been prepared, one might say, by a number of earlier attempts at working with conceptions of difference in a more radical fashion than previously. For example, in the Greek language a notion of difference, of distinctions, of *diapherein* existed already. The

sphere of this notion, however, was limited. In this sense, difference was one thing among others. Theology as well as ontology worked with a concept of being. But, around 1900, such unitary concepts started to become questionable.

One of the precursors was Ferdinand de Saussure, a linguist, whose lectures were published only much later (de Saussure, 1972). In them, he presents the thesis that language is the difference between different words or, if one would like to formulate the theory in terms of sentence structures, different propositions; language is thus not given, as imagined in classical semiology or semiotics (regardless of the preference one might have for either the French or the Anglo-American name), simply as the difference between words and things. Language functions because, *qua* language, it can distinguish between the word 'professor' and the word 'student', for example. It does not matter whether there are actual differences between the two specimens thus designated. When using language, we are bound to distinguish between professor and student. Whether there are also age differences, differences in attire, differences regarding the courage to display unconventional behavior and so forth is a different matter altogether. Language is able to draw these distinctions in the first place. And it is this difference between words that keeps language going and controls what can be said next. Whether these differences exist in reality may well remain an open question. Of course, we would not even begin to speak if we did not assume that something existed that could be designated in this manner. However, it is the difference within language that is decisive for the course of a particular linguistic action, of a linguistic process or, we could also say, of a communication. This difference is detached from the problem of reference; that is to say, from that whereof one wants to speak.

The problem of reference was worked out with increasing clarity in a lengthy, specifically French development. It was recognized with increasing clarity that the designated object could not be known as that which is meant by language nor be at one's disposal without language. Therefore, it could be neglected in the theory of language. Theories of sign use and of language that had structuralist affinities resulted from this insight.

At the same time, similar considerations emerged within the field of sociology. Once again this development took place in France, namely in Gabriel Tarde's work (1895). Tarde is no longer very well known, either in France or in Germany. However, from at least one point of view, he is important. He conceived of a theory of imitation, a theory of the spread and consolidation of sociality by means of imitation, that also did not begin with unity but with difference. If one imitates somebody else, this somebody else must exist in the first place. One cannot continuously imitate oneself, although some people seem to succeed even in this project, especially in the field of art. But in that case, one has oneself as that 'somebody else', as another who painted a picture that one found so beautiful that one now wants to create something similar once again. In

any case, a difference is presupposed—a difference that was expanded into a fundamental social theory in Tarde's book *Les lois de l'imitation*.

Today, one can find a similar project in René Girard's work (cf. especially 1977), although I do not know whether Girard explicitly refers to Tarde. In his case, too, it is a matter of a beginning conceived as a conflict of imitation. One enters into a conflict with another whom one wants to imitate. In a certain sense, copying somebody is a friendly gesture: a first thought might be that one imitates somebody whom one admires. However, if the goods of the world are scarce, particularly if there are only few desirable women, and one imitates the person whose wishes and desires—whose *désir*—have a specific aim, one becomes a competitor of the imitated person. The result is a conflict. René Girard's theory discusses the conditions that are required in order to transform such conflicts into social order. One of his examples is the sacrifice of a scapegoat. I will not deal with this question at length; I merely wanted to invoke some examples in order to point out a tradition that poses difference as the beginning and turns the problem of further developments resulting from this initial difference into the basic problem of explaining social order.

Nowadays, information theory is also often conceived of in terms of a theory of difference. This tendency can be traced back to Gregory Bateson's classic formulation that information is 'a difference that makes a difference' (Bateson, 1972). Information is information only if it is not just an existing difference; it is information only if it instigates a change of state in the system. This is the case whenever the perception (or any other mode of input one might have in mind) of a difference creates a difference in the system. Something was not known; then information arrives, namely that these, and none other, are the facts of the matter. Now one has knowledge and, as a consequence, one cannot help orientating one's subsequent operations by means of this knowledge. A difference that makes a difference! In this case as well, the question of how a theory arrives at its first difference remains unanswered. One begins with a difference and, interestingly, ends with a difference. Information processing in its entirety takes place between an initial difference and a difference that emerges during, and as a consequence of, the process. The difference that has thus come about can in turn be a difference that sets in motion further information. The process does not just follow a course from an indeterminate to a determinate unity, if we may paraphrase Hegel in this manner, but from a difference to a difference.

At this level, the differential approach is already textbook material. There are reports about the state of philosophy in France and similar topics that presuppose these insights or rehearse them once again (Descombes, 1980). This knowledge is not secret and it can also be found under the brand name 'difference theory' in the literature. In addition, I could adduce many further examples.

Instead, I would like to turn to the form of such differential thinking that I consider the most radical and that is available in a work written by George Spencer Brown (1969). To begin with, it might be worth mentioning that it is often difficult to find his book, *Laws of Form*, in the libraries, because librarians often do not know that 'Spencer' is part of his last name and therefore shelve Spencer Brown among the many Browns with the first name 'Spencer'. Then of course a search under 'Sp' turns out to be in vain. Only after Spencer Brown noticed this difficulty and began to write his name with a hyphen was the problem resolved, at least for some of his books. But his name is George Spencer Brown, written as two separate words, and should be listed under 'Spencer' in any bibliography.

Spencer Brown's text is the presentation of a calculus. He states explicitly that he is not writing a logic, presumably because he associates propositions that are capable of fulfilling truth conditions with logic. His is an operative calculus; that is, a calculus that presupposes time in the transformation of the signs that are used—or, as I will discuss in a moment, of Spencer Brown's 'mark'. The content concerns an issue that is not of foremost interest for us, namely the attempt to combine the bivalent schema of Boolean algebra with arithmetic and only use a single 'mark' in the process. This mark represents a distinction. To this purpose, Spencer Brown introduces a specific symbol (Figure1).

Figure 1. Spencer Brown's 'mark of distinction'.

Many of the annotations, preliminary remarks and afterthoughts in this book are written in almost standard English and are easy to read. However, the essence of Spencer Brown's statement lies in the order of his steps. Step by step, marks are linked with other marks and their combinations become increasingly complex. It helps me (I am not sure that others feel the same way) to imagine that there is first of all a white sheet of paper; then the marks are put down on the sheet and thereby gain a peculiar independence: one mark and another one, the second one copied in part from the first and so forth. In this context, Spencer Brown distinguishes two 'laws':

(1) The 'law of calling'. If I repeat the same distinction (the same mark) several times, then the value of the repeated distinctions taken together is equal to the value of one single distinction. The 'law of calling' can be formalized as follows (Figure 2).
(2) The 'law of crossing'. A mark can be crossed within the boundary it marks and thus, as it were, be negated. This means that a second distinction can be applied to the first one in such a manner that the

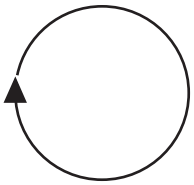
Figure 2. The 'law of calling'.

original distinction is 'cancelled'. The 'law of crossing' can be formalized as follows (Figure 3).

Figure 3. The 'law of crossing'.

I will now introduce a parallel conception that presents something similar but uses a different mark: namely an arrow. This mark was created by the mathematician Louis Kauffman (1987) and has the advantage that it is better able to depict self-reference (which is of particular concern to me). We only have to bend the arrow, so to speak, and turn it into a circle so that it points to itself (Figure 4).

Figure 4. Louis Kauffman's bent arrow.



At the beginning, we have nothing but the arrow, and Spencer Brown would say: let us draw another arrow! Let us copy this arrow from the first one! Louis Kauffman would answer: before anything else, the arrow must point to itself. Both Spencer Brown and Kauffman built a peculiarity into their respective statements. In the following, we will have to deal with this peculiarity, namely the fact that these marks consist of two parts. Spencer Brown's mark consists of a vertical line that separates two sides, and a horizontal line that points to one side and not the other, and could thus be called an indicator or pointer. The mark is consciously thought of as *one* sign but it consists of *two* components. However, if we start out in this manner, a question arises: who could designate one but not the other component without already having a sign for this particular purpose at his disposal? Thus, we must first of all simply accept the mark as a unified mark.

Only in the further development of the calculus can it become apparent that it was not as simple as the beginning might have thought—if indeed

the beginning could think at all, something that is very much in question. Kauffman's notation has the advantage that it makes clear that the entire thought process begins with self-reference. There is, as is stated in rather enigmatic formulations, no difference between self-reference and difference. Or, to put it differently, in a language that I will be able to introduce only at a later point in my argument: there is no difference between self-reference and observation. For he who observes something must distinguish himself from that which he observes. This fact is accounted for in the circular mark and everything else—even mathematical infinity, the direction of a process, or anything else—is represented as an unfolding of self-reference. Here too, the mark (the mark *in the singular*) has *two* parts: a 'body', as Kauffman says, namely the long line that is positioned in space, and a 'pointer' that indicates the direction (Figure 5).

Figure 5. *One* arrow: body *and* pointer.

We begin with a distinction. However, since the result of the distinction must function as a unity, the distinction can neither be designated nor named. It is simply there.

In logic, in mathematics—whatever one wants to call it—in Spencer Brown's calculus, this fact assumes the form of an injunction: 'Draw a distinction!' Draw a distinction, otherwise nothing will happen at all. If you are not ready to distinguish, nothing at all is going to take place. There are interesting theological aspects that pertain to this point. However, I will not work them out in this space (cf. Luhmann, 1987). Nonetheless, I would like to point out that advanced theology (e.g. the theology of Nicholas of Cusa) contains the proposition that God has no need for distinguishing. Evidently, creation is nothing but the injunction: 'Draw a distinction!' Heaven and earth are thereby distinguished, then man, and finally Eve. Creation is thus the imposition of a mode of distinguishing, if God himself is beyond all distinction. Interesting connections with our present topic could be made, but they are of no importance for an analysis of Spencer Brown's theory. For he is on earth and stands on the ground—at least on the white sheet of paper—and from there he proceeds, interlocking his operative calculus of marks in the direction of greater complexity.

To speak with more precision and return to the two aspects of the one mark, Spencer Brown remarks that a distinction is always needed simply for the purpose of indicating one side and not the other. What purpose could drawing a distinction serve other than to indicate one thing rather than another? Every distinction is a boundary, the marking of a difference. As a result, we have two sides; however, they are subject to the condition that both of them cannot be used simultaneously. If they were,

the distinction would be meaningless. Thus, if we intended to distinguish men and women, we would have to ask: 'Is it a man or a woman?' And if we answered 'It is a microphone', then our distinction would be unnecessary. In case we would like to mix the terms (nothing speaks against it), we would need a new term—for example 'hermaphrodite'—which in turn would have to be distinguished from other things.

In principle, a distinction contains two components: namely the distinction proper, marked by the vertical line, and the indication, marked by the horizontal line. It is striking that a distinction contains both a distinction and an indication and thus distinguishes between distinction and indication. If a distinction is supposed to become operational as a unity, it always already presupposes a distinction within the distinction. How this fact is to be interpreted is not entirely clear, at least not in the discussions of Spencer Brown with which I am familiar. I understand Spencer Brown's calculus in the following way (although I am not entirely sure about it). The distinction is extracted, so to speak, from the distinction. And, in the end, it is made explicit that a distinction had always already been present in the distinction. A unity is put into operation; in the instance of the beginning, it cannot yet be analysed. Only later, when possibilities of observation are introduced into the calculus—that is, when self-referential figures can be used—does it become apparent that a hidden paradox had already been present at the beginning. This paradox is the distinction contained in the distinction.

This brief description of Spencer Brown's conception is sufficient for my purposes. I will not explicitly deal with the actual calculus. I never tested it in a technical sense. Experts allegedly claim that it is correct and that it is much more elegant than the original mathematical calculus. But they also claim that something gets lost in the process (see also the criticism voiced by Cull and Frank, 1979). For our purposes, the important idea is to use only a single operator. I will return to this point. My interest and the specific interest advanced in this lecture concern applications to systems theory. You may have already suspected that the difference between system and environment can be understood as a distinction. A systems theoretician reacts first of all to the injunction: 'Draw a distinction!' This distinction is not just any distinction but the distinction between system and environment. The theoretician must use the pointer or indication in such a way that it indicates the system and not the environment. The environment remains outside. The system is on one side, the environment on the other.

In order to clarify this point for further use, I would like to refer once more to Spencer Brown. When the boundary between the two sides of a distinction is marked, he also names this boundary 'form'. That is the reason for his expression 'laws of form'. A 'form' has two sides. It is not just a beautiful shape or object that can be presented free of all context. Instead, it is a thing with two sides. If one wants to present a context-free

object, then one is dealing with an object in an 'unmarked space': for example a mark, perhaps a circle or something else, on a white sheet of paper or something determinable in the world, where other things exist as well, which however are not being determined in this instance. In principle, 'form' is a matter of two sides: in our case, system and environment.

This is a very general conception. The analysis of form could be pushed far beyond systems theory. I could perhaps say that one could even 'redraw' semiology and semiotics with the help of its tools. To this end, one would state that on the one side of the 'form' there is a sign—that which one needs to signify something—and on the other side there is the signified. Thus, one would arrive at the tripartite figure that plays such an important role for Peirce and others (see Peirce, 1955). To speak more precisely, the sign is the difference between signifier and signified. The French expressions that Saussure uses are *signifiant* and *signifié.* Something signifies something else. In German we have a tendency to call the signifier (*das Bezeichnende)* that is used for signification the sign *(das Zeichen)*. But by means of a formal analysis we recognize that the sign is a form with two sides and that in using it as a sign, we must always move to and operate from the inner side of the form; that is, the side of the signifier. Thus, language is used on the assumption that words signify something that we do not know very clearly.

I suspect that we could develop a very general theory that would transcend even systems theory on the basis of this very general concept of form that we can detach from its specifically mathematical use in Spencer Brown. We would be dealing with a theory of two-sided forms that can only be used in a one-sided way. I merely allude to this possibility because it could potentially relativize even the systems theoretical approach, in spite of its universal pretensions and its scientific claims that are currently being especially well developed (which merely means that there is much literature regarding systems theory). It also could instigate reflection on the possibility of an even more comprehensive general theory of forms and whether such a theory could then be applied to the concept of number, to mathematics, semiotics, systems theory, the medium/form difference between loose and tight couplings and other issues. However, I will leave it at this.

The consequence of this notion of 'form' for systems theory is that the 'system' can be called a 'form' under the condition that the concept of form must always apply to the difference between system and environment. I have recapitulated this point several times because it may not be entirely intuitive, and one simply must keep it in mind. We will only be able to judge this presupposition after we have seen what can be done by means of it. Against the background of the tradition of open systems and differential approaches of all kinds, we notice that we might have here within our reach a synthesis that could make it possible to include in a single theory knowledge derived from widely disparate sources.

Thus, the first point that we enter under the heading 'applications to systems theory' is: a system is a form with two sides.

A second suggestion that can also be derived from Spencer Brown concerns the question of whether it makes sense to define a system like Spencer Brown's calculus merely by a single operator and a single mode of operation. If you look at common descriptions and definitions of systems, you will notice that they do not work in this way. Usually, systems are described through a plurality of terms. For example, systems are relations between elements; or a system is the relation of structure and process, a unit that directs itself structurally in and through its own processes. Here you have unit, boundary, process, structure, element, relation—a whole bunch of terms—and if you ask what the unity of all these terms is, you end up with the word 'and'. A system then is an 'andness'. Unity is provided by the 'and' but not by any one element, structure or relation.

The question is whether it is possible to transcend this 'and state' in the description of the object 'system'. I believe that it is possible if one pursues a principled operative or operational approach. In other words, we must come to terms with the notion that it is actually a type of operation that produces the system, provided that there is time. A mere one-time event does not suffice. If an operation of a certain type has started and is, as I like to say, capable of connectivity—that is, if further operations of the same type ensue from it—a system develops. For whenever an operation is connected to another, this happens selectively. Nothing else happens; the unmarked space or the environment remains outside. The system creates itself as a chain of operations. The difference between system and environment arises merely because an operation produces a subsequent operation of the same type.

How should one imagine this process? First of all, I believe that the biology of living beings can be described well in this way, especially in light of the information we glean from recent biochemical theories that tell us that life is a biochemical invention that happened only once. It is a circular structure or, to speak with Maturana (e.g. 1981), an autopoiesis, a circular self-production. At some point in time, such a circular mode of operation was set in motion for reasons that can no longer be known with any precision and that one can state as a living being only if one is already alive. For evolutionary reasons, this process multiplied and then there were worms, snakes, human beings and all forms that are possible on the basis of an orientational type that, in principle, always has the same chemical composition. From the viewpoint of operation, the unity of life is guaranteed in the strict sense. The necessary presupposition is that the effect of the operation contributes to the creation of a system. Life must live on. Life must be connected to, and followed by, life instead of dying immediately after birth. Additional inventions such as bisexuality, the central nervous system and so forth presuppose such a mode of operation. Among other things, this means—and I will return to this

point—that the concept of autopoiesis itself explains next to nothing, except this beginning with self-reference: an operation that possesses connectivity.

The previous thoughts can be applied to social systems if we succeed in identifying an operation that meets the following conditions: it must be one *single* operation; it must always be the same; and it must possess connectivity. It is this operation that either ceases or continues as the same operation. I think that we do not have many potential operations to choose from. In fact, communication is the only type of operation that meets these conditions. A social system emerges when communication develops from communication. There is no need to discuss the problem of the first communication, for the question 'What was the first communication?' is already a question within a communicating system. In the beginning, the system always thinks outwards from its centre. Once it has become complex enough, it can ask the question of how it all began. There may then be different answers. However, they do not disturb the continuation of the communication. On the contrary, they may even quicken it. Thus, the question concerning the beginning or origin is of no particular interest to us; or, to put it differently, it interests us merely as one question among many.

What is interesting about the model I have presented is that it manages with a single type of operation. Yet much ought to be said now about how the notion of 'communication' is to be understood. In other words, which concept of 'communication' are we using here? At this juncture of my argument, I only want to say this much: communication can be conceived as the *synthesis* of information, utterance and understanding. That is to say that communication happens when information that has been uttered is understood (for a more detailed treatment see Luhmann, 1995: Chapter 4). 'Communication' is the structural equivalent of biochemical statements by means of proteins and other chemical substances. It is of primary importance that there is a prospect of identifying an operator that makes possible all social systems, no matter how complex societies, interactions or organizations might become in the course of evolution. From the viewpoint of an operational theoretical approach, everything exists because of the same basic occurrence, the same type of event: namely communication.

It is my opinion that the concept of action, in contrast to the concept of communication, does not meet the necessary requirements for functioning as a system-producing type of operation. For, on the one hand, the concept of action presupposes an agent to whom the action can be ascribed; on the other hand, the concept of action cannot easily be tailored specifically for sociality. Action occurs even when nobody is watching, when nobody else is there, when the agent does not expect that somebody else will react to her action—for example, when somebody brushes her teeth while by herself. It is done merely because everybody knows that it ought to be done. True, she was once told by somebody to

do it and somebody put the toothbrush there for this purpose. However, in principle, action can be conceived of as a solitary, individual operation that has no social resonance. In the case of communication, this is not possible. Communication happens only if somebody understands it at least approximately or perhaps even misunderstands it; in any case, somebody must understand enough so that communication can continue. Language use alone cannot assure this possibility. It lies beyond the mere use of language. Somebody must be there who can be reached and who is capable of hearing or reading.

Let me summarize these two points once again. The first statement concerns the analysis of form: a system is a difference. The second statement says that a system only needs one single operation, one single type of operation, in order to reproduce the difference between system and environment if the system is to continue to exist (this 'if' is of course not unimportant). In the case of the social system, we have identified communication as this type of operation. Communication is connected to communication.

A third point also relies on Spencer Brown and pertains to the concept of 're-entry'; that is, the re-entering of the form into the form or of the distinction into the distinguished. Initially, when I introduced Spencer Brown, I did not say anything explicit on this topic. You will recall that already the initial injunction 'Draw a distinction!' is an injunction that concerns an operation consisting of two components, the distinction itself and the indication of one side, the pointer that tells you where you are and from where you might continue. Distinction is already provided for in the distinction. Using Kauffman's terminology, one might say that distinction is already copied into the distinction. In the course of developing his calculus, Spencer Brown eventually arrives at the point where he makes this premise explicit. He presents the re-entry of the form into the form or the distinction into the distinction as a theoretical figure that eludes calculus and therefore can no longer be treated in the form of arithmetic or algebra. However, in the sense that certain mathematical problems can only be solved by means of this figure, it belongs, as it were, to the cornerstones of the entire system. This leads Spencer Brown into a theory of imaginary numbers.

I suspect that we may have some difficulty imagining this re-entry, this entering of the form into the form, at the abstract level that is required. Spencer Brown draws circles in his book but in the process, he always takes the white sheet of paper for granted. However, as soon as we begin to deal with a theory of social systems and can take the regular apparatus of communication (which can also be communication about communication) for granted, the problem loses its difficulty and acquires a certain persuasive power. Therefore, one may ask oneself what purpose our theoretical exploit serves, especially as we merely acquire knowledge that we have known all along. I will return to the question of purpose. It

is connected to the concept of paradox. But for the time being, I will merely explicate what I mean.

What I mean is that a system can distinguish itself from its environment. Its operation *qua* operation produces the difference. This is why I use the term 'difference' in this context. One operation connects with another; then a third one is added, a fourth and a fifth one. Then all that has been hitherto said becomes the topic of the next operation and is added to the series and so forth. All this happens in the system. At the same time, something else, or nothing at all, happens outside the system. The outside world has only limited importance for the consequences of communication. If a system has to decide or, to speak with greater caution, create couplings between one communication and another, then it must be able to discern, observe and establish what is compatible with it and what is not. A system that intends to control its own conditions of connectivity must have at its disposal a type of operation that, for the time being, we may call 'self-observation'. I will return to the problem of the observer. (The problem is that the concepts are circular. I always have to presuppose something that I will only explicate later. This is necessarily the case for any system design of this type. For the moment, I would encourage you simply to accept observer and observation as terms that are yet to be explicated.)

A system has to be capable of controlling its own conditions of connectivity. This is the case at least if we are thinking of systems that reproduce themselves via communication. We can distinguish communication from all that is not communication, particularly in the case of linguistic communication but also in the case of a standardized repertoire of signs. When I say 'we', I do not mean individuals with their specific psychic structure, although it may be true for them as well. However, it is also possible that an individual is absent-minded at that very moment and may therefore not notice that communication is happening.

It is crucial that communication itself draws the distinction between communication and non-communication. Thus, it is for instance possible to react with linguistic means to the fact that speaking has taken place and that one normally does not have to reckon with a denial of this fact. It is possible to get lost in interpretive difficulties or to look for excuses by explicating what was really meant. However, communication possesses the recursive certainty that it is based on communication; that it can and even has to restrict what can be said in the future (the same holds true of writing); and that, as a consequence, it can observe the difference between system and environment and thus separate self-reference from external reference.

This already becomes obvious when we look at the structure of communication. Communication happens only when something—specifically, a piece of information—is passed on by means of an utterance. Information and utterance already indicate the bipartite structure of communication. In addition, communication has to be understood. To

begin with, we can say: there is speaking about something. A topic is being dealt with. This topic can even be the speaker himself. He can turn himself into the topic of his speaking and say: 'I wanted to say something completely different'. Or he can turn his own emotional state into a piece of information: 'I don't feel like it any more, I'll stop'. As a matter of principle, there is always this bipartite structure of utterance and information. And communication can continue on the one or the other side of this divide. Either the question 'Why did you pass on something? Why did you say something?' or the question 'Did you perhaps lie?' is turned into the topic of the subsequent communication. Thus, one either proceeds from the utterance or from the information and then communicates about that which has been said.

Here we have an indication that the difference between external reference *qua* information and self-reference *qua* utterance is always already included in the operation itself. This inclusion is yet another illustration of the general topic of re-entry: the system re-enters into itself or copies itself into itself. Communication remains an internal operation. It never exits the system, for the next connection is once again provided for and has to take place in the system. Self-reference (reference to that which takes place in the system) and external reference (reference to the intended internal or external, past or present states of the system) must therefore be distinguished: one is the utterance, the other the information.

I believe that one can make plausible in this manner (even if it would be possible to offer a much more extensive and detailed treatment) that a social system that works with the operator 'communication' always already includes re-entry and could not function otherwise. An internal reference or self-reference and an external reference are processed more or less simultaneously. In other words, the system can switch from one side to the other at any moment—but only by means of internal operations. This explains the difference between the environment of a system from the standpoint of the observer and the environment as defined by the system itself as it oscillates between self-reference and external reference, or as it chooses specific emphases in one or the other direction for a certain amount of time but always under the condition that they may and can be revised and changed. This also means that one deals with a different environment depending on whether one has in mind an environment as defined by a system—that is, the external reference of a particular system—or whether one assumes the existence of an external observer whose environment includes the system as well as its environment. It is entirely possible that the external observer can see many more and quite different things that are not necessarily accessible to the system itself. We might add that in biology, Jakob von Uexküll (1928, 1934) showed an early awareness of the fact that the environment of an animal is not that which we would describe as its surroundings or *milieu*. We can see more (or perhaps fewer) and other things than those an animal

can perceive and process. Hence, two concepts of environment must be distinguished.

So far, I have limited my commentaries to social systems. However, I would like to add an excursus in order to present the thesis that psychic systems, too, work by means of the coupling of external and self-reference and that this can be shown, not with the help of much additional knowledge, but merely with a clear presentation using the terminology of two-sided forms, including such terms as 'internal side', 'external side', 're-entry' and so forth. Evidently, these theoretical figures or concepts suit psychic as well as social systems.

In psychology, and even more so in the philosophy of consciousness, these topics were treated for a long time from the viewpoint of reflection. There is a psychology of self-awareness; it poses questions concerning the production of identity and the consciousness of identity. The social-psychological literature produced by the likes of George Herbert Mead (1934) has familiarized us with such inquiries. However, the tradition of the philosophy of reflection is much older and has perhaps also been more articulate on many counts.

Here, I would just like to address for a brief moment Edmund Husserl's transcendental phenomenology, which is perhaps the most striking example of this philosophical tradition. Husserl arrived at the insight that the operations of consciousness can take place only if they are concerned with phenomena; that is, if they *intend* a phenomenon, no matter what the environment may be (this is an entirely different question) (cf. Husserl, 1950). From the viewpoint internal to consciousness, consciousness is concerned with phenomena and, at the same time, with itself. The terminology shifts slightly. Thus, 'noema' designates the phenomenon that one has in mind or imagines. 'Noesis' is the name of the reflexively accessible thought process or process of consciousness itself, or, to put it differently, of the reflexivity of consciousness and the phenomenality of the world with which consciousness is concerned. 'Intention' or 'intentionality' as the occurrence of the coupling between the two sides is yet another feature. Every intention allows for the possibility of further exploration of the phenomena or of considering the following questions: 'Why am I currently thinking about this? Why am I preoccupied with this? What is my consciousness actually doing? After all, there are more urgent tasks; for instance I am hungry right now or I would like to smoke a cigarette, yet I am preoccupied right now with phenomena'. It is via such reflections that I arrive at other phenomena, a cigarette, say, or a sandwich. This coupling is strict. Consciousness would never be able to lose itself entirely in its environment to the point that it could no longer return to itself. Similarly, it could not constantly be concerned merely with the reflection 'I think what I think what I think'. At some point, the need for phenomena becomes manifest.

For these reasons, this philosophy is called 'transcendental phenomenology'. It is 'transcendental' insofar as it claims that this state of affairs

applies to all consciousness systems (or, in other words, to every subject) and thus characterizes subjectivity as such, independent of the empirical multiplicity of differentiated phenomena. After all, there are many human beings, and each one of them is thinking about something different at any moment. The transcendental structure is not necessarily secured by *a prioris* but by this coupling of the reflexivity of consciousness with 'having' phenomena *(Phänomenehaben)*. I take this to be a precise theory; that is, a theory that precisely corresponds to the one that would result if we decided to represent consciousness by means of systems theory including, for instance, Spencer Brown's terminology. In that case, too, we would arrive at the following questions: how does the difference between system and environment re-enter the system? Does this actually happen at all? In what way does the system depend for its operations on re-entry? Could it operate without re-entry? (Evidently not.) And, finally, wherein does the peculiar operative form of the system lie? For Husserl, the operative form lies in intentionality, by means of which the problem is solved from one moment to the next. In addition, this starting point accounts for Husserl's distinct awareness of the importance of time. Every operation relies on retention (that is, a side glance at everything that has just happened) and on protention (the anticipation of everything that will come about during the next couple of occurrences in consciousness). On this basis, consciousness develops anticipations that are inspired by experience and theory, as well as a long-term memory. In principle, however, it operates in the center of time, as it were, along an axis that traverses the distinction between external and self-reference. The result is a rather complicated theory design.

When faced with such a theory design, we recognize how flat by comparison are the theories that nowadays are pursued under the heading of 'social phenomenology'. As a matter of fact, all they express is that 'there is something'. In a manner of speaking, all that is offered under the name of the empirical is having-been *(Dagewesensein)*. One saw it and now one describes it. All of a sudden, phenomenology serves to justify a descriptive stance towards objects: 'These are phenomena, and since we are conscious of them, we may assume that they must exist somewhere. The precision of our description insures our method against possible doubts regarding the phenomena. After all, others could go and look for themselves'. This attitude is almost certainly related to the transfer of Husserlian phenomenology to the United States. However, it was already discernible in Alfred Schütz's attempts (1967) at creating a unified theory out of both Max Weber's structure of motives and Husserl's phenomenology. It would be possible to show in greater detail how this simplification arose.

If we return to a systems theoretical theory of consciousness, we will see better which fundamental theoretical decisions are at the bottom of phenomenology. In Husserl's mode of thinking, these fundamental deci-

sions were still very much present. Nowadays, however, they are ignored as being simply present or given, or as of no further interest.

Having noticed that there are two cases in which the operative coupling of external and self-reference works, of course the questions arise why there should be only these two, and whether there are in fact further cases. Could we for instance discover something like self-reference and external reference in biology, or at the very least in neurology and neurophysiology? I would prefer not to commit myself to an answer to this question. Such an answer would require precise knowledge of the field. However, at this moment I suppose that the difference between the brain and consciousness or between the central nervous system and the phenomenally present consciousness lies in the fact that consciousness introduces the difference between external and self-reference. In consciousness, we imagine that all we perceive is somewhere outside, whereas the purely neurophysiological operations do not provide any such clues. They are entirely closed off and internal. Insofar as it is coupled with self-reference, consciousness is also internal, and it knows that it is. And that is a good thing, too, for it would be terrible if someone could enter someone else's consciousness and inject a few thoughts or a few perceptions of their own into it. Consciousness, too, is a closed system. But its peculiarity seems to lie—if we choose a very formal mode of description—in the transition from the purely operative closure of the electrophysical language of the neurophysiological apparatus to the difference between self-reference and external reference. Only this central difference constitutes consciousness, of course on the basis of neurophysiological correlates. I do not intend to claim that consciousness is no longer in need of a brain. However, it is of great interest to ask whether we are not just dealing with a new level of reflection, as is often said—a learning of learning or a coupling of coupling—but with the introduction of a critical difference.

If the operative management of external and self-reference is indeed the mark of a certain sphere of reality, it would be possible to formulate a programme that would aim at establishing a link with the concept of meaning. Here, I can only hint at such a connection (cf. the more extensive treatment in Luhmann, 1997: 44–59). For the moment, the only thing of importance is that there are a number of clues indicating that the phenomenal presentation of the world or the informative relations of communication contain patterns or structures; we perceive these patterns as meaning. They are at the disposal of consciousness as well as communication. But, in each case, the operative base is quite different and the patterns will be marked by discrepancies that we will not be able to clarify without further efforts so long as we rely on world descriptions of the linguistic kind. We try to solidify the difference between the system of consciousness and social systems with regard to their respective operative base; at the same time, we try to maintain that there are

agreements all the same: namely the decisive guiding difference of external/self and all the meaning structures that emerge from it. But here is not the place to expand on these issues.

However, there is a fourth point that will occupy us at least for a short while. I have already alluded to it. Spencer Brown's theory design contains a well-hidden paradox. It is constituted by re-entry itself or—if we refer to the beginning of the calculus, the first injunction 'Draw a distinction!'—by the fact that the distinction must be and is drawn merely in order to distinguish one side. Thus, every distinction contains two components: indication and distinction. The distinction contains itself, but apparently in a very specific form: namely as the distinction between distinction and indication, and not merely some juxtaposition such as of large and small, or anything else that could be conceived of as a distinction.

Accordingly, the re-entry of the form into the form—or of the distinction into the distinction, or of the difference between system and environment into the system—should be understood as referring to the same thing twice. The distinction re-enters the distinguished. This constitutes re-entry. Is the distinction now the same distinction it was before? Is that which existed before still there? Or does the first distinction disappear and thus become the second one? The answer is that we might well suspect that we are dealing with a paradox here, and that means that the distinction that re-enters itself is the same and, at the same time, is not the same. And this is the whole trick of the theory: suspended between two markers, both of them paradoxical, a purely logical operative space is created. As is typical of paradoxes, this one, too, can be dissolved. In fact, a paradoxical formulation does not make much sense if one does not also possess a transformative formula, a formula that can dissolve the paradox. I think that such a solution can be accomplished with relative ease in the present case. It depends on the distinction that is drawn by an observer who is capable of distinguishing whether his own distinction between system and environment (which could be another system or, if the observer is involved in reflection, an earlier state of his own system) is meant, or whether he is speaking of the distinction that is made within the observed system itself. The observer can make his appearance in two ways: as an external observer who sees that another system is observing itself, or as a self-observer, which is to say somebody who observes himself, refers to himself and states something about himself.

With the help of this distinction between external and internal observation, the paradox can be solved or, as logicians sometimes say, 'unfolded' (Löfgren, 1979); that is to say, it is taken as relating to different identities and variable perspectives. Logically, this method is questionable and disreputable. But the logicians keep using it themselves, so we do not have to expect any reproach from that corner. Typically, the logicians distinguish between different levels. As soon as a paradox occurs, they move to another level in order to dissolve the paradox. To be sure, under such circumstances, one must not ask the question: wherein does the

unity of the difference between the two levels consist? One dissolves a paradox by postulating two levels—a meta level and a lower level, or the external observer and the self-observer—and by making this move more or less plausible. One can achieve this gain in plausibility or fruitfulness by pointing to the phenomena that are made visible through this strategy of solving the paradox and to the efficiency of a theory construction that distinguishes between internal and external observation.

For sociological analyses, especially at the level of the theory of society, it is important that one keeps in mind this entire genealogy, including the concept of form, re-entry, the paradox of re-entry and the dissolution of the paradox through the distinction between observers. But now it is our turn, so to speak. We are external observers. Of course we know that we exist socially, that we live in a particular era, earn salaries, have expectations for our retirement and so on—or even that we read books in which others have already written about most of the things we had wanted to write about ourselves. Of course we lead a social existence, but as sociologists we can contemplate society as if from the outside. Regardless of the fact that we ourselves communicate in order to teach these things to other people, we can say that we observe society and see that society presents itself as a self-describing system. This system has two sides. On the one hand, society contains external references. It does not just speak about itself but under normal circumstances also about something that is not communication but the topic of communication.

Leaving the logical genealogy aside, I dealt with this question in a little book on ecological communication (Luhmann, 1989). In it, I proceeded from the assumption that ecological communication is just communication about ecological questions and that the sociological description of a communicating system reduces the irritation over ecological problems to a communicative phenomenon. 'Dead fish are floating in the Rhine'. Once upon a time that could have been a folksong; but nowadays it is alarming news. What is produced by means of this alarm is more obvious. We have certain connective expectations that are available for prospective manipulative purposes. Nonetheless, we are dealing first and foremost with a matter of communication. Whatever happens in society is communication. For this reason, we in our role as sociologists must be able to distinguish, on the one hand, between that about which people talk, write, print and broadcast and, on the other hand, that which is actually the case, so that we can see that certain topics could have also been chosen differently.

I do not—heaven forbid!—mean to suggest that the choice of topic is arbitrary and that everything could have just as well been done differently. Neither do I mean to say that the preoccupations of contemporary society are mere coincidences, fads thought up by journalists. No, far from it. But naturally we must look at the reasons that lead our society to refer to such states of affairs within a system of communication and to

process such topics in a preferential manner, as it were. Along this path, one also gains access to specific questions. One finds out whether only the popular press speaks about them; whether they are only a topic of instruction in schools or of discussion in youth groups; how the economy reacts to them; in other words, which of the three enumerated systems communicates about these topics and what the consequences of such communication are. These are the sociologically interesting facts about the topic at hand—not the fact that the fish are dying.

This double perspective would also allow us to deal with the ideological quality of self-description in a society. Why did societies describe themselves as 'capitalist' in the 19th and 20th centuries? Why did they describe themselves as 'patriotic' in the second half of the eighteenth century? Why are certain schematic models of society/community and individual/collective preferred at certain times, only to be neglected at other times? Why do notions like 'modernity' and 'postmodernity' arise? Why is the schema of tradition/modernity used for the representation of society? In our role as sociologists, we can assume the attitude of external observers, who we can never be in reality, and ask how it happens that systems prefer a certain self-description. With this, we return to the sociological tradition of ideology critique or even to the sociology of knowledge or Reinhart Koselleck's version of historical-social semantics (cf. Brunner et al., 1972). But now we have more theoretical confidence in this position than was possible at a time when a free-floating intelligence in Karl Mannheim's (1982) sense was presupposed, or, for that matter, when the mode of self-observation for a capitalist society was described, in keeping with Adam Smith and David Ricardo, by means of market laws, profit rates and similar phenomena, and nobody noticed that the argument was tied to the position of the capitalist while everything else was neglected. The same restrictions apply in the case of work that relied on Freudian complexes and all sorts of other concepts that gained prominence at one time or another.

We would instead begin with the sociology of self-describing systems, of the systems that couple external and self-reference. They do this in a selective fashion, referring to structures that have been around for some time and to the historical state of society in this very moment with its specific issues. Thus, we can occupy a somewhat more distanced position due to the figure of re-entry.

Translated by Peter Gilgen

Notes

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