A THEORY OF SEMIOTICS

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FOREWORD

A preliminary and tentative version of this text (dealing with a semiotics of visual and architectural signs) was written and published in 1967 as *Appunti per una semiologia delle comunicazioni visive*. A more theoretically oriented version – offering an overall view of semiotics and containing a long epistemological discussion on structuralism – was published in 1968 as *La struttura assente*. I worked for two years on the French, German, Spanish and Swedish translations (only the Yugoslavian, Polish and Brazilian ones appeared with sufficient speed to reproduce the original Italian edition without any addition) re-arranging and enlarging the book – and correcting many parts of it to take into account reviews of the first Italian edition. The result was a book half way between *La struttura assente* and something else. This 'something else' appeared in Italian as a collection of essays, *Le forme del contenuto*, 1971.

As for the English version, after two unsatisfactory attempts at translation and many unsuccessful revisions, I decided (in 1973) to give up and to re-write the book directly in English – with the help of David Osmond-Smith, who has put more work into adapting my semiotic pidgin than he would have done if translating a new book, though he should not be held responsible for the results of this symbiotic adventure. To re-write in

another language means to *re-think*: and the result of this truly semiotic experience (which would have strongly interested Benjamin Lee Whorf) is that this book no longer has anything to do with *La struttura assente* – so that I have now retranslated it into Italian as a brand-new work (*Trattato di semiotica generale*).

Apart from the different (but by no means irrelevant) organization of the material, four new elements characterize the present text as a partial critique of my own preceding researches: (i) an attempt to introduce into the semiotic framework a theory of referents; (ii) an attempt to relate pragmatics to semantics; (iii) a critique of the notion of 'sign' and of the classical typologies of signs; (iv) a different approach to the notion of iconism – whose critique, developed in my preceding works, I still maintain, but without substituting for the naive assumption that icons are non-coded analogical devices, the equally naive one that icons are arbitrary and fully analyzable devices. The replacement of a typology of signs by a typology of modes of sign production has helped me, I hope, to dissolve the umbrella-notion of iconism into a more complex network of semiotic operations. In doing so, the book has acquired a sort of 'chiasmatic' structure. In its first part, devoted to a *theory of codes*, I have tried to propose a restricted and unified set of categories able to explain verbal and non-verbal devices and to extend the notion of sign-function to various types of significant units, so-called signs, strings of signs, texts and macro-texts – the whole attempt being governed by the principle of Ockham's razor, *non sunt multiplicanda entia praeter necessitatem* – which would seem to be a rather scientific procedure.

In the second part, devoted to a *theory of sign production*, I felt obliged to proceed in an inverse direction: the categories under consideration (such as symbol, icon and index) were unable to explain a lot of different phenomena that I believed to fall within the domain of semiotics. I was therefore forced to adopt an anti-Ockhamistic principle: *entia sunt multiplicanda propter necessitatem*. I believe that, under given circumstances, this procedure is also a scientific one.

I would not have arrived at the results outlined in this book without the help of many friends, without the discussions that have appeared in the first six issues of the review *VS-Quaderni di studi semiotici*, and without confrontations with my students at Florence, Bologna, New York University, Northwestern University, La Plata and many other places around the world. Since the list of references allows me to pay my debts, I shall limit myself to warmly thanking my friends Ugo Volli and Paolo Fabbri, who have helped me

throughout the various stages of the research – mainly by merciless criticism – and whose ideas I have freely used in various circumstances.

Milan, 1967-1974.

NOTE ON GRAPHIC CONVENTIONS

Single slashes indicate something intended as an expression or a sign-vehicle, while guillemets indicate something intended as content. Therefore /xxxx/ means, expresses or refers to «xxxx». When there is no question of phonology, verbal expressions will be written in their alphabetic form. However, since this book is concerned not only with verbal signs but also with objects, images or behavior intended as signs, these phenomena must be expressed through verbal expressions: in order to distinguish, for instance, the object automobile from the word automobile, the former is written between double slashes and in italic. Therefore *//automobile//* is the object corresponding to the verbal expression /automobile/, and both refer to the content unit «automobile». Single quotation marks serve to emphasize a certain word; double marks are used for quotations. *Italic* denotes terms used in a technical sense.

A THEORY OF SEMIOTICS

INTRODUCTION: TOWARD A LOGIC OF CULTURE

0.1. Design for a semiotic theory

0.1.1. Aims of the research

The aim of this book is to explore the theoretical possibility and the social function of a unified approach to every phenomenon of signification and/or communication. Such an approach should take the form of a *general semiotic theory*, able to explain every case of sign-function in terms of underlying systems of elements mutually correlated by one or more codes.

A design for a general semiotics[1] should consider: (a) a *theory of codes* and (b) a *theory of sign production* – the latter taking into account a large range of phenomena such as the common use of languages, the evolution of codes, aesthetic communication, different types of interactional communicative behavior, the use of signs in order to mention things or states of the world and so on.

Since this book represents only a preliminary exploration of such a theoretical possibility, its first chapters are necessarily conditioned by the present state of the art, and cannot evade some questions that – in a further perspective – will definitely be left aside. In particular one must first take

into account the all-purpose notion of 'sign' and the problem of a typology of signs (along with the apparently irreducible forms of semiotic enquiry they presuppose) in order to arrive at a more rigorous definition of sign-function and at a typology of modes of sign-production.

Therefore a first chapter will be devoted to the analysis of the notion of 'sign' in order to distinguish signs from non-signs and to translate the notion of 'sign' into the more flexible one of *sign-function* (which can be explained within the framework of a theory of codes). This discussion will allow me to posit a distinction between 'signification' and 'communication': in principle, a semiotics of signification entails a theory of codes, while a semiotics of communication entails a theory of sign production.

The distinction between a theory of codes and a theory of sign-production does not correspond to the ones between *'langue'* and *'parole'*, competence and performance, syntactics (and semantics) and pragmatics. One of the claims of the present book is to overcome these distinctions and to outline a theory of codes which takes into account even rules of discoursive competence, text formation, contextual and circumstantial (or situational) disambiguation, therefore proposing a semantics which solves within its own framework many problems of the so-called pragmatics.

It is not by chance that the discriminating categories are the ones of signification and communication. As will be seen in chapters 1 and 2, there is a signification system (and therefore a code) when there is the socially conventionalized possibility of generating sign-functions, whether the functives of such functions are discrete units called signs or vast portions of discourse, provided that the correlation has been previously posited by a social convention. There is on the contrary a communication process when the possibilities provided by a signification system are exploited in order to physically produce expressions for many practical purposes. Thus the difference between the two theoretical approaches outlined in chapters 2 and 3 concerns the difference between rules and processes (or, in Aristotelian terms, metaphorically used, power and act). But when the requirements for performing a process are socially recognized and precede the process itself, then these requirements are to be listed among the rules (they become rules of discoursive competence, or rules of *'parole'* foreseen by the *'langue'*) and can be taken into account by a theory of physical production of signs only insofar as they have been already coded. Even if the theory of codes and the theory of sign production succeed in eliminating the naive and non-relational notion of 'sign', this notion appears to be so suitable in ordinary language and in colloquial semiotic discussions that it should not be completely aban-

doned. It would be uselessly oversophisticated to get rid of it. An atomic scientist knows very well that so-called 'things' are the results of a complex interplay of microphysical correlations, and nevertheless he can quite happily continue to speak about 'things' when it is convenient to do so. In the same way I shall continue to use the word /sign/ every time the correlational nature of the sign-function may be presupposed. Nevertheless the fourth chapter of the book will be devoted to a discussion of the very notion of the 'typology of signs': starting from Peirce's trichotomy (symbols, indices and icons), I shall show to what degree these categories cover both a more segmentable field of sign-functions and an articulated range of 'sign producing' operations, giving rise to a more comprehensive *n*-chotomy of various modes of sign production.

A general semiotic theory will be considered powerful according to its capacity for offering an appropriate formal definition for every sort of sign-function, whether it has already been described and coded or not. So the typology of modes of sign-production aims at proposing categories able to describe even those as yet uncoded sign-functions conventionally posited in the very moment in which they appear for the first time.

0.1.2. Boundaries of the research

Dealing as it does with all these subjects, a project for a general semiotics will encounter some boundaries or thresholds. Some of these must be posited by a purely transitory agreement, others are determined by the very object of the discipline. The former will be called 'political boundaries', the latter 'natural boundaries'; (it will be shown in 0.9 that there also exists a third form of threshold, of an epistemological nature).

A general introduction to semiotics has either to recognize or to posit, to respect or to trespass on all these thresholds. The *political boundaries* are of three types:

(i) There are 'academic' limits in the sense that many disciplines other than semiotics have already undertaken or are at present undertaking research on subjects that a semiotician cannot but recognize as his own concern; for instance formal logic, philosophical semantics and the logic of natural languages deal with the problem of the truth value of a sentence and with the various sorts of so-called 'speech acts', while many currents in cultural anthropology (for instance 'ethnomethodology') are concerned with the same problems seen from a different angle; the semiotician may express the wish that one of these days there will be a general semiotic discipline of which all

these researches and sciences can be recognized as particular branches; in the meantime a tentative semiotic approach may try to incorporate the results of these disciplines and to redefine them within its own theoretical framework.

(ii) There are 'co-operative' limits in the sense that various disciplines have elaborated theories or descriptions that everybody recognizes as having semiotic relevance (for instance both linguistics and information theory have done important work on the notion of code; kinesics and proxemics are richly exploring non-verbal modes of communication, and so on): in this case a general semiotic approach should only propose a unified set of categories in order to make this collaboration more and more fruitful; at the same time it can eliminate the naive habit of translating (by dangerous metaphorical substitutions) the categories of linguistics into different frameworks.

(iii) There are 'empirical' limits beyond which stand a whole group of phenomena which unquestionably have a semiotic relevance even though the various semiotic approaches have not yet completely succeeded in giving them a satisfactory theoretical definition: such as paintings and many types of complex architectural and urban objects; these empirical boundaries are rather imprecise and are shifting step by step as new researches come into being (for instance the problem of a semiotics of architecture from 1964 to 1974, see Eco 1973 *e*).

By *natural boundaries* I mean principally those beyond which a semiotic approach cannot go; for there is non-semiotic territory since there are phenomena that cannot be taken as sign-functions. But by the same term I also mean a vast range of phenomena prematurely assumed not to have a semiotic relevance. These are the cultural territories in which people do not recognize the underlying existence of codes or, if they do, do not recognize the semiotic nature of those codes, i.e., their ability to generate a continuous production of signs. Since I shall be proposing a very broad and comprehensive definition of sign-function – therefore challenging the above refusals – this book is also concerned with such phenomena. These will be directly dealt with in this Introduction: they happen to be co-extensive with the whole range of cultural phenomena, however pretentious that approach may at first seem.

0.1.3. A theory of the lie

This project for semiotics, to study the whole of culture, and thus to view an immense range of objects and events as signs, may give the impression of an arrogant 'imperialism' on the part of semioticians. When a

must then propose an apparently simplified *research model*. Finally we must constantly contradict this model, isolating all the phenomena which do not fit in with it and which force it to restructure itself and to broaden its range. In this way we shall perhaps succeed in tracing (however provisionally) the limits of future semiotic research and of suggesting a unified method of approach to phenomena which apparently are very different from each other, and as yet irreducible.

0.3. Communication and/or signification

At first glance this survey will appear as a list of *communicative* behaviors, thus suggesting *one* of the hypotheses governing my research: semiotics studies all cultural processes as *processes of communication*. Therefore each of these processes would seem to be permitted by an underlying *system of significations*. It is very important to make this distinction clear in order to avoid either dangerous misunderstandings or a sort of compulsory choice imposed by some contemporary semioticians: it is absolutely true that there are some important differences between a semiotics of communication and a semiotics of signification; this distinction does not, however, set two mutually exclusive approaches in opposition.

So let us define a communicative process as the passage of a signal (not necessarily a sign) from a source (through a transmitter, along a channel) to a destination. In a machine-to-machine process the signal has no power to signify in so far as it may determine the destination *sub specie stimuli*. In this case we have no signification, but we do have the passage of some information.

When the destination is a human being, or 'addressee' (it is not necessary that the source or the transmitter be human, provided that they emit the signal following a system of rules known by the human addressee), we are on the contrary witnessing a process of signification – provided that the signal is not merely a stimulus but arouses an interpretive response in the addressee. This process is made possible by the existence of a code.

A code is a system of signification, insofar as it couples present entities with absent units. When – on the basis of an underlying rule – something actually presented to the perception of the addressee *stands for* something else, there is *signification*. In this sense the addressee's actual perception and interpretive behavior are not necessary for the definition of a significant relationship as such: it is enough that the code should foresee an established correspondence between that which *'stands for'* and its correlate, valid for every possible addressee even if no addressee exists or ever will exist.

Paralinguistics: studies the so-called suprasegmental features and the free variants which corroborate linguistic communication and which increasingly appear as institutionalized and systematized. See the studies of Fonagy (1964), Stankiewicz (1964), Mahl and Schulze (1964, with a bibliography of 274 titles). Trager (1964) subdivides all the sounds without linguistic structure into (a) "voice sets", connected with sex, age, state of health, etc.; (b) paralanguage, divided into (i) "voice qualities" (pitch range, vocal lip control, glottis control, articulatory control, etc.); (ii) "vocalizations", in turn divided into (ii-1) "vocal characterizers" (laughing, crying, whimpering, sobbing, whining, whispering, yawning, belching, etc.), (ii-2) "vocal qualifiers" (intensity, pitch height, extent), (ii-3) "vocal segregates" (noises of the tongue and lips which accompany interjections, nasalizations, breathing, interlocutory grunts, etc.). Another object of paralinguistics is the study of the language of drums and whistles (La Barre, 1964).

Medical semiotics: until a short time ago this was the only type of research which might be termed 'semiotics' or 'semiology' (so that even today there is still some misunderstanding). In any case it belongs to general semiotics (as treated in this book), and in two senses. As a study of the connection between certain signs or symptoms and the illness that they indicate, this is a study and a classification of indices in Peirce's sense (Ostwald, 1964). As a study of the way in which the patient verbalizes his own internal symptoms, this extends on its most complex level to psychoanalysis, which, apart from being a general theory of neuroses and a therapy, is a systematic codification of the meaning of certain symbols furnished by the patient (Morris, 1946; Lacan, 1966; Piro, 1967; Maccagnani, 1967; Szasz, 1961; Barison, 1961).

Kinesics and proxemics: the idea that gesturing depends on cultural codes is now an acquired notion of cultural anthropology. As to pioneer studies in this field see De Jorio (1832), Mallery (1881), Kleinpaul (1888), Efron (1941), Mauss (1950); as to contemporary developments see Birdwhistell (1952, 1960, 1963, 1965, 1966, 1970), Guilhot (1962), LaBarre (1964), Hall (1959,1966), Greimas (1968), Ekman and Friesen (1969), Argyle (1972) and others. Ritualized gesture, from etiquette to liturgy and pantomime, is studied by Civ'ian (1962, 1965).

Musical codes: the whole of musical science since the Pythagoreans has been an attempt to describe the field of musical communication as a rigorously structured system. We note that until a few years ago contemporary musicology had scarcely been influenced by the current structuralist studies, which are concerned with methods and themes that it had absorbed centuries ago. Nevertheless in the last two or three years musical semiotics has been definitely established as a discipline aiming to find its 'pedigree' and developing new perspectives. Among the pioneer works let us quote the bibliography elaborated by J.J. Nattiez in *Musique en jeu*, 5, 1971. As for the relationship between music and linguistics, and between music and cultural anthropology, see Jakobson (1964, 1967), Ruwet (1959, 1973) and Lévi-Strauss (1965, in the preface to *The Raw and the Cooked*). Outlines of

new trends are to be found in Nattiez (1971, 1972, 1973), Osmond-Smith (1972, 1973), Stefani (1973), Pousseur (1972) and others. As a matter of fact music presents, on the one hand, the problem of a semiotic system without a semantic level (or a content plane): on the other hand, however, there are musical 'signs' (or syntagms) with an explicit denotative value (trumpet signals in the army) and there are syntagms or entire 'texts' possessing pre-culturalized connotative value ('pastoral' or 'thrilling' music, etc.). In some historical eras music was conceived as conveying precise emotional and conceptual meanings, established by codes, or, at least, 'repertoires' (see, for the Baroque era, Stefani, 1973, and Pagnini, 1974).

Formalized languages: from algebra to chemistry there can be no doubt that the study of these languages lies within the scope of semiotics. Of relevance to these researches are the studies of mathematical structures (Vailati, 1909; Barbut, 1966; Prieto, 1966; Gross and Lentin, 1967; Bertin, 1967), not to forget the ancient studies of *'ars combinatoria'* from Raimundo Lullo to Leibniz (see Mäll, 1968; Kristeva, 1968 as well as Rossi, 1960). Also included under this heading are the attempts to find a cosmic and interplanetary language (Freudentahl, 1960 [2]), the structures of systems such as Morse code or Boole's algebra as well as the formalized languages for electronic computers (see *Linguaggi nella società e nella tecnica*, 1970). Here there appears the problem of a "meta-semiology". [3]

Written languages, unknown alphabets, secret codes: whereas the study of ancient alphabets and secret codes has famous precedents in archeology and cryptography, the attention paid to writing, as distinct from the laws of language which writing transcribes, is relatively new (for a survey on classical bibliography see Gelb, 1952 and Trager, 1972). We call to mind either studies such as that of McLuhan (1962) on the *Weltanschauung* determined by printing techniques, and the anthropological revolution of the "Gutenberg Galaxy" or the "grammatology" of Derrida (1967b). Bridging the gap between classic semantics and cryptography are studies such as that of Greimas (1970) on *"écriture cruciverbiste"* and all the studies on the topic of riddles and puzzles (e.g. Krzyzanowski, 1960).

Natural languages: every bibliographical reference in this area should refer back to the general bibliography of linguistics, logic, philosophy of language, cultural anthropology, psychology etc. We should only add that semiotic interests, though arising on the one hand from studies in logic and the philosophy of language (Locke, Peirce, and so on), on the other hand assume their most complete form in studies on *structural* linguistics (Saussure, Jakobson, Hjelmslev).

Visual communication: there is no need for bibliographical reference because this item is dealt with explicitly in this book (in ch. 3). But we must remember that studies of this kind cover an area extending from systems possessing the highest degree of formalization (Prieto, 1966), through graphic systems (Bertin, 1967), color systems (Itten, 1961), to the study of iconic signs (Peirce, 1931; Morris, 1946, etc).

This last notion has been particularly questioned in the recent years by

Eco (1968, 1971, 1973), Metz (1970, 1971), Verón (1971, 1973), Krampen (1973), Volli (1973) and others. The latest developments begin to recognize beneath the rather vague category of 'iconism' a more complex series of signs, thus moving beyond Peirce's tripartition of signs into *Symbols, Icons* and *Indices*. Finally at the highest levels we have the study of large iconographic units (Panofsky and Schapiro in general), visual phenomena in mass communication, from advertisements to comic strips, from paper money system to playing-cards and fortune-telling cards (Lekomceva, 1962; Egorov, 1965), rebuses, clothes (Barthes, 1967) until finally we come to the visual study of architecture (see Eco, 1973 *e*), choreographical notation, geographic and topographic maps (Bertin, 1967), and film (Metz, 1970c, 1974; Bettetini, 1968, 1971, 1973; and others).

Systems of objects: objects as communicative devices come within the realm of semiotics, ranging from architecture to objects in general (see Baudrillard, 1968, and the issue of "Communications" 13, 1969 *Les Objets*). On architecture see Eco, 1968; Koenig, 1970; Garroni, 1973; De Fusco, 1973.

Plot structure: ranging from the studies of Propp (1928) to more recent European contributions (Bremond, 1964, 1966, 1973; Greimas, 1966, 1970; Metz, 1968; Barthes, 1966; Todorov, 1966, 1967, 1968, 1970; Genette, 1966; V. Morin, 1966; Gritti, 1966, 1968). Worthy of emphasis are the studies of the Soviets (Ščeglov, 1962; Žolkovskij, 1962, 1967; Karpinskaja-Revzin, 1966; as well as the classic Russian formalists). The study of plot has found its most important development in the study of primitive mythology (Lévi-Strauss, 1958a, 1958c, 1964; Greimas, 1966; Maranda, 1968) and of games and tales belonging to folklore (Dundes, 1964; Beaujour, 1968; Greimas-Rastier, 1968; Maranda, E.K. & P., 1962). But it also reaches to studies on mass communication, from comic strips (Eco, 1964) to the detective story (Ščeglov, 1962 a) and the popular nineteenth-century romance (Eco, 1965, 1967).

Text theory: the exigencies of a 'transphrastic' linguistic and developments in plot analysis (as well as the poetic language analysis) have led semiotics to recognize the notion of *text* as a macro-unit, ruled by particular generative rules, in which sometimes the very notion of 'sign' – as an elementary semiotic unit – is practically annihilated (Barthes, 1971, 1973; Kristeva, 1969). As for a generative text grammar see van Dijk (1970) and Petöfi (1972).

Cultural codes: semiotic research finally shifts its attention to phenomena which it would be difficult to term sign systems in a strict sense, nor even communicative systems, but which are rather behavior and value systems. I refer to systems of etiquette, hierarchies and the so-called 'modelling secondary systems' – under which heading the Soviets bring in myths, legends, primitive theologies which present in an organized way the world vision of a certain society (see Ivanov and Toporov, 1962; Todorov, 1966) and finally the typology of cultures (Lotman, 1964, 1967 a), which study the codes which define a given cultural model (for example the code of

the mentality of medieval chivalry); finally models of social organization such as family systems (Lévi-Strauss, 1947) or the organized communicative network of more advanced groups and societies (Moles, 1967).

Aesthetic texts: the semiotic field also spills over into the area traditionally belonging to aesthetics. Certainly aesthetics is also concerned with non-semiotic aspects of art (such as the psychology of artistic creation, the relations between artistic form and natural form, the physical-psychological definition of aesthetic enjoyment, the analysis of the relations between art and society, etc.). But clearly all these problems could be dealt with from a semiotic point of view as soon as it is recognized (see 3.7) that every code allows for an *aesthetic use* of its elements.

Mass communication: as with aesthetics, this is a field which concerns many disciplines, from psychology to sociology and pedagogy (see Eco, 1964). But in most recent years the tendency has been to see the problem of mass communication in a semiotic perspective, while semiotic methods have been found useful in the explanation of numerous phenomena of mass communication.

The study of mass communication exists as a discipline not when it examines the technique or effects of a particular genre (detective story or comic strip, song or film) by means of a particular method of study, but when it establishes that all these genres, within an industrial society, have a characteristic in common.

The theories and analyses of mass communication are in fact applied to various genres, granted: 1) an industrial society which seems to be comparatively homogeneous but is in reality full of differences and contrasts; 2) channels of communication which make it possible to reach not determined groups but an indefinite circle of receivers in various sociological situations; 3) productive groups which work out and send out given messages by industrial means.

When these three conditions exist the differences in nature and effect between the various means of communication (movie, newspaper, television or comic strips) fade into the background compared with the emergence of common structures and effects.

The study of mass communication proposes a unitary object inasmuch as it claims that the industrialization of communications changes not only the conditions for receiving and sending out messages but (and it is with this apparent paradox that the methodology of these studies is concerned) the very meaning of the message (which is to say that block of meanings which was thought to be an unchangeable part of the message as devised by the author irrespective of its means of diffusion). In order to study mass communication one can and should resort to disparate methods ranging from psychology to sociology and stylistics; but one can plan a unitary study of such phenomena only if the theories and analyses of mass communication are considered as one sector of a general semiotics (see Fabbri, 1973).

Rhetoric: the revival in studies of rhetoric is currently converging on the study of mass communication (and therefore of communication with the

reality; but he did clearly stress the fact that the signified is something which has to do with the mental activity of anybody receiving a signifier: according to Saussure signs 'express' ideas and provided that he did not share a Platonic interpretation of the term 'idea', such ideas must be mental events that concern a human mind. Thus the sign is implicitly regarded as a communicative device taking place between two human beings intentionally aiming to communicate or to express something. It is not by chance that all the examples of semiological systems given by Saussure are without any shade of doubt strictly conventionalized systems of artificial signs, such as military signals, rules of etiquette and visual alphabets. Those who share Saussure's notion of *sémiologie* distinguish sharply between intentional, artificial devices (which they call 'signs') and other natural or unintentional manifestations which do not, strictly speaking, deserve such a name.

0.5.2. Peirce

In this sense the definition given by Peirce seems to me more comprehensive and semiotically more fruitful: "I am, as far as I know, a pioneer, or rather a backwoodsman, in the work of clearing and opening up what I call *semiotic*, that is the doctrine of the essential nature and fundamental varieties of possible semiosis" (1931, 5.488). "By semiosis I mean an action, an influence, which is, or involves, a cooperation of *three* subjects, such as a sign, its object and its interpretant, this tri-relative influence not being in anyway resolvable into actions between pairs" (5.484). I shall define the 'interpretant' better later (chapter 2), but it is clear that the 'subjects' of Peirce's 'semiosis' are not human subjects but rather three abstract semiotic entities, the dialectic between which is not affected by concrete communicative behavior. According to Peirce a sign is "something which stands to somebody for something in some respects or capacity" (2.228). As will be seen, a sign can *stand for* something else to somebody only because this 'standing-for' relation is mediated by an interpretant. I do not deny that Peirce also thought of the interpretant (which was another sign translating and explaining the first one, and so on *ad infinitum*) as a psychological event in the mind of a possible interpreter; I only maintain that it is possible to interpret Peirce's definition in a non-anthropomorphic way (as is proposed in chapters 1 and 2). It is true that the same interpretation could also fit Saussure's proposal; but Peirce's definition offers us something more. It does not demand, as part of a sign's definition, the qualities of being intentionally emitted and artificially produced.

intentionally emitted by its senders. Let us look more closely at these two instances.

We are able to infer from smoke the presence of fire, from a wet spot the fall of a raindrop, from a track on the sand the passage of a given animal, and so on. All these are cases of *inference* and our everyday life is filled with a lot of these inferential acts. It is incorrect to say that every act of inference is a 'semiosic' act – even though Peirce did so – and it is probably too rash a statement to assert that every semiosic process implies an act of inference, but it can be maintained that *there exist acts of inference which must be recognized as semiosic acts*. It is not by chance that ancient philosophy has so frequently associated signification and inference. A sign was defined as the evident antecedent of a consequent or the consequent of an antecedent when similar consequences have been previously observed (Hobbes, *Leviathan*, 1,3); as an entity from which the present or the future or past existence of another being is inferred (Wolff, *Ontology*, 1952); as a proposition constituted by a valid and revealing connection to its consequent (Sextus Empiricus, *Adv. math.*, VIII, 245). Probably this straightforward identification of inference and signification leaves many shades of difference unexplained: it only needs to be corrected by adding the expression 'when this association is culturally recognized and systematically coded'.

The first doctor who discovered a sort of constant relationship between an array of red spots on the patient's face and a given disease (measles) made an inference: but insofar as this relationship has been made conventional and has been registered as such in medical treatises a *semiotic convention* (4) has been established. There is a sign every time a human group decides to use and to recognize something as the vehicle of something else.

In this sense events coming from a *natural source* must also be listed as signs: for there is a convention positing a coded correlation between an expression (the perceived event) and a content (its cause or its possible effect). An event can be a sign-vehicle of its cause or its effect provided that both the cause and the effect are not actually detectable. Smoke is only a sign of fire to the extent that fire is not actually perceived along with the smoke: but smoke can be a sign-vehicle standing for a non-visible fire, provided that a social rule has necessarily and usually associated smoke with fire.

0.6.2. Non-intentional signs

The second case is one in which a human being performs acts that are

perceived by someone as signalling devices, revealing something else, even if the sender is unaware of the revelative property of his behavior. A typical example is gestural behavior. Under some conditions it is perfectly possible to detect the cultural origin of a gesturer because his gestures have a clear connotative capacity. Even if we do not know the socialized meanings of those gestures we can at any rate recognize the gesturer as Italian, Jew, Anglo-Saxon and so on (see Efron, 1941) just as almost everybody is able to recognize a Chinese or German speaker as such even if he does not know Chinese or German. These behaviors are able to signify even though the sender does not attribute such a capacity to them.

One might assume that this case is similar to that of medical symptoms: provided there is a rule assigning a cultural origin to certain gestural styles, those gestures will be understood as signs, independently of the will of the sender. But no one can escape the suspicion that, as long as the gesture is performed by a human being, there is an underlying significative intention. So in this case our example is complicated by the fact that we are dealing with something which has strong links with communicational practice. If in the case of symptoms it was easy to recognize a signification relationship without any suspicion of actual communication, in this second case there is always the suspicion that the subject is *pretending* to act unconsciously with a specially communicative intention; he may, on the other hand, want to show his communicative intention, while the addressee interprets his behavior as unconscious. Moreover, the subject can act unconsciously while the addressee attributes a misleading intention to him. And so on. This interplay of acts of awareness and unawareness, and of the attribution of voluntarity and involuntarity to the sender, generates many communicative exchanges that can give rise to an entire repertoire of mistakes, *arrière pensées*, double thinks and so on.

Table 1 should generate all possible understandings and misunderstandings. S stands for Sender, A for Addressee, IS for 'the intention attributed to the Sender by the Addressee', while + and - mean either intentional/unintentional emission (for the Sender) or conscious/unconscious reception (for the Addressee): In case number 1, for instance, a liar intentionally shows the signs of a given sickness in order to deceive the addressee, while the addressee is quite well aware that the sender is lying. In case number 2 the deception is successful. In cases number 3 and 4 the sender intentionally emits a significant behavior which the addressee receives as a simple stimulus devoid of any intentionality: as when, in order to get rid of a boring visitor, I drum on the desk with my fingers, thus expressing nervous tension. The addressee may only

Table 1

	S	A	IS
1	+	+	+
2	+	+	-
3	+	-	(+)
4	+	-	(-)
5	-	+	+
6	-	+	-
7	-	-	(+)
8	-	-	(-)

perceive it as a subliminal stimulus which irritates him; in such a case he cannot attribute either intentionality or unintentionality to me (which is why + and - are put into brackets), although later he might (or might not) realize that my behavior was intentional.

Cases 1 and 2 also express the opposite of the last situation: I drum intentionally and the addressee perceives my behavior as significant, though he may or may not attribute to me a specifically significative intention. In all these cases (which could constitute a suitable combinatorial explanation of many interpersonal relations, of the type studied by Goffman (1963, 1967, 1969)), behaviors become signs because of a decision on the part of the addressee (trained by cultural convention) or of a decision on the part of the sender to stimulate in the addressee the decision to take these behaviors as signs.

0.7. Natural boundaries: the lower threshold

0.7.1. Stimuli

If both non-human and human but unintentional events can become signs, then semiotics has extended its domain beyond a frequently fetishized threshold: that which separates signs from things and artificial signs from natural ones. But while gaining this territory, general semiotics inevitably loses its grip on another strategical position to which it had unduly laid claim. For since everything can be understood as a sign if and only if there exists a convention which allows it to stand for something else, and since some behavioral responses are not elicited by convention, stimuli *cannot* be regarded as signs.

According to the well-known Pavlov experiment, a dog salivates when stimulated by the ring of a bell because of a conditioned stimulus. The ring of the bell provokes salivation without any other mediation. However, from the point of view of the scientist, who knows that to every ring must correspond a salivation, the ring stands for salivation (even if the dog is not there): there is a coded correspondence between two events so that one can stand for the other. There is an old joke according to which two dogs meet in Moscow, one of them very fat and wealthy, the other pathetically emaciated. The latter asks the former: "How can you find food?". The former zoosemiotically replies: "That's easy. Every day, at noon, I enter the Pavlov Institute and I begin to salivate: immediately afterward a conditioned scientist arrives, rings a bell and gives me food". In this case the scientist reacts to a stimulus but the dog establishes a sort of reversible relationship between salivation and food: it knows that to a given stimulus a given reaction must correspond and therefore the dog possesses a code. Salivation is for it the sign of the possible reaction on the part of the scientist. Unfortunately for dogs, this is not the way things are – at least within the framework of classical experiment: the sound of the bell is a stimulus for the dog, which salivates independently of any social code, while the psychologist regards the dog's salivation as a sign (or symptom) that the stimulus has been received and has elicited the appropriate response.

To my mind, the difference between the attitude of the dog and that of the psychologist is an enlightening one: to assert that stimuli are not signs does not necessarily mean that a semiotic approach ought not to be concerned with them. Semiotics is dealing with sign-function, but a sign-function represents the correlation of two functives which (outside that correlation) are not by nature semiotic. However, insofar as – once correlated – they can acquire such a nature, they deserve some attention on the part of semioticians. There are some phenomena that could be imprudently listed among supposedly non-signifying stimuli without realizing that 'in some respect or capacity' they can act as signs 'to somebody'.

0.7.2. Signals

For instance, the proper objects of a theory of information are not signs but rather units of transmission which can be computed quantitatively irrespective of their possible meaning, and which therefore must properly be called 'signals' and not 'signs'. To assert that these *signals* are of no importance for a semiotic approach would be rather hasty. One would then be unable to take into account the various features of the linguistic

articulated language) but they have been singled out as the objects of various semio-anthropological studies in order to show that the whole of culture is signification and communication and that humanity and society exist only when communicative and significative relationships are established.

One must be careful to note that this type of research can be articulated through two hypotheses, of which one is comparatively 'radical' – a kind of 'unnegotiable demand on the part of semiotics' – and the other appears to be comparatively 'moderate'.

The two hypotheses are: (i) the whole of culture *must* be studied as a semiotic phenomenon; (ii) all aspects of a culture *can* be studied as the contents of a semiotic activity. The radical hypothesis usually circulated in two extreme forms: "culture is *only* communication" and "culture is *no more* than a system of structured significations". These formulas hint dangerously at idealism and should be changed to: "the whole of culture *should* be studied as a communicative phenomenon based on signification systems". This means that not only *can* culture be studied in this way but – as will be seen – only by studying it in this way can certain of its fundamental mechanisms be clarified.

The difference between saying culture 'should be studied as' and 'culture is', is immediately apparent. In fact it is one thing to say that an object is *essentialiter* something and another to say that it can be seen *sub ratione* of that something.

0.8.2. Tools

I shall try and give a few examples. When Australopithecines used a stone to split the skull of a baboon, there was as yet no culture, even if an Australopithecine had in fact transformed an element of nature into a tool. We would say that culture is born when: (i) a thinking being establishes the new function of the stone (irrespective of whether he works on it, transforming it into a flint-stone); (ii) he calls it "a stone that serves for something" (irrespective of whether he calls it so to others, or out loud); (iii) he recognizes it as "the stone that responds to the function F and that has the name Y" (irrespective of whether he uses it as such a second time: it is sufficient that he recognizes it). [5]

These three conditions result in a semiotic process of the following kind: In Table 2, S_1 is the first stone used for the first time as a tool and S_2 is another stone, different in size, color and weight from the first one. Now suppose that our Australopithecine, after having used the first stone by

and function. A single use of the stone is not culture. To establish how the function can be repeated and to transmit this information from today's solitary shipwrecked man to the same man tomorrow, is culture. The solitary man becomes both transmitter and receiver of a communication (on the basis of a very elementary code). It is clear that a definition such as this (in its totally simple terms) can imply an identification of thought and language: it is a question of saying, as Peirce does (5.470-480) that *even ideas are signs*. But the problem appears in its extreme form only if one considers the extreme example of a shipwrecked individual communicating with himself. As soon as there are two individuals, one can translate the problem into terms not of ideas but of *observable sign-vehicles*.

The moment that communication occurs between two men, one might well imagine that what can be observed is the verbal or pictographic sign with which the sender communicates to the addressee the object-stone and its possible function by means of a name (for example: /headsplitter/ or /weapon/). But with this we only arrive at our second hypothesis: the cultural object has become the content of a possible verbal communication. The *primary hypothesis* instead presupposes that the sender could communicate the function of the object even without necessarily involving the verbal name, by merely showing the object. It thus supposes that once the possible use of the stone has been conceptualized, the stone itself becomes the concrete sign of its virtual use. Thus it is a question of stating (Barthes, 1964 a) that once society exists every function is automatically transformed into a *sign of that function*. This is possible once culture exists. But culture exists only because this is possible.

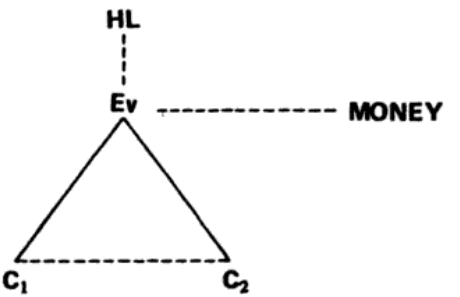
0.8.3. Commodities

We will move on now to phenomena such as economic exchange. We must above all eliminate the ambiguity whereby every 'exchange' would be 'communication' (just as some think that every communication is a 'transfer'). True, as every communication implies an exchange of signals (just as the exchange of signals implies the transfer of energy); but there are exchanges such as those of goods (or of women) which are exchanges not only of signals but also of consumable physical bodies. It is possible to consider the exchange of commodities as a semiotic phenomenon (Rossi-Landi, 1968) not because the exchange of goods implies a physical exchange, but because in the exchange the *use value* of the goods is transformed into their *exchange value* – and therefore a process of signification or *symboliza-*

tion takes place, this later being perfected by the appearance of money, which *stands for something else*.

The economic relationships ruling the exchange of commodities (as described in the first book of *Das Kapital* by Karl Marx) may be represented in the same way as was the sign-function performed by the tool-stone (Table 3).

Table 3



In Table 3, C_1 and C_2 are two commodities devoid of any use value (this having been semiotically represented in Table 2). In the first book of *Das Kapital* Marx not only shows how all commodities, in a general exchange system, can become signs standing for other commodities: he also suggests that this relation of mutual significance is made possible because the commodities system is structured by means of *oppositions* (similar to those which linguistics has elaborated in order to describe – for example – the structure of phonological systems). Within this system *«Commodity number 1»* becomes the Commodity *in which* the exchange value of «Commodity number 2» is expressed («Commodity number 2» being the item *of which* the exchange value is expressed by *«Commodity number 1»*). [6] This significant relationship is made possible by the cultural existence of an exchange parameter that we can record as Ev (exchange value). If in a use value system all the items referred back to a function F (corresponding to the use value) in an exchange value system Ev refers back to the quantity of human labor necessary to the production of both C_1 and C_2 (this parameter being recorded as HL). All these items can be correlated, in a more sophisticated cultural system, with the universal equivalent, money (which corresponds in some respects to the cultural name standing for both commodities and their abstract and 'type' equivalents, HL and Ev). The only difference between a coin (as sign-vehicle) and a word is that the word can be reproduced without

economic effort while a coin is an irreproducible item (which shares some of the characters of its commodity-object). This simply means that there are different kinds of signs which must also be differentiated according to the economic value of their *expression-matter*. The Marxist analysis also shows that the semiotic diagram ruling a capitalistic economy differentiates both HL and Ev (which are mutually equivalent) from a third element, the *salary* received by the worker who performs HL. This gap between HL, Ev and Salary constitutes the *plus value*. But this fact, highly significant from the point of view of an economic enquiry, does not contradict our semiotic model; on the contrary it shows how semiotics can clarify certain aspects of cultural life; and how, from a certain point of view, a scientific approach to economics consists in discovering the one-sidedness of some surface semiotic codes, that is their *ideological* quality (see 3.9.).

If one turns back to Table 2 one realizes that even that was a one-sided representation of more complex relationships. As a matter of fact a stone has not only *that* particular function F (head-splitting), but many others too; and a possible global semiotic system (that is, a representation of a culture in its totality) must take into account every possible use value (that is, every possible semantic content or meaning) or a given object – thus recording every kind of functional *synonymy* and *homonymy*.

0.8.4. Women

Let us now consider the exchange of women. In what sense can this be considered a symbolic process? In this context women would appear to be *physical objects* to be used through physiological operations (to be *consumed* as in the case of food and other goods). However, if the woman were merely the physical body with which the husband enters into sexual relations in order to produce sons, it could not then be explained why *every* man does not copulate with *every* woman. Why is man obliged by certain conventions to choose one (or more, according to the custom) following very precise and inflexible rules of choice? Because it is only a woman's symbolic value which puts her *in opposition*, within the system, to other women. The woman, the moment she becomes 'wife', is no longer merely a physical body: she is a *sign* which connotes a system of social obligations (Lévi-Strauss, 1947).

0.8.5. Culture as a semiotic phenomenon

So it is clear how my first hypothesis makes a general theory of culture

out of semiotics and in the final analysis makes semiotics a substitute for cultural anthropology. But to reduce the whole of culture to semiotics does not mean that one has to reduce the whole of material life to pure mental events. To look at the whole of culture *sub specie semiotica* is not to say that culture is only communication and signification but that it can be understood more thoroughly if it is seen from the semiotic point of view. And that objects, behavior and relationships of production and value function as such socially precisely because they obey semiotic laws. As for the *moderate hypothesis*, it simply means that every aspect of culture becomes a semantic unit.

To say that a class of objects (for example «automobile») becomes a semantic entity insofar as it is signified by means of the sign=vehicle /automobile/ will not get us very far. It is obvious that semiotics is also concerned with sodium chloride (which is not a cultural but a natural entity) the moment it is seen as the meaning of the sign-vehicle /salt/ (and vice versa).

But our second hypothesis implicitly suggests something more, i.e., that the systems of meanings (understood as systems of cultural units) are organized as structures (semantic fields and axes) which follow the same semiotic rules as were set out for the structures of the sign-vehicle. In other words, «automobile» is not only a semantic entity once it is correlated with the sign-vehicle /automobile/. It is a semantic unit as soon as it is arranged in an axis of oppositions and relationships with other semantic units such as «carriage», «bicycle» or «feet» (in the opposition "by car" vs. "on foot"). In this sense there is *at least one way* of considering all cultural phenomena on the semiotic level: everything which cannot be studied any other way in semiotics is studied at the level of structural semantics. But the problem is not that simple. An automobile can be considered on different levels (from different points of view): (a) the *physical level* (it has a weight, is made of a certain metal and other materials); (b) the *mechanical level* (it functions and fulfills a certain function on the basis of certain laws); (c) the *economic level* (it has an exchange value, a set price); (d) the *social level* (it indicates a certain social status); (e) the *semantic level* (it is not only an object as such but a cultural unit inserted into a system of cultural units with which it enters into certain relationships which are studied by structural semantics, relationships which remain the same even if the sign-vehicles with which we indicate them are changed; even – that is – if instead of /automobile/ we were to say /car/ or /*coche*/).

Let us now return to level (d), i.e. to the social level. If an automobile (as an individual concrete object) indicates a certain social status, it has then

crystal-like and unchanging model. I would put the matter this way: the object of semiotics may somewhat resemble (i) either the surface of the sea, where, independently of the continuous movement of water molecules and the interplay of submarine streams, there is a sort of average resulting form which is called the Sea, (ii) or a carefully ordered landscape, where human intervention continuously changes the form of settlements, dwellings, plantations, canals and so on. If one accepts the second hypothesis, which constitutes the epistemological assumption underlying this book, one must also accept another condition of the semiotic approach which will not be like exploring the sea, where a ship's wake disappears as soon as it has passed, but more like exploring a forest where cart-trails or footprints do modify the explored landscape, so that the description the explorer gives of it must also take into account the ecological variations that he has produced.

According to the theory of codes and sign production that I intend to propose, it will be clear that the semiotic approach is ruled by a sort of *indeterminacy principle*: in so far as signifying and communicating are social functions that determine both social organization and social evolution, to 'speak' about 'speaking', to signify signification or to communicate about communication cannot but influence the universe of speaking, signifying and communicating.

The semiotic approach to the phenomenon of 'semiosis' must be characterized by this kind of awareness of its own limits. Frequently to be really 'scientific' means not pretending to be more 'scientific' than the situation allows. In the 'human' sciences one often finds an 'ideological fallacy' common to many scientific approaches, which consists in believing that one's own approach is not ideological because it succeeds in being 'objective' and 'neutral'. For my own part, I share the same skeptical opinion that all enquiry is 'motivated'. Theoretical research is a form of social practice. Everybody who wants to know something wants to know it in order to do something. If he claims that he wants to know it only in order 'to know' and not in order 'to do' it means that he wants to know it in order to do nothing, which is in fact a surreptitious way of doing something, i.e. leaving the world just as it is (or as his approach assumes that it ought to be).

Ceteris paribus, I think that it is more 'scientific' not to conceal my own motivations, so as to spare my readers any 'scientific' delusions. If semiotics is a theory, then it should be a theory that permits a continuous critical intervention in semiotic phenomena. Since people speak, to explain why and how they speak cannot help but determine their future way of speaking. At any rate, I can hardly deny that it determines my own way of speaking.

2. But see the objections raised to this book by Robert M.W. Dixon in his review in *Linguistics*, 5, where he observes that even mathematical formulae, considered 'universal' by the author, are abstractions from Indo-European syntactical models, and that they can therefore be understood only by someone who already knows the codes of certain natural languages.

3. This concerns the need for a hyperformalized language, formed by *empty signs*, and adapted to the description of all semiotic possibilities. As for this project, proposed by modern semiologists, see Julia Kristeva, "L'expansion de la sémiotique" (1967). She refers to the research of the Russian Linzbach and predicts an axiomatics through which "semiotics will be built up on the corpse of linguistics, a death already predicted by Linzbach, and one to which linguistics will become resigned after having prepared the ground for semiotics, demonstrating the isomorphism of semiotic practices with the other complexes of our universe." Semiotics will therefore be presented as the axiomatic meeting-place of all possible knowledge, including arts and sciences. This proposal is developed by Kristeva in "Pour une sémiologie des paragrammes" (1967) and in "Distance et anti-representation" (1968), where she introduces Linnart Mall, "Une approche possible du Sunyayada", whose study of the "zero-logical subject' and of the notion of 'emptiness' in ancient Buddhist texts is curiously reminiscent of Lacan's *'vide'*. But it must be pointed out that the whole of this axiomatic program refers semiotics back to the *characteristica universalis* of Leibniz, and from Leibniz back to the late medieval *artes combinatoriae*, and to Lullo.

4. One should establish from this point on what a *convention* is. It is not so difficult to explain how someone can posit the conventional relationship between a red spot and measles: one can use verbal language as a metalinguistic device. But what about those conventions that cannot rely upon a previous metalanguage? Paragraphs 3.6.7. to 3.6.9. (about the mode of sign production called 'invention') will be devoted to this subject. For a preliminary and satisfactory notion of 'convention' let us assume for the time being the one proposed by Lewis, 1969.

5. Whether or not all this applies to the Australopithecines we do not know. It is sufficient to maintain that all this must apply to the first being which performed a semiotic behavior. This could mean – as Piaget (1968, p. 79) suggests – that intelligence precedes 'language'. But this does not mean that intelligence precedes semiosis. If the equation 'semiosis=verbal language' is eliminated, one can view intelligence and signification as a single process.

6. Since this is a book on *semiotics* and not only on linguistics, I will be obliged at times to quote a non-verbal device as the sign-vehicle of a given cultural content (see chapter 2). Having adopted the decision of representing the sign-vehicles between slashes (/xxx/), and since in a book even the quotation of an object needs to be realized through a word, let me assume that when something which is not a word is taken as a sign-vehicle and is therefore represented by a word, this corresponding word will be written *in italics* between double slashes (*//xxx//*). Double slashes thus mean «the object usually corresponding to this word». Thus /automobile/ represents the word 'automobile', while *//automobile//* represents the object usually called /automobile/.

1: SIGNIFICATION AND COMMUNICATION

1.1. An elementary communicational model

If every communication process must be explained as relating to a system of significations, it is necessary to single out *the elementary structure of communication* at the point where communication may be seen in its most elementary terms. Although every pattern of signification is a cultural convention, there is one communicative process in which there seems to be no cultural convention at all, but only – as was proposed in 0.7 – the passage of stimuli. This occurs when so-called physical 'information' is transmitted between two mechanical devices.

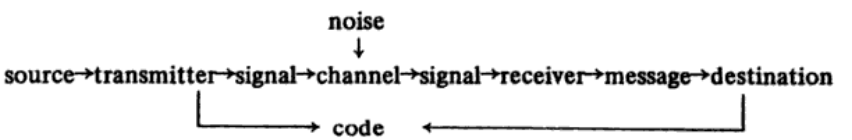
When a floating buoy signals to the control panel of an automobile the level reached by the gasoline, this process occurs entirely by means of a mechanical chain of causes and effects. Nevertheless, according to the principles of information theory, there is an 'informational' process that is in some way considered a communicational process too. Our example does not consider what happens once the signal (from the buoy) reaches the control panel and is converted into a visible measuring device (a red moving line or an oscillating arm): this is an undoubted case of sign-process in which the position of the arm *stands for* the level of the gasoline, in accordance with a conventionalized *code*.

But what is puzzling for a semiotic theory is the process which takes place before a human being looks at the pointer: although at the moment when he does so the pointer is the starting point of a signification process, before that moment it is only the *final result* of a preceding communicational process. During this process we cannot say that the position of the buoy stands for the movement of the pointer: instead of 'standing-for', the buoy *stimulates, provokes, causes, gives rise to* the movement of the pointer.

It is then necessary to gain a deeper knowledge of this type of process, which constitutes the lower threshold of semiotics. Let us outline a very simple communicative situation(1). An engineer – downstream – needs to know when a watershed located in a basin between two mountains, and closed by a watergate, reaches a certain level of saturation, which he defines as 'danger level'.

Whether there is water or not; whether it is above or below the danger level; how much above or below; at what rate it is rising: all this constitutes pieces of information which can be transmitted from the watershed, which will therefore be considered as a *source* of information.

So the engineer puts in the watershed a sort of buoy which, when it reaches danger level, activates a *transmitter* capable of emitting an electric *signal* which travels through a *channel* (an electric wire) and is picked up downstream by a *receiver*; this device converts the signal into a given string of elements (i.e. releases a series of mechanical commands) that constitute a *message* for a *destination* apparatus. The destination, at this point, can release a mechanical response in order to correct the situation at the source (for instance opening the watergate so that the water can be slowly evacuated). Such a situation is usually represented as follows:



In this model the code is the device which assures that a given electric signal produces a given mechanical message, and that this elicits a given response. The engineer can establish the following code: presence of signal (+ A) *versus* absence of signal (- A). The signal + A is released when the buoy sensitizes the transmitter.

But this 'Watergate Model' also foresees the presence of potential *noise* on the channel, which is to say any disturbance that could alter the nature of the signals, making them difficult to detect, or producing + A when - A is intended and vice versa. Therefore the engineer has to complicate his code. For instance, if he establishes two different levels of signal, namely + A and +B, he then disposes of three signals (2) and the destination may accordingly be instructed in order to release three kinds of response.

+ A produces 'state of rest'
+ B produces 'feedback'
- AB (and + AB) produces an emergency signal (meaning that something does not work)

This complication of the code increases the cost of the entire apparatus but makes the transmission of information more secure. Nevertheless there can be so much noise as to produce + A instead of + B. In order to avoid this risk, the code must be considerably complicated. Suppose that the engineer now disposes of four positive signals and establishes that every message must be composed of two signals. The four positive signals can be represented by four different levels but in order to better control the entire process the engineer decides to represent them by four electric bulbs as well. They can be set out in a positional series, so that A is recognizable inasmuch as it precedes B and so on; they can also be designed as four bulbs of differing colors, following a wave-length progression (green, yellow, orange, red). It must be made absolutely clear that the destination apparatus does not need to 'see' bulbs (for it has no sensory organs): but the bulbs are useful for the engineer so that he can follow what is happening.

I should add that the correspondence between electric signals (received by the transmitter and translated into mechanical messages) and the lighting of the bulbs (obviously activated by another receiver) undoubtedly constitutes a new coding phenomenon that would need to receive separate attention; but for the sake of convenience I shall consider both the message to the destination and the bulbs as two aspects of the same phenomenon. At this point the engineer has – at least from a theoretical point of view – 16 possible messages at his disposal:

AA	BA	CA	DA
AB	BB	CB	DB
AC	BC	CC	DC
AD	BD	CD	DD

want to use and by means of which he could signal other states within the watershed (combined with appropriate additional responses): they could also be used in order to introduce synonymies (danger level being signalled both by AB and by AC). Anyway the code which has been adopted would seem to be an optimal one for an engineer's purposes and it would be unwise to complicate it too much. (3)

1.2. Systems and codes

Once the Watergate Model is established and the engineer has finished his project, a semiotician could ask him a few questions, such as: (i) what do you call a 'code'? the device by which you know that a given state in the watershed corresponds to a given set of illuminated bulbs? (ii) if so, does the mechanical apparatus possess a code, that is, does the destination recognize the 'meaning' of the received message or does it simply respond to mechanical stimuli? (iii) and is the fact that the destination responds to a given array of stimuli by means of a given sequence of responses based on a code? (iv) who is that code for? you or the apparatus? (v) and anyway, is it not true that many people would call the internal organization of the system of bulbs a code, irrespective of the state of things that can be signalled through its combinational articultation? (vi) finally, is not the fact that the water's infinite number of potential positions within the watershed have been segmented into four, and only four 'pertinent' states, sometimes called a 'code'?

One could carry on like this for a long time. But it seems unnecessary, since it will already be quite clear that under the name of /code/ the engineer is considering at least four different phenomena:

(a) A set of *signals* ruled by internal combinatory laws These signals are not necessarily connected or connectable with the state of the water that they conveyed in the Watergate Model, nor with the destination responses that the engineer decided they should be allowed to elicit. They could convey different notions about things and they could elicit a different set of responses: for instance they could be used to communicate the engineer's love for the next-watershed girl, or to persuade the girl to return his passion. Moreover these signals can travel through the channel without conveying or eliciting anything, simply in order to test the mechanical efficiency of the transmitting and receiving apparatuses. Finally they can be considered as a pure combinational structure that only takes the form of electric signals by chance, an interplay of empty positions and mutual oppositions, as will be seen in 1.3. They could be called a *syntactic system*.

shall therefore call a system of elements such as the syntactic, semantic and behavioral ones outlined in (a), (b) and (c) an *s-code* (or code as system); whereas a rule coupling the items of one s-code with the items of another or several other s-codes, as outlined in (d), will simply be called a *code*.

S-codes are systems or 'structures' that can also subsist independently of any sort of significant or communicative purpose, and as such may be studied by information theory or by various types of generative grammar. They are made up of finite sets of elements oppositionally structured and governed by combinational rules that can generate both finite and infinite strings or chains of these elements. However, in the social sciences (as well as in some mathematical disciplines), such systems are almost always recognized or posited in order to show how one such system can convey all or some of the elements of another such system, the latter being to some extent correlated with the former (and vice versa). In other words these systems are usually taken into account only insofar as they constitute one of the planes of a correlational function called a 'code'.

Since an s-code deserves theoretical attention only when it is inserted within a significant or communicational framework (the code), the theoretical attention is focused on its intended purpose: therefore a non-significant system is called a 'code' by a sort of *metonymical* transference, being understood as part of a semiotic whole with which it shares some properties.

Thus an s-code is usually called a 'code' but this habit relies on a rhetorical convention that it would be wise to eliminate. On the contrary the term /s-code/ can be legitimately applied to the semiotic phenomena (a), (b) and (c) without any danger of rhetorical abuse since all of these are, technically speaking, 'systems', submitted to the same formal rules even though composed of very different elements; i.e. (a) electric signals; (b) notions about states of the world, (c) behavioral responses.

1.3. The s-code as structure

Taken independently of the other systems with which it can be correlated, an s-code is a *structure*; that is, a system (i) in which every value is established by positions and differences and (ii) which appears only when different phenomena are mutually compared with reference to the same system of relations. "That arrangement alone is structured which meets two conditions: that it be a system, ruled by an internal cohesiveness; and this cohesiveness, inaccessible to observation in an isolated system, be revealed in the study of transformations, through which the similar properties in apparently different systems are brought to light" (Lévi-Strauss, 1960).

In the Watergate Model systems (a), (b) and (c) are homologously structured. Let us consider system (a): there are four elements (A; B; C; D) which can be either present or absent:

A = 1000
B = 0100
C = 0010
D = 0001

The message they generate can be detected in the same way:

AB = 1100
CD = 0011
BC = 0110
AD = 1001

AB is recognizable because the order of its features is oppositionally different from that of BC, CD and AD and so on. Each element of the system can be submitted to substitution and commutation tests, and can be generated by the transformation of another element; furthermore the whole system could work equally well even if it organized four fruits, four animals or the four musketeers instead of four bulbs.

The (b) system relies upon the same structural mechanism. Taking 1 as the minimal pertinent unit of water, the increase of water from insufficiency to danger might follow a sort of 'iconic' progression whose opposite would be the regression represented by the (c) system, in which 0 represents the minimal pertinent unit of evacuated water:

(b)		(c)
(danger)	1111	0000 (evacuation)
(alarm)	1110	0001 (alarm)
(security)	1100	0011 (rest)
(insuff.)	1000	0111 (admission)

By the way, if an inverse symmetry appears between (b) and (c), this is because the two systems are in fact considered as balancing each other out; whereas the representation of the structural properties of the system (a) does not look homologous to the other two because the correspondence between the strings in (a) and the units of (b) and (c) was *arbitrarily* chosen. One

could have chosen the message ABCD (IIII), in order to signal "danger" and to elicit "evacuation". But, as was noted in 1.1.3, this choice would have submitted the informational process to greater risk of noise. Since the three systems are not here considered according to their possible correlation, I am only concerned to show how each can, independently of the others, rely on the *same structural matrix*, this being able to generate different combinations following diverse combinational rules. When the formats of the three systems are compared, their differences and their potential for mutual transformation become clear, precisely because they have the same underlying structure.

The structural arrangement of a system has an important practical function and shows certain properties[4]. It makes a situation comprehensible and comparable to other situations, therefore preparing the way for a possible coding correlation. It arranges a repertoire of items as a structured whole in which each unit is differentiated from the others by means of a series of *binary exclusions*. Thus a system (or an s-code) has an *internal grammar* that is properly studied by the mathematics of information. The mathematics of information, in principle, has nothing to do with engineering the transmission of information, insofar as it only studies the statistical properties of an s-code. These statistical properties permit a correct and economic calculation as to the best transmission of information within a given informational situation, but the two aspects can be considered independently.

What is important, on the other hand, is that the elements of an informational 'grammar' explain the functioning not only of a syntactic system, but of every kind of structured system, such as for example a semantic or a behavioral one. What information theory does not explain is the functioning of a code as a correlating rule. In this sense information theory is neither a theory of signification nor a theory of communication but only a theory of the abstract combinational possibilities of an s-code.

1.4. Information, communication, signification

1.4.1. Some methodological distinctions

Let us summarize the state of the present methodological situation:

The term /information/ has two basic senses: (a) it means a statistical property of the source, in other words it designates the amount of information that *can be transmitted*; (b) it means a precise amount of selected information which *has actually been transmitted and received*. Information in sense (a) can be view as either (a, i) the information at one's

disposal at a given natural source or (a, ii) the information at one's disposal once an s-code has reduced the equi-probability of that source. Information in sense (b) can be computationally studied either: as (b, i) the passage through a channel of signals which do not have any communicative function and are thus simply stimuli, or as (b, ii) the passage through a channel of signals which do have a communicational function, which – in other words – been coded as the vehicles of some content units.

Therefore we must take into account *four* different approaches to four different formal objects, namely:

(a, i) the results of a mathematical theory of information as a *structural theory of the statistical properties of a source* (see 1.4.2); this theory does not directly concern a semiotic approach except insofar as it leads to approach (a, ii);

(a, ii) the results of a mathematical theory of information as a *structural theory of the generative properties of an s-code* (see 1.4.3); such an approach is useful for semiotic purposes insofar as it provides the elements for a grammar of functives (see 2.1.);

(b, i) the results of studies in informational engineering concerning the *process whereby non-significant pieces of information are transmitted* as mere signals or stimuli (see 1.4.4); these studies do not directly concern a semiotic approach except insofar as they lead to approach (b, ii);

(b, ii) the result of studies in informational engineering concerning the *processes whereby significant pieces of information used for communicational purposes are transmitted* (see 1.4.5); such an approach is useful from a semiotic point of view insofar as it provides the elements for a theory of sign production (see chapter 3).

Thus a semiotic approach is principally interested in (a, ii) and (b, ii); it is also interested in (a, i) and (b, i) – these constituting the lower threshold of semiotics – inasmuch as the theory and the engineering of information offer it useful and more effective categories.

As will be shown in chapter 2, a theory of codes, which studies the way in which a system of type (a, ii) becomes the content plane of another system of the same type, will use categories such as 'meaning' or 'content'. These have nothing to do with the category of 'information', since information theory is not concerned with the contents that the units it deals with can convey but, at best, with the internal combinational properties of the system of conveyed units, insofar as this too is an s-code.[5]

understood in sense (a, i), while in the latter information is understood in sense (b, i), that is, information as a selected, transmitted and received piece of information.

1.4.3. Information of the s-code

Nevertheless in the preceding pages information has instead appeared to be the measure of freedom of choice provided by the organized structure known as an s-code. And in the Watergate Model the s-code appeared as a reductive network, superimposed on the infinite array of events that could have taken place within the watershed in order to isolate a few pertinent events.

I shall now try to demonstrate how such a reduction is usually due to a project for transmitting information (sense b, i), and how this project gives rise to an s-code that can in itself be considered *a new type of source* endowed with particular informational properties – which are the object of a theory of s-codes in the sense (a, ii).

Examples of this kind of theory are represented by structural phonology and many types of distributional linguistics, as well as by some structural theories of semantic space (for instance Greimas, 1966, 1970), by theories of generative grammar (Chomsky & Miller, 1968; etc.) and by many theories of plot structure (Bremond, 1973) and of text-grammar (Van Dijk, 1970; Petöfi, 1972).

If all the letters of the alphabet available on a typewriter keyboard were to constitute a system of very high entropy, we would have a situation of maximum information. According to an example of Guilbaud's, we would say that, since in a typewriter page I can predict the existence of 25 lines, each with 60 spaces, and since the typewriter keyboard has (in this case) 42 keys – each of which can produce 2 characters – and since, with the addition of spacing (which has the value of a sign), the keyboard can thus produce 85 different signs, the result is the following problem: given that 25 lines of 60 spaces make 1,500 spaces available, how many different sequences of 1,500 spaces can be produced by choosing each of the 85 signs provided on the keyboard?

We can obtain the total number of messages of length L provided by a keyboard of C signs, by raising C to the power of L. In our case we know that we would be able to produce $85^{1,500}$ possible messages. This is the situation of equi-probability which exists at the source; the possible messages are expressed by a number of 2,895 digits.

But how many binary choices are necessary to single out one of the possible messages? An extremely large number, the transmission of which would require an impressive expense of time and energy.

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