

ORDER IN NATURE
AND SOCIETY

In a cloud, the imagination can cut out patterns freely. The substance which fills them is real, but the objects which they outline do not exist. To exist, they would have to be distinguishable from the continuity within which they arose; they would have to constitute within it a particular and identifiable state endowed with an egregious privilege: duration. This duration can be brief or long, that of a cake of soap or of a spiral nebula; it is always of finite dimensions. This is what makes it the opposite of the instantaneousness of the mathematical beings which differential calculus arbitrarily cuts out within the continuity of movements.

Existence is a singularity that endures. But this duration, in the domain of the realities that are offered to our cognition, is never unlimited. In the universe of men there is nothing that escapes the slow or rapid, but always active, degradation which debases everything that has risen, which attenuates every kind of diversity in order to bring about a uniform distribution that physicists call the maximum state of entropy and housekeepers, as well as sociologists, call the maximum of disorder.

This deterioration of order, this inescapable trend toward a state of disorganization in which no one arrangement is preferred to some other, because they are all equally devoid of merit, constitutes, according to mod-

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ern physics, the most general of natural phenomena. From the very first moment of a structure's existence, the forces of erosion go to work to destroy the tie which unites its parts and to distribute according to chance the elements of which these parts are composed.

Social orders are as vulnerable as material orders. If there is any doubt about this, the fourteen civilizations which Toynbee enumerates in the graveyards of history prove that societies are likewise mortal.¹ And everywhere the slow and continuous ascent of the soil of cities, as shown, for example, in Rome by the burying of ancient monuments, provides a concrete picture of the inevitable fall of civilizations into a state of chaos. The trend toward an increase in entropy is "just the natural tendency of things to approach the chaotic state . . . unless we obviate it," a great physicist, Erwin Schroedinger, has said recently.²

In the kaleidoscopic intermingling of substances, an order, no matter how improbable, can, during an instant of reason, be the effect of a chance encounter. The order will accord with existence only if an appropriate mechanism prevents it from disintegrating by removing the parts which constitute it from the simple operation of the laws of chance. Existence never depends on itself alone. It subsists only if an appropriate mechanism establishes it, which eliminates chance and stops up the fissures through which the latter constantly seeks to recapture its prey.³ This removal of chance is always the work of an organization, that is to say, of an ordered arrangement which groups its constituent elements into a true society.

Atoms are societies of electrons. Molecules are societies of atoms. The solar system is a society of planets. Galaxies are societies of stars. The universe is a society of galaxies.

The common trait of all these societies is their discontinuous structure. Louis de Broglie tells us: "Only the existence of quantic discontinuities makes it possible to understand the stability of atomic and molecular edifices. It alone protects them against a rapid descent into the ocean of chaos."⁴ But life itself, with its treasures of organization that become more and more subtle with every ascent in the hierarchy of species, seems to de Broglie to be, in accordance with Henri Bergson's profound insight, a means of postponing the inevitable increase of entropy. "Life," he adds,

1. *L'Histoire* (Gallimard, Paris, p. 52; Eng. ed.: London, Oxford, 1934).

2. *What is Life?* (Cambridge, University Press, 1951), p. 74.

3. Pierre Auger, *L'Homme microscopique* (Paris, Flammarion), p. 27.

4. *La Cybernétique, Structure et Evolution des Techniques* (Paris, S.E.T.), p. 56.

“is a struggle to maintain the very improbable state which the living organism represents,” but it is a struggle waged with the certainty of defeat “because in the end the increase of entropy will prevail with the return to the most probable state in which the organism will be dissolved and reduced to dust.”⁵

Nevertheless, life—and this, I think, is its essential characteristic—has invented, through the mechanism of reproduction, the means of prolonging through time this desperate struggle against the increase of entropy. It accepts the fact that its societies disintegrate but it has found the means of re-creating them in always identical form.

What is essential in the point of view with which we are here concerned is that atoms, cells and genes—and also the societies of cells which are complex living beings—remain stable only because their structures cannot undergo the continuous variations posited by classical physics. They consist of individual entities united in permanent organizations which are true societies.

The existence of these societies always rests on the existence, among the elements—I was going to say individuals—that constitute their attractions, forces or, speaking generally, interactions which integrate the behavior of each and assure the stability of the social edifice. Indeed, the principal if not the sole purpose of the natural sciences—physics, chemistry, astronomy, biology—is to study the mechanisms of integration and regulation which beget the various natural societies.

Social orders, although in general less solid than natural orders, are not distinguished from these either in stability or even in the techniques which establish them. They consist of groupings of individuals which are based upon the *interactions* that exist between their members. These interactions, whose nature we will clarify later on, insure the stability of the social structures which they establish.

The groupings, in complex human societies, are diverse. However, they are all characterized by the kind of hierarchy that is observed in the realm of the natural sciences.

It is not possible to describe here the various types of social groupings uncovered by the study, in space and time, of human collectivities. The couple, the gens or deme, and in a general way, the family, the curia, the phratry, the tribe, the city, afford examples of the social hierarchy. Feudalism in the Occident and castes in the Orient, constitute modes of

5. *Ibid.*

association based upon principles which are different but which are equally hierarchical. Each of these societies stems from the sum of the societies that preceded it. "Human society," says Fustel de Coulanges, "did not develop like a circle that grows little by little, expanding step by step. On the contrary, it consists of small groups, established long before it, which have joined one another. Several families formed the phratry, several phratries the tribe, several tribes the city. Family, phratry, tribe, city are societies which exactly resemble one another, and which are created one from the other by a series of federations. . . . The city is not an assemblage of individuals: it is a confederation of many groups."⁶

But cities are, in turn, integrated into confederations. The amphictyonies, those of both Delos and Delphi, are veritable societies of cities, welded together by a common cult—"because," Strabo says, "the same idea that prevailed in the founding of cities also led to the institution of sacrifices common to several cities."

It was this same idea that begot the Roman empire. "Let us form only one state, a *civitas*," Anniius cried out in the Senate, in 340 B.C. Anniius was the head of the cities of Latium which had united in an effort to overcome the chaos into which conquest without integration had plunged them.⁷

The need for an intermediary body in the process of association is confirmed by the fact that in conquered Gaul and Spain, which never experienced a true municipal regime, Rome tried to create one "either because it did not believe it was possible to rule any other way, or because to assimilate them little by little to the Italian populations, it was necessary to make them follow the same route that those populations had travelled."⁸

Modern states are also the product of a federating process. The latter, as we watch it, evolves by creating first nations and then international groupings—such as the League of Nations and today the United Nations—or supranational ones like the European Coal and Steel Community.

Running parallel to this political integration, the need to stimulate, maintain and discipline productive activities led to the development of an economic hierarchy which embraced enterprises, corporations, employers' associations and trade unions, trusts and cartels, committees of organization and organs for national or international planning.

All these groupings, however diverse their forms, their extent and their

6. *La Cité antique* (Paris, Hachette, 1870), pp. 143–145.

7. Titus Livy, iii. 5, 5.

8. Fustel de Coulanges, *La Cité antique*, pp. 448, 452.

object, have one characteristic in common: they associate individuals—physical or moral persons—into one collective structure which possesses a certain permanence and therefore constitutes a society.

Each society, by virtue of its unity and its permanence, can, in turn, be regarded as an individual capable of forming, with analogous individuals, a new society of a higher type.

The social order, however diverse it may be, appears thus, in all instances, as the effect of a technique of integration. It secures the elements that it associates from disorder, incorporating them into a structure capable of enduring.

The phenomenon of social integration has been very little studied. It was only recently that a legal philosopher, Maurice Hauriou, attempted to formulate a theory.⁹ According to him, “That which is instituted is the opposite of that which is unorganized, isolated, strictly individualized, ephemeral, and temporary.” “Institution implies the idea of organization, that is to say, of ordered arrangement, and the idea of stability, of permanence.”

Seen in this way, the concept of the institution is extremely general. It includes both the concept of juridical institution, a body of legal rules organized around a central idea in a systematically ordered whole, and the concept of purely social institution, not a body of rules but a permanent and organized human grouping that serves a collective interest. We shall concern ourselves here with the social institution, as a reality distinct from the individuals who compose it.

According to Maurice Hauriou, three essential elements can be distinguished in the Institution: the technique of associations, which insures its existence, the manifestation of communion to which it leads, and the leading idea that it tends to put into effect.

The technique of association varies greatly according to the object of the institution. However, it conforms to certain common necessities that are based upon the nature of the elements to be associated.

The essential trait of institutions usually classified as social is to be found in their substance, which is made up of human beings. The institution derives its existence not from the texts which tend to create it, but by the

9. Maurice Hauriou, Dean of the Faculty of Law in Toulouse, died in 1929. In 1925 he published, in the fourth fascicule of *La Nouvelle Journée*, his study on “La Théorie de l’Institution et de Fondation.” The text was reprinted in fascicule 23 of the same publication (Bloud et Gay, 1933). The present state of theories concerning “Institution” is expounded in a remarkable article by Jean Brethe de la Gressays, in Vol. V of the *Repertoire de Droit Civil* of Dalloz.

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behavior of the individuals who constitute it. It will have reality only if their behavior establishes it.

However, men are free. I am not speaking now of their juridical rights but of the state which their anatomical structure immutably engenders for them—at least so long as their physical or mental integrity has not been affected. Thanks to this structure, and particularly to the ties of dependence which it establishes, man performs the acts which constitute his behavior only if he wishes to do so. “Man is always in the hands of his own counsel.”¹⁰

In this respect the slave and the soldier do not differ from the free man. To get them to act, whoever commands them must inspire in them the will to do what he expects of them. It should be noted that every action, so far as the agent is concerned, is worth the results it procures and the sacrifices it requires. In general, the action will not be performed unless the agent, judging according to his own scale of values, tastes, and desires, considers “in his own counsel” that the fruits which it is capable of yielding are more agreeable—the economists say more desirable—than the sacrifices and the effort which it requires are disagreeable, or, to use a different word for the same thing, undesirable.

Thus the behavior of each individual is a function of the value judgments to which the consequences of that behavior give rise. These judgments, everything being equal so far as the nature of things is concerned, spring from inclinations that are peculiar to the person who exercises them, hence from his preferences and his tastes—in a word, from his *nature*.

Human nature is revealed to us by immediate knowledge of our own consciousness and by mediate knowledge of the consciousness of others. This twofold method of obtaining information attests to the presence in all men of certain fundamental traits that are more or less accentuated but never absent, that give rise to true *interactions* between men, which integrate the elements which they affect into very diverse complexes. We know, in the first place, that all members of the human species live in space and time. The sense of time, cemented by memory, integrates the infinite diversity of human experiences into the unity of the person. The sense of space puts the persons so formed into a common framework of reference where, despite the total separateness of their respective *personal* lives, they

10. *Ecclesiasticus* xv. 14. Quoted by Aquinas *Summa Theologica* I, qu. 22, art. 2, 4.

can coordinate their actions and even exchange the expression of their ideas.

It is impossible to enumerate here all the faculties which, when combined, constitute the human person. We can do no more than point out that the most important and effective of these on the social plane is undoubtedly the faculty of love. Sexual love, maternal love, filial love, love for one's ancestors, divine love, the generators of a basic and universal religiosity, are, in varying degree, omnipresent characteristics of human nature. Since the dawn of history, they associated men in family groups. It is difficult to say whether sexual love or maternal love—as strong among the higher animals as among men—are physical drives or moral aspirations. But they are unquestionably immediate products of human nature. Hence the family, the emanation of sexual love, soldered in space by maternal love, and the feeling of family solidarity in time by love for one's ancestors, can only be regarded as a natural institution. But the bonds which it establishes grow weaker as they become more extensive. The increase in the number of individuals who are united by blood relationships was bound to lead to more and more numerous but less and less cohesive groupings.

Actually, the forces which generate family groupings are balanced, and all the more effectively as they are less intense, by those that are aroused by self-love, by the desire for gratification, by the inclination to possess—in other words, by the generators of individual or family egoism. We leave it to the naturalist and the theologian to explain the coexistence of the opposed forces of love and egoism. We only wish to point out that the conflict between them would be bound to lead to savage societies in which every family unit would mark out by the use of force the area of its sovereignty, and in which those individuals who failed to protect their independence would be appropriated as if they were things.

The modification of this natural state which, so far as men were concerned, was the most probable one, could flow only from a change in their behavior. But the latter is the result of reactions which the nature of things, such as it is, provokes in the nature of men, such as they are. Hence one could modify their behavior only by modifying the nature of both men and things.

To alter the nature of men, that is to say, the scale of values in the light of which they determine their actions, one would have to subject them to a real reconditioning. This changes their tastes and desires and teaches them

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to destroy what they adore and to adore what they destroyed. Actually, it constitutes for them a second birth.

Such a transformation can only be expected from the power of love, which bestows upon the loved one the power to make the one who loves obey or imitate him. Divine love, love of the father, and, to a certain extent, love of the master have made it possible, through instruction and education, to mold men's souls and to inspire in them a will to perform acts that are very different from those that the uncorrected nature of men would give rise to.

It was religious instruction which inspired in men the behavior which was destined to extend the family as an institution and to give rise to the first social institutions. "Primitive religion actually constituted the Greek and Roman family, established marriage and paternal authority. It fixed the degrees of kinship, consecrated the right of ownership and inheritance. It was primitive religion which, after having enlarged and broadened the family, created a larger association, the city, and reigned in it as it did in the family. It was to religion that the city owed its principles, its rules, its customs, its courts. From it sprang all the institutions of the ancients."¹¹

I often think, as I observe the migrations which every morning and everywhere in the world take immense numbers of children to their schools, which take men to their churches, temples or mosques, once or several times a week, of the tremendous task of reconditioning which delivers to society men fitted to engender human institutions.

Nonetheless, no matter how efficacious instruction and education might be, they cannot inspire a general and permanent attitude. When they are of religious origin their efficacy depends upon the intensity of the faith upon which they rest. For all these reasons, the enterprise of conditioning begun by shaping the nature of men has been prolonged and widened by shaping the influence which, via the senses, things themselves exert upon men.

If, then, we consider the nature of men as something given, there remains only one way to modify their behavior and that is to modify the unitary desirability or undesirability which, without any change in their inclinations, the acts that they are capable of performing take on for them.

However, the desirability or undesirability of an act depends upon its over-all effect on the individual who performs it. This effect can only be modified by supplementing its proper results with accessory ones, rewards

11. Fustel de Coulanges, *La Cité antique*, p. 4.

or penalties, whose desirability or undesirability will be added to those of the first results.

If the accessory is indissolubly attached to the principal, it is from the standpoint of the total result that the action is capable of bringing it about, under the actual conditions in which it occurs, that each individual, his characteristics unchanged, will determine his action. Individual behavior will no longer be determined solely by the consequences of the action as they have been determined by the nature of things, but also by its consequences as corrected by the compelling rewards or penalties that will have been attached to them.

If these compelling rewards or penalties are suitably calculated and if one succeeds in inspiring in the individual the feeling that they will be applied without fail, they give to the authority from which they emanate the certainty of being able to determine, at will and under all circumstances, the behavior of individuals.

The compelling action can be divine or human. The rewards or penalties on which it is based can be promised for this world or for the next. They can be applied by a supernatural power enlightened by transcendental channels or by a temporal power whose information has been furnished by the police. In both cases, the action of gods and kings, in bending the will of men, inspires in them the ordered conduct which will give rise to the institution with an eye to which this conduct was established.

The institutional arrangements created by divine or human legislation are innumerable. I have named a few. They can be classified in two categories: those that oblige the individual to want what the governmental authority wishes him to want; those that lead the individual to decide voluntarily and freely to perform the actions that the governmental authority expects of him.

Constraint and incitation are also the two extreme forms of institutional technique. They have been used simultaneously to modify the qualitative conduct of individuals, to obtain from them respect for "commandments" and later to impose, despite the animal survivals in their basic nature, devotion to the spirit of charity.

But it is in the economic "institutions" required by technological progress that the institutional procedures of constraint and incitation have been fully employed.

The problem in the complex economies of modern states was not only to create general, qualitative dispositions, but also to stimulate productive activities, to shape their nature and extent, with that precision without

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which the necessary quantitative equilibrium in the social order could not have been established.

Compulsory planning, by getting the individual to want to do what the plan prescribes for him, allows the planning authorities to resolve the equations of economic equilibrium and to sketch, in human terms, the solutions to which economic calculations have led him.

Incitation by means of prices establishes the reward, which is income, and the penalty, which is expense, at the exact level at which they determine, among all those who are capable of participating in the market, as their own nature determines, the reactions whose totality will assure the indispensable over-all equilibrium. At the same time, recourse to such incitation gives to those who help to shape this equilibrium within the limits of their purchasing power the maximum of satisfaction for the minimum of effort.

The institution that the market constitutes offers a typical example of a regulating mechanism. It utilizes obviously immutable individual characteristics to establish, in fluid and unpredictable circumstances, the collective equilibrium which, for a society, is the condition of permanence.

In all institutions created by the nature of men and things, such as they are or as they have been conditioned by the intervention of institutional aims, one finds, besides techniques of association, the second element that Maurice Hauriou believes is characteristic of the existence of an institution: the state of communion that it establishes between its members in its proper domain.

“This is plainest in the great popular movements that accompany the founding of new political and social institutions; in the Middle Ages, the founding of communes was accompanied by great moral crises that aroused the people to cry, ‘communion, communion’; the formation of trade unions at the end of the nineteenth century gave rise to the same movement toward unity among the working class; there is no doubt that the formation of states, at a time when the process assumed the characteristics of a contagion—for example, about 1000 B.C.—caused an analogous movement.”¹²

This state of communion between the members of the institution gives it its unity and separates it from the rest of the world by real discontinuities, thresholds, which make it, in the physical sense of the word, an absolute object. These discontinuities endow the institution, whether it is per-

12. *Aux Sources du droit* (Paris, Librairie Bloud et Gay), p. 105.

sonified or not, with an existence of its own, distinct from that of its members, but distinct, too, from that of the analogous societies that surround it.

In this respect the example of the ancient family, as a closed group, is particularly characteristic: "Each family constitutes first of all a closed society whose own cult separates it from others; religion did not say to man, pointing to another man, there is your brother. It said: there is a stranger; he cannot participate in the religious rites of your household; he can approach neither your family's graveyard nor any other place. And he cannot unite himself with you by common prayer; your gods reject his worship and regard him as their enemy; and as your enemy as well."¹³

It is these discontinuities that insure the stability of the social edifice and permit it to overcome the ever-present forces of disintegration.

The third characteristic—and, according to Maurice Hauriou, the most important—of any institution is the idea which it puts into effect, to which it attempts to give reality.

This idea characterizes "the order" that the institution establishes. Hence any institution appears to be an arrangement of the elements that constitute it—ordered toward the ends that it hopes to promote.

Political or social institutions are essentially finalist. They illustrate and confirm the thinking of Bergson for whom "reality is ordered to the exact degree in which it satisfies our thought." "Order," he says further, "is spirit rediscovering itself in things."¹⁴

The spirit that rediscovers itself in human institutions is that of the great social reformers, the founders of civilization or of religion, of all those who helped to condition man for the role which the institution demands that he play.

The purposeful nature of the institutional creation becomes attenuated, however, or rather becomes less apparent, as one draws closer to institutions which, like the primitive family or the earliest religions, appear to be the immediate consequences of the human condition as nature itself seems to have fixed it. Of course the ordered aspect, arranged with a view to the result to be obtained, in other words the finalist nature of the institution, does not disappear, at least not for the man who contemplates it. But it becomes more and more difficult, if not impossible, to identify "the inventor" of the order that the institution puts into operation.

13. Fustel de Coulanges, *La Cité antique*, p. 104.

14. *Evolution créatrice* (Geneva, Skira, 1945), p. 229.

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Thus primitive institutions appear to be so close to a state of nature that they are distinguished from it only by shadings of ordered states that the natural sciences investigate. However, the ordered states characteristic of our world—atom, molecule, sidereal systems, living cells, pluricellular animals—have seemed to us to be social states. We will now examine all the principal characteristics of the “institution,” as the juridical analysis of Maurice Hauriou formulated them.

Each of these natural, social states unites the elements which constitute it into an organized whole, endowed with an individuality that is distinct from that of its members. Integration, of which each society is the product, is the consequence of “interactions” between its members. Sometimes these interactions, such as the forces of attraction that atomic, molecular or solar institutions establish, are *data* proper to the nature of assimilated elements; “is the notion of force, then, clearer than that of love?”¹⁵ At other times, on the contrary, they are the consequence of a conditioning that is peculiar to these elements, a conditioning whose state of magnetism can undoubtedly provide an example.

However, if the social edifices of inanimate nature present, from the standpoint of the technique that establishes them, an institutional character, it is above all in living beings that one finds the modes of association that are characteristic of truly social institutions.

Elementary behavior, within the social edifices that pluricellular animals constitute, generally seems the effect of a previous conditioning which in turn represents true social planning. Everything happens as if the individual who constitutes the cell really felt himself inspired with the will to perform the act that the plan provided for him. Such a conditioning is indispensable for an explanation of unconscious animal activities such as heartbeats or the digestive process.

However, whenever the individual, that is to say, the cell, preserves a certain freedom, it is incited to perform the task that society expects of it by a conditioning of things suited to stimulate its action. Everything happens as if the ovum, to the exclusion of the cells which surround it, was actually a desired object for the spermatozoa. By pouring the salt of pleasure on acts that it wishes to see accomplished and the bitterness of suffering on those it wishes to keep us from performing, nature seems to utilize rewards or penalties like a legislator who is anxious to achieve, by influencing the behavior of individuals, the integration necessary to social construction.

15. Simone de Beauvoir, *Tous les Hommes sont mortels* (Paris, Gallimard, 1947), p. 283.

This analogy can be pushed to its extreme limits by the study of regulative mechanisms which insure the stability of societies of cells as well as that of human societies. The cybernetic mechanisms, the innumerable phenomena of "feed-back" which condition the behavior of animals, the transfer of messages, and the incitant effects which the hormones seem to produce in living beings, irresistibly evoke the stimulative and regulative effects produced by the mechanism of prices.

We are less familiar with animal societies than with cellular or human societies. But the wonders which our study of them reveals seem likewise to rest on institutional procedures. The caste system in vogue among bees and termites can be explained only in terms of a conditioning suited to inspire in each bee and each termite the will to discharge the function which the plan has marked out for it. Thereby it evokes—making due allowance, of course, for the important difference in regard to effectiveness and rigidity—the techniques of religious and social conditioning which today insure the stability of the caste system in India.

Monographs would be necessary in these and in many other domains to describe the mechanism of integration, generator of social phenomena. All I wish to point out here is that it seems to exist everywhere, that everywhere it has the effect of ordering the behavior of associated elements, and hence of removing it from the operation of mere chance. The mechanisms of conditioning are opposed to and work against mere chance, according to Eddington.¹⁶ For the working of blind forces they substitute an ordering influence and make it possible for us to find, in the societies of which nature is made up, an associative technique analogous, *mutatis mutandis*, to the one which constitutes, in human societies, the primary element characteristic of an institutional structure.

The second characteristic element of the social institution is, as we have said, the state of communion which it establishes among its members. Here there can be no doubt. All the institutions of nature, atomic as well as molecular, cellular as well as animal, exhibit this characteristic of convergence and unity which makes natural societies, in the physical sense of the word, "absolute objects" endowed with an existence of their own and separated by discontinuities from the analogous objects which surround them.

As for the third characteristic, the finalism expressed by the idea that has been put into operation, it likewise seems to be present in all natural institutions. Indeed it is difficult to avoid the impression that the eyes were

16. *Revue scientifique*, August–September 1944.

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made for seeing, the lungs for breathing, the egg and the sperm for reproducing. All natural or human institutions tend toward an end: that which is put into operation by the idea with which they seemed to be imbued.

Despite all these analogies, there is a profound difference between natural and human institutions. Human institutions are not only finalist, but, as we know with certainty, intentional. The legislator who created them can almost always be identified. The intention that inspires them, hence the idea which they put into effect, is often formulated explicitly and when it is not, it is easy to discern.

Have we the right to infer, from the finalist appearance of natural institutions, that they put into operation another idea, one that is supernatural, but marked by awareness of its ends and mastery of its means?

Thus we arrive at the edge of an abyss where two kinds of attitudes confront each other. Some, who reject the transcendental explanation, see in instituted order the effect of fortuitous conjunctions that create states which are capable of enduring.

For these people "creation is decomposed into a series of stages, each of which has as its basis an initial permanence, a favorable terrain that can 'wait' without changing. Then, after a prescribed period of time, a fluctuation occurs which adds a new detail to one of the permanent elements and constitutes the beginning of a new permanence. If this stage lasts, that is to say, if it grows and reproduces itself in such a way as to resist the evolution toward disorder, it constitutes a basis for new stages which will appear in the course of time. . . ."17 Thereafter, natural selection will do its work and by allowing to subsist only the best adapted and most efficacious institutions it will create the illusion of continuous progress toward a more complete efficacy.

"Waiting, fluctuation, development and selection—these are the essentials of the processes in the course of which nothing ever appears that might resemble an orientation toward a pre-established end."¹⁸ According to this explanation, the finalism of nature is merely a fallacious appearance produced by the rigorous selection of the only stimuli that are apt to exist.

For others, to be sure, ordination by chance and selection seems hardly admissible. They refuse to admit that the eye can be, even after several billion years, the product of fortuitous atomic encounters selected by the

17. Pierre Auger, *L'homme microscopique* (Paris, Flammarion), pp. 43, 44.

18. *Ibid.*

competition for life. Relating the problem of creation to their experience as creators, they fail to see that the automobile which their thought has created—although it is extremely simple compared to the least complicated vital orders—could have been the product, in the course of a period of no matter how long, of spontaneous encounters of atoms subject exclusively to the laws of chance; encounters stabilized by interactions resulting from the nature of the elements involved and subsequently selected by the play of commercial competition.

Those who reject explanations based on chance and selection believe, with Bergson, that order can only be “an idea rediscovering itself in things.” And noting the existence of complex natural orders which are plainly not the product of a human idea, they are led to attribute their creation to a supernatural idea that is endowed with an unlimited power to condition things.

Such an explanation satisfies our human minds ascribing an unknown mode of action to a process that we believe we know—that of the influence of our thought upon things—because we immediately feel, in our consciousness, the reality of it.

But this immediate knowledge is not in any way a rational knowledge. We know from direct experience that our thought can affect things by provoking us to bodily movements. The present state of biological knowledge leads us to believe that these movements are dictated by nervous currents. And the energy of which these currents are composed can only come from atomic changes.

The efficacy of our action on things therefore obliges us to admit that our thought can modify the structure of certain atoms. And so, in the last analysis, it is man’s thought that acts upon the atoms.

How, by what intermediaries, according to what processes?

Until recently the very meaning of these questions was not apparent. At best, they evoked a metaphor in which Sir James Jeans¹⁹ considers the fate of blind larvae whose perceptions are limited to two dimensions of the ground’s surface. From time to time this vital surface seems humid to them. We, whose powers extend to the three dimensions of space, attribute to rainfall the existence of these zones of humidity. But our thinking larvae, enclosed in their two dimensions, would be totally incapable of discovering even the beginnings of a causal determination in the distribution of humid and dry zones; their savants would be reduced to discussing

19. *Le Mystérieux Univers* (Paris, Hermann), p. 144; Eng. ed. (New York, Macmillan, 1930).

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humidity and aridity only in terms of probability, which would represent for them the expression of the ultimate truth.

And Sir James Jeans concludes that “events that are entirely outside of the time-space continuum, wherein are confined all human creatures, determine the course of events which unfold on the four-dimensional surface of our universe.”

Thus the social order created by man is no less mysterious than the natural order. The processes that give rise to both cannot, at least for the present, be analyzed rationally.

And it is because one does not find here a subject-matter that depends on the judgments of human reason, that so many men call upon other modes of knowledge—the existence of which they feel in themselves, as they feel in themselves the power of thought—to clarify, for their own use alone, problems which, given the present state of their powers, it is as impossible for them to solve as it is to refrain from raising.