

P R E F A C E

"Fundamentally life is a very simple affair." With these lapidary words the parish priest began his sermon during the wedding ceremony for a couple of my friends. And he was quite right ; life is a simple thing. That is to say, for those who are happy. For them life is simple, just because they are happy. Or they are happy, because they know that life is simple. But it is not so for dualists : for them life is not simple but twofold. By this I do not mean that, as we all know, everything in this life has its reverse, that nothing is absolutely perfect, and that no one is absolutely happy or completely miserable. No, by this 'twofold' I mean that for dualists life, existence, the cosmos, perhaps even Being itself, fall into two separate categories.

1. Dualism : what it is and what it is not

In all previous volumes of this series I have followed this definition of dualism : two utterly opposed conceptions, systems, principles, groups of people, or even worlds, without any intermediate terms between them. They cannot be reduced to each other; in some cases the one is not even dependent on the other. The opposites are considered to be of a different quality - so much so that one of them is always seen as distinctly inferior and hence must be neglected or destroyed.

In dualism there are quite a number of subdivisions possible. The most important of these is that between radical (or absolute) and relative dualism. In radical dualism the two principles, systems, or worlds are absolutely coeval; they are both from eternity, and there is no interdependence whatsoever between them. This is the case, for instance, in Mani-

chaeism. In relative dualism, which occurs in many Gnostic systems, one system or group of people is dependent on another. However strongly opposed they may be, they can, nevertheless, not do without each other.

With regard to the subject of dualism, misunderstandings abound. Our western way of thinking, based on Greek metaphysics and having developed by way of medieval scholasticism and seventeenth-century rationalism, and after that going through the school of the Enlightenment, makes us argue in terms of logical systems. A reviewer of my work reproached me at one point because I had failed to establish the thesis that dualism is a key-concept for historians of culture ¹. But it was never my intention to adopt such a thesis. Dualism has to say something about concepts, or perhaps rather it does something with concepts, but it is not a concept itself. It is about discontinuity and discrepancies, about antagonisms and disharmony. In short, it is about what does not 'fit', about what does not go together. It is, fundamentally, anti-holistic.

Dualism is not an intellectual system, neither is it an ideology, a philosophy, or a religion; instead, it is a mental phenomenon. It cannot be set over against non-dualistic systems, for then we would be comparing things of a different order. The term 'dualistic system' is, although I use it myself, basically a contradiction in adiecto. There have, indeed, been a number of attempts to create such a system. Recapitulating what I wrote in the Preface of Volume V (pp. XX/XXI) and amplifying this in the light of the subsequent volumes, I am able to present the following 'dualistic systems': the Pythagorean fraternity (Vol. I, Ch. 1.15), the Orphic religion (Vol. I, Ch. IV.10), the philosophies of Empedocles, Heraclitus, and in particular, Parmenides (Vol. I, Ch. II.6, 8, and 9), those elements in Plato's teaching that show a strong tendency towards dualism (Vol. III, Ch. III.20-22), Zoroastrianism (Vol. IV, Ch. IV.8 and 9), and still more Iranian Zervanism (Vol. V, Ch. II.22), in India Yoga in particular (Vol. V, Ch. V.22), Chinese Daoism (Vol. V, Ch. III.25), and, finally, the numerous Gnostic systems as described in Volumes VII, VIII, and the present one. This is rather a meagre harvest for the long periods and the many civilizations I have studied. Furthermore, the impact of these systems was not great. Pythagoreans and

Orphics, Yogis and Daoists, as well as almost all Gnostic communities never became mass movements. Although Valentinianism and Manichaeism enjoyed a reasonable success, only Zervanism came close to becoming a national religion.

Add to this that nearly all dualistic systems not only remained restricted in membership and extent but also confined in time. Most of them - I am thinking here especially of Gnostic systems - were only short-lived. Manichaeism lived on for more than a millennium, but finally foundered in the backgardens of China. Mandaicism exists until the present day but is tucked away in the marshlands of Lower Iraq. Of the philosophies only Platonism remained influential throughout the ages, probably more because of its non-dualistic elements than of the dualistic ones. It is my conviction that it is precisely their dualism, that is their predilection for disconnectedness, that made the impact of these systems so feeble and their span of life so short. In the end it was always the 'holistics' that won the day.

2. Dualism and monism

I believe it is invariably the 'holistics' who contend that monism is the exact opposite of dualism. This is a constantly recurring theme of western thought. Those who relish this idea - and they are not few - do not realize that this opposition is dualistic in itself, for in their eyes it is a case of either-or. Monism can generate dualism. It is simply not feasible to bring all metaphysical, cosmic, and human phenomena under one heading; there will always remain an intractable remnant. This remnant will 'rebel' against the monistic monopoly which will lead to a dualistic situation. In fact, monism and dualism belong in the same category, that of forcing all kinds of reality into one single straightjacket ².

3. Dualism as an anthropological phenomenon

I shall not again discuss the fairly general misunderstanding that all dualisms are of Iranian provenance, or at least have an Iranian background. Time and again I have argued that dualism is an independent phenomenon, and that Iranian dualism is only one dualism among many³. Very often it is treated as though it were only a religious phenomenon, the proper subject for historians of religion; not rarely the field of philosophy is also included.

My own thesis, however, is that dualism is an anthropological phenomenon, something that is common to all humanity, occurring everywhere and in all periods of history. And if I am right in positing that it is something anthropological, something generally human, then we should look for it in all fields of human life, not one excluded. This is why I gave my work the subtitle of 'A cultural history of dualism'; this expresses my intention to place the occurrences of dualism in a far wider context than that of religion or philosophy.

4. The origin of dualism

a. The role of personal circumstances

If Iranian dualism is not the fountainhead of all dualism, the question arises where we should look for its origin. If dualism is basically human, it must express a human proclivity. In most people this rarely if ever comes to the surface or not at all. But in others it becomes a definite attitude that colours their whole conception of life, their way of thinking, their behaviour, and their relation with fellow-beings. In our treatment of the Gnosis we encountered instance after instance of this. Is this relishing of the sharpest possible oppositions something pathological? Not necessarily. In a book I wrote on Hitler⁴, the greatest and fiercest dualist of modern times, I argued that he was not a pathological case; I am convinced that an

international panel of famous psychiatrists would have declared him fully responsible for his actions.

I am quite sure that personal circumstances can kindle this propensity to dualism that, perhaps, is slumbering in every human being; usually such circumstances will occur in early youth or adolescence. In Antiquity we are poorly endowed with detailed biographies; only very rarely do we get a glimpse of personal developments. It is only in the cases of Plato (Vol. III, Ch. III.22), the apostle John (Vol. VII, Ch. IV.5b), and the prophet Mani (the present volume, Ch. IV.8) that I feel able to describe how and why a possibly innate tendency to dualism grew stronger in the course of their lives.

b. The role of more general circumstances

However influential personal circumstances may be, I doubt whether they offer a sufficient explanation. Perhaps dualists also feed on less personal and more general experiences. I am not thinking here of abstract philosophical reasonings or the impact of certain religious ideologies. It could rather be that the acceptance of a peculiar creed, a Gnostic one for instance, is the outcome, first of circumstances in the personal sphere, and, secondly, of a confrontation with 'existential' issues, I mean such as concern humanity in general.

Ioan Couliano, the victim of a vile political murder, once wrote that "the 'dualism of the west' has a social history", adding that he himself would not write this history. "It is up to others to write it" ⁵. I don't know whether I am qualified to compose this 'social history of dualism', but I feel that this is more or less what I am attempting to do in this series. The problem that is occupying me is whether there is something in the world, something really present, that might give rise to dualism, something that does not wholly fit, such as loose ends, gaps in fundamental explanations, unsolved contradictions. Let us take a sharp look at this.

5. What is a paradox?

Philosophy and mathematics know of paradoxes. Now, what is a 'paradox'? "A paradox, in the original sense of the word", says the author of an article in a encyclopaedia of philosophy, "is a statement that goes against generally accepted opinions" ⁶. I assume that it is for this reason that another philosophical encyclopedia carries no entry on 'paradox' but rather off-handedly relegates it to the article on 'the absurd' ⁷. R.M. Sainsbury defines the concept of paradox as "an apparently unacceptable conclusion derived by apparently acceptable reasoning from apparently acceptable premises" ⁸. Logicians and mathematicians are no great lovers of paradoxes; they spoil their game. What they are out for is consistency and identity. They can admit a paradox only as something incidental or accidental, hoping that sounder reasoning may eliminate it ⁹. Whitehead and Russell even developed a theory by means of which the occurrence of paradoxes can be avoided. According to them, "an analysis of the paradoxes to be avoided shows that they all result from a certain kind of vicious circle" ¹⁰.

It is an undeniable fact indeed that many paradoxes are only apparently so, among them most paradoxes that stem from the ancients who were very fond of them, especially the Sophists. One might think here of the famous paradox of Achilles and the tortoise ¹¹. The swift-footed hero gives the tortoise an ample start, but he proves unable to overtake the slow animal because he is constantly halving the distance still separating him from it. Since the tortoise keeps crawling on, however slowly, Achilles, by halving the difference, will never succeed in coming abreast with it : there will always remain a distance to be halved. One of the reasons for invalidating this paradox is that, as Whitehead/Russell would say, "it has no consonance with common sense". For the argument is based on the assumption that an onlooker would be able to observe the finally infinitesimal distance between the runner and the tortoise, which, of course, is practically impossible ¹².

6. The later history of the paradox

Medieval scholastics did not show any affinity with the idea of paradox. What had seemed paradox in the eyes of pagan philosophers became soundly orthodox. The so often misquoted paradox 'credo quia absurdum' is not to be found in any Christian author of late Antiquity or the Middle Ages ¹³. With the advent of the Renaissance the paradox began to slowly regain prestige. It became so popular then that a modern scholar spoke of 'paradoxia epidemica' ¹⁴. Many authors of that period loved to go against the grain, but whether they really developed impeccable paradoxes is another question.

The great Enlightenment prophet, Rousseau, declared that he had rather be "a man of paradoxes than a man of prejudices" ¹⁵ which inspired Proust to say that "the paradoxes of today are the prejudices of tomorrow, because the thickest ... of present-day prejudices once had a moment of newness" ¹⁶. Just like this French novelist, Goethe was no lover of paradoxes; he equalled 'the appetite for paradoxes' with 'the spirit of contradiction' ¹⁷. But Schopenhauer declared truth as such to be paradox ¹⁸, an idea that would have filled medieval scholastics with horror, while Yorck von Wartenburg even went so far as to state that "paradoxicality is a hallmark of truth" ¹⁹.

Although logicians and mathematicians always hope to have the best of paradoxes, poets and dramatists think differently. Whereas Mackie wanted to understand paradoxes "without becoming ensnared in them" ²⁰, the romantic author Novalis obviously loved to be 'ensnared'. Although he put it interrogatively, he found that "the highest principle would comprise the highest paradox in its task"; this would be "a proposition that ... ever again would become incomprehensible, how often believed to have been understood" ²¹. The dramatist Dürrenmatt pointed to the occurrence of chance. "People who act according to plan want to attain a certain end. Chance hits them most horribly, when they attain just the opposite of this end ... (This) is not senseless, it is paradox." And he cited the story of Edipus as a case in point ²².

Moving back along this road, we meet Kierkegaard who stated in his journal what the real, the ontological significance is of the paradox. "The paradox is not a concession but a category, an ontological definition expressing the relation between an existing, acknowledging mind and eternal truth" ²³.

6. The fundamental question

In her book 'Purity and Danger' Mary Douglas writes as follows ²⁴. "Purity is the enemy of change, of ambiguity and compromise ... The yearning for rigidity is in us all. It is part of our human condition to long for hard lines and clear concepts. When we have them, we have either to face the fact that some realities elude them, or else blind ourselves to the inadequacy of the concept. The final paradox of the search for purity is the attempt to force experience into logical categories of non-contradiction. But experience is not amenable, and those who make the attempt find themselves led into contradiction." In this connection, one thinks of the Gnostic dualists with their rigid distinction of the lower and upper worlds and their division of mankind into two totally different and opposed sets. They do this for the sake of purity indeed, the purity of the elect.

Yet another quotation, this time from a very famous work, 'Varieties of religious experience' by William James ²⁵ who mentioned the interesting notion "of there being elements of the universe which make no rational whole in conjunction with the other elements, and which, from the point of view of any system which those elements make up, can be only considered so much irrelevance and accident, so much 'dirt' as it were, as 'matter out of place'". It is, of course, typical of such a highly sophisticated intellectual as James to refer to those elements which do not fit into 'any system' as 'dirt'.

The paradox, therefore, throws up the fundamental question whether we, as human beings, however intelligent we may be, are able to grasp, to comprehend Being as a whole. Or, in other words, whether there is not a gap between Being and our comprehension of it. Behind this

question lurks another one. If there is nothing wrong with our intellect, is Being at fault then? Or is our comprehension defective and is Being unified and uniform?

7. Some paradoxes

Haskell B. Curry prints a list of paradoxes, which he terms 'logical antinomies', and which appear in scientific literature ²⁶.

a. The paradox of the barber

A well-known and popular paradox is that of the barber (probably due to Russell). The council of a certain town in Spain, the name of which is sometimes given as Sevilla, orders the barber (there is obviously only one barber there) to shave all the men in town who do not shave themselves, and only those. But what about Figaro himself? If he shaves himself, he does not shave all the men who do not shave themselves; if he does not shave himself, he likewise does not shave all the men who do not shave themselves. But the barber can easily dodge the problem by growing a beard. The council's order did not lay down that he should remain beardless. This turns this paradox into a pseudo-paradox.

b. The liar paradox

A harder nut to crack is the 'liar paradox', the best-known one there is. The most simple form of it is the statement 'I am lying'. If the speaker really is lying, it is a lie that he is lying, which means that he is speaking the truth. But if he is speaking the truth, then indeed ..., and so on. The more sophisticated form is that of Epimenides the Cretan who said : "All Cretans are liars". We are obviously trapped in a vicious circle here in the same way ²⁷. Whoever its author was, when it became known, it caused an enormous uproar; some people felt that it meant the end of rational thinking, Philites of Cos, for instance, who for this reason committed suicide. But the

statement 'I am lying' does not involve the speaker who, confronted, for instance, with an astute police officer, may finally admit that he has been lying, in which case he is believed. So it is with Epimenides who certainly does not apply his statement to himself. For else he would openly advertise that he is an inveterate liar. And who would do this ²⁸?

c. Grelling's paradox

We really get into the epicentre of the logical earthquake with 'Grelling's paradox', published in 1908 by Kurt Grelling. It is the 'paradox of heterologicality'. Some words are applicable to themselves and only to themselves. Such a word is 'short', another 'polysyllabic', yet another 'vague'. These are called 'autological'. Words that are not applicable to themselves are called 'heterological', for instance 'monosyllabic' or 'green' or 'useless'. A good example is 'symbol' which is not a symbol itself but a concept. The great problem here is that, if 'heterological' is 'heterological', it is by the same token 'autological'; but if it is 'autological', it is also 'heterological'. And now there is no way out ²⁹.

d. Russell's paradox

An equally watertight paradox is that of Russell ³⁰. When he communicated it in June 1903 by letter to Gottlob Frege, who is considered to be the founder of mathematical logic, his correspondent sent his answer almost by return of post. Frege proved deeply shocked; in his opinion the discovery of this paradox had shaken the foundations of the system of logic on which he, Frege, intended to build arithmetic ³¹.

We consider a tree as an object. All possible trees taken together form a new object which we call a 'class'; a class, therefore, is an object consisting of individual objects. As an individual I am an object too, a Dutchman. As a Dutchman I am a member of the class comprising all Dutchmen; since Dutchmen are Europeans, their class forms part of a class comprising all Europeans. But this class also comprises Englishmen,

Portuguese, Fins, Greeks, and so on. The class 'Europeans', in consequence, is a class of classes. Even a class of all classes would be conceivable, something like 'mankind', or Plato's Idea of the Good, the source of all other ideas.

Now Russell distinguished proper and improper classes. Proper classes are those which are not members of themselves. The class of numbers, for instance, is a 'clean' case, since this class is not a number itself. Improper classes are those which are members of themselves, like the class of all ideas which is an idea itself. All proper classes taken together form the class of proper classes. This class I call R, the 'Russell class'. However, R, the general class, is a proper class itself, and, in consequence a member of itself. This signifies, by the same token, that it is not a proper class but an improper one.

But, my sharpwitted reader will say, you start from the premise that R is proper class itself. Let us assume that it is an improper class. OK! If R is an improper class, it is not a member of the class of proper classes; in logical consequence, it then is a proper class. However, suppose that R is a member of itself; hence it is a proper class; hence it is not a member of itself. On the other hand, suppose that R is not a member of itself; hence it is a proper class, hence it is a member of itself. Now we see why Frege became so upset.

8. Is there a solution?

Those who occupy themselves with problems like these can be divided into optimists and pessimists. The optimists, as I have already mentioned, trust that hard work and acute thinking will succeed in eliminating all paradoxes. Perhaps Russell himself was one of these; he thought that his paradox could be solved. But others are not so hopeful. As John van Heijenoort writes, "no rule could be formulated that would by itself eliminate all paradoxes, and only the paradoxes ... The known paradoxes had to be eliminated by a radical and thorough reconstruction of logic and set theory that involved much more than the plucking out of paradoxes" ³². In

other words, to get rid of paradoxes, a totally new system of logic would have to be developed that would be paradox-free.

And Curry concludes that "the problem of explaining the paradoxes remains an important open problem. Although there is a vast literature devoted to them and a great variety of explanations has been offered, yet there is at present no one explanation which is universally accepted. It seems that a complete reform of logic is called for" ³³. But would what has always been known as 'logic' since Aristotle, still be 'logic'? Would it not rather be a 'metalogic'? And have we any guarantee that this totally new system too would not contain a paradox?

9. Gödel's theorem

In 1930 a twenty-four year old Austrian mathematician, Kurt Gödel (1906-1978), presented to the Wiener Akademie der Wissenschaften a proposition that soon became known as 'Gödel's theorem' ³⁴. Gödel's essay cannot have been agreeable reading for logicians and mathematicians. It disturbed the relative peace that prevailed in the different compartments of logic. Slowly but certainly the confusion caused by the possibility of there being unsolvable paradoxes had been overcome. In 1879 Gottlob Frege had proposed a system of formal logics that seemed to promise perfect consistency. As John van Heijenoort expresses it : "It seemed to embody the Aristotelian ideal of a perfect deduction from first principles" ³⁵.

a. The Hilbertian ideal

As late as 1922 the German mathematician David Hilbert acknowledged that mathematics would be a poor affair indeed if it did not possess solidity. In former days mathematicians had, according to him, trusted too much to intuitive evidence; this had led the discipline into difficulties. This is what my teacher of maths in grammar-school did, way back in 1933, when, in the very first lesson, he told us that we would start from some premises which he called 'axioms'; axioms, he added, were propositions

which could not be proved but did not need proof, since they were evident enough. Of course, none of us asked him what was the guarantee of this evidence. Intuition probably. But is our intuition infallible?

Hilbert admitted that we cannot do without intuitive evidence. But at the same time he proposed that a logical system must be possible that would comprise the concrete, extra-logical, intuitive, or 'lived' (mathematical) objects. There was a field, he thought, in which we would encounter pure truth, a field higher than 'ordinary' mathematics that had proved not to be entirely free of paradoxes. This would be the field of 'meta-mathematics', written in a system of symbols showing that mathematics did not contain contradictions. Mathematical thought seemed on the verge of overcoming all inconsistencies ³⁶.

b. A theorem with a catastrophic effect

And then there appeared out of the blue a young upstart of a mathematician who categorically declared that there is no such thing as complete coherence, that there nowhere exists a wholeness that is without dents and fissures. Gödel's theorem is known as the 'incompleteness theorem'. The (fundamental, intrinsic) incompleteness (of logico-mathematical) systems consists in the fact that in the last resort they are undecidable. "On the basis of reasonable assumptions, one can show that the formula so constructed is neither provable nor disprovable". Curry stated that this assertion had 'a catastrophic effect on mathematical logic' ³⁷.

The theorem in 'Reinkultur' is not accessible to these who have no training in formal logic (being a mathematician is not sufficient). It is rendered in signs, symbols, and numbers, one of which, the 'Gödel number', was his own addition; consisting of two lemmata and some forty-six introductory definitions, it occupies twenty-five pages in print. The non-mathematician need not be ashamed of his or her incomprehension; at the time of its publication hardly anybody understood it ³⁸.

Rendering the theorem in ordinary language makes it somewhat less precise, but this is the only alternative. What we may reasonably

expect of formal logic is that its propositions do not contain contradictions, or that it is able to state unequivocally and irrefutably what is true and what is not true. Now Gödel did not start from the truth concept; he was not looking for criteria to dissolve the antinomy true/untrue. His problem was that of deducibility : can the desired result be inferred from the data we possess?

Gödel asserted that an arithmetical proposition is undecidable (unentscheidbar) if, within its own system, it is impossible to prove whether or not it is true. Every arithmetical system, even an elementary one, may contain contradictions (referring to relations between numbers, for instance the impossibility to disprove that $2 \times 3 = 5$). Every formal system that is large enough to allow operations like adding up and multiplying is subject to such restrictions! Gödel's theorem did not, of course, wreck the whole system of mathematical logic. But it frustrated its pretensions. It showed to what extent this kind of logic is effective; it followed from the theorem that the reach of this logic is not unlimited. No system of logics is capable of solving its own problems in their entirety. Monod said that such systems cannot describe their own structure integrally; Jean Martel wrote that no system 'boucle sur lui-même', does not have the power to make itself perfectly closely-reasoned ³⁹. Thomas Kuhn went somewhat further by stating that "no paradigm that provided a basis for scientific research ever completely resolves all its problems" ⁴⁰.

If an arithmetical system contains a contradiction, it is inconsistent. But from Gödel's theorem it follows that, even if a contradiction is deduced, this does not prove that the system is consistent. To make a system consistent one has to appeal to the one higher system that is larger and possesses ampler means of argumentation. But the inexorable consequence of Gödel's theorem is that this system too is subject to the same restrictions : it is incapable of making itself consistent. Once again it will be necessary to appeal to a still larger system, only to hit again on the same problem. Finally, one could appeal to the largest system of all, for instance the universe, - if this can be described arithmetically, - only to discover the same restriction.

d. An example

Let me give an example. Our chronology can be presented in purely arithmetical terms. At this moment of writing it is 23.11.1993 at 12.16.30 hrs; everybody understands that it is the end of November about noon. Chronology is indeed a highly detailed and exact arithmetical system but not without its contradictions and anomalies. For instance, not everywhere in the world it is 12.16 hrs at this moment, although my intuition tells me that it is everywhere 'now', nor is it everywhere the same day, although my intuition says that it is everywhere 'to-day'.

We know precisely what a year is; it is the period our globe needs to rotate around the sun; at this moment it stands at exactly the same spot on the ecliptica where it was on November 23, 1992. But what about the 29th of February? In the year before the leapyear there was no February 29! Where then was the earth exactly one year ago? On the spot of February 28 or on that of March 1? This would entail that February 28 and 29 are the same day, just as February 29 and March 1. And this again would mean that February 28 and March 1 are the same day. Or February 29 does not exist! Never! This is an anomaly that remains undecidable within our chronological system (in practice we are able to live with it because we are forced to). For the Gödelian theorem it follows that it will not do to refer to a higher system, for instance the solar system, and from there to the Milky Way, and from there to the universe as the supreme court. For even this court cannot provide a solution.

e. Conclusion

All attempts to lift Gödel's theorem out of the saddle have misfired. We are forced to admit that Hilbert's ideal of an absolute mathematics, of an absolute logic, has receded beyond the horizon. There will always remain contradictions, inconsistencies, and anomalies.

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10. The law of entropy

In his famous and much discussed essay 'The Two Cultures' C.B. Snow reproached the scholars of the humanities for not knowing how the second main law of thermodynamics reads. The first main law, yes, is that of the conservation of energy, but the second ...? Although I belong the humanities myself, I have had occasion to note that many physicians who, by reason of their discipline, are acquainted with these laws, do not realize that they are at variance with each other. The first law, that of the conservation of energy, says that the total amount of energy in the universe remains equal. To put it as simply as possible : what is lost here is added there.

The second law of thermodynamics is called 'the law of entropy', also known as 'the principle of Carnot', because it was first formulated by the French physician Sadi Carnot in 1824 ⁴¹. Nobody paid any attention to his essay. The principle was reformulated in 1865 by R. Clausius ⁴² and is, therefore, also known as 'the principle of Clausius' (or of Carnot-Clausius).

Whereas the law of the conservation of energy implies that energy is always useful, always produces something, for instance movement or rotation, the law of entropy says that there is also a degradation, a loss of energy. Clausius stated in as many words that his principle conflicts with that of the conservation of energy. It is also incompatible with the prevailing tendency in science to consider all processes as reversible; they are all seen as non-historical, that is, time plays no role in them; there is no change, everything remains virtually the same. But the law of entropy implies that processes are be irreversible, that they are 'historical', that there is a change, because first there is more and later there is less. Scientists do not love this idea!

Let me explain this more amply. Suppose they give me a box and sixteen billiard-balls, eight red, eight white; if I lay them in the box, they will cover its bottom entirely. They tell me to do this, but before I begin, they blindfold me. This leaves me with in all 12.870 possibilities of placing;

the chance that I make an orderly pattern, say, regularly one white, one red, is very small indeed. But let them give me a hundred balls, again half white, half red. I now have 10 to the 29th possibilities, and my chance of a regular pattern has become infinitesimally small. In other words, there is an overwhelming possibility that I will make a chaos of it ⁴³.

Let us shift our argument to the world of atoms. Since there exist innumerable atoms, the chance that they will form an orderly pattern of themselves is infinitely small. The most probable thing is that there will be a situation of 'chaos', and the least probable that they will form configurations of a regular type. Viewed from a statistical point of view, our conclusion must be that atoms in a closed system will show a tendency to move from a situation of improbability (orderliness) to one of probability (chaos); the atoms will tend to divide themselves evenly over the available space. This happens when you throw bath-salts into your bath. In a few moments the pellets will disappear; they lose their coherence (order) entirely.

Now it is true that an amount of energy is set free through the disruption of the coherence - the energy that was invested in keeping together the 'improbable' construction; insofar the law of the conservation of energy comes into its own. The freed energy is converted into heat; the speed of the atoms increases enormously. But this results in a loss of energy since heat, as a source of energy, is almost useless. A good example is a nuclear explosion; the enormous amount of energy needed to keep the pattern of the fissionable material intact is set loose at the moment of the explosion and is converted into an inconceivable amount of heat. This heat is absolutely useless, if we don't consider the annihilation of people and cities as 'useful'. This is pure one-way traffic : the heat cannot be converted into binding energy.

The yardstick with which we measure the irreversible process of the loss of energy is called 'entropy'; the more energy is converted into heat, the greater the entropy. In consequence, scientists have to face the fact that an entirely coherent description of the field of nature is impossible; there is a flaw, a fundamental contradiction.

11. Quantum mechanics

a. A short history of 'atomism'

'Atom' is a Greek word meaning 'indivisible'. The first atomic theory was propounded in the fifth century B.C. by Democritus and Leucippus, and on this the foundations of atomism were laid. Its basic idea was that matter consists of the smallest possible indivisible particles. It will be clear that this classical atomic theory is wholly at variance with modern atomism which is based on the premise that atoms are divisible and that, in consequence, there exist particles smaller than atoms. Nevertheless, the Greek mind had made an important leap : it left the realm of the visible behind and moved into the world of the invisible and unobservable ⁴⁴.

Not much was heard of atomism again until the seventeenth century. Democritus's theory had the attention of several Renaissance scholars but what Descartes brought forward was considered authoritative. He developed a corpuscular theory according to which matter consisted of small material particles with specific physical properties and subject to mechanical laws. Later in the century Robert Boyle added that those particles not only had physical but also chemical properties. On the basis of this theory Lavoisier composed the first list of chemical elements.

b. Modern atomic theory

The real founder of modern atomic theory was Robert Dalton who, in the first years of the nineteenth century, stated that atoms were particles with the properties of chemical elements. However, he still clung to the age-old idea of Democritus that (chemical) atoms were inchangeable. This means that, although they are unobservable, they remain imaginable since they are fixed things bound together in a compound that finally is a visible object, however small.

In the course of that century it became increasingly clear that atoms are not the smallest particles; they are structures of particles them-

selves. This led to the construction of the famous atomic model of Bohr (or of Rutherford-Bohr) in 1913 that shows the atom as a structure consisting of a nucleus around which electrons wheeled in fixed orbits; in other words, it was a kind of solar system. Many of us will remember this model from their lessons in physics or chemistry in grammar-school. The teachers were glad to use it since it made so perfectly plain what an atom looked like - somewhat plainer than it really is, as Bohr himself understood very well! Anyhow, the mysterious atom seemed to have regained some measure of visibility.

c. The shift to quantum mechanics

It was, however, this same Bohr who, together with others, was instrumental in utterly destroying every idea, not only of making an atom 'visible', but still more of even the possibility of imagining it or conceiving it. In several steps, from the work of Niels Bohr through the investigations of Max Planck, Louis de Broglie, and E. Schrödinger to that of Werner Heisenberg, in the course of the twenties a totally new form of physics was developed that has become known as 'quantum mechanics'.

Quantum mechanics abandoned the idea that the particles of an atom can be 'localized', that is, can be located at an exactly definable place and that, if they move (which they constantly do), the velocity can be determined with which they go from one place to another. Quantum mechanics says that this is impossible; we have now to do with what Heisenberg called 'uncertainty relations'. That electrons would describe regular orbits is only the product of a (false) hypothesis which makes Bohr's atomic model ripe for the dustbin. Neither location nor speed of the particles can be determined at the same moment; there no longer are coordinates but only 'relations' which only can be expressed in mathematical terms.

If the idea that the internal structure of an atom has now lost every form of conceivability makes the reader feel somewhat uncomfortable, he or she finds him- or herself in very good company. An excellent scholar

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like Popper always remained highly sceptical. And the great Einstein himself could never bring himself to accept what quantum mechanics told him; it proved impossible for him to believe that physical reality in its inner core should be something indeterminate, that there is no such thing as 'the exact state of the microparticle'. According to Pais, "his attitude regarding quantum mechanics was one of scepticism" ⁴⁵. In December 1926 he wrote to Born that "quantum mechanics is very impressive. But an inner voice tells me that it is not the real thing. The theory produces a good deal but hardly brings us closer to the secret of the Old One (= God - F.). I am at all events convinced that he emphatically does not throw dice" ⁴⁶.

d. Philosophical consequences

The philosophical consequences of this new theory are immense indeed! The realm of reality seems to have become dualistically divided between a world we can observe, describe, imagine, conceive of, and comprehend, and another deeper lying world that is beyond every form of comprehension and imagination. And this second world seems to be the basic one on which all other reality rests. I for one would call this a 'derealization' of reality. The mental effects of this all are probably not very healthy. Of course, hardly anybody knows what quantum mechanics is. But lessons in school and popular expositions have fostered the vague but unpleasant impression that the core of reality is a seething and dangerous volcano. People couple this with the fear they have of nuclear fission, in particular of atomic bombs and nuclear warheads but also of nuclear plants. All this has a destabilizing effect and makes people feel uncertain and threatened in their own world ⁴⁷.

There are, indeed, those for whom this new mathematical concept is definitely the last word in our understanding of physical nature. However, this was also alleged for the two central views of nature that preceded it. The first was that of the world seen as an organism; its great prophet was Aristotle who put this idea under the high protection of the Prime Mover. The second model was that of the world understood as a mechan-

ism, with Newton as its prophet. To Voltaire, God was 'the eternal machinist' ⁴⁸. Both these models have one great advantage : they are imaginable. The word 'organism' reminds us of the human body and suggests to us the ancient relationship of macrocosmos and microcosmos. The word 'mechanism' is far more bloodless and lifeless, but still, we are able to visualize it as a machinery.

Now, after the introduction of quantum mechanics, the world is presented in terms of relations of numbers. With this the last vestige of 'picturesqueness' has disappeared from physics. Of course, not a few physicists honestly believe that with this development the last and most definite word in physics has been spoken. Some of them now speak of God as a mathematician. But there is a poor chance that the newest model will prove the ultimate since neither of the two previous ones could hold its own. For this and other reasons the famous historian of science, Stanley L. Jaki, thinks that "the replacement of theories in science will go on as before" ⁴⁹.

12. An all-comprising theory?

Is nature playing cat and mice with us? Or hide-and-seek? Or to put it into more scientific terms, does there exist something like a 'final theory of nature', an ultimate theory containing the first principles, the 'archai', which the pre-Socratic philosophers so eagerly looked for (but each of them suggesting another 'archê') ⁵⁰? From these first principles, no longer expressed in philosophical terms but *modo mathematico*, the laws governing the physical universe might be deduced so that we would finally possess a coherent and non-contradictory pattern of all that is going on in organic and anorganic matter. If this were possible, then we would be able to pinpoint every action, every movement, every phenomenon in nature into its natural and logical place in the all-comprising system.

There are physicists, and not the least ones, who believe that such a theory is possible. Heisenberg is one of them. In 1958 he announced that he had developed a mathematical model in which all physical phenomena

are included, but since then very little has been heard of this. More recently the Nobel Prize winner Steven Weinberg, a highly erudite and widely read man, published a book called 'Dreams of a Final Theory' (1992); he calls his book "a great intellectual adventure, the search for the final laws of nature" ⁵¹. He is more modest than Heisenberg, since he does not contend that he has developed such a theory but only that he is 'dreaming' of it. But to him it is a dream that one day will become true.

Weinberg's conviction is partly based on his hopes for an experiment in the physical field, an experiment that has still to be undertaken and that will cost enormous amounts of money (to be provided by the American tax-payer). If this experiment succeeds, it will be proved that there exists a particle which at the same time can be described as at once the most fundamental although still purely hypothetical particle. It is hoped and believed that this particle "will supply the remaining key unlocking the secrets of the Final Theory of mathematical physics" ⁵².

This mysterious particle is thought to be 'the giver of mass to other particles' (i.e. to those we know already); as Penrose in his review of Weinberg's book expressed it : "Its complete role is not just as God in heaven, but as a God who also deigns to live among his mortal subjects" ⁵³. It is, so to speak, the missing link. Quantum mechanics is to play a large part in this endeavour. "Quantum mechanics may survive not merely as an approximation to a deeper truth ... but as a precisely valid feature of the final theory" ⁵⁴. But in the very last words of his book Weinberg proves non-committal on the possibility of this theory. "Whether or not the final laws of nature are discovered in our lifetime, it is a great thing for us to carry on the tradition of holding up nature to examination, of asking again and again why it is the way it is" ⁵⁵.

If Weinberg himself is non-committal, other excellent physicists remain downright sceptical. About these 'grandiose ideas' Penrose stated that "we are, at best, a very long way from any kind of ultimate understanding of the nature of our universe" ⁵⁶. And Jaki is of the opinion that "at present the prospect of this, - (i.e.) of modern physics to find one day its final mathematical form and synthesis - are extremely meagre" ⁵⁷. As a

layman I must confess that I could easily do without a Final Theory if it would cost those billions of dollars which would be the price of the intended experiment (it would involve the boring of a tunnel with a length of 83 km) ⁵⁸.

13. Is something wrong with the universe?

Should we categorically state, after having pondered deeply on all that was written above, that the universe is not a coherent whole? Are we forced to renounce all holistic dreams? Do we have no other choice than to wander aimless and forlorn among the ruins of what we supposed to be a cosmos - ruins which, viewed as they stand, are still impressive and picturesque, but can no longer be seen as part of the complex in which they had seemed to be integrated? Or was there never such a complex? Answering these anguished questions is no easy task. There are two possibilities. The first is that the universe really is a coherent whole but that our fractured brains are not, and perhaps never will be, able to perceive it as such. The second is that the universe is not without flaws indeed, and that, for this reason, we see it as devoid of ultimate logicity.

In order to decide between these two possibilities, we cannot do without philosophy. Making use of Gödelian terms once again, we must say that science as it is, as a discipline, has not sufficient means at its disposal for making valid decisions on fundamental points. The Polish-English philosopher Leszek Kolakowski starts from the non-positivist but now generally accepted premise that the person of the observer cannot be eliminated from the description of physical events. I for one would add that the more 'fundamental' these phenomena are, the more 'present' the observer is. Kolakowski then puts us between Kant and Plato.

To Kant the intellect was all and matter was nothing, that is, utterly formless; matter only acquires form (becomes perceptible, intelligible, describable, computable) because the (sovereign) intellect imposes a priori forms on it, forms that exist in his mind, and only there, but not in matter. But to Plato it looked quite differently. In his view reality possesses

forms of its own, and the human mind is able to discover these because "the reality is mind-like, and the very act of recognition, as Plato would have it, presupposes an affinity, or even a loving kinship, between my mind and the mind of the world" ⁵⁹.

In my opinion, Kant makes man into God, or perhaps rather, into the Creator - the Creator not of matter (which is presupposed) but of the cosmos as an orderly and intelligible complex. His position is curiously dualistic since this order exists in the mind only and not in reality. In his view reality has no ontological status at all. The Platonic position, however, accords autonomy to reality which possesses its own forms independently of the human intellect; metaphorically speaking, reality has a mind of its own. And the human mind and that of the world correspond.

Now the great question is, what makes them correspond? If there is kinship between them, something or someone must have fathered them both. The answer is given by the scholastic concept of the 'analogia entis', the 'analogy of being', which concept is due to Thomas of Aquinas. It presupposes a God who is the creator of the universe and all that it contains. Since I believe in such a God, it is impossible for me to reason as though I didn't. The analogy concept says that there is analogy (but not identity!) between the mind of God and the human mind. It does not argue as though reality itself had a mind.

God, as the Creator, has imposed order on the universe, an order that is autonomous indeed. Since man is his creature too, God has also imposed his order on the mind. And since this is 'mind', and not matter, it represents and resembles the divine mind. It is because of this analogy that man is capable of discovering the order that there is in nature; it is at the basis of every science and every discipline, even of theology.

But once again, although there is analogy, there is no identity. If the human mind really were identical with that of God, man would be God. Then, and only then, he would be capable of seeing the universe as a perfect harmony without flaws, contradictions, and anomalies. Assuming that God created the world and imposed order on it, we must also assume that he did this well and did not leave loose ends dangling. That we cannot

perceive this perfect harmony - the 'harmony of the spheres' - is not the fault of the universe, still less of God, but of our own imperfection. Perhaps Adam and Eve in Paradise were better conditioned to see the ultimate harmony of all that is. But since we do not live in Paradise, we have to be content with what Popper called 'piecemeal engineering', realizing that grandiose vistas are not within our reach. We can do no more than penetrate slowly into the mysteries of nature, knowing all the time that every revealed secret will hide another secret, that every resolved problem will pose another problem, and that every levelled anomaly will confront us with a new anomaly.

13. A-symmetrical man

a. The non-symmetry of the body

If we assume that harmony supposes or is expressed by symmetry, then there is no complete harmony in the human constitution, neither internal nor external. First of all, we have the remarkable fact that mankind is dual, because it consists of males and females. It is a mistake to maintain that this is necessary because otherwise there would be no procreation. Among the great number of reproduction systems which exist in nature there are also a-sexual ones. There is no reason to go deeply into the *raison d'être* of human gender here; what is important in our context is that it is dual, a-symmetrical. Male and female are complementary but also different and opposite. In volume after volume, at the appropriate places, I have expounded how this duality may lead, and often really does so, to dualistic contrasts, more often than not to the detriment of women.

But the human person is not symmetrical internally either; the two halves of the human body are not identical ⁶⁰. For instance, the perpendicular running through the body does not divide the heart into equal halves; it stands obliquely on the water-level line, at an angle that, if I am correctly informed, is exactly the same as that formed by the axis of the earth with the ecliptica. How curious!

b. Right against left

But if we may consider this as a intriguing but harmless curiosity, the difference between our right and left hands is by no means harmless ⁶¹. Robert Hertz, an anthropologist, gave his essay the title of 'The Pre-Eminence of the Right hand, followed by the subtitle : 'A Study in Religious Polarity'. Three things should strike us : the right hand occupies a privileged position; there is a polarity between both hands; this polarity has a religious character ⁶². In Hertz's view this has dualistic connotations. "To the right hand go honors, flattering designations, prerogatives ... The left-hand, on the contrary, is despised and reduced to the role of a humble auxiliary ... The right hand is the symbol and model of all aristocracies, the left hand of all plebeians" ⁶³.

Does this difference have an anatomical cause? It is often thought that the preponderance of the right hand is linked to the left cerebral hemisphere which is supposed the better developed of the two halves of the brain. Modern cerebral neurology is by no means sure that one half would be better equipped than the other; they have different tasks indeed, but do not operate independently from each other ⁶⁴. Much, often rather silly, speculation has been based on the idea of 'the two brains' ⁶⁵. Hertz had already suggested that, if the privileged position of the right hand is due to the better equipped part of the brain, it is equally conceivable that the left cerebral hemisphere is more developed, because the right has to do the bulk of the work.

At this moment I sit writing with my right hand, while my left hand is completely idle. But if the left hand is properly trained, it can become the compeer of its colleague on the right. Ravel wrote a piano concerto for the left hand for an artist who had lost his right hand in the Great War; this piano concerto is far more than a curiosity, it asks for accomplished playing. The fact that the left hand is a pariah must have other reasons than sheer anatomical ones.

When I was a little boy, I sometimes dared to reach my left hand to a visitor. My mother then sternly reproached me and said : "Give your good

hand!", clearly implying that something is wrong with the left hand. In this way, and in many others, it is inculcated into very young children that all honours have to go to the right hand. In primary school we learn to write with the right hand, although it is perfectly possible to write with the left hand, and even with both alternately. Add to this that many instruments and implements are designed for right-handers ⁶⁶.

The English speak of a 'left-handed compliment' by which they mean a misplaced one, or rather a compliment of doubtful sincerity. In many European languages a clumsy person is described as 'left' : 'links' in Dutch, 'gauche' in French, 'linkisch' in German, while the English do not use 'left' in this sense, but have 'sinister', the Latin for 'left' which is of evil omen. In English as in other languages it can be said of a person that he is born 'with two left hands'. Hertz concludes that "right-handedness ... is an ideal to which everybody must conform and which society forces us to respect by positive sanctions" ⁶⁷, while the conclusion of Coren is that "it is true that society pressures individuals to become right-handed" ⁶⁸.

c. A religious origin of the difference in hands?

Hertz thinks that the origin of this a-symmetry must be found in the religious sphere, in the difference between the sacred and the profane ⁶⁹. In our secularized world this origin is forgotten, but we are reminded of it when, during a wedding ceremony, the officiating priest says to the couple : "Give each other the right hand". In a great many cultures there is a dualistic difference between the sacred and the profane, dividing the whole universe into two spheres. Hertz writes that "social polarity is still a reflection and a consequence of religious polarity" ⁷⁰.

All that is strong, powerful, healthy is located in the sacred sphere, whereas everything that is weak, powerless, impure has its place in the profane sphere. A very early expression of this in European thought is the Pythagorean list of opposites in which the good items are on the right side and the wrong ones on the left ⁷¹. "How", asks Hertz, "could man's body, the microcosm, escape the law of polarity that governs everything?" ⁷². So

the left hand is doomed to be the loser. Man is a 'homo duplex', a double being, who "possesses a right and a left that are profoundly differentiated"

⁷³.

14. The scourge of war

a. Our violent history

May we expect harmony and coherence in the human world, among mankind in general, among the nations, among states? Putting the question is answering it, and the answer is an emphatic no! In spite of all that took place in this century, we doggedly keep believing that we are living in an age of progress; for this reason many people arrogate to themselves the right to look down on former generations, especially those of the Middle Ages, when people were stupid, narrow-minded, bigotted, superstitious, and not to forget, given to cruelty. But our enlightened era saw the two largest wars of all history, fought all over the globe, with countless victims, more than fell in all the wars of history together. And didn't we see more than five millions Jews transported to the extermination camps, together with a great number of Gypsies? When communism was abolished and the Soviet-Union was carved up into fifteen successor-states, the world hoped for one short moment that we were in for a period of universal peace. We all know what has happened since then; there is no need to describe it.

Our time seems to be the apogee of an extremely long and violent history. There have always been wars, tribal wars, civil wars, guerillas, interstate wars; there is hardly a year in history without war on. War is simply endemic; I am tempted to say that is an 'organic' part of the existence of mankind, if only it were not so thoroughly inorganic. For there is a curious and painful difference between our general longing for peace, our profound desire to be spared the horrors of war, and the constant recurrence of this form of violence on a big scale.

The human dilemma is expressed in a proverb of those pastmasters in the art of violence, the Romans : "Si vis pacem, para bellum", if you

want peace, prepare for war. As though peace would only be possible if a nation remains armed to the teeth! This would make peace into no more than an interval between periods of war - which, so much must be admitted - sums up the history of the world fairly well. "History is little more than a register of crimes, sorrows, and misfortunes", sighed Gibbon ⁷⁴.

b. Why there is war

Do we not all love order? But somehow a vicious law of entropy seems at work in humanity, a strong tendency to turn order into chaos, as though chaos were by far the easier and more self-evident thing. The experienced and worldly-wise Comte de Ségur who in 1812 accompanied Napoleon's Grande Armée to Moscow and back, and saw what happened when a great army lost its coherence, concluded that "order is an effort against nature" ⁷⁵. This made the great novelist Robert Musil say that "somehow order changes into a need of homicide" ⁷⁶.

Why is there war? Let us listen to Doris Lessing. "Everything desintegrated. Anyone who has been in or near war ... knows that time ... when everything falls apart, when all forms of order dissolve ... During this time old scores of all kinds are settled. It is when unpopular officers are killed 'by accident'. It is when a man who has an antipathy for another will kill him, or beat him up. A man who wants a woman will rape her, if she is around, or rape another when she is not; and those who want to be make sure that they are where the raping is ... In short it is a time of anarchy, of looting, of arson and destruction for destruction's sake. There are those who believe that this time out of the ordinary is the reason for war, its hidden justification, its purpose and law, another pattern behind the one we see" ⁷⁷. It seems as though humanity is in permanent need of this time off. With this anomaly we have to live. Louis Menand calls this 'the incommensurability of the world' which according to him is the basis of dualism

15. Death as an anomaly

War is not the direst anomaly with which humanity has to cope. There is another, much more painful, hurting far more deeply, because it eats into the very core of our existence. It is death. Ask as many people as you want : "what is the opposite of life?", and they will invariably answer : death. But the opposite of life is non-life, non-being, in the sense of never having existed. Death is anomaly, a non-concept; the idea of life is incompatible with that of death. Those who do not believe in an afterlife - a tiny minority in humanity since its beginnings - do not think that, at the moment of death, they will be confronted with something real, for instance, by the concept or the image of death, but, on the contrary, that they will fade into nothingness. And those who believe in an afterlife think that death will have no power over them.

Death does not form part of the order of creation; it is not 'natural', it should not be there. It is, therefore, not fundamentally important when or how a person dies; what is existentially basic is that we die. "Death was never of God's fashioning; not for his pleasure does life cease to be; what meant his creation but that all created things should have being? No breed has he created on earth but for its thriving; none carries in itself the seeds of its own destruction ... God, to be sure, formed man for an immortal destiny, the created image of his own endless being. But the devil's image brought death into the world" ⁷⁹. This is, of course, the biblical view to which not all of us will adhere. But all the same, it expresses very neatly the duality, the dualism which we all experience, that of life and death.

16. Conclusions

I have described a world full of rifts and fissures, of anomalies, contradictions, and oppositions. We are fundamentally incapable of coping with this world, with our existence, with ourselves, incapable as we are of managing the affairs of this world as they should be managed by homo sapiens. We have neither the brains nor the practical abilities for it. We

have to be content with muddling on. "As long as we live we live surrounded by dangers", said Saint Teresa of Avila; we may also add : as long as we live we are surrounded by anomalies. By far the greater part of humanity succeeds in getting along reasonably well in an imperfect world; they accept the good and the bad, the sour and the sweet, the light and the dark as being simply a part of their existence. But some people, everywhere, in all times, in every culture, are viscerally unable to do this. These are the dualists.

In the prefaces of previous volumes and here and there in the chapters I have indicated which are the personal, psychological, historical and anthropological conditions under which dualistic attitudes and ideologies may develop. Now we see that there is something in the existential order (or disorder) of the world that may pain certain people so much that they take their refuge in dualism. As the term itself says, it divides the world into two. What one does not like one can put on one side, and what one likes on the other, and then draw the line between them. Thus dualism seems the way to solve some disagreeable problems, even ontological ones.

I must not send this volume into the world without thanking some persons who have helped me. First of all, I must express my gratitude to Dr. F.R. Ankersmit, professor of the theory of history, and Dr. T.A.F. Kuipers, professor of the philosophy of science, both of Groningen State University (NL). At my request they read the Preface with a critical eye, supplied me with a number of remarks, and by doing so, saved me from some errors and mistakes. Then there is, as always, Dr. J.R. Dove, who was naturalized as a Dutchman some time ago; he corrected the English of this volume in his usual precise and courteous way. My daughter Dr. Th.A.M. Smidt van Gelder found the time - heaven knows where - to act as a 'general reader' throughout this whole volume. Both she and Dr. Dove provided me with some sensible hints and remarks. My dear wife Anneke found the time and the courage for correcting the one but last version of the text on typing errors. Finally, my publisher. Mr. J.C. Gieben saw the book through the press in his usual friendly and efficient manner.

The responsibility for the whole text rests entirely with me, for the scholarly contents, for the English text, for the typography, and for the lay-out. This volume, like all others, can be read without consulting others, but all the same, the volumes VII, VIII, and IX, containing the argument on the Gnosis and related systems, belong together. To begin with Volume X I shall shift the argument to dualistic phenomena in Roman history.

NOTES TO THE PREFACE

1. See Vol. V, XIII/XIV.
2. See Vol. VI, XXV/XXVI.
3. See my basic statement in Vol. IV, Ch. IV.5.
4. P.F.M. Fontaine, *De onbekende Hitler* (Hitler the unknown). Baarn (NL), 1992.
5. Couliano, *Gnosés dual*. 21.
6. John van Heijenoort s.v. 'Logical paradoxes', *Enc.Phil.*, 5, 45.
7. Kathrin Sandkühler s.v. 'Absurde (Das)', *Eur.Enz.Phil.u.Wiss.*, 1, 43-45.
8. Sainsbury, *Paradoxes* 1.
9. P. Probst s.v. 'Paradox', *Hist.Wört.b.Phil.* 7, 89.
10. Whitehead/Russell, *Princ.math.* I, 37.
11. Attributed by Aristotle to Zeno of Elea, *Physics* 239b and 263a-b.
12. This pseudo-paradox bears a curious resemblance to something that is familiar to many Dutchmen. On a tin of Droste's cocoa we see a picture of a nurse carrying a tray with a cup of cocoa on it and, next to the cup, a tin of Droste's cocoa. On this tin we see a picture of a nurse with ..., and so on ad infinitum. Ad infinitum? In theory, yes. But as children we amused ourselves with following as far as possible the ever smaller nurses with trays on which ..., until even with a large magnifying glass we lost track. To say nothing of the painter who, at a certain moment, was no longer able to paint the picture, so infinitely small it had become.
13. It is usually but falsely attributed to Tertullian who, however, never wrote this but something else, namely that the death of God's son on the cross was "prorsus credibile quia ineptum", *De carne Christi* 5.4.
14. R.L. Corie, *Paradoxia epidemica*. The Renaissance tradition of Paradox. Hamden (Conn.), 1976.
15. Rousseau, *Émile* 323.
16. Proust, *Plaisirs* 110.
17. Goethe. *Dichtung* II.8, 350.

18. Schopenhauer, Preisschrift 812.
19. Letter to Dilthey, 13.I.1883, Briefwechsel 249.
20. Mackie, Truth 239.
21. Novalis, Schriften II, 523/524.
22. Dürrenmatt, Physiker. Anhang 92.
23. Kierkegaard, Tagebücher 2, 80, VIII, A 11.
24. Douglas, Purity 162.
25. James, Varieties 129.
26. Curry, Foundations 3-8. Another list is printed by Sainsbury, Paradoxes 145-151. Nice, non-scientific paradoxes are the slogan of Popeye the Sailor man : "I am what I am, and more than I am", and the advertisement of Hassan : "The dates of Hassan are bigger than they are" (recorded by the Dutch author Multatuli = Eduard Douwes Dekker (1820-1887)). A fascinating example of a pseudo-paradox is this one : "Abraham Lincoln was born in a log cabin that he had built with his own hands" (from an essay by an American student).
27. Epimenides the Cretan, who really existed, was probably not the father of this statement; in DL 2.108 we find mentioned a certain Eubulides of Milete, a philosopher who was fond of dialectical arguments and who wrote a (lost) essay called 'The Liar'.
28. The reader will find all the information he or she may want in a book by Rüstow, 'Der Lügner' (see Bibliography).
29. Except that in 1925 the English mathematician F.P. Ramsey said that this is a 'semantical' or 'epistemological' paradox, and, therefore, may become a subject for discussion. He found that the real, 'logical' paradoxes are written in mathematical symbols. Curry, Foundations 7, finds the distinction 'a little vague'; it "tends to be obliterated in modern logic". As a non-mathematician I feel that Ramsey's distinction comes from an idiosyncrasy that is not rare among mathematicians, to acknowledge nothing that cannot be written in mathematical symbols.
30. The formulation of this paradox dates from June 1901. In 1903 he dealt with it in his 'Principles of mathematics', Ch. 10, and in 1910 in his 'Principia mathematica' I, 77-83.
31. Van Heijenoort, A Source Book, 124/125 Russell's letter to Frege dd. 3.VI.1902, and 127/128 Frege's response to Russell's letter dd. 22.VI.1902.
32. John van Heijenoort s.v. 'Logical paradoxes', Enc.Phil. 5, 49.
33. Curry, Foundations 7/8.
34. First publication in the Monatshefte für Mathematik und Physik 38, 173-198, Leipzig, 1931. Translation into English in Gödel, Propositions (see Bibliography). The interested reader can easily find an English translation of Gödel's articles in Van Heijenoort, From Frege, 582-617.
35. John van Heijenoort s.v. 'Gödel's theorem'. Enc.Phil. 3, 356.

XLVIII

36. David Hilbert published his far-reaching ideas in several stages : in 1917 he gave a lecture at Zürich on 'axiomatisches Denken' (published in *Mathematische Annale*, Vol. 78 (1918). Then came 'Neubegründung der Mathematik. Erste Mitteilung', *Abhandlungen an dem mathematischen Seminar der hamburgischen Universität*, Vol. I (1922), and 'Über das Unendliche', *Mathematische Annale*, Vol. 95 (1926). For this subject one should also consult Ladrière, *Limitations* (seen Bibliography).
37. Curry, *Foundations* 123/124.
38. Nagel & Newman, Gödel's proof, 7.
39. Martel, *Dieu cet inconnu* 113.
40. Kuhn, *Structure* 79.
41. S. Carnot, *Réflexions sur la puissance du feu* (1824).
42. R. Clausius, *Über verschiedene Formen die Anwendung bequeme Formen der Hauptgleichungen der mechanischen Wärmetheorie*. *Annale der physischen Chemie* 125 (1865).
43. I borrow this example from J.D. Fast, *Materie en leven. De samenhang der natuurwetenschappen (Matter and Life. The coherence of the sciences)*. Publication of 'Natuur en techniek', 1973 2, 1972 1, p. 99.
44. See Vol. VI, Ch. III.3.
45. Pais, *Subtle* 440.
46. Quoted by Pais, *Subtle* 486.
47. A telling example of this fear is that in the summer of 1945 which was cool and very wet, farmers in the Dutch province of North-Brabant told me that this was the effect of the two nuclear bombs on Japan. They obviously feared that the cosmos itself was shaken by these bombs.
48. Voltaire, *Traité de métaphysique* (1734), Ch. VIII, *Oeuvres complètes*, seconde partie 1549.
49. Jaki, *Relevance* 137.
50. See Vol. I, Ch. II.
51. Weinberg, *Dreams* IX.
52. James Penrose in *NY Review of Books*, Oct. 21, 1993.
53. See previous note.
54. Weinberg, *Dreams* 89.
55. Weinberg, *Dreams* 275.
56. James Penrose in his review of Weinberg's book in *NY Review of Books*, Oct. 21, 1993.
57. Jaki, *Relevance* 137.
58. It is described in Weinberg, *Dreams*, Ch. XII. After the completion of this Preface I read that this project, called the 'Superconducting Super Collider' (SSC), will not be executed; on October 21, 1993 the American House of Representatives voted to cancel funding for it.

59. Kolakowski, *Met. Horror* 71.
60. Coren, *Left-Hander Syndrome* 27 : The "apparent symmetry of the human form is actually an illusion". For this reason he calls man 'a lopsided animal'.
61. I am basing what is going to follow mainly on an essay by Robert Hertz, *Pre-Eminence* (see Bibliography). The original essay was in French and is dated 1909 ('La prééminence de la main droite : étude sur la polarité religieuse', *Revue philosophique* 68 (1909). Hertz was a highly promising French sociologist whose career was cut short by his death in action on April 13, 1915.
62. There is little, or even nothing at all, about this religious polarity in two recent books on left-handedness, those of Coren, *The Left-Hander Syndrome. The Causes and Consequences of Left-Handedness*. New York (1992), and of Rik Smits, *De linkshandige picador (The Left-Handed Picador). Over links- en rechtshandigheid : feiten en verzuinsels*. Amsterdam (NL), 1993.
63. Hertz, *Pré-Ém.* 3. A telling example of this is provided by Smits, *Picador* 22. During World war II Roosevelt and Churchill paid a diplomatic visit to King Saud of Arabia. Churchill promised him an armour-clad car. This pleased the king greatly. But when the car came, he was not only disappointed but even felt insulted. For this British car had the wheel at the right side. This meant that the king would have to sit, especially during hunting parties, to the left of his driver; in Saudian etiquette this was simply inconceivable. The King never used the car.
64. See Coren, *Syndrome*, Ch. 6.
65. Coren speaks of 'psycho-neuro-astrology' (title of his Ch. 7).
66. Smits, *Picador* 201, gives the example of those pens on a chain which we find at office-windows; they are placed at the right side which make them almost unusable for the left-hander.
67. Hertz, *Pré-Ém.* 5.
68. Coren, *Syndrome* 70.
69. Hertz, *Pre-Em.* 7.
70. Hertz, *Pre-Em.* 8.
71. Vol. I, Ch. I.11.
72. Hertz, *Pre-Em.* 8.
73. Hertz, *Pre-Em.* 21.
74. I mislaid the source of this quotation.
75. Ségur, *Campagne* : "L'ordre est un effort contre la nature".
76. Musil, *Mann ohne Eig.* I, 465.
77. Lessing, *Out of the Fountain* 21.
78. Louis Menand, *NY Review of Books*, 25.VI.1992.
79. *Wisd.* 1:13-14 and 2:23-24.