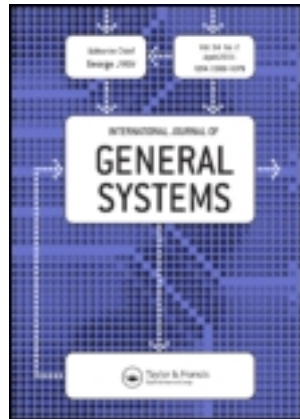


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# THE WORLD SOCIETY AS A SOCIAL SYSTEM

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It is argued in the paper that social systems are self-referential. As such, they can be best viewed as autopoietic systems. Various implications of this view are discussed in the paper.

INDEX TERMS: Society, social system, self-reference, evolution, autopoietic system, complexity.

## I.

Within the European tradition a very general notion of society survived from the time of Aristotle until about 1800. The concept of society (*koinonoia*, *societas*) was almost identical with what we would call social system. The *encompassing* system was seen as a *special* case, namely as the political society (*koinonia politiké*, *societas civilis*).<sup>1</sup> This conceptualization lost its significance when the facts of the modern state and of an industrialized economy became evident. The old tradition cannot be revived.<sup>2</sup> It has, however, never been replaced with an adequate theoretical framework. There are attempts to change the dominant position of politics and to put economy or culture in its place. Such theories use a part of the reality of social life to represent the whole. Without sufficient reasons, economic or cultural or again political processes are postulated as the basic phenomenon. But the theory of these basic processes can maintain only a historical and relativistic validity, since these processes are themselves part of sociocultural evolution.

General systems theory offers a new approach. At first sight, it looks like Aristotelian theory. A general notion of the social system is used to define the *encompassing* system as a *special* case of social systems. The content, however, has changed. Systems theory does not refer to the city or the state in order to characterize the special features of the encompassing system. Our society is too highly differentiated for this kind of design. Instead, systems theory uses systems analysis to disclose the structures and processes which characterize the societal system—"the most

important of all social systems which includes all others".<sup>3</sup>

Social systems are self-referential systems based on meaningful communication. They use communication to constitute and interconnect the events (actions) which build up the systems. In this sense, they are "autopoietic" systems.<sup>4</sup> They exist only by reproducing the events which serve as components of the system. They consist therefore of events, i.e. actions, which they themselves reproduce and they exist only as long as this is possible. This, of course, presupposes a highly complex environment. The environment of social systems includes other social systems, (the environment of a family includes for example other families, the political system, the economic system, the medical system, and so on). Therefore, communication between social systems is possible; and this means that social systems have to be observing systems, being able to use, for internal and external communication, a distinction between themselves and their environment, perceiving other systems within their environment.

Society is an exceptional case. It is the encompassing social system which includes all communications, reproduces all communications and constitutes meaningful horizons for further communications. Society makes communication between other social systems possible. Society itself, however, cannot communicate. Since it includes all communication, it excludes external communication.<sup>5</sup> It has no external referent for communicative acts, and looking for partners would simply enlarge the societal system. This, of course, does not mean that society exists without relations to an environment or without

perceptions of environmental states or events; but input and output are not carried by communicative processes. The system is closed with respect to the meaningful content of communicative acts.<sup>6</sup> This content can be actualized only by circulation within the system. At the same time, but at another level of reality, the system uses body and mind of human beings for interaction with its environment.

The logic of a theory of self-referential communicative systems requires this notion of an encompassing system as a limiting case. The theory of social systems, by its own logic, leads to a theory of society. We do not need political or economic, "civil" or "capitalistic" referents for a definition of the concept of society. This, of course, does not persuade us to neglect the importance of the modern nation state or the capitalist economy. On the contrary, it provides us with an independent conceptual framework to evaluate these facts, their historical conditions, and their far-reaching consequences. In this way, we avoid prejudices toward particular facts; we avoid a *petitio principii*.

## II.

One consequence of this general approach is the way in which different historical types of societies can be distinguished. A society cannot be characterized by its most important part, be it a religious commitment, the political state or a certain mode of economic production. Replacing all this we define a type of societal system by its primary mode of internal differentiation.

Internal differentiation means the way in which a system builds subsystems, i.e. the difference of system and (internal) environments within itself. Forms of differentiation determine the degree of complexity a society can attain. Sociocultural evolution began with segmentary systems. Some of these societies developed a higher order of differentiation, above that of families or villages, namely stratification according to rank. All traditional societies that produced enough complexity for high culture were stratified societies and, in this sense, hierarchical systems. Since these societies evolved from different regional sources and since their aristocracies based themselves on land and/or cities, it was quite natural to conceive of different co-existing societies in spite of a certain degree of reciprocal

knowledge and communication. The idea of society therefore assumed a territorial reference, however unclear the extension and the frontiers.<sup>7</sup>

Modern society has realized a quite different pattern of system differentiation, using specific *functions* as the focus for the differentiation of subsystems.<sup>8</sup> Starting from special conditions in medieval Europe with a relatively high degree of differentiation of religion, politics and economy, European society has evolved into a functionally differentiated system. This means that function, not rank, is the dominant principle of system building. Modern society is differentiated into the political subsystem and its environment, the economic subsystem and its environment, the scientific subsystem and its environment, the educational subsystem and its environment, and so on. Each subsystem accepts for its own communicative processes the primacy of its own function. All the other subsystems belong to its environment and vice versa.

Basing itself on this form of functional differentiation, modern society has become a completely new type of system, building up an unprecedented degree of complexity. The boundaries of its subsystems can no longer be integrated by common territorial frontiers. Only the political subsystem continues to use such frontiers because segmentation into "states" appears to be the best way to optimize its own function. But other subsystems like science or economy spread over the globe. It therefore has become impossible to limit the society as a whole by territorial boundaries. The only meaningful boundary is the boundary of communicative behaviour, i.e. the difference between meaningful communication and other processes. Neither the different ways of reproducing capital nor the degrees of development in different countries give convincing grounds for distinguishing different societies.<sup>9</sup>

The inclusion of all communicative behaviour into one societal system is the unavoidable consequence of functional differentiation. Using this form of differentiation, society becomes a global system. For structural reasons, there is no other choice. Taking the concept of the world in its phenomenological sense, all societies have been world societies. All societies communicate within the horizon of everything about which they can communicate. The total of all the implied meanings for them is the world. Under modern conditions, however, and as a

consequence of functional differentiation, only one societal system can exist. Its communicative network spreads over the globe. It includes all human (i.e. meaningful) communication. Modern society is, therefore, a world society in a double sense. It provides one world for one system; and it integrates all world horizons as horizons of one communicative system. The phenomenological and the structural meanings converge. A plurality of possible worlds becomes inconceivable. The world-wide communicative system constitutes one world which includes all possibilities.<sup>10</sup>

In choosing our concept of society we carefully avoided any reference to social integration. It does not presuppose any kind of pooled identity or pooled self-esteem (like the nation state). Modern society in particular is compatible with any degree of inequality of living conditions, as long as this does not interrupt communication. A self-referential system defines itself by the way in which it constitutes its elements and thereby maintains its boundaries. In systems theory, the distinction between system and environment replaces the traditional emphasis on the *identity* of guiding principles or values. Differences, not identities, provide the possibility of perceiving and processing information. The sharpness of the difference between system and environment may be more important than the degree of integration (whatever this means) because morphogenetic processes use differences, not goals, values or identities, to build up emergent structures.

Given its clearcut boundaries, differentiating communicative behaviour from non-communicative facts and events, modern society is a social system to a higher degree than any of the traditional societies. It depends more on self-regulative processes than any previous society. And this may be one of the reasons why it cannot afford a high degree of social integration.

### III.

No society so far has been able to organize itself, that is, to choose its own structures and to use them as rules for admitting and dismissing members.<sup>11</sup> Therefore no society can be planned. This is not only to say that planning doesn't attain its goals, that it has unanticipated consequences or that its costs will exceed its usefulness. Planning society is impossible because the elaboration and implementation of plans

always have to operate as processes within the societal system. Trying to plan the society would create a state in which planning and other forms of behaviour exist side by side and react on each other. Planners may use a description of the system, they may introduce a simplified version of the complexity of the system into the system. But this will only produce a hypercomplex system which contains within itself a description of its own complexity. The system then will stimulate reactions to the fact that it includes its own description and it will thereby falsify the description. Planners, then, will have to renew their plans, extending the description of the system to include hypercomplexity. They may try reflexive planning, taking into account reactions to their own activity. But, in fact, they can only write and rewrite the memories of the system, using simplistic devices which they necessarily invalidate by their own activity.

All this, of course, does not prevent planners from being active and activities from being planned. We know how to handle production plans and electoral campaigns. We plan wars (defensive ones only, of course) and insurance systems, school curricula, traffic systems, mass media programmes, and many other things. Within organized social systems, the chances are relatively high that activities are carried out as designed. This does not necessarily mean that effects turn out as intended. And it certainly does not mean that the society develops in a planned direction.

The social system can change its own structures only by evolution. Evolution presupposes self-referential reproduction and changes the structural condition of reproduction by differentiating mechanisms for variation, selection and stabilization.<sup>12</sup> It feeds upon deviations from normal reproduction. Such deviations are in general accidental but in the case of social systems may be intentionally produced. Evolution, however, operates without a goal and without foresight. It may bring about systems of higher complexity; it may in the long run transform improbable events in probable ones<sup>13</sup> and an observer may see this as "progress" (if his own self-referential procedures persuade him to do so). Only the theory of evolution can explain the structural transformation from segmentation to stratification and from stratification to functional differentiation which have led to present-day

world society. And again: only observers may see this as progress.<sup>14</sup>

Whereas the post-Darwinian decades were fascinated by the alternative of creation (with author) and evolution (without author), the idea of planned human evolution (in distinction to the organic evolution) later replaced the first wave of social Darwinianism.<sup>15</sup> Recent research, however, strongly suggests a third version of the relation between planning and evolution. Evolution itself can never be planned; this would be a *contradictio in adiecto*. But a self-referential system which tries to absorb planning may speed up its own evolution, because it becomes hypercomplex and will force itself to react to the ways in which it copes with its own complexity. If this is true, world society will have to face conditions in which more intentional planning will lead to more (and more rapid) unintentional evolution.

#### IV.

Problems are a consequence of the way in which a distinction between system and environment is made. Therefore, all the most urgent problems of a societal system are direct or indirect effects of its way of stimulating internal differentiation of systems and environments. In this sense, they are in our society consequences of functional differentiation. They are the results of evolutionary developments, not results of planning, and they are interconnected with all the advantages of modern life; we cannot imagine an alternative to its mode of primary system differentiation; and in any case we cannot plan to change the type of differentiation of our society.

We can, however, analyze the special risks we run with this type of society. Evolution is, as I have said, a transformation of improbable into probable states with increasing "costs". Without intending to "change the society" we can become aware of the relations between structures and their trains of consequential problems. Apparently, there are even self-defeating mechanisms at work. For example, functional differentiation presupposes equality and creates inequality. It *presupposes equality* because it can discriminate only according to special functions (e.g. in schools according to school performance and prospects of further education) and because it operates best if everybody is included on the

base of equal opportunity in each functional subsystem (avoidance of exclusions, of "marginalidad" and so on). But it *creates inequality*, because most functional subsystems (particularly the economic and the educational subsystem) tend to increase differences. Small differences in the beginning—be it in credit, in educational prospects, but also in scientific, artistic, political "reputation"—become large differences in the end, because functional subsystems utilize differences, employ differences in pursuing their specific functions, and there no longer exists a superior mechanism such as stratification which controls and limits this process. The whole society, therefore, tends to proceed in the direction of increasing inequality, it accumulates differences between classes and between regions without being able to make use of these differences or to provide functions for them, i.e. without being able to regress into the state of meaningful stratificatory differentiation.

Another example of this kind of built-in mechanism which may become self-defeating can be described as the relation between dissolution and recombination. Elements which formerly were regarded as natural units ("individua") have become decomposable and their components have become available for recombination. We may think of the advances of physics, chemistry and genetic biology, but also of the breaking up of persons ("individuals") into roles, actions, or motives as a consequence of advances in economic differentiation and organization. These advances, too, are consequences of functional differentiation. Dissolution or decomposition, however, not only provides *chances* of recombination, it also requires new forms of *control of interdependencies*. Singularized particles or motives (or even singularized person) may associate in unpredictable ways. This problem has been underestimated; it was for a long time hidden behind distinctions of system and environment. To dissolve and to recombine were strategies of systems and the changes of interdependencies came about in their environments. The famous problem of the "social cost" of economic production may illustrate this situation. Systems, generally, may control selected facts or events in their environment, related to their own inputs and outputs. They cannot control interdependencies in their environment. The more we rely on systems for improbable performances, the more we shall produce new

and surprising problems, which will stimulate the growth of new systems which will again interrupt interdependencies, create new problems, require new systems.

It is a comfortable self-deception to attribute all this to "capitalism". Capitalism in itself is nothing other than the differentiation of the economic system out of societal bonds, and it is by no means the only instance of functional differentiation. The concept of "capitalist society" makes it easy to locate structures in the system whose change would lead us toward a non-capitalist society, presumably a better society. From a systems point of view, however, this is a highly questionable procedure, because it is not possible to define the *unity* of a system by pointing to *specific structures within the system* which can then be changed. The unity of the system is the self-reference of the system, and its change will always require operating within, not against, "the system."

Our argument can be summarized by two statements: (1) A functionally differentiated world system seems to undermine its own prerequisites; and (2) planning cannot replace evolution—on the contrary, it will make us more dependent on unplanned evolutionary developments. If this is so the prospects of further evolution deserve a second look.

There may be a continuing process of biological evolution on the level of human organisms, given society and culture as their environment. This is not our topic. Social systems are not a *late branch*, they are a *different level* of the evolution of order in general. If all social systems today belong to one single world society, the theory of evolution faces a new kind of problem: the level of sociocultural evolution is presented by one system only. There are no longer many societies from which evolution can select successful ones. A one-system-evolution: is this possible? And is this possible without the almost certain prospect of destruction? In this situation, one alternative needs further consideration. Functional differentiation constitutes a kind of self-referential autonomy at the level of functional subsystems. This type of order, once attained, may set off evolutionary processes at the level of these functional subsystems. Within the general framework of the societal system we may have plurality of evolutionary developments. The economic subsystem will evolve, but also the scientific

subsystem, and possibly others too—each taking the others as a less reliable environment for its own evolution. The system of world society provides a sufficiently domesticated "internal environment" for its internal evolutions; whereas its own evolution becomes more or less dependent on the outcome of evolutionary processes within this internal environment.

In fact, if we can scan the relevant literature, we find several attempts to reconstruct the history and development of functional domains in terms of concepts which are derived from a Darwinian theory of evolution.<sup>16</sup> Each subsystem may realize its own self-referential mode of reproduction—for example reproduction of sufficiently liquid capital in the economy or reproduction of legal "cases" in the legal system—and may therefore find its own ways to deviate from its mode of reproduction, releasing processes of variation, selection and restabilization. There may be different "accelerators" in different subsystem—for example, credit in the economic system, legislation in the legal system—increasing the chances for, and the speed of, structural transformations. This may "upgrade" the "adaptive capacity" of the whole system,<sup>17</sup> but it by no means guarantees a viable relation between the system of society and its own environment.

Evolution is unpredictable anyway. The joint evolutions of our differentiated society will reinforce this unpredictability. Their interdependence will bring about a higher degree of uncertainty with respect to the future. This makes it much more important than ever before to strengthen our ability to observe what is going on.

## V.

Self-referential systems can, as we have seen, insert descriptions of themselves into themselves. They may "identify" themselves with a simplified image of themselves. They may use a strategic difference to point to themselves, referring to one side and not to the other.<sup>18</sup> They may even conceive of themselves as "complex" and may orient themselves toward their own complexity—taking "complexity" as information about the lack of information which would be required for a complete understanding and control.<sup>19</sup> They

are unable however, to objectify themselves and they will never be able to be available to themselves as objects. These remarks qualify the notion of *self-observation*.

Social systems, of course, are not self-conscious units like human individuals. Societies have no collective spirit which has access to itself by introspection. Self-observation on the level of social systems has to use social communication. Self-observing communication refers to the system which is produced and reproduced by the communication itself. In this sense, self-observation requires self-referential communication which indicates the communicative system and refers to itself as part of the system.

To some extent modern society has developed theories as instruments of self-observation within different functional sectors. During the 18th century, European society recognized new central problems of identity and order which arose in different functional subsystems. These problems could no longer be solved by stratification alone. This observation led to a new kind of theory, focussing on these identity problems, a new kind of theoretical reflexion, differentiating itself along the line of functional differentiation. Political reflexion had to take up the problem of sovereign power, its ability to decide all possible conflicts and its nevertheless non-arbitrary use. The solution was the constitutional state. The theory of cognition found itself facing the problem of the difference between subjective cognition and objective reality. Different solutions were offered by the common sense philosophers (Claude Buffier, Thomas Reid, David Hume) and by transcendentalism. The national and international economy required a theory of its own, focussing on production or on exchange or on distribution as basic models for the integration of economic activities. The theory of law had to recognize the fact that the whole of law is contingent on legal decisions and therefore on legal rules which regulate the production of legal rules. References to natural law had to be done away with and to be replaced by a "philosophy of positive law" (Feuerbach) or by purely historical foundations (von Savigny). A theory of love became fashionable, which saw love itself as responsible for its own troubles (and not parents, husbands, or other external circumstances) and focussed on marriage as the solution. For education, the central problem was the increasing difference between human perfection and human usefulness,

and was solved (or at least alleviated) by a new concept of the individual.

There are fascinating parallels between these first waves of quasi-scientific self-observation within different functional subsystems. All these theories were concerned with the reflexive foundations (e.g. basing law on law, education on education, love on love) and the self-referential autonomy of their respective subsystems. In this sense, they could claim universal, world-wide validity. Once differentiated, they had different motives for internal variation, for criticism and for change. From Kant to Popper, from Adam Smith to Keynes, from Humboldt to Dilthey, from Feuerbach to Kelsen, from the theory of the constitutional state to the theory of the welfare state, more or less radical changes took place. But neither did these parallels become visible, nor did these theories develop a self-referential framework to account for their own effects within their functional subsystems.

One interesting exception is love. By the 18th century (and perhaps even earlier) the semantics of passionate love reflected its own disturbing influence on real love relations. Reading about love prepares for love, stimulates doubts, creates unauthentic feelings and the awareness of one's own second-hand emotions.<sup>20</sup> The code of love re-enters<sup>21</sup> its own domain, and its cultural imperatives become desperate, self-defeating rules which nevertheless have to be used to define relations as love relations.

Occasionally, we can find similar arguments in other fields. Savigny, for example, objects to the theory of positive law on the grounds that it will, if known and applied, undermine the confidence of the people, and will lead to rapid legal change and destroy legitimacy.<sup>22</sup> Substituting for the invisible hand, the visible hand of Keynesian planning may also become counter-productive. But such reflections on re-entry are rare and tend either to destroy or to remystify order. On the whole, the pretention of "scientific" validity excluded the open admission of self-reference and circular reasoning.

Today, however, the theory of science itself is changing in the direction of a naturalized (neurophysiological, biological, cybernetic, sociological) epistemology which incorporates self-referential structures.<sup>23</sup> Universalistic scientific theories use concepts which also apply to science and to cognition itself—concepts like system, evolution, communication, complexity,

meaning. These theories simply cannot avoid recognizing that they themselves reappear within the world of objects which they describe. Despite many logical and methodological warnings, the recognition of self-referential systems is on its way.

These purely theoretical developments do not have immediate "practical" consequences. They may, however, change the ways in which the societal system can use theories as instruments of self-observation. The social structure and the semantics of modern society have grown in Europe. Their present shape is the outcome of evolutionary transformations using particular regional and historical circumstances. The impact of this European background remains strong; making all the more remarkable the fact that this tradition does not supply us with an adequate theory of society. For roughly one hundred years the materials have remained unchanged. The almost incredible revival of the theory of Karl Marx (1818–1883) confirms this thesis. Partial structures are used to characterize the whole system as "capitalistic" or "industrial" or "post-industrial" society. Evolution is seen as an historical "process", although the theory of evolution treats only structural changes (and not processes!). Self-reference, on the other hand, is locked up in the "subject", leaving the "world" outside accessible for asymmetric technological exploitation. It is easy to see the interdependence of these semantic devices; they compensate for their deficiencies on one side with overestimations and presumptions on others. They push society in the twin direction of technical and humanistic improvements; but they provide no theoretical framework for self-observation.

Systems theory has a certain capacity to improve the instruments of self-observation, i.e. of communicating within society about society. It is an international language, not designed to protect specific interest. Contrary to what is commonly thought of it, the focus of modern systems theory is not identity but difference, not control but autonomy, not static but dynamic stability, not planning but evolution. At least, there are remarkable advances that are changing the outlook of systems theory in this direction. However, these are developments within subsystems of subsystems of a subsystem of world society. It is difficult to see how they could become a common language for the process of

societal self-observation.<sup>24</sup> Furthermore, systems theory, itself struggling to surmount the prevailing predispositions of the European tradition, is becoming more complex (and not simply more complicated in terms of models or variables). Evaluation and even understanding becomes difficult. Finally, there are no solutions for the most urgent problems but only restatements without promising perspectives. Taking all this into account, success seems to be highly improbable. On the other hand, we can see fascinating possibilities of arriving at a higher level of intelligibility. It requires, at present, a kind of stoic attitude to stay at the job and "to do the formulations"—*nec spe nec metu*. It may remain unsuccessful but I cannot find it ridiculous.

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2. In spite of many attempts to do so—from Hegel to Treitschke, to Leo Strauss, to Hannah Arendt. Cf. St.T. Holmes, "Aristippus in and out of Athens." *American Political Science Review*, 73, 1979, pp. 113–128.
3. "he pasón kyriotáte kai pásas periéchousa tás állas" (Aristotle loc. cit.).
4. Cf. H. R. Maturana and F. J. Varela, *Autopoiesis and Cognition: The Realization of the Living*. Reidel, Dordrecht 1980; F. J. Varela, *Principles of Biological Autonomy*. North-Holland, New York, 1979.
5. The possibility/impossibility to communicate with God symbolizes this condition. Cf. also Th. Luckmann, "On the Boundaries of the Social World." In: *Phenomenology and Social Reality: Essays in Memory of Alfred Schutz*, edited by M. Natanson, Nijhoff, Den Haag, 1970, pp. 73–100, who elaborates on the concept of the de-socialization of the universe but refuses to accept the corresponding notion of a boundary of the social world.
6. At this point we are leaving the presuppositions of the biological theory of autopoiesis, using a different notion of "closure" and "autonomy". Biologists have to start with a definition of life whereas sociologists may use at this place a definition of meaning.
7. Cf. O. Lattimore, *Studies in Frontier in Frontier History*. Mouton, Den Haag—Paris, 1962.
8. Cf. N. Luhmann, *The Differentiation of Society*. Columbia UP, New York, 1982. For corresponding semantic transformations see also id., *Gesellschaftsstruktur und Semantik*, 2 vol. Suhrkamp, Frankfurt 1980–81.
9. It is, of course, not very helpful to avoid this insight by distinguishing the global system and different societal systems on earth. This leads only back into the unsolved problems of defining societies in a way which can be related to territorial units. And even if this problem could be solved by some kind of criterion it would be difficult to see how this criterion could be related to our ways of understanding the typical features of modernity.



10. For the corresponding semantic transformation of the concept "world" see A. Koyré, *From the Closed World to the Infinite Universe*. Johns Hopkins, Baltimore, 1957; I. Pape, *Von den "möglichen Welten" zur "Welt des Möglichen": Leibniz im modernen Verständnis*. Studia Leibnitiana Supplementa I. Akten des Internationalen Leibniz-Kongresses Hannover, 1966, Vol. I, Steiner, Weisbaden, 1968, pp. 266-287.
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13. Cf. N. Luhmann, "The Improbability of Communication." *International Social Science Journal*, 23, 1981, pp. 122-132.
14. It is notable that the use of "progress" (in the singular) became fashionable only around 1800, when the modern society became visible and induced self-observing processes. Cf. R. Koselleck. "Fortschritt." In: *Geschichtliche Grundbegriffe*. Historisches Lexikon zur politisch-sozialen Sprache in Deutschland, Vol. 2, Klett-Cotta, Stuttgart, 1975, pp. 351-423 (384 sq.).
15. Cf. Julian S. Huxley, *Evolutionary Ethics*. Oxford UP., London, 1943; E. Jantsch (ed.), *Design for Evolution*. Braziller, New York, 1975.
16. Cf. for the economy: A. A. Alchian, "Uncertainty, Evolution, and Economic Theory." *Journal of Political Economy*, 58, 1950, pp. 211-221; J. Spengler, "Social Evolution and the Theory of Economic Development." In: *Social Change in Development Areas: A Reinterpretation of Evolutionary Theory*, edited by H. R. Barringer, G. I. Blanksten and R. W. Mack, Schenkman, Cambridge, Mass., 1965, pp. 243-272; H. Reise, "Schritte zu einer ökonomischen Theorie der Evolution." In: *Probleme der Wachstumstheorie*, edited by B. Gahlen and A. E. Ott, Mohr-Siebeck, Tübingen 1972, pp. 380-434; K. Boulding, "Toward the Development of a Cultural Economics." In: *The Idea of Culture in the Social Sciences*, edited by L. Schneider and Ch. Bonjean, Cambridge UP, Cambridge, 1973, pp. 47-64 (55sq.); R. R. Nelson and S. G. Winter, "Toward an Evolutionary Theory of Economic Capabilities." *American Economic Review*, 62, 1973, pp. 440-449.
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- For the legal system see: H. Cairns, *The Theory of Legal Science*, University of North Carolina Press, Chapel Hill, NC, 1941, 29 sq.; R. D. Schwartz and J. C. Miller, "Legal Evolution and Societal Complexity." *The American Journal of Sociology*, 70, 1964, pp. 159-169; N. Luhmann, "Evolution des Rechts." In: id., *Ausdifferenzierung des Rechts*. Suhrkamp, Frankfurt, 1981.
17. In the sense of the evolutionary variable "adaptive upgrading" which serves the A-function in Parsons' theoretical framework.
18. Cf. the logic, based on distinctions and indications of G. Spencer Brown, *Laws of Form* (2. ed.), Allen & Unwin, London, 1971.
19. For this notion of "complexity" see H. Atlan, *Entre le cristal et la fumée: Essai sur l'organisation du vivant*. Seuil, Paris, 1979.
20. Cf. R. Girard, *Mensonge romantique et vérité romanesque*, Grasset, Paris, 1961.
21. "re-entry" in the sense of Spencer Brown op. cit.
22. F. C. von Savigny, *Vom Beruf unsrer Zeit für Gesetzgebung und Rechtswissenschaft*. Heidelberg, 1814, reprint Wissenschaftliche Buchgesellschaft, Darmstadt, 1959.
23. Cf. W. S. McCulloch, *Embodiments of Mind*. M.I.T. Press, Cambridge, Mass., 1965; Campbell op. cit. (1974); H. von Foerster, "Lessons From Biology." In: *Futures Research: New Directions*, edited by H. A. Linstone and W. H. C. Simmonds, Addison-Wesley, Reading, Mass., 1977, pp. 104-113; H. R. Maturana and F. J. Varela, *Autopoiesis and Cognition: The Realization of the Living*. Reidel, Dordrecht, 1980; K. Knorr, *The Manufacture of Knowledge*. Oxford, 1981; N. Luhmann, "Die Ausdifferenzierung von Erkenntnisgewinn: Zur Genese von Wissenschaft." In: *Wissens-soziologie*, edited by N. Stehr and V. Meja, Westdeutscher Verlag, Opladen, 1981, pp. 102-139.
24. See also N. Luhmann, *Politische Theorie im Wohlfahrtsstaat*. Olzog, München, 1981, for the analogue situation within the political system.

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