

Advances in the Theory of Organization

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Abstract: *The quanta carry a charge in one or more of the fundamental forces, a charge that constitutes the sensory element that carries the information with which the quanta communicate and interact. Operating on quanta whose information structure is constituted by gravitational and electromagnetic charges, it is shown that with them it is possible to create aggregates in a limited number of simple compositional types. These aggregates, by virtue of their structure, which is wider and more articulated than that of the single quantum, present a more complex information and can therefore give rise in further aggregative processes to a growing number of associative typologies. The aggregation determines a mutual dependence between the components and gives rise to an action, transformation of mass into energy or a contraction, transformation of energy into mass. In the context of the phenomena we are dealing with, the transformation of energy into mass manifests itself as an increase in the strength of the aggregative connection. With the enlargement of the electromagnetic interaction, increasingly stronger aggregative bonds are created which ultimately determine the formation of what is called gluing aggregate in which the components lose their individuality and the aggregate behaves as a unit. Through the iteration of the gluing process we arrive at a complex system in which both sensory and state information of all the components circulate in a network of connections and which has the characteristic of "flexibility", that is, it can modify the macroscopic condition of state from that of action to that of contraction and vice versa. It is shown that this can explain certain quantum phenomena which, according to the current views of physics, are not compatible with the physics of macroscopic bodies.*

Keywords: relationality, gluing, action and contraction, flexibility

1. The Physical Foundations of the Organization

Being is made up of elementary units called quanta carrying a charge in one or more of the fundamental forces, a charge that constitutes the information with which the quanta communicate and interact. Space is also part of physical reality and is divided into quanta. In this study we consider the informational interaction between bodies endowed with charges in the gravitational force and in the electromagnetic force.

All the components of being have a gravitational charge, that is, they have mass. The claim that there are massless particles is arbitrary and contrary to Einstein's famous formula that gives the mass of the energy $m = e / c^2$. We can say that the mass of certain particles is so small as to be undetectable, but we cannot say that it is non-existent. Incidentally, this explains the higher speed of stars found at the periphery of galaxies than the value obtained by neglecting the mass of energy, a difference that has led to the hypothesis of the existence of a dark mass.

The information on the existence and size of the gravitational charge is transmitted to the adjacent space quanta and in this way it can reach distant quanta from which it is recognized [1]. The electromagnetic information is instead transmitted through the associated electromagnetic field. The electromagnetic charge can be either positive or negative. The quantum, ultimate indivisible unit, can support only one of the alternatives and it follows that in an ideal gas consisting of quanta there will be both attractive and repulsive encounters. In this case, recognition takes place in two stages. If the attractive information is transmitted through the associated electromagnetic field, recognition determines an increase in the charge of the receiving quantum. Only when direct contact is established does aggregation take place.

The aggregates thus obtained, by virtue of their structure, which is wider and more articulated than that of the single

quantum, support more complex electromagnetic information and can therefore give rise to further aggregative processes and a consequent production of organizational typologies.

The information, whether gravitational or electromagnetic, if recognized by a body gives rise, in addition to aggregation, to the development of an action, transformation of mass into energy, or of a contraction, transformation of energy into mass [1]. The first case occurs when the attraction, in which recognition is identified, does not find obstacles to its motor manifestation due to the presence of opposing repulsive forces as it happens in the second case in which the attraction must overcome opposing forces to give rise to the recognition.

According to the theory of general relativity, the variations of a physical phenomenon are of two types related to the infinitesimal variations of the coordinates of the first and second order. The two types of variation are of opposite sign and occur on the same object. The energy variations belong to the first type and the corresponding mass variations belong to the second type. This implies that the mass variations occurring in the phenomenon are infinitely smaller than the corresponding energy variations. Of course, the mathematical concept of infinitesimals can be replaced, in this specific case, by a precise relationship between the two quantities as it results from Einstein's famous formula $e = mc^2$ [2].

In introducing the operations of action and contraction, I am referring first of all to Einstein's conclusion according to which if the principle of conservation of energy is not realized in a variational phenomenon, the transformation of the missing quantity of energy into mass must be assumed [3].

Let us therefore examine the fundamental scheme of gravitational interaction between rigid bodies produced by Newton. The simple addition of the spatial path of information to justify mutual feeling, a problem left

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unsolved by classical physics, does not change Newton's construction at all. He acknowledged that he did not have the solution to this problem and did not want to make hypotheses, "hypotheses non fingo" [4]; he therefore limited himself to analyzing the phenomenon in its perceptible aspects.

These raised the problem, which I have already mentioned, consisting of variations in kinetic energy that violated the law of conservation of energy. This problem seemed to Newton solved with the introduction of a potential energy (but isn't this a hypothesis?). This setting, in consideration of Einstein's results, must be corrected by replacing the variations of the potential energy with variations of the mass.

We can then say that gravitational recognition determines the production of kinetic energy through the transformation of mass into energy (production of an action) or the increase in mass through the transformation of energy into mass. (producing a contraction). The first case occurs when the attraction produced by the gravitational information acts between two bodies at rest or in approach motion; in this case it produces a continuous acceleration, with simultaneous reduction of the mass, which ends in the collision. The second case occurs after the collision when the attraction induced by the information acts between two bodies moving away induced by a repulsive force; in this case it produces a continuous deceleration, with simultaneous mass production, which ends in the cancellation of the energy.

The transformation of energy into mass implies the contraction of energy and we know that, given the dimensional relationship between the two quantities, as shown by the afore mentioned Einstein formula, even massive transformations of energy give rise to quantities of mass not perceptible to our level of perception of reality. However, for the principle of continuity, we must believe that the contraction occurs gradually on gradually decreasing volumes. The transformations that occur as a result of the information interactions operating in the context of the gravitational force are therefore unable to create or destroy point elements of mass; they can then only lead to an increase or decrease in the interdependence bonds between the existing masses (introversion and extraversion of energy).

It is therefore evident that energy does not require any substantial change in producing the contraction, but only to bend under the action of gravitational force, wrapping itself around the bodies to be bound. The creation of punctual mass elements, in which energy wraps around itself, requires the intervention of nuclear forces and is a subject foreign to our current interests.

The energy - mass transformation operations and vice versa therefore only change the state of the same physical entity; in the same way that water can present itself in the gaseous, liquid or solid states, the matter of which bodies are made can present itself in the state of energy or in the state of mass to varying degrees depending on the quantity of energy transferred in the bonds.

Therefore, the gravitational attraction is a property of matter that manifests itself in all its forms of aggregation, with an intensity equal to the size of the aggregation, therefore decreasing passing from mass to energy and finally to space, which is also matter, as already stated by Plato [5] and confirmed by Einstein who demonstrated its gravitational capacity, therefore being matter [6].

However, despite the fact that enormous dimensions of the aggregate can be reached through gravitational attraction, the functional integration that opens the door to the formation of complex systems is not determined. To achieve this goal it is necessary to consider the recognition processes in which the information elements are supported by electromagnetic forces.

We therefore consider bodies placed in mutual contact by a simple pressure and whose peripheral elements that form the information, associated with electromagnetic forces, are more numerous than in the case of gravitational forces. In this case, information is a complex phenomenon as it does not depend exclusively on the nature and number of information elements that face each other and of course on the charge associated with each of them.

The magnitude of the force developed between two elements, which can be both attraction and rejection, varies extremely rapidly with the reciprocal positioning within the network of interactions between the components of information, especially as regards the level of approach. This implies that the same elements that confront each other in a recognition process can give rise, depending on their positioning, to an infinity of penetrative profiles to which different recognition results correspond.

The variation in pressure, therefore, by inducing changes in the mutual position of the information elements, constitutes an important modifier of the amount of recognition. In particular it can modify the relationship of forces between the attractive and repulsive forces. We can therefore believe that between bodies of a certain size, one or the other forces may take precedence based on stresses coming from the outside. Assuming that the attractive forces exceed the opposing forces to an extent greater than that necessary to achieve the aggregation, the aggregate retains an attractive differential which allows it to iterate the aggregation with another aggregate.

Also in the context of electromagnetic information interactions, the formation of mass at the expense of energy in the contraction consists in increasing the intensity and extension of the bonds formed by the energy, wrapping around the bodies to be bonded. We can see this at the atom level, where the attraction produced by the nucleus bends the trajectory of the energy - carrying element, the electron, which can serve two atoms, thus determining their aggregation (chemical bond of covariance).

2. The Theory of Organization

A set of moving bodies, subject exclusively to the forces of mutual gravitational attraction, forced into a limited volume, which could be an ideal gas, cannot evolve towards any

form of order and organization; it maintains the state of maximum entropy which corresponds to the homogenization of the state of the bodies throughout the whole. If energy is added, in the form of disordered kinetic energies, due to the tendency of the energy to stress discharge and therefore to the disappearance of the tension differentials during collisions (Carnot and Clausius), the system returns to the inertial state of maximum entropy (second law of thermodynamics).

The formation of the order is obtained by eliminating from the whole the destructive effects of the collisions, with their induction of tension homogeneity and directional symmetry constraints, realizing a common direction of movement through the action of a current of adequate intensity, penetration and persistence coming from outside (Prigogine's order principle in open systems [7]).

This condition allows the forces of attraction that act between the components in parallel motion to compose with the forces that support the latter thus achieving a gradual convergence to the contact condition. In such conditions, as we have already seen, forces of electromagnetic origin associated with their elements of form act between the bodies.

During the phase of gradual approach changes in the structure of the informations which give rise to an increase of the recognition force are made through selection in the context of infinitesimal random modulations of the information elements. This leads to an increase in the cooperative discharge finally obtained in the contact condition.

However, in addition to the cooperative discharge, that is to say in the direction of parallelism, the bodies are subject to an attraction to this orthogonal which can give rise to an action or a contraction according to the conditions acting around them. For slight levels of pressure, despite the strengthening of the recognition forces consequent to the said modulation of the information elements, the bodies can remain spaced apart by rejection forces which constitute a peripheral barrier to their approach. It is only when a recognitive attraction or a pressure of such dimensions as to overcome the opposing barrier, thus realizing the condition of contraction, that the attractive forces become ligament forces.

Therefore, even though the recognition link exists and persists, the bodies can move closer or move away depending on the size and direction of the forces they encounter in the movement and there may be conditions in which the two processes alternate.

In addition to the action of a unidirectional current coming from the outside, the condition of motor parallelism and subsequently of aggregation can also be achieved in another extremely important way for the purposes of the discourse we are developing. According to classical mechanics, if in an open system the kinetic energy exceeds a certain value, the so - called "escape value", the gravitational field can no longer hold back the components that move in the

centrifugal direction, which therefore initially continue their motion.

According to the theory of relativity, on the other hand, during the escape expansion and over large distances, in addition to the reduction of the gravitational attraction towards the center of gravity of the system, already considered by the classical theory, transformations of energy into mass occur which involve an increase in the attraction between the components. In flight and the consequent transformation of their motion from divergent to convergent, ultimately giving rise to aggregative processes [8].

The result can be extended to more general conditions in the sense that, in the presence of large distances between molecules, the other molecules can, even if distant, produce gravitational attractions capable of modifying the direction of the trajectories of the colliding molecules, and it is therefore possible the realization, within the ambit of an extended configurational variability, of local parallels which, in the presence of an attractive electromagnetic information acting between molecules in motor parallelism, induce aggregation. This is the case of nebulae that give rise to a certain frequency of aggregations, albeit for infinitesimals of the second order, which constitute accretion nuclei and ultimately lead to the collapse of the nebula and the birth of stars.

With the increase of the attractive forces of recognition, there are increasing effects of aggregation and interdependence. There is a critical condition in which the strength of the aggregative bonds reaches a level such as to lead to a condition called "gluing" in which the components lose their individuality and the aggregate behaves as a unit. In general, a condition of inequality of the attractive force exerted is established between the constituent components of the aggregate in conditions of gluing. We will call the element of greatest attraction "dominant" and the element of least attraction "gregarious".

In the binary aggregate in gluing condition, the sensory stresses that stimulate the gregarious component instantly reach the dominant component. However, the two components make a different contribution to the determination of the functional and dimensional aspects of the response to sensory stimulation. That is, the aggregate has within itself a hierarchical structure of inequality that manifests itself through the size and characteristics of the information flows that pass in both directions through the connecting elements.

Through the iteration of the gluing process we arrive at a complex system in which the information, both sensory and state of all the components, circulate in a network of connections that has the characteristic of "flexibility", that is, it can modify the macroscopic condition of state from that of action to that of contraction and vice versa.

As we have already mentioned, according to general relativity the variations of the mass occur for infinitesimals of the second order so that the transformation of even large dimensions of energy gives rise to non perceptible variations of the mass. However, in the present case, we are faced with

a large number of mass elements connected in the network where the strong rigidity of the connections expresses a large amount of energy already transformed into mass in the previous gluing processes. The further marginal stiffening carried out by each member of the swarm completes the contraction and gives rise to a perceptible union.

Such a system, based on the external conditions collected by the information system and the coordination achieved by the gluing, moves like a wave or a corpuscle, as intuited by De Broglie. The same happens in the process of locating the electron in its orbit around the nucleus of the atom; it is therefore necessary to believe that the electron has an internal structure of a flexible system, replacing the interpretative scheme of this phenomenon due to Heisenberg which appeared to many (for example Einstein and Schrodinger) paradoxical.

Therefore we see that in the context of the phenomena that we perceive and which are therefore part of our real life, a condition of destruction of any order and tendency towards the homogenization of states takes place but that at the same time phenomena of construction of aggregates take place in the cases in which it is possible to determine a motor parallelism and the connected phenomena of information and recognition.

These phenomena occur for infinitesimal variations that escape our perception until they reach a certain critical dimension. In the aggregate that is thus constructed, an inhomogeneity of state develops between groups of elements and a network of interconnections between all the components in which the information coming from all the constituent elements flow. At a certain level of the aggregating forces the system assumes the ability to alternate the macroscopic conditions of action and contraction which accounts for certain quantum phenomena otherwise inexplicable.

Gluing [9] is a complex phenomenon, of extraordinary importance for the understanding of the structure of the physical world whose first intuition can be traced back to Aristotle "the whole is greater than the sum of its parts" [10], but which also has found a place in broad philosophical treatises such as those of Leibniz and Hegel. The amazing aspect of the gluing process is that with it a creative activity develops, an entity is born whose characteristics are no longer traceable in the component elements. And this creative activity has no limits, it is infinite. Here is the amazing part of the organizational process, what Corning rightly calls the magic of nature [11].

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