

THE HISTORY OF OUR IDEAS OF TIME AND SPACE

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An Essay starting from *The Discovery of Time* by Toulmin and Goodfield. (Hutchinson 1965. 35 shillings.)

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This is the third and final volume of the series with the overall title of "Ancestry of Science". The general title is well chosen, for the authors give genealogies of the main concepts, holding fast to their general metaphysic that the morphologies of modern scientific ideas are not different from the bare ideas prefiguring them in ancient times. However, the title of their latest work is misleading since it is rather a discovery of age and of the past that their story describes. One of the major features of the story is how remarkably our attitude towards the past and towards the significance of durations has changed, considering how little our concepts have been transformed concerning the nature of time. While we can contemplate a thousand million years of geological process, we remain baffled by problems of the existential status of past and future and find it difficult to see the structure wherein psychological and chronometrical durations fall into respective place.

Fully to review this book would require a long and detailed essay. I can only give in broad outline certain criticisms of the conceptual analysis. At the outset, I must say that for anyone interested in these topics, the book is necessary reading, and good reading at that.

It is curious and significant that the Greeks (who are the usual candidates for the first scientific thinkers) found themselves cut off from the past by a sea of legends. The Egyptian priest who instructed Solon— according to the Timaeus—could well say "O Solon, Solon! You Greeks are but as children . . . you have no science that is hoary with age". The Greeks were Indo-European barbarians who picked up the fruits of the ancient Mycenaean culture and acquired ideas from Babylonia, Egypt and Persia. Being unbounded by tradition they could make progress and forget the past. But what was this "past" ? It was a past of the origins of human society and the techniques, languages and beliefs which were in play at that time in the Eastern Mediterranean and South West Asia. The traditional view was that the origins were from superhuman beings through a higher dispensation. All of that was in marked contrast to the new belief in the importance and independence of the human mind and person. Rather than study of the ancient teachings, contemplation of rational structures was the way towards understanding. One highly significant change was wrought in cosmological thought. Earlier schemes had always portrayed the action of intelligence in world creation in personal form: the world and human affairs were the "work of the gods". With the Greeks, intelligence became abstracted—as in the speculations of Anaximander on the act of *Nous* in the separation of opposites. It was the beginning of the great process whereby men were accustomed to think in terms of design in the universe with no designer or designers.

According to Toulmin and Goodfield, the original myths and legends were rationalisations and justifications of the present dispensation, from the creation of the world to recent human affairs. But our present situation is not different from this. A good example is in modern evolutionary cosmology where the present moment wherein all our experience of the total extra-terrestrial universe is interpreted in terms of evolutionary speculations which have little hope of empirical

verification. Coming closer to the scale of human history, this is interpreted to-day in terms of our view of the human situation. The authors themselves affirm almost without argument, that our history is a record of events with no integrative structure since the only agents and instruments have been human volitions and social structures within the context of the terrestrial environment. Our view of history depends on our view of human life, and if we exclude intelligences other than those of human beings history must inevitably be seen as a perpetual muddle. The earlier civilisations had a different view. The intelligence discernible in creation was a sign of an active intelligence that operated through various agencies even in human affairs. For us, to-day, we have the contrast of the necessary confusion of human history with the immutable order of nature which is an article of faith amongst all scientific thinkers. (This holds even for those who speculate that the so-called “constants” of physical manifestation are undergoing change—the change is always regular and not capricious.)

The creation myths undoubtedly nourished the speculations of the Ionian philosophers, as they, in their turn, had been developed from still earlier notions of matter and process as they were expressed in fundamental beliefs. This intellectual development has only been given at large the most cursory examination and we can hardly criticise the authors for avoiding it by a few vague introductory remarks. The pity of it is that in this alone can we encounter the origins of man’s intuitions of time as such. It may well be that different cultural streams evolved distinct notions which were later combined. We forget that for children time is not our time—a time marked out by clocks in which past, present and future stretch out in a single plane—but an experience dominated by the present feeling which in later years becomes tinged by the anguish of perpetual losing. So must it have been for early man with an untrained mind not accustomed even to entertain consistently the idea of “yesterday” and “tomorrow”. Our normal ideas of time are picked up from language and education. Through our own experience we sometimes have the intuition of the crudity of these ideas but have no language wherein to formulate and conceptualise the fleeting glimpses. Hence all such occurrences are labelled “mystical” and are withheld from intelligent examination. Our present time shows many signs of a change of attitude which may well bring a new intelligence into our ideas of time. For the moment, it is enough that we realise that our normal ideas of time are not—as Kant seemed to suggest—intuitive and immediate, but secondary habits of mind induced by external communications.

Undoubtedly, the origins of our notions of time are to be found together with the origins of language. No one has yet demonstrated how the complex linguistic structures which are our heritage could have come into existence by accidental accretions. The step to a grammar of tenses already involves the conceptual framework of time which was given form thereby. Grammatically, the early languages had a complexity far beyond what was needed for practical affairs. The excess is a sign of intellectual or “religious” interests and it is these interests which must have been the source of our notions of time. Man discovered time perhaps ten thousand years ago—in the sense of past and future continuous with the present but of a different status.

Some account of this complexity—so briefly sketched here—is essential as the need of an account of man’s discovery of time, or even of the “age of the past”. Too often, we forget that before the Greeks stands an historical period as long as that between the Greeks and ourselves, and of comparable complexity and richness. The great intellectual themes of our modern world were laid down even before the time of the Mycenaean civilisation. I hope I have made it clear that an

interpretation of this early history is unavoidable in any essay on the history of our ideas on time. The authors have chosen the easy way of describing the early civilisations' views of the past as a 'dream-time' peopled only by the shadowy rumours of unseen mythological powers.

We should also look to the East for an integral part of the story. Our notions of successive time are inextricably associated with that of causality—and it was the Gotama Buddha who, above all others, gave expression first to the doctrine of successive causation. The requirements of continuity and succession themselves lead to a definition of causal connection—if capriciousness is excluded from the universe. The Buddha's stern doctrine of inescapable suffering in the wheel of existence rested on the assumption of an iron necessity. All this amounted to a separation between the flux of happenings and the conscious intelligence that could comprehend and survey them. Put another way, the opposition of time and eternity was made a psychological reality observable for oneself. This was undoubtedly the experience in Greece and it stood behind the conflicts of the thinkers who sought to define a consistent ontology. It led to the search for an invisible order behind phenomena corresponding to the intelligence that surveyed them. This intelligence was impersonal and abstract but it gave viability to the theoretical constructions of the scientific speculators. On the other hand, the Buddha's dictum that "everything bears the seed of its own corruption" gave rise to two trends. One treated the flux as illusory—atomists or Parmenidians—the other found a place for it in terms of the intimate structure of transformations wherein all processes are integrated. This second idea probably arose in the Middle East and must have been crucial for the later notions of alchemy which inspired modern science. The time of transformations of substances is neither merely successive nor is it a complex process in eternal equilibrium. Heraclitus never gave expression to the idea which later emerged of progressive time, but alchemists of late medieval times certainly did. The important factor was that the time of transformations was the time of action and from action, coupled with directing intelligence, we have progress.

The theme of their second chapter is the a-historical cosmologies of the Greeks based on the notion of immutable rational order. As they point out, it is significant that the early Ionians came nearest to an evolutionary cosmology. The truth is that they were more in contact with notions of transformation than those which came later. Bounded by an eternal universe an easy conclusion for later thinkers was that all events were subject to exact recurrence in the "course of time". Such a view was to dominate the thought of Nietzsche in the late nineteenth century disillusioned as he was by notions of human progress and man's increasing enlightenment. The effect is to produce an ambiguity into the states of events—they are both made more shadowy, the uniqueness of "now" being lost, and also more concrete, since they do not perish irretrievably. The trouble was that even the most trivial event must return again. In other words, this was not the time of the duration of significant events, not historical time as we mean it to-day. Uncertainty is to be found as a factor admitted in atomistic thought, but there time lost all meaning in the dance of the "same".

The legacy of intellectual enigmas is represented by three continuing problems. First the problem of motion connected with successive time. Second, the "problem of the planets" or that of the structure of the universe, connected with the eternal design or pattern of the world. The third was the problem of how things were made and unmade in the world of flux and transformation. This last problem came out of Greece and into the Islamic world in the form of alchemy.

The later history of the first two of this kind of problem is well known. The problem of motion led to a rebirth of Stoic intuitions on infinitesimals and continuity on the one hand and to a concrete calculation of accelerations and motions on the other. In the struggle to answer the problem of the planets, Pythagorean intuitions of mathematical harmony and the heliocentric solar system found fruition. But in this great process, time had become quantified and made homogeneous with distance as a linear dimension. Further, eternity had been assumed as a substantial condition of celestial entities and not as a condition of all existence. Galilean observations of the “imperfections” of the moon and sun and Brahe’s discovery of changes in the super-lunary sphere made eternity itself corruptible save as a purely “spiritual” condition. But all this is neglecting the influence of the alchemical stream which taught men to find analogies between experiments in their laboratories and processes in nature.

The authors’ third chapter is devoted to the influence of the authority of the scriptures. In their account of the Jewish view of history they mention its importance for the whole of modern European thought. No other nation had the notion of a progressive and dramatic history highlighted by unique events which were divine interventions. One significant factor is not brought out—this notion creates a divorce between the course of nature and the act of God. It was still to be found in Newton’s views on God’s intervention in the unstable mechanism of the solar system. But this should answer Toulmin and Goodfield’s point that Christians should have been inclined to historical study, but in fact were not. It was not only that Christians were concerned, above all, with the future, but that what we call “historical study” would have been merely the study of the course of nature, totally alien to knowledge of the acts of God. As these acts were witnessed by the prophets, so they were competent to speak of them and even of future acts.

Yet with the arising of Christianity, new complexities of thought were made. The act of Creation had to be interpreted on a level with the rest of Greek Thought. Philo, before the birth of Christ, had, as the authors here describe, already seen that with the creation of the world, time, too, came into operation. Augustine came to the same conclusion. At the same time, there came an increasing urgency to have a truly historical view of the creation of man for this was central to understanding the nature of original sin and hence of the human condition, the human will and the meaning of the Redemption. The Gnostic heresies were mostly founded on special views of the creation of man and the fall. Later, the message of Mani came, based on an historical picture of an early catastrophe which had left mankind an enfeebled remnant of an original glory still under the sway of a perpetual war of Dark and Light forces.

We too readily assume to-day that only the “perspective of time” can give us a hold on events. Events “happen”—then we are the spectators of a frozen drama. Thus we acquire knowledge of them. On the other hand, also, events produce effects in the present and are therefore substantial. The substantial condition of the past must, however, rest not in dependence on that of the present—and certainly not on our present knowledge—but on itself if it is to be substantial at all. It follows that our hold upon events should be read more as our ability to participate in them. This requires that we are able to grasp an organisation which embraces the actions, usually, of a multitude of people within a complex situation. On these grounds, we can suggest that knowledge of past events needs complementation by an understanding only to be gained from the event itself. A simplified way of speaking about this is to say that events have a being and hence need an apprehension that is “from within” them for a true understanding. In practical terms, this can be

answered by an intentional transmission from within the event by men of an exceptional embrace of mind. This is the orthodox claim of historical scriptures and should not be dismissed as a justification for a mere process of mythologizing.

The authors are right when they say that the eschatological hopes of Christendom were a barrier to studying the past—but they bear with them the taint of a completely new understanding of time. Never before had futurity assumed such importance and been associated with definite and overwhelming progress. The struggle began of trying to understand a future which would be better and yet still within the existing universe. Augustine saw that the ordinary future corresponding to successive time could never be essentially different than the past; and so he put the Civita Dei in eternity. Yet he could not put the Second Coming in eternity for that had to be historical. So it was regarded as a divine intervention “yet to come”. This enigma was associated with problems of predestination and the role of human volition in salvation. Too often, man was portrayed as moving impotently towards a prefigured action unable to affect his own position. The church struggled to make sense of the notion that man must be able to act in a meaningful way with regard to the eschatological future. From our own age, with different impulses, we can begin to see how significant the notion of a future which was prefigured, yet uncommitted in terms of human action, was and is.

Undoubtedly, major contributions were made towards human understanding through Islam. There are two sides to Islam: its face and heart is the call to absolute monotheism and the Quran is a presentation of the act of God in creation and human life; its mind and soul is purposeful action and co-operation between man and man, and between man, angels and God. The second side was carried forward by the “inner tradition” usually associated with Sufism—though we can see in the Desert Fathers, the early founders of the great monastic traditions such as St. Benedict and in thinkers such as Origen and the heretic Valentinius other forms of the same tradition.

The great schools of Baghdad, Balkh and Samarkand were centres where studies of history and alchemy were vigorously pursued—side by side with the more abstract studies more peculiar to the Greek legacy. The more concrete approach of the Arabs led naturally to an apprehension of geological changes—an insight not followed up as the authors point out. Most important of all, however, they came to ideas of evolution. Often, they are treated of small importance since they were not correlated with our modern time-scale nor with a mechanism of selection such as to-day we assume axiomatically in biological evolution. These are important reservations but they should not deter us from appreciating the insight involved. It went far beyond the speculations of a Lucretius dreaming of a primal state wherefrom all creatures began. Evolution was a progressive transformation which represented a fundamental constituent of reality. Here was not a singular process with the universe but a creative action in a creative universe. The stages were marked by an “essence” which was a prefigured pattern of qualities, capable of entering into existence—and successive time. This notion became standard in Sufi thought—it is prominent, for example, in Rumi’s works.

The intuition of evolution was only one component in the complex structure of the growing new understanding of time. In the Sufi writings, there are clear indications of an insight into causality and progress that is original and profound. Our normal associations of causality—as the “reason” for something happening—with continuous and successive time is constantly ridiculed. But it is not

replaced by a preference for eternal stillness. Instead, there is a technical and practical concern with connections—important for significant action—transcending those under successive time. Our ordinary time is treated as belonging to a certain conditioning of our thinking and state of our minds—and it is contrasted with a dynamic reality for which we need purified and finer instruments to apprehend. This view—that time as we ordinarily know it is to be understood in terms of the structure and condition of the experiencing mind—has found a firm place in modern phenomenological thought.

For the moment, we should consider another influence. This is the alchemical tradition, which entered Europe probably in the twelfth century. The authors couple this with astrology, and they say: “The whole of astrology and alchemy could have been incorporated into the orthodox medieval picture of Nature.” But, “. . . it was the ambitions of the two sciences which kept them under a cloud. Both were suspect, as being excessively presumptuous. The astrologer was seeking to predict things that God alone could foresee, and the alchemist aimed at power over Nature of a kind reserved to the Deity”.

This is well-said, for it was those very ambitions which inspired modern science and technology and not the detached contemplation of the classical humanists. The key notions were mastery in time and transformation. Throughout, the universe was assumed to be “dense” with a complexity of intelligence, substance and action in which the key was an understanding of the invisible operations of the world. In astrology, there was far more than a prediction of material events. It dealt with the changing patterns of influence which favoured different courses of action.

Similar to it was the notion signified by the Greek word *Kairos*—found so often in the New Testament—which means “God’s time” or the “propitious time”—i.e., durations of exceptional possibility, a subject dear to the hearts of kings and conquerors!

The discovery of the immense duration of the world was an event in the human mind. It was in part a development of the power to appreciate the cumulative effect of immensely slow changes—of quite a different kind to those of human history and of the human mind itself. What were the signs of the aeons? First of all, the face of the Earth itself. People had always recognised that it had been worked upon, that immense forces had brought it into its present shape. Early myths of the exploits of Gods probably often refer to notions of the forces pictured behind the formation of the landscapes of the Earth, and these were different Gods from the multitude to whom various cultures made obeisance and who lived in trees, streams, rivers, mountains and sacred places. By the time of Albertus Magnus, the various gods had become “natural forces”. Influenced by alchemy and magic, he was one of the first in the West to express notions of great geological processes. Later, Leonardo da Vinci, whose concrete thinking made him a true man of the new era, saw the Earth as the work of primeval forces of wind and water. His apocalyptic visions express the feeling for great and violent actions—but there were also intuitions of the continuing processes at work in the terrestrial landscape. Second was the hierarchy of living creatures. It could not be doubted that there was a structure that both separated various kinds of organism into different groups and also related them. As we have said, certain Arab scientists had already had the idea of an evolutionary sequence. In the West, this never took hold. Descartes, in giving his story of creation describes a sequence from primal class to the arising of life and man. But for him such a theory was a priori unverifiable and only constructed in order to show the comprehensiveness of his scheme of scientific ideas. In the

eighteenth century, however, men such as Diderot were taking seriously the idea of cycles of chaos and relative order, life arising out of chaos through natural laws. All of this supplied the conviction that the arising of life could have been simply a result of the world being what it is. Put in other words, the design of the Universe would inevitably lead to life whatever the reducing geological and biological change to processes in successive time.

One of the results of this, which we can easily see to-day, is that accounts of biological evolution are riddled with meaningless references to “trends”, “energies” and so on which are simply vestiges of notions of the ancient Gods and elemental forces. These vestiges are not dross clinging from the past, but traces of a view of transformational changes which embody a different conception of time.

Not only conceptions of time were involved—for the awakening of the human mind to the immensity of time was bound up with changes in the appreciation of space. The transition from “the closed world” to “the infinite universe” was not simply an expansion in the kind of space previously imagined. The closed universe was a structure of regions and not a vacuity “occupied” by discrete objects differing in “attributes”.

It was implicit that a being meant a singular configuration and that the configuration of the universe was inseparable from the hierarchy of organisation which distinguished between levels of existence. The medieval universe was recognised by contemporary thinkers as a representation of this intrinsic configuration—not as a model of the sensible universe. The break came with the discovery that the actuality of the universe could be explored—as with Galileo’s telescope. From this it was possible to use the mind to give an extension of the kind of region associated with sense perception. The universe became a problem in perspective; space a mapping grid of all possible vantage points, ultimately the absolute space of Newton equivalent to the sensorium of God.

One of the results was an alienation of notions of natural forces, as unobservables, and this paralleled their alienation in the gradual discovery of extended successive time which we referred to above. Out of it came the notion of field which is a hybrid conception of co-presence and separation, an energy filling the vacuity of space in complex and changing configurations. Even this came as a peculiar return of the notion of a structure of regions in past-relativistic cosmology.

The loss of structure in space was followed by loss of coherence in time. The “time” of the new physics was in reality the perfectly reversible time of Newtonian dynamics. It is not sufficiently appreciated that this differs from the thermodynamic time associated with successiveness. Time, to be a truly independent categorisation, had to be other than the time of the quantified dimension of mechanics—quantified by Newton’s day for some three hundred years. After “space” became identified with emptiness, time became the agent of decay and, eventually also of progress. The variations were many. Time was the mediator of change wrought by substantial forces. “Given time”, that which was a possibility could become an actuality. Through time, progress came. So time became a jumble of conceptions: the condition of actualisation, the agent of corruption, a partial flow of successiveness, the creative power and even a substitute for the notion of intelligent direction in action.

Where time and space came fruitfully together was in the tradition of concrete thinking. The breakthrough into the past was made by taking stratigraphical distributions as indicative of a succession of durations, each marked by a particular kind of action. This was really a return to space

as a structure of regions, each region bearing traces of a compresence of geological and biological states. One is concerned with living structures which transcend the mapping grid of the space-time of physics.

In the eighteenth century, Immanuel Kant produced an actual theory of the evolution of the Solar system. He went even further, describing the whole universe as a scene of a continuing creative activity, arising from a centre of order out through vast reaches of time into the infinity of space. The order of the world was the work of God through time— “each finite period . . . has a proportion to the greatness of the work to be accomplished”—“Creation is not the work of a moment”. Significantly, the work of creation had a terminus within finite regions of space—the establishment of order. In many ways, Kant’s theories were a return to Ionian speculations—such as Anaximander’s *Nous* separating the opposites from the centre of the primal vortex. The futurity of the ordered worlds was closed. When Kant considered regions on a smaller scale to those of cosmology, he could not accept progress. So it was in considering the possibility of the evolution of life.

In the sphere of historical thinking the eschatological future had become watered down to social progress. The changes in cultural life present to the European consciousness perceived the notion of a gradual movement from savagery to rational society. Also, the futuristic thinking of Bacon and his intellectual companions established the idea of actual progress distinguished by advances in the comfort of people. Again, we see the signs of the times. Progress was conceived in terms of a sequence of actualities, the future a condition of possibilities for the advancement of human welfare. This aggressiveness towards the future well characterised the rising tide of thought which considered human intelligence adequate to the task of improving human life and directing progress. The seeds of revolutions initiated with the hope of accelerating progress were sown in the eighteenth century.

It is interesting to reflect that the French Revolution and the Bolshevik Revolution were inspired by a particular view of time—for so it was. To consider the future purely as a condition of possibilities for action directed by human intelligence was to assume that time had no structure to it and that there was only successive time. The previous failures of mankind to make progress were attributed to the negative forces of “superstition” and “passion”.

We, in our own time, have a peculiar fear of the future because we see it only as the outcome of what we do and we are no longer confident of the capacity of our intelligence to cope with the problems of the present moment and direct our course into the future. This is expressed in an extreme form by existentialists such as Sartre: the future is my choice but I can never attain it; the future is empty because I am free, hence I am a nothingness also. Here is the complete antithesis to earlier theological conceptions, where the future was, if anything, overfull of content and there arose problems of predestination. In the seventeenth century, the brilliant theologian Molin struggled to understand time because of these problems. How could it be that for God all acts of men were corn- present, yet for man some were only future possibilities dependent on his own volition? He failed to give expression to a kind of future that consisted of possible acts created by a higher intelligence and not actual. Such a future is future only for the human mind—not for God to whom it is purely present. The intersection of God and Man comes with commitment. The point is that the future required for a realistic account of human and divine will had to be structured: not all of a kind, a homogeneity of equivalent possibilities, but a structure of different kinds of possibility. It

is men's commitment to God's will for him that is crucial and theologically necessary. And that is independent of the course of material events which belong to successive time and which are largely pre-determined. Thus, in order to account for the interaction of God's will with that of man, there was needed a sphere which would be future for the man, yet a scene of operations present to some higher intelligence. This is a reflection of the nature of the human mind, and is inexplicable in terms of the material world apprehended by the human mind.

Interestingly enough, little attention was paid to the problem of space. In talking of heaven and hell, intellectuals recognised the metaphors used to be only figurative yet always faced the embarrassment of giving some meaning to the notion of a heavenly region. Undoubtedly, the heavenly empyrean was understood as a special place and quite concretely correlated with regions of the stars. When the infinite universe was conceived, this had no place for heaven in it being all the same place. So, increasingly, the place of heaven was conceived as "within" man himself. The notion of "within" became more and more a matter of the state of the soul. Yet the words of Christ "The kingdom of Heaven is within you" was universally addressed and could not be confounded with a special designation of souls of special spiritual achievement. The problem was really one with that of the future and time. If there is a region of operations which are non-actual, in accord with the design of God's will, then this must have integrated with it a configuration which is of a state of things which does not exist.

Here we come to the crucial point: we are dominated by the notion that all kinds of operation must be in the present. That is why the time of succession is called "creative" and why we look to the present for the validity of the past and the course of the future. We allow that space can be the receptacle of traces of the past and actions of the present but not patterns of the future. That is because, again, our "space" is the homogeneous vacuity which accommodates material things. The only possible mode of conceiving regions appropriate to a creative future is "within" our own minds—as we look upon the world, so some greater intelligence looks upon our minds. We have made little advance in even considering how ordinary space becomes apparent to us from sense experience and still little recognise that our perceptual embrace—as Kant recognised— represents the nature of our minds. Our very minds are regions of space and time brought into a whole. And not space and time only for there is organisation and also an integration of events which go beyond these. It seems no accident that eternity has always been thought of in spatial terms. We find it for example in Kant's "eternal Space"—meaning the plenum of creation. We can then consider the notion of the eternal elsewhere. What is elsewhere can be reached in the future. Now, elsewhere is two-fold: it can mean both the far-distant and the deeply hidden. Distance belongs to the space of separation—the absolute space of the physicists—and hence is that which is most alien to the patterning of eternity. So we suggest that the eternal elsewhere is the "deeply hidden" and that this has been viewed as "far distant" because of the dominance of notions of space based on sense-perception. The notion of the eternal within is that there are regions such that configuration, distribution and concentration are in conformity with an ideal or pattern. Then the creative future becomes a duration of non-actual questions totally integrated towards the achievement of this perfect state.

The notion of ideal states is just that of the eternal elsewhere. In common thought they are considered to be "not of this world" and thereby unreal. Yet "this world" is that world of distances and succession which by its nature cannot contain them: it is the world knowable by the human

mind from its sense-experience. In its own structure, however, duration and presence have a greater unity and point towards a creative realm in which only a supreme intelligence could work. Hence the notion is allied to that of a work of co-operation between minds of differing orders of intelligence, ranging perhaps from the Divine Mind to the mind of the meanest organism.

Now let us return to the past and the world spread out for our examination. It is in space that man discerns the traces of the past—but space includes not only the terrestrial landscape but also the morphology and distribution of organisms: the geography of cultures and even the arrangement of notions in the human mind. All of these made a contribution. In the case of cultures, for example, the end of the eighteenth century saw the first signs of an understanding of the common origin of the Indo-European languages. Here a morphology of languages gave evidence of a primal geographical unity of a total great culture (though even to this day the actual place remains in dispute). In the case of the ideas in the human mind, there were significant changes of attitude. The philosophers of the seventeenth and eighteenth centuries who belonged to the empiricist tradition rejected the validity of a transmission of ideas from the past. This was part of the revolt against authority which paralleled the disintegration of religious supremacy. The rejection implied the dismissal of an intelligence working in human history from which the primal notions of our cultural heritage arose. It was not simply a growing appreciation of the independence of the human mind within its own moment of duration. In denying that intelligence working in the past can enter the present, philosophers sought for an origin of ideas and usually hit upon the “external world”. The problems of this position are well known—but it is not usually recognised that they illuminate certain very important problems in understanding space. What was difficult to explain was how the interior and exterior space could be connected when their nature seemed to be quite opposed. Also, there was the supposition that what could enter or arise in the mind must come from somewhere and the somewhere was what was essentially separate from the mind, or outside. We come back again to the proposition of the eternal elsewhere that is “within”. But more—the rejection of the past was really a reflection of an inability to become connected with the structure of ideas which had entered into the Western world through a host of intermediaries. It was not simply a belief that what was past was extinguished for the ideas were present. The authors of the present volume themselves very much use the notion of a kind of eternal morphology of ideas. They leave unexplored the problems of origins simply accepting the classical starting-point of Greek philosophical thought.

An important component of the changing mood of thought in the eighteenth century was a rejection of supernatural intervention in the natural course of events. Undoubtedly, this was an immense step forward. A sustained natural order, by its nature, cannot permit interference. The catastrophic view point was a great regression and certainly far more crude than the old notions of natural powers and forces working on the Earth. Put succinctly, it assumed that the Divine Will could enter action without the help of instruments. Really, the God of such a theory was like the capricious nature gods of antiquity, and the antithesis of the view of God in Christianity.

Each explanation of course of events rests on an initial spatial arrangement. Secondly, we have to accept the importance of synchronous events for all complex processes. These are just the kind of factors which we take into account when conducting any intelligent action of our own.

We should mention here that in recent thought has arisen a quest to understand the structure of intelligent action—as in scientific work and dealing with problems of organisation—which is of quite a different kind to classical philosophical enquiry. Eventually this may lead to an appreciation of the working in the world of a great intelligence.

By the nineteenth century, three kinds of history had arisen: that of the physical earth, that of living organisms and that of human history itself. Human history was taken to begin after a primal “savage” period. Between human history and the history of life was a gap of ignorance. Darwin extended organic evolution into the history of man. Yet the two histories remained of different kinds. The same was true for geological and biological history, and we have inherited the legacy of the problem of the two gaps.

Of course, they were not absolute. The social history of the eighteenth century was a step away from the history of unique events which dominated in accounts of saints, heroes and chosen nations. Marx’s views on history collapsed the whole structures of human history to the economic level, relying upon really extraneous ideas of the dialectic and inevitable progress for a basis of duration and dynamism. Economic history of this kind joined quite naturally, in the twentieth century, with developing notions of organisms as dynamic energy systems.

In the eighteenth century, a lone figure expressed new insights into human history that were not to be given a place in general thought for almost two hundred years. Giambattista Vico, as Toulmin and Goodfield succinctly describe, saw very clearly that the fundamental suppositions of Cartesian philosophy—and hence the hope of an ultimate, precise and mathematical account of nature—could be called in question in toto. Mathematics, being the creation of our minds was necessarily transparently clear to our reason; but the world was inherently complex and contained much that the human mind could only dimly comprehend. In fact, what was most accessible to our understanding were the works of the human mind itself—and hence the history of human culture was the prime science. However, in this was a reduction of that history to the interplay of actions commensurate with the embrace of the human mind. Durations of a thousand years and great processes within them could not be considered as a whole action, but only considered in terms of successive fragments. The notion of “period” was really a compromise.

Yet, at the same time as the complexity of the world and the vast reaches of time and space became apparent, men were endowed with the faith in the power of their minds to embrace the future of society and the antiquity of man. The disillusionment which began in the nineteenth century has only just begun to transform our views into a more realistic perspective.

In between came Hegel—a philosopher unfortunately not discussed in the present work—who, in giving expression to original ideas on progress hypostasised Reason as the creative force which worked in human history and used the material of history to illustrate the thesis. It was Hegel who really gave, for the first time, a theme for human progress. Yet he was unable to make the idea comprehensible: what was the status of the future state of Reason and from where does Reason enter into the scene of human history?

We have seen all such attempts at absolute schemes come to failure while maintaining their power to inspire and hold our minds to themes which call out for a new kind of understanding. For Hegel, Nature had no real history: only that which has purpose can have a history and only Reason had

purpose. It was a purpose belonging to the “essence” of Reason—that is, it was within it. So we have again a problem of connecting two closed regions: that of Reason and that of Nature. Certainly, Man participates in both.

As teleology fell away, only man was left with purpose and the contradiction became more and more marked: mind which can entertain purpose has arisen in a world bereft of it. Yet the material for a new understanding was there. Human history has its focus in Man’s understanding of his role in creation. On the other hand, the face of the Earth changes inexorably according to the conditions first established upon it and the influences which have borne upon it from within the Earth and from without the terrestrial sphere. The intermediary is organic evolution, possible only on the earth as it is and leading eventually to mankind. In the world of life we are presented with an overwhelming complexity— but no one can doubt that it is a total structure also. In order to avoid supernatural interventions we must allow that intelligence was present at the start and has gradually entered into life itself. The process has been gradual and throughout in accordance with what was naturally possible.

However, we have a tendency to see only continuity in history. A discontinuity suggests too much an “external” interference. I return to our discussion of space and time. One can conceive that the elements of a discrete step are present, but in a different state—in the “eternal elsewhere”. One can also conceive that the sequence of operations whereby the step is to be made are prefigured in a creative future where they are as a pattern of operations and not as some already actual event. The change of state and the realisation involved in the step are possible only in terms of a structure of instruments each differently related to space and time.

The issue is simple: if we believe in progress then the path of progress cannot be ascribed to our own intelligent design. Our minds cannot reach the creative heights of the future, nor plumb the depths of the past in the vast world in which we live.

The authors still assume that the history of human affairs, involving human volitions, cannot be integrated into the total progressive cause of evolution.

.. it would be naive to suppose any longer that history represents either a single process, or one with a demonstrable direction.”

The same reasoning the authors used would seem also to apply to evolution where no single geneological line of progress is discernible, but, instead, a branching chain of great complexity in which the elements which turn out to be progressive only seem to be expected in the light of the subsequent cause of events.

We return to continuity and discontinuity in history. Toulmin and Goodfield write:

“... the idea of historical discontinuities is as unenlightening in the human realm as it is in natural science”.

“Historical understanding comes through exploiting continuities between the past and the present—matching the current patterns of relationships against what we know of earlier events”.

The flaw in the whole argument is the assumption that in history we have a succession of present moments like our own. We are only components in the action of history and our minds do not embrace the totality. Those who live in the middle of the great events can hardly hope to comprehend the significance of what is coming about. Those who come after rely on the vista of prolonged time and extended space in order to comprehend its total significance.

Continuity is assumed because there is a priori no provision made for novelty. Yet history is always marked by the unexpected! Only from an active future and an inner space can the world be transformed.

The final chapter is to be commended for dealing with the amazing extension of historical thinking to every domain of human life and nearly every sphere of scientific enquiry, even to the elements. We are near the stage when the sources of progress will be understood as inherently beyond the compass of our minds and hence to an appreciation of our role in a total cosmic history. The simpler the elements we study, the more easy is it to encompass their evolution. As we ascend the scale of complexity we reach ourselves and beings who participate to a degree in their own progress. Beyond we can represent abstractly regions and beings from which and whom the whole process originates. It is an action over and above the routine workings of nature yet enters intimately into it without violation.

The world can be intelligible in two ways: by learning how it came to its present state or by understanding what it is for. The "discovery of time" has significantly enlarged our learning of the past, but little seems to have emerged concerning our understanding of the future. There are hopeful signs, however. We need to come to an understanding of the human mind as a special kind of space-time region through which particular actions are possible. The participation of this region in the world transformation gives rise to our perspective of space and time. Through this perspective, as one of the elements, we can come to make our contribution to a total work of progress. Other regions also participate: some of a duration and extent that are far beyond us, not just quantitatively but qualitatively; some of brief and localised existence such as the life span of a microbe. In modern phenomenology, the notion of the special region of the human mind is emerging. Also, there are signs of a quest to understand structures which involve components variously related to space and time. The creative future of thought certainly resides in progress towards a comprehension of the world as a totality; containing our own minds; of an immense complexity yet organised into a structure that, through involving uncertainty and hence the unexpected, is inherently meaningful.