

AFTER SIX YEARS OF A  
DOUBTFUL COMBAT\*

The progress of knowledge consists in part of avoiding superficial analogies and discovering profound kinships, less apparent perhaps, but far more important and significant. In the eighteenth century there still appeared zoölogical works which classed animals according to the number of their paws, grouping, for example, the lizard with the bat. Today the adder appears under the same rubric—a creature that has no paws at all but that, like the others, is oviparous and covered with scales. These characteristics have appeared, rightly, to be of more consequence than that which was singled out in the beginning—the number of paws. In the same fashion, it is well known that, despite its appearance, the whale is not a fish, nor is the bat a bird.

I have purposely chosen an elementary and incontestable example.

Translated by Muriel McKeon.

\* This study constitutes a sort of bringing-into-focus, clearer and more ambitious than preceding formulations, of the editor's interpretations of the aims of *Diogenes*. The occasion is the seventh anniversary of the review, and the article appears at the same time under the title "Sciences diagonales" in *La Nouvelle revue française*, April, 1959.

*After Six Years of a Doubtful Combat*

But, as soon as one studies, even superficially, the history of the constitution of the sciences, he perceives an almost infinite number of pitfalls that scholars have had to avoid consistently in the interests of identifying the useful distinctions—those which delimit the field of each discipline. These pitfalls, these misleading resemblances, are no more than simple shams: properly speaking, not even resemblances. They are realities to which is finally affixed a lower coefficient of importance than that accorded to other realities. It is correct that the lizard and the tortoise have four paws, like other mammals—although they are not mammals—and that the bat, which is not a bird, has wings.

To classify, then, is to make the best possible choice among distinctive characteristics. The characteristics eliminated cannot be called false; they correspond only to classifications which lead quickly, or more quickly, to difficulties, incoherencies, or contradictions. It is still possible that, according to the point of view, these classifications which are subsidiary or are set aside can suddenly become once again essential. If it is my intention to study the functioning of wings, it is clear that I must now reclassify the bat with the bird and even with the butterfly and enumerate all the winged tribes whatever are the reasons (decisive, I recognize) which have led to the distribution of the members into different species: invertebrate Lepidoptera, vertebrate birds, and so on. Supposing I wish to examine a particular aspect of the functioning of the wings, for example, the flight at a fixed point; that is to say, the maintenance of the body motionless, suspended in the air at a fixed point by means of vibrating beats. I cannot do otherwise than to have recourse to examples that do not belong to the neighboring species: the hummingbird and the long-tongued hawk moth, which apparently suspend themselves over a flower to feed from a distance by means of a proboscis or of a long, slim beak.

Everyone admits the legitimacy, even the necessity, of this device. Examining it more closely, however, I observe that it is only tolerated if it remains within the limits of the same science or of the same domain. The sciences, in effect, correspond to the domains, and their system forms the best pattern of the fundamental divisions of nature. Thus the tacit interdiction against bringing together phenomena which belong to different domains and which, to that extent, belong to different sciences. The scholar tends, by a kind of reflex, to hold as sacrilegious, as scandalous, and as mad a comparison, for example, of the vivisection of living tissues and those of the crystal. However, it is a fact that crystals,

like organisms, reconstitute their mutilated parts adventitiously and that the injured region benefits by an increase of regenerative activity which tends to compensate for the injury, the disequilibrium, and the dissymmetry created by the wound.<sup>1</sup> Is this nothing but deceptive analogy—nothing but pure and simple metaphor? It is always the case that intensive work re-establishes regularity—in the mineral as well as in the animal. I know, as everyone knows, the abyss which separates inert matter from living matter. But I also imagine that both have common properties tending to re-establish the integrity of their structure, whether it is a question of inert matter or of living matter. Nor am I ignorant of the fact that a nebula comprised of thousands of worlds and the shell secreted by certain marine mollusks defy the least attempt at rapprochement. Nevertheless, I see them both subsumed under the same law of spiral development. What is more, this does not astonish me, because the spire constitutes par excellence the synthesis of the two fundamental laws of the universe, symmetry and growth; it combines order with expansion. It is almost inevitable that the living, the vegetative, and the star should find themselves equally subsumed.

The opposition of the right and the left is found in all domains, from quartz and tartaric acid to the shell of the snail, always spiraling clockwise (with extremely rare exceptions), and finally to the pre-eminence of the right hand in man. Pasteur, in 1874, thought he could explain this invariant contrast, which appears both in the intimate structure of matter and in the anatomy of living beings, by some cosmic influence or by the movement of the earth. The enigma has remained unsolved. It is, after all, reasonable to conjecture that the solution, be it what it may, is the same for all these disparate cases that interest chemistry, crystallography, zoölogy, and sociology, the history of religions, of art, and of

1. Cf. "Mémoire de Pasteur in 1857," *Annales de chimie et de physique*, XLIX, 5–31: "Il résulte de l'ensemble de ces observations (accroissement des cristaux de bimalate d'ammoniaque) que quand un cristal a été brisé sur l'une quelconque de ses parties, et qu'on le replace dans son eau-mère, en même temps qu'il s'agrandit dans tous les sens par un dépôt de particules cristallines, un travail très actif à lieu sur la partie brisée ou déformée; et en quelques heures il a satisfait non seulement à la régularité du travail général sur toutes les parties du cristal, mais au rétablissement de la régularité dans la partie mutilée.' De façon très significative, Pasteur aperçoit le rapprochement possible avec la cicatrisation des plaies, mais sa prudence le conduit à noter le fait, sans prendre parti: 'Beaucoup de personnes aimeront à rapprocher ces faits curieux de ceux que présentent les êtres vivants lorsqu'en leur a fait une blessure plus ou moins profonde. La partie endommagée reprend peu à peu sa forme primitive, mais le travail de réformation des tissus est, en cet endroit, bien plus actif que dans les conditions normales ordinaires.'" (Cited by J. Nicolle, *La Symétrie dans la nature et les travaux des hommes* [Paris, 1955], p. 75.)

### *After Six Years of a Doubtful Combat*

the theater, since on the stage and in a picture right and left are once more not equivalent. In an analogous fashion, an identical law of economy should explain the radial symmetry of sea urchins, of starfish, and of flowers. Thus, in the whole keyboard of nature, these multiple analogies appear, and it would be rash to affirm that they signify nothing and are capable of gratifying only daydreams without being able to inspire rigorous research.

Man, at the price of one thousand triumphs, one thousand victories over the most specious ambushes, has without doubt distributed the facts of the universe according to the most fecund, coherent, and pertinent classificatory system. But this perspective certainly does not exhaust the diverse combinations that are possible. It leaves to one side the transverse steps of nature, of which one establishes the empire in the most distant domains, and of which I have just given some poor examples. Such steps cut across the established classifications. Science can all the less restrain these, since they are, by definition, interdisciplinary. In order to appear, however, they require the bringing-together of distant facts, whose study is conducted by specialists who live necessarily in mutual ignorance of each other's work. Nevertheless, it would not be possible to exclude the fact that these transversal cuts fulfil an indispensable role for clarifying phenomena which, in isolation, appear each time as aberrant, but whose significance would be better perceived if one dared to bring these exceptions into a single line and to encompass their mechanisms in a single perspective—possibly fraternal.

Everyone recognizes and deplores the fact that science is diversified to the extreme, taking into account, nevertheless, that this is for science the prime condition—and the price—of its progress. It is useless to complain about a state of fact, the recognition of which is today the inevitable point of departure of every attempt at revolution. Those inquirers who labor to extend knowledge no longer have communications among themselves and sometimes do not even have at their command a sufficient latitude in their own research to replace the detail which puts them off the track into a desirable context. The pathways of science always were and should be centrifugal. The time has come to try to join through necessary abbreviations the numerous points of a periphery immeasurably extended, without internal lines, and where the risk constantly grows that each worker may end by simply digging a sector of his own, like a mole, blind and obstinate. In certain cases it seems that I should add—obstinate, because blind.

The facts to be reconciled are not obvious. It is clear that it cannot be a question of returning to the superficial and qualitative analogies, from which the sciences have had to free themselves in order to institute a system of methodical, controlled, and perfectible knowledge. From this point of view the ambitions of the philosophers of the Middle Ages and of the scholars of the Renaissance constitute a lure which is the more formidable because it corresponds to a permanent need of the spirit, particularly binding today, and seems, therefore, to offer a quick solution that is fascinating to minds seduced in advance. The tables of concordances, in which a Paracelsus distributes the qualities of the phenomena, are no longer admissible, nor is even the analogical, essentially visual science of which Leonardo dreamed when he drew a head of hair like a river, a mountain like drapery. "He did not wish," notes a commentator, "to establish relations between the measured magnitudes, but, as he has said, *transmutarsi nelledmente di natura*, to put himself in the place of nature in order to know how she proceeds."<sup>2</sup> The result is that he conceives a new model of biological organs in the manner in which a technician would invent a machine. However, insects alone, obeying precisely the laws of another domain, have been able to insert in their bodies organs equivalent to machines. Mechanism and life are set off by opposed principles between which no give and take is possible but in which correlations ought normally to appear, since tool and organ are destined to perform the same work. All the genius of Leonardo—whether it be for this reason or for some other—was not able to create a single machine capable of functioning: his airplanes were too much like birds, and his submarines all but had gills. He had not thought of replacing the wing, the organ, by the helix, the engine. Leonardo sought out the archetypes of the phenomena, as did Goethe at a later date. He was wrong to seek them with the senses, and particularly with sight, the sense most easily victimized by appearances. That was the work of the painter and the poet, not of the scholar, since for the latter the real task consists, on the contrary, to determine the hidden correspondences—invisible and unimaginable to the profane. They will very rarely be those which seem evident, logical, and probable. These hidden relationships articulate, rather, phenomena which seem at first to have nothing in common. They unite the unexpected

2. Robert Klein, Postscript to *La Civilisation de la Renaissance en Italie*, by Jacob Burckhardt (Paris, 1958), p. 30.

*After Six Years of a Doubtful Combat*

aspects which take on, in the orders of things which have little compatibility among one another, the effects of a single law, the consequences of a single principle, and the responses to a single challenge. Heterogeneous solutions dissimulate efficaciously to naïve investigation the disparate development of a profound economy, the principle of which, nonetheless, remains everywhere identical with itself. It is this principle which it is important to discover.

The erudite, who know a great deal in a restricted domain, rarely find themselves in a position to perceive a class of relations which a polyvalent knowledge alone is suited to establish. Most of the time it is only chance, combined with a certain boldness of imagination, which opens the way to that kind of discovery. The conferences of scholars belonging to diverse disciplines, but uneasy about the development of others, anxious to confront their results, their methods, and their stumbling blocks, ought equally to multiply the occasions on which they come upon the connivances which permit the clarification of what I have just called the transverse steps of nature. Finally, it is probable that a small number of inquirers, spontaneously attached to the study of phenomena which project over the traditional frames of the diverse sciences, find themselves in the best possible position to mark out the neglected correlations destined to complete the system of established relations.

It is time to try the luck of the “diagonal sciences.”