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STRUCTURAL CHANGE: THEORETICAL CONCEPTS AND MACHLUP'S WEASELWORDS

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Por Vicente Vázquez-Presedo

El desarrollo implica cambios en las relaciones de lo actual con lo potencial. La evolución describe los cambios de potencia. Ambos pueden ser asociados con cambios estructurales, pero los segundos son de naturaleza más profunda, como en el caso de la biologia.

Studiosus

The term or idea of structure can be retraced over a long series of meanings, albeit rather imprecise, even back to the Greek classics. The vagueness could be readily associated with the fact that this term, this idea, has appeared at very diverse points in the cultural spectrum. From linguistics to mathematics, from biology to history, everyone at one time or another made some use of the idea of structure. However, only during the 19th century did very evident traces appear of the use of the concept in the field of social sciences.*

Perhaps it may have been Spencer who was responsible for advancing an initially clear interpretation of the term structure within this context which leads from biology to sociology, although it came about many years after commonplace use of organic analogies by political thinkers. Although we can believe that Spencer does not confuse the social body with the biological body and that, moreover, he insists on their differences, an «organicist» presence is plainly evident in his concept of «social structure». The organic image also appears in his association of the concepts of structure and function. This image will come down to contemporary times first through Durkheim and later through Radcliffe-Brown. For the latter, «there exists a truly and significant analogy between organic and social structure».

Against the so-called «naturalist» viewpoint originating in Spencer, at about the same time, Lewis Morgan ushers in another which can possibly be followed on down to

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* In everyday language we use the word structure when refering to the way a complex object is constructed. *Struere* in Latin means to construct, and the meaning of the word is clear when applied to the construction of buildings. But dictionaries also provide other meanings less associated with concrete experiences such as that which refers to the relationship of the essential parts of a set or to a frame, or grouping of the essential parts of something. According to the foregoing, it would be quite in order to speak of the structure of a building, of a machine, of an animal, as well as of the structure of a poem or of the structure of a phrase.

Levi-Strauss himself. Morgan's ideas on kindred relationships assumed a certain bibliographical importance due, probably, to the influence that this author came to exercise upon the work of Engels. As we know, Marx wrote about other relationships[1] : «In social production —he writes circa 1860— individuals contract determinate relationships, essential, independent of their will, production relationships corresponding to a given phase of the development of their material productive forces. The sum total of such production relationships constitute society's economic structure (*Struktur*), the base on which rises a legal and political superstructure (*Ueberbau)*, to which conform determinate types of social conscience». Engels was later to approximate the «political, legal, religious and philosophical systems», that is to say, those which constitute the Marxist «superstructure» to Morgan's systems of kindred. The metaphor used by Marx in this context is that of a building, and not that of an organism; however, be that as it may, the notion of structure here does not appear clearly differenciated from other more or less allied concepts such as «system» or «form».

Beyond the English «structural» school of Radcliffe-Brown and his colleagues, the 20th century leads us to more abstract conceptions bordering on the merely formal.[2] Even «structural linguistics» itself is somewhat removed from the architectural and biological models. The new models call our attention to the case of the musical pieces which, on being executed on different instruments, recorded on tapes, transmitted by radio and, lastly, heard by human ears, pass through a series of transformations while always *conserving* something essential that can be called *structure*.

The idea of structure transmitted to us by Levi-Strauss has its origin, as is known, in linguistics, and its bases appear much more abstract than those used in analyses rather more empirical of the English anthropological structuralists. In Radcliffe-Brown's conception, for example, the «persisting structure» is that of a concrete society, tied to a concrete

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[1] Cf. Marx, K., *Zur Kritik der politischen Oekonomie*, Berlin, 1859.

[2] «However, what is more impressive and frequent is the construction of purely abstract structures which much later and without prior intention, serve as essential frames for physical phenomena». Cf. Piaget, J., *Biologie et Connaissance*, paris, 1967.

culture, to a concrete geographical space. In Levi-Strauss', «the persisting structure can only be discovered by abstraction starting from generalizable elements. Levi-Strauss would summarize his structural method as follows: «Structuralism draws social events from experience and transports them to the laboratory. There he does his best to represent them in the form of models taking always into consideration, not the terms, but rather the relationship between the terms». This method would appear to some to approximate human sciences to physical sciences in the sense already indicated by Niels Bohr in 1939: «Traditional differences between human cultures —the great physicist would explain— resemble, in many aspects, the different although equivalent ways in which physical experience can be described».

In a more general sense, structuralism can be defined as a line of thought which rejects the viewpoints of empirical atomism[3], holding that the sum total or whole is not just a mere combination of the parts. According to the principle of logical priority of the whole versus the parts, no individual part can be interpreted independently of the situation it occupies in the overall configuration. A structural analysis, therefore, would mean substituting the partial analyses of isolated causalities by general analyses of inderdependence based on the invariant nature of such configuration vis a vis given transformations. To the study of the two basic lines of totality and interdependence there would then be added the conditions of invariance of the respective structure.

The concept of totality does not always appear devoid of ambiguity[4]. However, there exists an important kind of totalities (biological, psychological, social) that for many can quite clearly be distinguished from the others because they are «organic units» and not mere aggregates of parts. The nature of such organic totalities is often defined by the characteristic that its parts do not function independently one from the others. On the contrary, it is assumed that they are related in such a way that any alteration in any one of

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[3] Atomism attempted to introduce into human sciences principles applied in the 19th century to the sciences of nature. This atomism sought, according to whether it was empirical of rational, universal correlations or causal and necessary explanations.

[4] The words «whole» and «part» are often used in a different sense to that associated with geometrical texts. The word «sum» usually associated with these words consequently suffers from analogous ambiguities. Cf.. Nagel, E., *The Structure of Science,* New York, 1961.

them will result in a change in all the other parts. It is impossible to suppress any one part of these totalities without changing both the part eliminated as well as the remainder. It is for this reason that we are not overconvinced by the results of analysing an organic totality from an «additive» standpoint, since it would not be possible to infer the structure of that totality from the properties evinced by its parts separately; they should be considered *in situ*[5].

From the foregoing, it would appear to follow that the analysis of the organic totalities assumes the existence of irreducible laws that are characteristic to them and which may not be acceptably deduced through application of the «additive» viewpoint. The parts of a functional totality do not perform independently one from the others, so that the laws that are valid for such parts when they do not conform a totality cannot thus be assumed valid in the event that they form part of it.

The distinction between the additive and «totalist» analysis is not clear in physics, in the contrast habitually established between the corpuscular viewpoint of classical mechanics and the one that arises from the theory of the field, familiar in electrodynamics. According to Newton's mechanics, the acceleration caused in a particle by the action of others, can be represented as the vectorial sum of the accelerations caused by each one of the latter separately. The assumption then is that the individual forces can be considered as independent of the others for the analysis. Consequently, if we should wish to ascertain the operation of the solar system, for example, we only require to determine the force that each one of the bodies individually exerts on the others. In electrodynamics, on the other hand, the action that a body with an electric charge exerts on others does not depend only on the respective distances; one must necessarily take into consideration the relative movements. Then again, the effects of the changes in the movements are not instantaneously propagated; their speed is finite. The forces performing in this case are not determined by the positions and speeds of the bodies in question but rather by the conditions of the

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[5] Some authors consider it difficult to distinguish between this type of totalities and any other *systems*, that is to say, any other sets of interdependent elements which perform as a «whole». In order to maintain that «all systems should be considered as an organic totality to a greater or lesser degree», they seek the support of the «philosophy of the organism» of A.N. Whitehead, Cf. *Process and Reality*, N.Y. 1929.

electromagnetic field around one given point[6]. This field cannot be considered as the sum total of «partial fields».

Although there are arguments as to the precise formulation of the differences between that which is alive and that which has no life, few would deny the fact that such differences exist. For biology it is of special interest to consider organisms as structures of interdependent parts with functions that tend to maintain them as a whole. Here it would appear quite evident that live beings are organic totalities and not additive sets of independent parts. The different parts of an organism exert influence on each other in such a way that the activity of the whole is regulated by their behaviour and vice versa. For organicist biologists «the activity of the whole cannot be completely explained in terms of the activities of the parts isolated by the analysis», and «it is not possible to completely understand any part of a live organism if it be isolated from the structure and the activity of the organism as a whole.»[7]

In the ancient dispute between biologism and physicalism there entered recently new elements pertaining to Cybernetics and the System Theory. These elements, added to the formal contributions of topology and the theory of decision, tended to replace old atomistic, analytical and Laplacian methods by others which could deal with totalities. The old strategy of making only one factor vary turned out useful only for the case of relatively simple systems. When something more qualitatively complex was undertaken, it was found necessary to resort to a type of strategies which led to Cybernetics and allied technology. For the authors of this trend, classical analysis provides only a considerable number of separate parts the interactions of which cannot be foreseen. If we were to disassemble a system of that type, we would find it impossible to assemble it again[8].

In the psychology of the early years of this century, the elements of perception were considered simple and irreducible elements. In order to explain the combinations of these

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[6] It would not be pertinent, within this context, to inquire about the «physical reality» of the electromagnetic fields. Although they were to be considered as a «mathematical fiction», the form of analysis they imply is, evidently, distinguished from the corpuscular approach.

[7] An additional point usually emphasized by organicist biology is the «hierarchical organization» of the vital entities and processes. Cf. Russel. E.S., *The Interpretation of Development and Heredity*, Oxford, 1930.

[8] Cf. Ashby, W.R., *An Introduction to Cybernetics,* London, 1956.

isolated sensations and, consequently their images, that psychology invoked mechanisms of association by contiguity «that would introduce order into the initial chaos of the sensations». However, towards 1890, Christian von Ehrenfels spoke of «events perceived which were not the sum total of local independent components». The properties of an entity such as roundness or symmetry do not exist in their separate parts or in a mere aggregate of the latter. We have already observed that somethin similar occurred with a melody. A circle continues to be recognized as such although it be enlarged, reduced or displaced. There are a great many examples of this type, referred to qualities only existing as totalities. Such «qualities of form» (*Gestaltqualitäten)*[9] presented an insoluble problem for a psychology which considered isolated sensations as the ultimate elements of experience. Towards 1920, Max Wertheimer was to place emphasis not only on «a coherent whole which has properties and trends that are not discovered in its parts when these are considered independently», but also in the fact that a part has properties which it does not possess when it is isolated from the whole or when it belongs to another totality. The nature of a whole would determine, more often than not, if one of its parts is perceptible and which are its properties. The Gestalt concept was later developed by Wolfgang Köhler[10], who particularly called attention to the surprising analogy existing between some aspects of topological physics[11] and the trends of the perceptive organization.

In the social sciences, the opposition between atomism and totalism has manifested itself as a methodological problem of particular interest. The question is to decide whether social phenomena can be considered as mere aggregates of actions, attitudes or

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[9] Cf. Ehrenfels, Ch. von. «Uber Gestaltqualitäten», *Vierteljahrschrift für wissensschaftliche Philosophie und Soziologie*, XIV, 1890.

[10] Cf. Gestalt *Psycology*, N. York 1947.

[11] For some authors it is also possible to speak in psychology of a «theory of the field» or topological psychology. (Topology is a relatively recent branch in geometrical history. In this discipline, two figures are equivalent when it is possible to pass from one to the other through a deformation, with the condition of respecting continuity. Topological principles are associated, despite their apparent vagueness, with the most precise mathematical relations. When it was noted that the fundamental ideas of topology were applicable to all types of sets, points, curves, functions, and that what is essential is the topological structure between the elements of the set, it was possible to generalize the concept of space and to introduce the fruitful topological notions in abstract spaces. The questions studied are of a qualitative and «global» nature, that is to say, they correspond to the space considered as a whole). Cf. Bourbaki, N., *Topologie Générale*, Paris, 1940.

circumstances of participating individuals or if such phenomena should be studied «according to their own autonomous levels and their macroscopic laws». For those who hold this latter opinion, it is the social totalities and not their individual elements which are the ultimate instance in the study of social and historical disciplines[12].

However, it has also been argued, in the opposite sense, that «as opposed to the sciences of nature, social sciences can never directly observe collective entities or their attributes», since in the latter disciplines important data directly accesible are the beliefs and attitudes of individuals which eventually go to conform the different social totalities. According to this viewpoint, the sciences of nature have their starting point in observations on complex totalities such as chrystals, sparks or animals, and then proceed to explain them in terms of atoms, electrons or cells. On the contrary, the alledged starting point of social sciences would be observation of individual human behaviour, so that the collective terms used in this field would be theoretical constructions exclusively defined with the help of individual terms.[13] The latter argument, however, not only appears unjustified in its affirmation that totalities observed by the sciences of nature are fundamentally different from those observed by the social sciences but also that it is far from showing us that the meanings of the collective terms in social sciences can only be obtained through the meanings of individual terms. To deny that social totalities (and their attributes) can be directly observed is analogous to denying that a forest can be observed, based on the argument that what we ultimately see are individual trees.

For 19th century science under the powerful influence of classical physics, the objectives of knowledge would be met by dividing the object in increasingly smaller units and isolating individual causes. The problem, in the end analysis, involved the study of atoms, cells, pinpoint sensations and reflexes; the corresponding causality would be unilateral, unsymmetrical, divorced from notions of interaction and organization. The

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[12] In the study of human behaviour two types of terms are usually distinguished. The first contains only those terms relating to individuals or to their attributes; the second contains those relating to groups of individuals, the attributes of such groups considered collectively, or forms of organization or activity of such groups. The distinction between [12] Cf. Ehrenfels, Ch. von. «Uber Gestaltqualitäten», *Vierteljahrschrift für wissensschaftliche Philosophie und Soziologie*, XIV, 1890

[13] Cf. Hayek, F.A., *The Counter-Revolution of Science*, Glencoe, 1952.

paucity of this viewpoint would bring to mind a thought in terms of totalities, of interdependence, of order, of finality.[14]

The aspect of the interdependence of the parts comprising the totality that we have presented cannot overlook, however, the relationship between interaction and the classic causality[15]. This relationship has manifested itself according to three main conceptions: the first, held by Kant, considers both categories on an equal footing; the second, associated with Russell, puts the interaction under the causation; the third, proposed by Hegel, considers causation as a particular case of interaction. For Hegel, cause and effect are but the two poles of the interaction category; interaction, in turn, is a stage within a process. This last proposal has special importance in its relationship with the main criticism raised against functionalism; the fact of placing emphasis on conservation, equilibrium, stability and homeostasis in detriment of the *historical* aspects relating to change, to the process, development, evolution. Perhaps this is the most relevant context when considering the properties of invariance, the third of the three basic elements associated with the concept of structure.

Evolution, belongs to a class of theoretical concepts which, as that of structure are common to divers branches of knowledge. This concept usually appears composed of several principles, not all of them equally admitted in available evolutionist theories. These evolutionist theories may be distinguished by the number of those principles (change, order, direction, progress, perfectibility) which they consider essential for their own definition. Some of these theories include only change and order, others also do it with direction; moreover, there exist those which, like Teilhard de Chardin's, uphold the principle of perfectibility[16].

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[14] Cf. Bertalanffy, L. von, *General System Theory,* N. York, 1968.

[15]The inadequacy of unsymmetrical causation, as opposed to reciprocal causation, is acutely experienced in modern technology, where the concept of retroaction has become something essential... The fact that causation should often constitute a unilateral approximation to interaction is quite evident in biology, and even more so in the study of society. Cf. Bunge, M., *Causalidad,* Buenos Aires 1961.

[16] In a non-genetic structuralism, structures are set up in such a way that any causal explanation ceases to make sense; the only thing that can be done with such structures is to describe them, understand them. However, there exists a genetic structuralism that aspires to introduce new perspectives. For this line of thought, understanding and explanation are integrateable in one process. Together with the notions of genesis and structure there also appears, naturally, the idea of *finality.* «What constitutes the value of the structure is not, then, its implication of immutability

In its simplest form, the idea of evolution tells us that any state of a system is the result of a change, more or less continuous, starting from another state that we consider the initial one. The continuity, frequency, or regularity requirement of the changes appears essential to many, in order to distinguish the evolutionist position of the world's static conceptions. Associated with this position, is also often held, a «principle of uniformism», according to which the forces producing the change would depend on general and immutable laws. To uphold an evolutionist viewpoint implies, in the end result, admitting the instability of the order presumed at a given point of time.

For Whitehead as well as for Bergson, there is no evolution, however, when one passes from one chaos to another. From chaos should arise some sort of organization so that a process may be considered as really evolutive[17]. The condition that an evolutive process creates order or, at least, leads from one order to another, underscores the separation between a positivism which admits as evolution any rearrangement of parts of a structure and a creative evolutionism in which order is associated with the ideas of direction, progress or perfectibility.

The old evolutionist trends assumed that the development of human societies is relatively cumulative along a given line and that the stages of that development are, generally speaking, universal, although differences in detail may be appreciated and not all societies achieve the same degrees of evolution. Some of those trends also assumed that it was not necessary to specify the structural characteristics of individual stages and of the respective mechanisms of transition. Almost all tended to indicate the general causes of the change, be they technological, economic or spiritual, pointing out at the same time general trends such as the one that leads to an increasing complexity of systems and institutions. New advances in social studies restated these perspectives with fundamental questions such

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but rather the fact that a form has arisen, that something has been accomplished, that there has been a transition to something better». Cf. Goldmann, L. and others, *Les notions de genèse et de structure,* The Hague-Paris, 1966.

[17] «Evolution in the materialist theory is restricted to a roll of being just another word for describing changes in the external relations between portions of matter. There is nothing that evolves because one set of external relations is just as good as any other. There can be a new change, without object and without progress». Cf. Whitehead, A.N. *Science and the Modern World,* N. York, 1925.

as[18]: To what extent is change from one social structure to another not accidental and is the result of global evolutive trends? To what extent do such changes increase the capacity for adaptation of a society to its natural and cultural environment? Does it make sense to speak of the evolution of human culture and society as a whole? To what extent do other societies constitute a fundamental aspect of the environment to which a society must adapt? To what extent can forms of organization (structures) be transplanted from one society to another so as to improve its potential for adaptation?

According to the preceding synthesis, the concept of economic structure and, in general, the structuralist ideas in economics, should appear in a framework of totality, interdependence and invariance such as the one established, if it was desired to integrate them without violence in that great epistemological trend which, as we have seen, is in diverse ways opposed to the principles of empirical atomism. Let us see firstly, in which context the term or the idea of structure in the economic field appears.

Fritz Machlup in one of his well known essays on economic semantics[19] divided the contexts of this kind which he found in his readings, with the qualifications of «vague meanings», «cripto-apologetic meanings» and, finally, «clearer meanings» of the term structure. If we restrict our interest to the latter, they could be summarized, for our purposes, as follows:

1) Structure of the economy: A set of given and *invariable* conditions taken as assumptions for theoretical analysis.

2) Structure of the model: A set of the coefficients and of the constants, numerically known in the econometric analysis.

3) Structure which transforms irregular impulses into regular cyclical oscilations.

4) Structure of an aggregate, that is to say, its composition determinate and constant, which cannot be easily changed.

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[18] Cf. Sahlins, M.D. and Service E. R. (ed.), *Evolution and Culture,* Univ. of Michigan Press, 1960. See also Mead, M., *Continuties in Cultural Evolution,* Yale Univ. Press, 1964.

[19] Cf. Machlup, F., «Structure and Structural Change: Weaselwords and Jargon *Zeitschrift für Nationalökonomie*, Vol. XVIII (1958).

5) Price structure, that is to say, a set of relative prices, as something different from the level, or from any average of prices.

Regarding *structural changes,* these appear in two ways according to Machlup: as permanent alterations, different from merely temporary changes of the type of cyclical fluctuations; and as modifications in actual resources, in techniques or in preferences.

When we speak of the «structure of the economy» we can believe or it can be believed by those who hear us, that we are talking about something concrete, determinate, and about whose uniqueness there is no doubt. In the field of philosophy it is held, however, that possession of a given structure does not constitute an absolute characteristic of the objects. Just as it would not make sense to search for the absolute simultaneity of two events, nor would it to ask what is the structure of the world, or the structure of an object, without clarifying about which set of elements, properties and relations the question is being posed. For this viewpoint, «the world does not have a structure, the world possesses infinite structures according to the set of elements, properties and relations chosen as the system of reference». This criterion is applicable to the object called economy, and the way the first context was stated does not appear to contradict it. Nevertheless, the principle of invariability is subject to dynamic considerations which will appear anon.

If structure, quite ungarnished, were a theoretical term of economic science, it would have, of course, all the difficulties that theoretical terms of all sciences present. But it so happens that if we fail to associate this term with several others, it does not appear possible for us to consider the term structure, or even the association «economic structure» as anything more than a class of theoretical terms. Even more specific associations such as *«structure of production»* would be no more than sub-classes while we did not define the elements, properties and relations we have under consideration. More defined, in this sense, appears to be the association «structure of the model», of the second context. For the latter it would not be, to our way of thinking, an element of the mentioned theoretical classes, but rather an element of a metatheoretical class.

Regarding the «structure which transforms irregular impulses into regular cyclical oscilations», its uniqueness becomes as doubtful as «the structure of the economy», plainly stated. There would still remain the structure of aggregate magnitudes or variables, and,

with it, the very special case of price structure. Price structure has such characteristics of totality that it can easily induce us into considering it as a sort of representative of all the other economic structures. It should not surprise us, then, that when structuralism is spoken of in this field, the contexts remain, more often than not, reduced to one, already famous, monetary controversy.

The controversy, rather more methodological than doctrinaire[20], appears as follows in one of its simplest forms[21]. The position called *monetarist* avers that inflation is produced by disequilibrium between monetary supply and demand, in line with the classic theory according to which the general price level has as cause, also general, a too rapid expansion of the amount of money versus the actual needs of the economy. For monetary *structuralism*, inflation is related to sectorial maladjustments affecting, in principle, certain products. These maladjustments are, in turn, associated with individual price increases which spread and directly affect production cost of other goods, or the cost of living level and the rate of real wages. If we were to ask the representatives of this line of thought as to the origin of such maladjustments, the more likely replies would contain references to the changes associated with the development of any economy.

A first glance at the two positions might suggest to us that monetarism prefers to work with magnitude or variable levels and structuralism with the respective structures. This criterion might turn out useful, at least, to classify the different forms of inflation into two well defined types: inflation of levels and inflation of structures, according to whether the emphasis of the analysis was placed on the former or the latter. A cursory look, however, does not suffice in order to grasp the essential differences between both positions.

The disequilibrium to which monetarism refers is, finally, a partial disequilibrium, and it is referred to one market only, although it dealt with a very particular commodity, such

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[20] «Latinamerican structuralism is no longer the antithesis of monetarism. It moves on a different plane. As other varieties of structuralism it is a method rather than a doctrine». Cf. Olivera, J.H.C., «La teoría de la inflación en su vigésimo aniversario», *Reunión de técnicos de Bancos Centrales del Continente Americano*, San Carlos de Bariloche, 1977.

[21] Cf. Olivera, J.H.C., *Inflación estructural y política financiera*, Academia Nacional de Ciencias Económicas, Buenos Aires, 1965.

as money is. The disequilibrium of structuralism is, on the other hand, a *general* disequilibrium, with all of its consequences in totality and interdependence. For the former, it makes sense to ask for *the cause* of inflation; for the latter, the category of causality does not appear to have a simple application in a given direction. It is rather the category of *interaction* the one called to intervene in the structuralist context. It is understood that the economic policies required to correct the respective disequilibria should also be different in several senses. For the structuralist viewpoint, it is of little interest to ascertain which was, in the end analysis, the primitive impulse originating the disequilibrium; once the structures are modified, the road ahead will be a new road about to be created, not an old road over which we must return to the starting point. The stability to which this point of view can aspire is a dynamic stability, relating to the forms of change of the respective structures[22].

In a previous paper we proposed a very general dynamics, defined by a succession of pairs of structures[23]. If we assume that one of the structures of the pair is a price vector, we might believe that we have a good starting point for a dynamic structural explanation. However, at least one front ranking philosophic authority would remark: «A mere succession of states still does not constitute a process. Only when the states are joined one with the others and constitute, in their continuity, a transition, can we speak of a process». Yet again, how are we to introduce evolution, genesis and teleology in our dynamics without returning to the classic causality? When an attempt is made to answer this question it might be useful to recall that the category of interaction is applicable between two structures.

In conclusion we shall again pose the fundamental questions of social evolution, albeit referred, at this time, to economic evolution. To what extent the change of an economic structure is not accidental and answers to global evolutionary trends? To what extent do

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[22] In order to achieve a dynamic perspective, some authors have adopted definitions of structure such as the following: «...elements of an economic set which, during the course of a given period, appear as relatively stable in relation to the rest» (Marchal); or otherwise «contexture which, short range, appears as invariable» (Akerman); or even «quantities in delayed movement» (Perroux). In this perspective, Machlup concludes, it may be useful to designate with the word structure «the set of variables and economic relations of slow variation which are important for explaining economic processes which develop quicker».

[23] Cf. Vázquez-Presedo, V., «Equilibrio económico y otros equilibrios», *Ciencia e Investigación*, Vol. 33, 1-2, 1977.

such changes increase the capacity for adaption of an economy to its economic environment? Does it make any sense to speak of the economic evolution of humanity as a whole? To what extent do the structures of other economies constitute a fundamental aspect of the environment to which ours must adapt? To what extent must an economy transplant structures of another in order to improve its adaptation potential?

Until relatively recently, attempts at synthesis in the scientific field were too associated with the *reduction* of all classes of arguments, of all classes of phenomena to mechanical analogies. The new synthetic trends, among which we have attempted to situate our views, seek instead a conception of economic and social changes which does not try to force these levels of reality towards the level of classical mechanics.

It is true that Pythagoras already taught, some twenty five centuries ago, that mathematical entities, numbers, forms, are the ultimate substance at the base of our perceptive experience. Whitehead would also hold, almost today, that the only thing that persists, finally, are structures; but that they, nevertheless, are evolutive.

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