

The novel called "science".

For "Crises", Paris.

"Hypotheses non fingo". (I. Newton)

One may consider the history of science to be the progressive accumulation of knowledge, and it will then to be a powerful drama. It springs from the stony hills of Ionia as a number of thin brooklets, overcomes in sparkling water falls the obstacles of Christianiyu and of the invading barbarians, stagnates during the Middle ages, receives the powerful tributaries of alchemy, astrology and the Cabbalah, becomes a violent stream in Northern Italy and overflows its brims, swell by the melting of the glaciers of orthodoxy, divides into a thousand arms and forms an enormous delta which covers at present the entire landscape, and it flows toward the ocean of total scientification of humanity in its irresistible advance. In this dramatic happening there appear and disappear heroic "dramatis personae", Aristotle, Euclid, Paracelsus, Galilei, Newton, Lamarck, Darwin, Freud, and these heroes fight against the resistance of Darkness to open new spaces for the clear, thoughturbulent waters of science. If seen thus, no drama is comparable to the drama of science in its power and suspense; it is the drama of human spirit in its struggle against the conditioning world.

But one may <sup>look</sup> in an entirely different way on the history of science. One can ask for instance: what has happened between the following two statements: "God created the world for men to dwell in it", and "the world originated 16 billions of years ago in a Big Bang"? Those two statements deal with the same subject: "the origin of the world", but they do so in two different manners. They are answers to two different questions. The first one asks: "what did the world begin for?", and the second one asks: "how did it begin?". This suggests that the stretch between the first and the second statement, the history of science, is characterized by a reformulation of the questions to which science answers. If one sees the history of science thus, it appears to be an enormous novel, a "roman fleuve".

It then appears that basically only three types of questions have been asked of science, namely those that begin by "what for", those that begin by "why", and those that begin by "Why". The final, the causal, and the formal questions. And it may then be seen that the novel of that history is composed of three chapters: the first chapter answers mostly to final questions, the second one mostly to causal questions, and the present incipient third chapter mostly to formal questions. Thus each chapter has a specific meaning, its own "universe of discourse". The universe of the first chapter is one of purpose and destiny, the universe of the second chapter one of causality, and the universe of the third chapter one of structures. The novel of science is an epic which unrolls against a changing back-ground, a travelogue from out of destiny, through causality, toward the realm of forms.

In the center of such a view upon science as a novel of the type "Chanson de Roland" stands the question. The Roland of the scientific novel is a hero in quest of monsters called "questions", which he is to kill, to decapitate their innumerable pseudopodia. An "Orlando furioso". To kill an answer means to have "satisfied" it. An answer is fully satisfactory if there remains nothing further to ask. If the answer is liquidated. An answer, an "explanation", is satisfactory if it makes plain

that which is implicit within the question, if it unties its knot and thus make it disappear. Thus the novel of science has to do with "satisfaction", with the overcoming of questions. It has to do with "appeasement", in the curious sense in which, for the Roman empire, "Imperium Romanum" was synonymous with "Pax Romana".

But, obviously, this would be an entirely wrong reading of the novel of science. In the course of the development of the story it becomes evident that it is precisely not "satisfaction" that is aimed at. What science precisely does not intend is to liquidate questions. Its purpose is to formulate such answers to questions that new questions be provoked. What it intends to provoke are "fertile" questions, i.e. such that give birth to ever new questions. The Monsters science wants to fight are hydrae, where a hundred new heads sprout if one is severed. The more the novel of science progresses, the more science intends to formulate "falsifiable" answers, i.e. of the kind that may be questioned. At the present stage science has advanced so far that it eliminates all satisfactory, unfalsifiable questions as being un-scientific. And questions which demand satisfactory answers have become no "good" questions, "meaningless" questions. Thus progress of the scientific novel may be judged by its tendency toward lack of satisfaction. A measure of scientific progress is, from such a point of view, its growing less and less satisfactory for us, those who are asking the questions.

The universe of the final discourse was a full universe. It was full of purposes, motives, values: full of "gods". Each thing paid tribute to all the others for the crimes it committed. Stones fell to the soil, and flames soared to the sky, because the "just" place for stones is the Earth, and for flames "Heaven". Aristotelian physics have to do with justice, each motion "under the Moon" had a motive and was "unjust", (a-dikia), because it disturbed the heavenly order "above the Moon". In such a universe all questions may be satisfactorily answered. "What does a stone fall for, and what does a bird fly for?" Because they seek their just place, the earth and the nest. There is nothing more to ask. Every further question would lead to the Unmoved Mover, to God, to the foundation of faith. And it is precisely because such a universe permits satisfactory answers that it was abandoned by science. Final questions are suspect, even in those realms of being where they occur spontaneously. It is not to be asked: "what has an animal eyes for?", nor "why does the thief steals?". Those questions are not "good".

One should ask instead: "why does an animal have eyes?" Answer: "because they were contained within its genetic information." The animal does not have eyes in order to see, but it sees because it has eyes. The thief does not steal in order to enrich himself, but because his biological, economic, social, cultural, psychological conditions "lead" him to steal. The universe of causal discourse is a value-free universe. There are no purposes, no motives. Movements need not be explained: it is an inert universe where every movement goes on for ever. What has to be explained are accelerations. And they may be explained by co-inciding vectors. It is a net of causal chains which form knots everywhere. Everything may be explained there, and nothing is a "coincidence" or a "miracle". Every explanation becomes the discovery of a cause, and the prediction of an effect. This is why each answer pro-

vokes new questions. Each cause has had previous causes which must be questioned, and each effect produces a fan of further effects which must be predicted. It is a universe in which science feels at ease, but which does not satisfy man. Because the question which he wants answered is: "What am I to do?", and that is no good question.

Lately it became apparent that even causal questions are not "good" ones. If I shoot a photon against a screen with two openings, it is no good to ask why it passes through one of the slits rather than through the other. One must ask: how is the photon trajectory? To ask: "why do the planets orbit?" is not a "good" question. One should ask: "how is the space-time continuum curved in this region?" To ask: "why do the owners of tools oppress the workers in capitalism?" is not a good question. One should ask: "how do the structures of capitalist society function?". Causal questions are no good, because they explain the present from the past, but the present should be explained from within, since it is the only "form of reality". The universe of formal discourse is an empty field of overlapping structures, and where they overlap relations appear as if they were objects. Like a magnetic field without any iron shavings which permits to calculate how those shavings would conform, if they were present. In such a universe all questions are extraordinarily fruitful, because they cannot expect any answer, only further questions. Progress of science in such a universe is a pouring stream of ever more ramified questions without answer. It is a bottomless universe.

For us, who basically ask what we are here for in the face of death, the formal universe is totally meaningless. And for science this fundamental question of ours is meaningless. We cannot experience the universe of formal science, and formal science cannot explain the world we live in. Science has become totally unsatisfactory. The last chapter of the novel called "science" shows that it is an absurd novel.

The universe of scientific discourse is a fiction, and science is science fiction. That fiction is the result of progressive abstractions from the concrete world we live in. First the values, and then the causes, were abstracted from it. What remained are empty forms. It is a world of the shadows of causes and values. The universe of formal science is a game the elements of which form structures by accident. This accidents turns into necessity, like the six turns up in dice by accident, but becomes necessary if we throw the dice often enough. The six is within the "program" of the game of dice, and the world as we know it is the realisation of the structure game. The present cosmos was contained in the program of the Big Bang, as was the human brain contained in the program of the original genetic information, and "Hamlet" in the program of the original occidental project. The universe of scientific discourse is a fiction, because it is an abstraction from the concrete world, and changes it into an absurd game.

Newton was still able to say that he did not invent his hypotheses freely. Such a metaphysical faith in a concrete reality which sustains science has become untenable ever since Kant. But matters are even more advanced at present. Science has become an abstract game with symbols which do not permit to ask what is their

concrete, "ultimate" meaning. They are symbols which mean other symbols, and if science becomes "experimental", then it is not in order to return to the concrete meaning of its symbols, but to symbolize concrete phenomena. An inversion of the vectors of significance is in the making: no longer does scientific discourse mean the concrete world, but the concrete world now means the universe of formal discourse. Thus the concrete world itself has become fictitious: we are about to lose any sense of reality. Science has pre-empted the world we live in, and we have become bottomless.

Such a view shows science to be a novel in two different meanings of that term: its history is a novel of questioning, and its result is the transformation of concrete reality into science fiction.