

# GEOLOGY

BY  
EUGEN  
KOLISKO  
M.D. Vienna

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# **GEOLOGY**

by

**Eugen Kolisko (M.D. Vienna)**

**I**

**REVIEW OF VARIOUS GEOLOGICAL THEORIES**

**II**

**THE ICE AGE AND THE EXISTENCE OF AN  
ATLANTEAN CONTINENT**

Published by  
**Kolisko Archive Publications**  
Manchester, England

Cover by G.A.M. Knapp

First Edition 1945

Reprinted 1978

Reprinted 1995

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ISBN 0 906492 01 7

## EDITORIAL

HAVING quite recently started the publication of a series of lectures given by Dr. Kolisko on Zoology, I became convinced that it would be a good idea to publish simultaneously another series of lectures dealing with Geology. The generous donation of a member of the Kolisko Archive enables me to do so and I want to express my heartfelt gratitude to the donor.

These lectures were given in Stuttgart in 1931. The shorthand notes were made by me and later transcribed, but not revised by the author himself.

The science of geology is in its infancy, and in general not popular. I have before me an interesting recent publication on this subject: "Geology for Everyman" by the late Sir Albert Charles Seward (Cambridge. At the University Press 1943). He complains in his introduction: Geology as a Hobby, that geology is "unfortunately rarely taught in schools, and young people have little chance of discovering whether or not it is likely to appeal to them." In the schools which educate according to the pedagogical principles of Rudolf Steiner, this subject is included in the curriculum. We teach the children about the "Earth as a whole" in our natural science teaching and since Dr. Kolisko was for many years engaged in teaching at the Waldorf School in Stuttgart, he naturally studied geology thoroughly and lectured about it also to the public.

Sir Albert Seward's book is from many points of views very interesting indeed and I enjoyed reading it. He is of the opinion that the "human race is one of the more recent products of evolution; though we cannot assign a date to the birth of man, we know that he is but a creature of yesterday in comparison with the whole span of geological history." It is the modern standpoint expressed here in very clear thoughts in an admirable way. Then he goes on a little later, stating, that "the more we know about the history of the earth the more we marvel, the more deeply we feel the inadequacy of a conception of the universe as the soulless product of physical and chemical processes fortuitous and uncontrolled." He wanders backwards through evolution and in his chapter The End of the Journey "he emphasises that, having reached the longest and the oldest chapter of the earth's history we are in a world where life began, a

world in its physical environment, in its relation to the forces of Nature differing but little from that in which we live, a world warmed by the sun, under the same canopy of sky by day and the same star-lit dome at night.”

In the lectures delivered by Dr. Kolisko different opinions will be expressed and explained, arriving from overwhelming material gathered in the various fields of scientific research.

Seward must end his book with the chapter “The Procession of Life” stating that “the manner of unfolding of life remains a mystery; the theory of Natural Selection, as formulated by Darwin and by Wallace, no longer finds favour with many biologists; but whether or not it will be reaffirmed or abandoned, the central conception of evolution remains as an article of belief in the naturalist’s creed.”

This is wonderfully described as the “journey’s end “ reached by modern scientific deliberations. Life must remain a mystery and Man is but a creature of yesterday. But this is not our conviction and therefore we think it justified to place before mankind another picture of earth evolution, which enables Man to find his proper place in the whole process of evolution according to the threefoldness of his being: body, soul and spirit.

L . Kolisko.

21st March, 1945.

# GEOLOGY

## I.

### REVIEW OF VARIOUS GEOLOGICAL THEORIES

THIS series of lectures deals with the evolution of our planet earth, and attempts to harmonise our present knowledge according to natural scientific investigations, with claims which arise from the depths of the soul, when we seek to justify ourselves as complete human beings in the midst of this process of world evolution. Reviewing all the various theories which have come into existence during the historical development of mankind, we find tremendous changes in the conceptions formed.

Far back in the past we find that the ideas about the evolution of our planet earth are more or less contained in the mythologies of the various nations. It is the same whether we wander back into the history of the old Oriental nations, or only as far as the Greek civilisation; everywhere we find theories of evolution, cosmologies based on the whole world conceptions of the different nations, but derived entirely from mythologies; the religious ideas of these peoples.

With the development of Christianity, the great variety of thoughts which had formerly been produced about the evolution of the universe and our planet earth, was gradually superseded by one which we find especially among the old Hebrew people: the biblical theory of evolution which tells of the creation of the world. This slowly penetrated to those people who later on formed ideas about world evolution on the basis of Christianity. The biblical story of the creation is one of many reports we find in the various civilisations. It is derived from a spiritual conception of the world.

If we try to find the essentials common to these many stories about the creation of the earth, we invariably come to the conclusion that they are all rooted in a consciousness which is completely different from our present one. Modern man wants to approach from an entirely different angle, such questions as: ‘How has our planet earth evolved?’ Or: ‘How did Man come into existence?’ Or another burning question: ‘How has life evolved?’

In the past ideas were prevalent which cannot be explained otherwise,

than that they were rooted in an entirely different human consciousness. To a certain extent these conceptions were still accepted until modern scientific research came into existence, and the modern scientific world conception was initiated. Only then a new cosmology, a new theory of world evolution, springing from different sources than the ideas of antiquity, arose.

In previous times people thought that spiritual powers took part directly in the process of world evolution. Man was always thought of as standing in the centre of this development. We find this idea everywhere. There can be no doubt that all these cosmologies, all these conceptions of earth evolution were derived from a different idea of Nature and of Man, from that we possess to-day. We modern men could never, even if we exerted our imaginations to the uttermost, form conceptions similar to those of previous times. They can only be created with another kind of consciousness .

It is possible to think of this other type of consciousness as a phase in mankind's evolution, which we have outgrown. Only in our modern times did men acquire a more scientific attitude, and from this time onwards intelligence became a human faculty. In previous times it was rather an inner wisdom that governed men.

Of course we may feel that these old world conceptions have outlived themselves, that they represent a phase in mankind's evolution which we have surpassed. In a way it is justifiable to have this conviction, because obviously the faculty which once upon a time made it possible to become inspired with these world conceptions no longer exists in human souls. The various reports of world creation are only living on through tradition. They are to be found in the religious and other documents of older civilisations, and we have accepted them from these records. It was only in the 19th century, when the natural scientific world conception was evolving, that the struggle began between it and what lived in mankind through the old traditions. Already the battle had started in the 18th century, but it developed to a much greater intensity in the 19th century.

What we have to-day as a general idea concerning world evolution and the development of living organisms, is of very recent origin; it has arisen from scientific investigations. Slowly Man's confidence in the value of the many scientific discoveries, and investigations about Man himself, and those concerning the history of earth, was so strengthened that it was hoped it would also be possible to acquire an idea about the evolution of the planet earth itself; that this new and different world conception could be opposed to the old ones. We can follow this development during the 18th and 19th centuries.

Let us consider for instance, such a well known theory as that evolved by the important philosopher Kant in his book "Die Naturgeschichte des Himmels" (Natural History of the Heavens). This theory has been more or less generally acknowledged. We must also take the researches of the great astronomer Laplace, a contemporary of Kant. These two theories were welded together into the so called Kant-Laplace theory of evolution of our planetary system. There we find the idea that our universe has arisen from conditions similar to those of a glowing gas ball. Slowly a condensation of matter took place and then a solidification. Ultimately from this revolving gas ball split off the various planets belonging to our solar system. These conceptions are imprinted into us during our education. Everybody is taught this theory. Nobody is spared hearing it. This is the obvious idea of world evolution which has arisen in modern mankind.

Little thought is given to the development of Man as a whole. How can man come into existence with all his spiritual capacities in such conditions? Humanity and all living beings came into existence much later. First we have a development which must be understood according to the laws of physics when a glowing revolving gas ball slowly condenses. By means of mechanical revolutions we have to understand the splitting off of the various planets. There is no mention of "divine powers," no mention of Man himself as a spiritual being, nor even a mention of any living organism. The evolution of the world is thought of as something non-living, penetrated however by mechanical laws; laws which can be verified by natural science, and calculated by mathematics. Kant once said, that each science contains only as much real science as it contains mathematical laws.

Since through the two great astronomers Kepler and Copernicus, a new world system had been evolved which was accessible to mathematical calculations, certain conceptions about the cosmos were available. Of course the ideas formed by Kepler, the great discoverer of the most important astronomical laws, were entirely different. He imagined the whole universe as an ensouled being of gigantic measurements. — It is a peculiar fact that all the great astronomers of the 15th and 16th centuries were deeply convinced that the whole universe was a huge living being. This part of their thought never became effective in mankind, but only the mathematical laws.

Most clearly this can be seen in Newton, who progresses to a system which can be calculated according to the laws of mathematics, where powers are active which are conceived according to a completely non-living entity. Slowly conceptions creep in which try to make it plausible, that the planet earth has

evolved from conditions which are nonliving, but which follow natural laws. Thus the evolution started from below, from matter. Then we see the formation of the theory of Kant-Laplace.

There is an interesting anecdote told about the great astronomer Laplace, which is important enough to mention here. Laplace was the court-astronomer of Napoleon. We are told that once Napoleon asked him, since he was such a great astronomer and had searched through and through the whole Universe, if he had not found the " Spirit " somewhere. Laplace assured Napoleon, that throughout all his researches he had never met the " Spirit." This is an important story, because it demonstrates to us that in Laplace there lived a personality who was deeply convinced that one must deny the existence of the spirit if it is not possible to trace it with a telescope. This personality was permeated through and through with a materialistic world conception. Still, in spite of this, he was able to make enormous discoveries in the sphere of physics.

Kant was convinced that spiritual, divine powers were also active, although he thought that it would never be possible to gain knowledge about the " object itself "; these divine powers act in our souls as our consciences, as moral faculties. This was a way to approach the Spirit. In Nature, outside, we cannot find the Spirit; there the way is barred and we must be content to start with the glowing gas ball and to end with riddles we cannot solve. How did life begin on earth? How did Man come into being on earth as an ensouled living entity? How did all the other living beings come into existence? All these questions cannot be answered with Kant's conception of Nature.

It is strange, that the mathematical—astronomical conceptions of Laplace have been welded together with those of Kant (who was deeply convinced of a spiritual activity) to produce the popular idea of the evolution of our solar system and the earth. Eventually even the church has agreed that this conception is not in contradiction with the biblical story of the Creation. The first scientists had to fight very hard for their convictions, for instance Galileo, was not recognised by the church. The Kant—Laplace theory has been introduced everywhere, it has penetrated all the civilised world and is simply there as a reality. It is a theory which tries to explain how the Universe, which is not yet considered a living entity, has arisen from below. That is exactly the opposite idea from that which existed in previous times, where spiritual, divine beings acted; where cosmologies existed in which God was thought to be active in the evolution of the world; where Man himself participated in the acts of God. Now we have another picture where the Universe is born from non-living matter, even if it is a very thin, nebulous matter in a gaseous condition. The Universe is built up from below.

At the same time something else happened. We need only go back to the 18th century. There, in various parts of the earth in mountainous regions, scientists found various objects, the so called "petrifications." These are petrified organisms which once lived and now can only be found preserved in rock formations. It is very difficult for us to understand how it was possible that in the 18th century such a spiritual personality as Voltaire did not recognise them as petrified organisms, but considered them "freaks of Nature" objects which were formed arbitrarily in matter. In the 18th century people were not inclined to say: "These are organisms which were once alive." The scientific trend of thinking did not yet penetrate into inorganic nature. The non-living entities were not yet within the reach of science. Copernicus, Kepler, Newton, made the laws of Nature accessible to mathematical calculations. It seemed impossible to extend these to living beings, which could be described, but not calculated. Linneaus appeared and he started to discriminate between the various forms in nature, which had not been so clearly distinguished before, by dividing them into species. He gave them names. There is scarcely any other personality who distributed so many names, which have remained effective. For nearly every plant or animal species we find the name, and in brackets, that this name was given by Linneaus. He is the great name-giver of living organisms. At that time the science of biology was more or less only a descriptive science. At the same time it was possible that such a phenomenon as a petrification was not taken seriously. It was a "freak" of nature. One did not think that a fossilised bone was once a part of a living being! Only at the very end of the 18th and the beginning of the 19th century the impulse arose to incorporate these findings into scientific classifications and to build up a history of living organisms from the remains which are found of previous ones. — In this way palaeontology, the science of the old (Greek: palios) previously living organisms, was formed and added to the Kant—Laplace theory of evolution. They united.

In the 19th century the theory was produced, that all living beings evolved from each other. More and more petrifications were found of both plants and animals. A plant world and animal world was collected as manifold and varied as the one which exists now-a-days. All this was added to the theory of Kant—Laplace about the evolution of the planets and earth. It was discovered that in those layers of earth which are older, which lie deeper, the more simple organisms are found; and in the upper layers, which obviously have been formed later, there are more complicated organisms. The idea arose, that at first lower forms existed; then higher, more complicated ones evolved, and eventually

man himself. In this way the conception of the evolution of Man was formed. For a long time people did not dare to include Man, and great deliberations between natural scientists and those who still remain faithful to the biblical story of the Creation, at least as far as Man is concerned, started at the end of the 19th century. They came into the open with the personality of the great zoologist Haeckel. He included Man in the evolution theory.

Violent battles were fought. There was Haeckel and the world conception which he had built up from below, starting with the mineral kingdom (palaeontology) and which now wanted to crown the whole building in attempting to let Man himself also evolve from below. Powerful opposition was raised by those who believed in the ancient traditions, rooted in age old wisdom, derived from a spiritual world conception, which was disappearing; and which, because it was fading away, could not offer much to back the traditions. It could easily be attacked by those who were standing on a solid basis, working from below upwards, slowly arriving at Man himself. In 1899 Haeckel wrote his famous book about the Riddles of the World. At the same time Dubois Reymond gave lectures about the world-riddles and declared that it would never be possible to explain life, consciousness and the spiritual activity of Man. Haeckel said: "If we are only logical in working our way from below upwards, all the problems will be solved."

There are two streams. The one originates from a world conception which cannot be united with our present natural scientific knowledge. It comes from another consciousness of mankind, and loses more and more of its original power. The other stream is represented by a very young world conception, based on experience, and on observation, creating a theory of world evolution — but powerful riddles and unsolved questions arise.

*How did Life come into existence?*

*How did consciousness come into existence?*

*How is it possible to conceive Man as a personality?*

*How can Man be thought of as evolved from Nature; for instance evolved from the animal kingdom?*

All these questions arise immediately with the new theory of evolution. There we have a picture of the human being and of the world evolution, which in reality leaves no space for Man. According to certain observations it was thought possible to calculate that at the end of the world evolution every movement would come to a stand-still, and everything would be transformed into warmth

energy and would come to an end. Death through heat, or one might as well say, death through cold, would mark the end of the evolution, where originally there had been the glowing gas ball. This theory leaves no room for Man. He is only an episode, an inexplicable episode. He comes into existence somehow, at some time, during the evolution of this glowing gas ball, and disappears again. In ancient times Man is included in the evolution. He is himself creative, active. He has always existed in those old conceptions. In the new ones one must come to the conclusion that man cannot have been in existence. He cannot have been on a glowing gas ball. He cannot have been there if we imagine that there were enormous temperatures in which no living organism, let alone a human being, could have existed. We are compelled to ask: "When did life enter at a later period? Where did Man evolve? When will he cease to exist?" We find a beginning and an end, and between there is just a little space left for Man, but no more.

Herman Grimm the great Goethe commentator, once made a very drastic statement concerning the Kant—Laplace theory. He said that a dog which walks round and round a decaying bone is a more appetising sight than the conception one has to form about the destiny of Man according to Kant—Laplace. Grimm was unable to offer any scientific argument to support his convictions. He was compelled to let the scientists have their say, and this happened to many others too. Even to-day man is so placed if he has had a scientific training — that he must confess: "If I am honestly logical in my scientific deliberations, then there is no room for human ideals, then I must capitulate at the forum of science." It is true that to-day we no longer speak that hearty straight forward language of the great materialistic scientists, of Ernst Haeckel and his opponents; it is no longer modern to say such things, it is much more convenient to bypass such contradictions in a state of sleep. But deep down in every human soul these contradictions are to be found. What do we think about the planet earth and its ultimate destruction? What do we feel about it? And how are these thoughts and feelings in contradiction with each other? Both are present in the human soul. This feeling that the position of Man is not fully justified as it is now, this strange feeling does not only arise from old traditions. It is something which was there right from the beginning, originally embedded in every human soul.

Now we have reached the point where we see the necessity to place Man really and truly into the conceptions we form about earth evolution. It will be my task to show, how it is possible to include Man in a world which fully recognises all the various facts found by natural science. This is one of the

tasks of Anthroposophy: to demonstrate how one can fit Man, the anthropos, into the world evolution, so that he really belongs to it; so that he is not only an outside observer, completely passive.

I have mentioned already that, looking back into the past of our planet earth, and imagining that at the beginning there was a revolving glowing gas ball, the question naturally arises: "When did Life start on earth, since there cannot have been any life in the beginning?" We arrive at the problem of spontaneous generation. This problem only arises, because we have formed a world conception which thinks that the Universe has evolved according to mechanical laws. There is a theory which pre-supposes life-less conditions at the beginning. Then of course we must ask: "When did Life start?"

We will stop for a moment at this question and search carefully to see how it really arose. We can compare the ideas formed in the 19th century with those added in the last 30 years. If we do this quite honestly we notice a remarkable fact. Modern natural science has, especially in the last decades, come very close to an important fact: a great part of what we are accustomed to call "dead mineral matter" and which composes the solid earth, is derived from a process of life. I will try to explain this in more detail .

### THE ORIGIN OF LIME.

For instance we may ask: "How did such a mineral as lime, calcium, come into existence? "You will soon find that the mountains built up from limestone have various origins. The mountains in the South Sea Islands have been formed from corals, that means living organisms. Great areas of the Alps, for instance the Bavarian Alps, the Wetterstein Mountains, consist of corals. We find the same thing in the Jurassic Mountains. Wherever we study the formation of Limestones we are sure to find that they have originated in the realm of living organisms; we find the shells of various animals.

If we take that seemingly pure mineralised material, Carrara Marble, which has been used by sculptors for centuries, it seems as though we have a completely dead inorganic, crystalline substance. Still there are places in this beautiful, shining white marble, containing petrified corals.

Of course lime can be dissolved in water, and after some time it re-crystallises; this lime is then a purely crystalline substance, and we may have the impression that nothing living has taken part in the formation of this mineral. Still the origin can be traced to living organisms.

*The lime formations are deposits of living beings.*

Only because there was a world conception which thought that life might be born out of the lifeless, only because one wanted to have this conviction, from necessity the question arose: "*When did life come into existence on earth?*" This is a problem to which an answer can never be found. This question is asked by a thinking which presumes that life is something secondary, not originally united with the planet earth, not primarily contained in the evolution of the whole universe. Life is not a compound\* of mineral substances. If we take some living substance, protoplasm, there are all kinds of substances contained in it, but we cannot distinguish between them. When we kill this living entity, the various substances appear. Thus we may visualise life interwoven with the whole process of earth evolution; then we acquire more living conceptions about the life on earth.

Yes, but how was it possible that life could exist in such exceedingly high temperatures? Remember that geological statements produce rather astonishing contradictions. On the one side we are told of extremely high temperatures, several thousand degrees of heat; on the other hand geological investigations discover that at the same time, during which we have to imagine glowing-liquid conditions, there were Ice-Ages as well. Just imagine these at the same times when we are told such immense temperatures were raging! This has caused many contemporary geologists not to believe any more in these enormously high temperatures. Now the idea is prevalent that these epochs alternated. There were cold and warm periods. But we must imagine that the whole earth was in a liquid condition. Then again, if it really was liquid, there must have been these high temperatures! It is necessary to have this enormous heat to have all the minerals and metals in liquid form. We have again reached an important point..

*We must presume that the substances themselves have also changed.*

\* EDITORIAL: I would like to draw attention to a very interesting recent publication in this connection, where we find the following explanations for "life": "The chief difference between living and non-living matter is the complication of living matter. Its elements are built up into molecules much bigger and more elaborate than any others known, often containing more than a thousand atoms each. And, of course, living matter has the property of self reproduction; when supplied with the right materials, it can build up matter which is not living into its own complicated pattern. Life, in fact, from the "public" standpoint, which-Professor Levy has stressed as being the only possible standpoint for science, is simply the name for the various distinctive properties of a particular group of very complex chemical compounds." These statements are contained in an essay "Man as a Relative Being" by Professor Julian Huxley in the book: Science in the Changing World (George Allen & Unwin Ltd., 1933).

There are two possibilities of liquifying matter. The one is, to apply heat until the substances melt. We need a great deal of heat, because the substances are so hardened, that they have a high melting point.

There is another way to make substances melt, and that is found in the process of life. In protoplasm all kinds of substances are dissolved, which otherwise would be solid. Digestion is such a process. In the human blood many substances are dissolved which otherwise would be solid.

Or to take another example: the formation of hydrochloric acid is achieved quite comfortably inside the human organism at a temperature of about 37°C. In Nature powerful processes are necessary to create hydrochloric acid. For instance we need the eruption of a volcano, and must allow the sea to stream into it — then hydrochloric acid is formed! This is a mighty process in outer Nature. Or we can make hydrochloric acid in the laboratory with the help of concentrated sulphuric acid. All this does not happen inside the human body. Still human beings form hydrochloric acid. In Man these processes never function as they do in the test tube in a laboratory. It needs complicated chemical processes there, and in Man it happens quite of itself. We have life-processes and not such high temperatures.

Similarly we may imagine previous geological epochs. *Everything was liquid on earth, not because it was so hot, but because the inner life was so powerful.* Only when all matter has become mineralised, does the planet earth become such a stubborn fellow that we must apply great heat to make the substances liquid again. Moreover, who can say, when everything has changed in Nature, that the various substances have not changed their characteristics as well? All this may seem absurd to you. But take for instance the metal quicksilver. It is liquid and all the other metals are solid. What causes quicksilver to be liquid in our temperature? It is because quicksilver originated in circumstances where this inner liquidity was still much stronger. Imagine for a moment that all the qualities of the substances have changed. Imagine that we do not have substances which possess the same qualities for ever, which wander through the world like Ahasver the eternal Jew, but that the substances themselves alter. In the moment substances enter the process of life, other laws begin to be valid for them. We must admit a much wider expansion of life in the whole process of evolution, and the development of natural science slowly approaches this goal. In reality we must think that the whole Universe is endowed with life, and the mineralised earth is only a deposit from a previous gigantic life process. Just as we have the human corpse when life has left, so we must see in the mineralised earth the final product of a much more living past. We come to the conception

that in the past the whole world was much more alive. We need not ask such a puzzling question as: "How has life come into being?" because this can never be answered.

We are also inclined to think that geological evolution is spread out over enormous periods of time. Millions of years, billions of years, have elapsed since the Jurassic Epoch. You find this mentioned in the geological textbooks.\* We get quite bewildered in thinking of these millions of years. But these huge numbers are also calculated only because of a certain conception scientists have formed. For instance we may say: "The River Nile deposits a certain amount of soil every year. The next year we find twice the amount, in the third year again the same amount is added and so on. "Therefore we may say: "Rivers deposit a certain amount of material in a given time. "We form a conception about the ratio in which a mountain might be deposited. We look at a mountain which originated in the Archaic Epoch and ask: "How many years will have been necessary to build up this mountain if we take as a basis the same velocity of depositing matter as we have observed on the River Nile?" It must have taken many millions of years. But it might just as well have happened that there was an eruption of a volcano, and this volcanic eruption may pile up in half an hour a much higher mountain ! This principle of taking natural laws which can be observed at present in a small period of time and applying them to calculations leading back into the past of the earth evolution, has created these enormous numbers of years.

Johannes Walther, a German geologist, goes so far as to say, that all the dates stated now-a-days by the science of geology are completely worthless. There is not a single date which is not based on a fantastic conception. This has been said by the geologist Walther ! We may as well brush aside all geological data. That is quite all right, because they all came about with the scientific method of extrapolation. A small section is really calculated and then with the result thus obtained one reckons backwards, indefinitely.

Rudolf Steiner made a drastic comparison. He pointed out, that, with the same reasoning, somebody might calculate how a human stomach changes in the course of a year. Knowing this, nobody can deny that, according to this calculation, the stomach will have undergone a quite definite alteration after 300 years. The calculation will certainly be correct — only meanwhile the

\* EDITORIAL: The recent publication of "Principles of Physical Geology." by Arthur Holmes (Professor of Geology and Mineralogy University of Edinburgh), gives as age for the Jurassic period 150 millions of years.

human being to whom this stomach belongs has long ceased to exist. This is the viewpoint of a flea; the measurement is taken from an exceedingly small entity and is then applied to indefinite periods, where it becomes completely lost. In this way the enormous number of years is created.

We find a similar phenomenon in studying the light-years, that means the amount of time it takes light to reach the planet earth. There, laws valid for the earth are transferred to events in the starry heavens, which has its own laws.

In this way we form a theory of evolution which brings us more and more riddles and questions we cannot solve. If we want to gain a real understanding of the earth evolution we must even consider that natural laws of to-day may not be the same to-morrow. We have to take into account the possibility of a change in them. The Kant—Laplace theory starts with the present day natural laws and extends them indefinitely. If this is done, if we take the laws of the deadened earth, then we can never find in it the life, or soul or spirit of the human being, because the starting point has been taken from a Nature which possesses only mineral, mechanical laws; the starting point has been taken from below. If we can realise that going back to that time of evolution when everything was in glowing-fluidity means, at the same time, that all earthly matter was more imbued with life, then we already know much more.

We go a further step back in evolution, and imagine the whole Universe as a gaseous ball; then something else must happen. Going back from the solid earth to the liquid state in evolution — life has to be added; going further back to the gaseous condition, where there is only light and air, sun and earth cannot have been separated. We arrive at conditions where we have to imagine everything diluted to such a high degree that the gaseous stage is reached. In this not only life is active, but the soul-element enters. When Man inhales and exhales, the breath makes it possible for his soul to live in him. In the animal kingdom we observe that the more intensive the breathing process of an animal is, the more highly developed is its soul life. Imagine that the whole world is put backwards into that condition where everything was in a gaseous state, then everything also becomes ensouled. We cannot only imagine a globe of gas, while wandering backwards from the solid, through the liquid, towards the gaseous; we must look forward at the same time to the progression from the living, to the ensouled condition.

We go a step still further back in evolution and reach an epoch where everything is only energy, where the warmth is spread out. The matter has become so dematerialised, so fine, that this sphere of warmth can become the carrier of spirit. Man is only a personality, an individuality, a spiritual being, because he

has a definite degree of warmth. If we had not this definite individual degree of warmth, we could not retain consciousness. Too much warmth makes us delirious, but too little may cause death from brain anaemia .

Imagining this transformation of the Universe from the solid, to the liquid, to the gaseous, to the warmth sphere, we must simultaneously visualise a process of spiritualisation. We cannot make this process of diluting only materially, without at the same time having a thorough transformation of everything. Then we also have a place for the human being — of course not for the human being as we think of him in his material existence only — but for Man as a spiritual being.

At present science has progressed so far, that scientists begin to realise that the earth is not lifeless; and they are realising that in going, backwards in evolution, we find more and more life. There will come another development in scientific research, when Man will discover that behind the conditions of life other phases can be found which are imbued with soul and spirit.

It will be possible in future to connect soul and spirit with the process of earth evolution. It will be a recognised scientific fact that the mineral earth has been separated out of a world process in which, slowly, solidification took place from the spiritual life, to the soul-life, to life, and ultimately to mineral matter. It will not be possible to think only of conditions of warmth air, water, earth without adding the human being, because these steps in evolution mean at the same time, spiritualisation, ensoulment, life. All this is included in the process of world evolution. In the old wisdom, spirit, soul and life were always included; divine powers having been active in the process of evolution. Then natural science arose, trying to build up a world conception from below, in which there is no place for Man.

It is a task of Anthroposophy to build the bridge from natural science to spiritual science. When we read Rudolf Steiner's books dealing with world evolution we find a description of how everything has evolved from the spirit and how Man was always active in this process. If we take all the results of modern natural science and continue to strive sincerely for knowledge, we shall meet with spiritual science. Where natural science and spiritual science meet, there will be the completion and reconciliation of that world conception which started in complete freedom from below (natural science) based only on human observation, with that other one which represents renewed primeval wisdom reborn in Man, as we see it represented in the great personality of Rudolf Steiner. A world conception, built up with a clairvoyant consciousness, penetrating the realms of the spirit in a new way, is united in him with a scientific world

conception. At the present time we need this union. We must keep the results of modern natural science, the scientific world-conception which every human being bears in himself, and, on the other side we need a renewal of what has been lost in mankind. But this renewal must be achieved in such a way that it can be brought into harmony with the results of modern natural science.

## II.

THE ICE AGE AND THE EXISTENCE OF AN  
ATLANTEAN CONTINENT

NATURAL science has provided us with a world conception, which has no place for the development of the human being; it does not reckon with Man. So the burning question arises: "What evolution of the Universe can we imagine which also includes the human being?" For this purpose we must picture a much greater transformation in the process of evolution than is usually done. I have tried to show that it is reasonable to think that in previous times our planet earth was much more alive, and only much later that part has been separated out which we call to-day "solid earth". We must imagine a period where not only was everything in a glowing-fluid condition, but where simultaneously everything was permeated with life. If we venture back to still earlier stages, we obviously come to conditions which can no longer be likened to our present ones. The whole evolution can only be understood when we presume an epoch in which soul — and spiritual influences were active. I have already tried to show this with many examples, and now want to make an attempt to demonstrate step by step, how it is possible to unite the scientific world conception of to-day with a spiritual world conception. We will start from the conditions we observe at present here on earth, and gradually wander backwards, trying to establish a synthesis, by bringing together the statements of natural science with the results gained through spiritual science by Rudolf Steiner, which will complete the whole.

The physical conditions we find at present on our planet earth, all the fixed natural laws and occurrences, do not go so very far back into the past. I want to point out the limits of what can be discovered historically on the one side, and what can be elucidated with the help of geology on the other. We find a very remarkable fact. The natural scientific world conception of 20 or even only 10 years ago, according to historical and geological research, shows an immense gap between the facts which can be established with the help of historical documents and the results obtained by geological investigations. Until quite recently the opinion was prevalent that historical documents reach only as far back as about 2000-3000 years B.C. Science was sceptical of everything beyond this time as far as history goes. Further back in the 19th century there was a still more

critical attitude. We remember that when *Schliemann* hoped to find historical proofs for the existence of Troy, everybody was very sceptical about the idea of reaching back to mythological epochs, as far back as the time when Homer lived. How much calumny was showered upon Schliemann, what contempt he encountered! If we remember these facts, we appreciate much more the immense gap which existed then between history and geology. History is based on documents.

We turn to geology, and point out that in the European countries, especially in the northern hemisphere, an occurrence which we call an "Ice Age" has taken place. This Ice Age, which is also called the period of the Diluvium (that is "flood" "Deluge") represents a first transformation of the physical conditions we have to-day on earth. It is the beginning of that research which leads us backwards in the natural history of our planet. This Ice Age has been dated far back by geology. The study of various textbooks reveals enormous numbers of years. Some scientists place it as far back as 30,000 years, some 50,000; others even 100,000 years. This geological epoch seems very far from us.

On the other hand historical events seem close to our present times — only 2000 or 3000 years away. Between history and geology a wide gap has opened. Into this gap it was possible to place — let me call it so for a moment — modern, "god-less" mythology of the evolution of Man out of the animal kingdom. Future humanity will perhaps be amused about this strange phase of scientific development, where an attempt has been made, to imagine the evolution of Man in this space stretching from the most recent geological happening, the Ice Age, to the limit of historical research.

To do this was in a way easier at the time when this mighty gap still existed. But strange to say, this gap is contracting slowly from both sides. This is very characteristic for present development in history and natural science. You will find that to-day we reach much further back in history; the sphere of historical research has been widened to a great extent; many events which had been considered mythological, have become historical facts, they have been found in reality. Such examples are the excavations in Egypt and Babylon, of the ancient cultures which have been found reaching farther back into the past than even Babylon; the excavations in Erech; all the other things discovered lately, the American excavations, which proved beyond doubt that there were old cultures as far back as 10,000 or maybe even 15,000 B.C. Archaeologists do not shrink from mentioning such numbers in their calculations of previous civilisations. Just think how much scorn would have been poured on a scientist who dared to make such statements perhaps 30 years back; to-day they are

considered quite obvious facts. Further and further back penetrated the historians, everywhere remains of old cultures were found; even in those epochs where mankind was presumed to have been in a very primitive cultural state. For instance, people discovered that in Europe before the Ice Age, the so called Stone Age, even if it was primitive, was by no means so uncivilised as had been imagined before. Because of the discoveries made in the various caves in Spain, at Biscay, in Ireland, in France and other countries, where strange paintings and drawings of "primitive" men were found on the walls, it became clear that this primitiveness was only external, and was at the same time united with a high culture .

The American excavations reach back into very early epochs and give the impression that there must have been mighty cultures in which Man did participate to a high degree. The discoveries penetrate further and further back into the past.

The recent researches of Professor Wirt have proved that we must allow in our calculations for an original culture, from which later on, sprang all the others which spread towards the Orient. More and more historical discoveries led to the conviction that in an epoch near the Ice Age an Atlantic cultural centre must have existed on an ancient Atlantic Continent, which is now at the bottom of the ocean. This Atlantic Continent once connected America and Europe. The researches of Froboenius, concerning the cultures of Africa, also point to the fact that these are the remains of such an ancient Atlantic cultural centre. If all these items are summarised, it becomes clear that historical reseach reaches now several thousand years further into the past. It becomes more and more certain that an original wisdom existed which spread through all these various ancient peoples. On the other hand ethnological studies, for instance the important researches of Professor Karutz show, that the fragments discovered of old cultures of primitive peoples are of very high standard. Critical investigation makes it more and more clear that the further back historical researches lead, the more spiritualised Man appears to be, and the more powerful the cultures he initiated. This fact does not allow us to imagine, that we come nearer to a more animalic state of Man.

The problem of the skeleton of primeval man will be dealt with later.

We have mentioned already that the various estimates about the Ice Age ranging from 30,000 to 100,000 years are also slowly shrinking. These epochs become shorter and shorter. We have stated the main principle of determining geological periods. It is based on the application of laws concerning present day occurrences to those of remote times. Because we observe the deposits of a river

in a given time, it is considered justifiable to multiply these deposits back into the past epochs. If we find a certain number of layers deposited, we then presume it must have taken a certain number of years. However, it may happen even to-day that a volcanic eruption creates a mountain 3000 feet high in a few hours!

Walther in his geology of Germany says, that all attempts hitherto made to calculate geological occurrences, considering the velocity of deposits, are extremely doubtful and the results gained by this method must be applied with great caution. In another publication he is still more outspoken, saying that no geological dates whatsoever can be trusted, because they have been gained with the method of extrapolation. A small portion is calculated and then extended indefinitely without any control.

We see that a short while ago the Ice Age was very remote from us, and the historical research was very compressed. At present we watch the phenomenon that the Ice Age comes nearer and the historical research reaches farther back into the past. They almost meet to-day. History reaches back to the Atlantic mankind and touches the catastrophe which led to the destruction of the Atlantic Continent. Slowly we approach a very important fact.

If we want to understand history we must study the great rhythms of world history. An idea of the utmost importance expressed by Rudolf Steiner is, that there are cultural epochs occurring in definite rhythms which determine the historical evolution. These cultural epochs are very definite, and after studying impartially the whole of world history, one simply must come across the fact that there are various steps of development, a gradual progress of cultural epochs which occur about every 2000 years. To be precise we must say, that every 2160 years such a step takes place. Historical evolution reveals these stages quite clearly. Our present cultural epoch is based on the development of natural science, on the great discoveries made also in the sphere of geography. This started in the 16th century, at the same time when the whole consciousness of mankind changed.

To find a similar development we must go back as far as the 8th century B.C. about that time when the foundation of Rome took place according to Roman history. We are told that the foundation of Rome happened in the year 753 before Christ. But Quintus Fabius Pictor, Ambassador to the Oracle of Delphi fixes another date for this event, and this is the year 747. This moment can also be determined astronomically. It happens at that time when the world conditions change through the fact that the sun progresses from one zodiacal sign into another. There is one rhythm in our world evolution, based on the fact

that the sun does not rise every year at exactly the same point of the ecliptic during the Spring Equinox. Slowly this point changes until it has moved the space of one complete zodiacal constellation. The time reckoning of old cultures was based on this fact.

We find that enormous transformations in the cultural development upon earth have happened whenever the sun has completed one twelfth of its course through the zodiac, and is about to enter another constellation. At present the sun rises in the constellation of the Fishes. During the Greek and Roman Cultures it rose at the Vernal point of the Ram. It takes 2160 years to change over from one constellation to another.

Rudolf Steiner drew our attention to this important occurrence, which connects heavenly events with earthly developments. He discovered it through spiritual investigations. To-day it is possible to mention a rich literature which deals with this remarkable phenomenon .

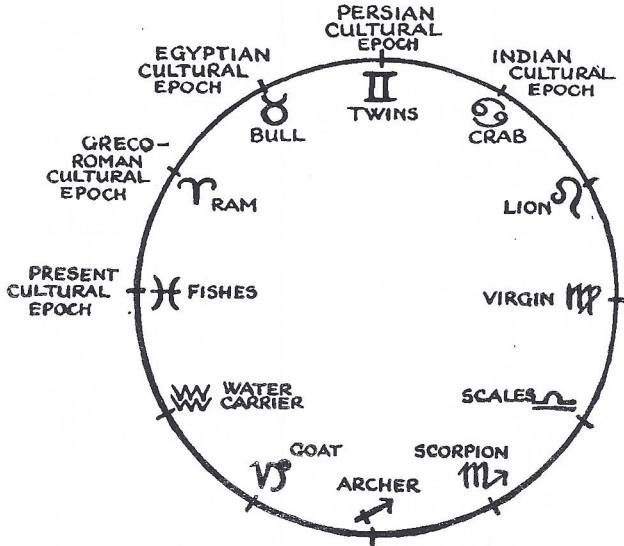
During the Egyptian Cultural Epoch, and the one before, the vernal point was in the constellation of Taurus, the Bull. We find the Bull as a representative of Egyptian Culture. Going still further back we arrive at the constellation of the Twins, characteristic for the Persian Culture. Rudolf Steiner often mentioned these facts in his lectures and gave many historical examples for his assertions.

Still further back we arrive at an epoch which fades away into remote times. Records of this period have been made much later. This is the Old Indian Epoch. This cultural epoch is to be found behind the constellation of the Twins, that is the constellation of the Crab. We shall never achieve an understanding of the great world historical connections, if we do not study these five cultural periods. World history is made in great rhythms, in steps, it is similar to the development of a human being, which also proceeds in various steps; thus the whole world history progresses in stages. These are not only historical facts, but at the same time they are reflections of cosmic events. They depict the connection of the sun to the zodiac and to the planet earth.

Summing up these twelve steps the sun must make to complete the whole circle, we arrive at the so called Plutonic Year. This is an epoch of 25,920 years, the rhythm in which the sun changes the vernal point. After 25,920 years the sun arrives at the same point from which it originally started its course through the zodiac. Now we have to distinguish on the one side the cultural epochs, and on the other we must observe the events taking place between the earth and the whole cosmos. This movement (which is recognised by the astronomers, but is not connected with the whole cultural evolution) can be visualised in this way, that the axis of the earth vibrates. Imagine a spinning top and you will observe that its axis makes a movement, describing a cone pointing upwards. In the

course of 25,920 years the axis of the earth completes such a rotating movement; owing to this the North Pole alters its position and the axis changes its place. The various cultural epochs are connected with these events.

## VERNAL POINT OF THE SUN IN



For a long time people thought about the possible causes of the last great catastrophe, the Ice-Age. Some scientists held the opinion that the Ice Age was directly connected with this movement of the earth. Besides this, we must consider that the distance between the sun and earth is not constant. Sometimes the earth is near to the sun and sometimes far away. Taking for granted that the earth moves round the sun in an ellipse, then it is obvious that when the earth reaches certain points in this course sometimes it must be nearer and sometimes further away. Now it may happen that the earth is near to the sun in Summer, than in Winter. This changes, but the change has a rhythm also, though a very slow one, about four times slower than the rhythm of the Platonic Year mentioned before; that means more than 100,000 years elapse until the same position is reached again concerning Summer and Winter. Through thousands of years the earth is near to the sun during the Summers and then it is far from

the sun during the Summers for a corresponding period. This fact causes a great change in the climatic conditions on earth. We can easily imagine that alterations in the temperatures occur. It may happen that the Summer (or the Winter) lasts for 18 days longer. If this continues for thousands of years the accumulated results produce on the one side effects of heat, on the other effects of cold. All this is combined with the movement described before; a rhythm is created where we have to calculate about 21,000 years producing enormous changes in temperature.

For a long time scientists believed it justifiable to trace back the Ice Age to the position of the earth's axis. The rotation of the axis creates the rhythm of the Platonic Year (called after Plato who was aware of it). The fact that the earth has Winter and Summer respectively in various distances from the sun, creates another, definite rhythm. Taking half of the 21,000 years mentioned before, we get 10,500 years. Calculating back we must place the Ice Age about 8,000 years B.C. This has never been taken into consideration. It was customary to reckon with much higher figures; because one always calculated with from 30,000 to 100,000 years; nobody thought that the Ice Age might be identified with this rhythm. To-day it is different. There is no reason for extending these dates so enormously, and on the other hand historical researches place mankind of the Stone Age back into the time following the Ice Age. Slowly these researches are meeting each other. To-day we may say: "We have the event of the Ice Age for which the most varied hypotheses have been formed, connected with this rhythm, according to which the Ice Age ought to have happened about 8,000 B.C.

The study of the Cultural Epochs in connection with cosmic events and occurrences which can be studied by means of natural science, continued backwards, leads us also to an Ice Age. It is just this study which can unite the conceptions about a primeval mankind on the one hand, with conceptions about cosmic connections on the other.

Various hypotheses have been formed about the Ice Age. Essentially they can be reduced to two: that such a cosmic rhythm was supposed; and that the lengthening winters created intense cold and eventually floods.

Observe for instance the difference between the southern and northern hemispheres. In the South or Tierra de Fuego the climate is much, much colder, than in the similar latitudes of the northern hemispheres. In the South or Tierra de Fuego the paramount effect is upon climate. Most probably the Ice Age is on the one hand a phenomenon of cold, on the other a phenomenon of floods. Then there was much more water in the northern hemisphere, whereas now the contrary is to be found. These floods are the same which were

experienced when the Atlantic Continent which stretched between Europe and America disappeared. All this fits together.

I want to make a few remarks about the Ice Age. For instance the question may be asked: "Since what time have Ice Ages been thought of?"

Only a few people know that Goethe was one of the first who conceived the idea of an Ice Age. He had the opportunity of observing in his native country, and also in Switzerland, blocks of stones consisting of quite a different mineral from all the rocks in the neighbourhood. Since he thought that one should look for the most obvious explanation of this strange phenomenon, he reasoned in the following manner: "How can such huge blocks of stone in northern Germany be identical with minerals in Scandinavia?" It was suggested that they might have been thrown there through volcanic eruptions. Goethe did not like this explanation; he could not understand how it was possible to arrive at an explanation so unrelated to Nature. He thought that the only force which could transport such huge blocks for long distances was a glacier, was ice. That is how Goethe formed the conceptions of previous epochs with extensive glaciers and Ice Ages which caused all those various transformations. To-day this is common knowledge. It can be verified with geological remains. There are specific signs which testify to the action of ice. For instance it is possible to find rocks with specific engravings, scratches, similar to those found at the bottom of glaciers; in the moraines there are displacements of minerals where we can trace the Ice Age. The formation of old moraines has been studied; and river valleys shaped by the action of ice; the various remains which can only be found in glaciated territory, the glacier-mills, where the stones are pressed by the glaciers and acquire a specific formation; the glacier-tables, and many other details have been studied, which make it possible to-day to judge whether in a certain territory the effects of an Ice Age are present.

We are dealing here with the last Ice Age. Of course previous ones are sometimes talked about, but for the moment we will consider only the last. We are chiefly interested in the Ice Age of the Diluvium and the great flood (Deluge) connected with it. Here we know exactly which time it includes. We must imagine that the axis of the earth was in such a position that the North Pole was displaced about 20 degrees towards the South. Then we could have exactly the position which caused the building of glaciers. The inland-ice reached over the whole North Sea as far as northern Germany. We could construct a line connecting the towns of Zittau, Dresden, Weimar, then moving towards the Harz, Dortmund, Duisberg, so far south that nothing was left from the

North Sea or Baltic Sea. All this territory we have to imagine as a big glacier.

Perhaps there was a shallow sea on the top of which ice-bergs were floating, just as we find them now in the northern latitudes. There was some inland ice, some water with ice-bergs floating in it. At intervals there were periods of warmer temperature. We can distinguish 3 or 4 such intermediate periods, with always new periods of glacier-building between. Furthermore we must imagine glaciers originating from the Alps. The Alps extended their glaciated regions much farther than to-day, to the Danube on the one side and the Italian Plain on the other. Big tongues stretched forward into France, into the Swiss Jura, so that in Europe only a small part — from the Danube to the line I have indicated before — was free from ice. In the West we must imagine ice over the British Isles, to the East over the whole of Russia, Siberia and the Himalaya regions and enormous glaciers in North America as far as the mouth of the Mississippi River. Thus we can imagine the whole of the northern hemisphere forming huge glaciers which even extend partly into the southern hemisphere; there was ice covering the northern hemisphere, with a small strip in the middle free from ice, which probably looked similar to Siberia of to-day. Tundra, dwarf oaks and birches and a strange animal world existed; those which lived before the great flood, such as the mammoth. Some of the animals have been found preserved with all the muscles and fur intact. The remains of elephants have been excavated, and other animals, like the musk-ox.

Many animals of the old world belonged to these regions, the Arctic hare, the ibex, and the reindeer, for instance. When it became warmer many of them withdrew to the North or towards the Alps. This is the reason why we find a fauna in the Alps which corresponds to that of Siberia. It has been divided after having been linked up in a small area, having come there from the North arid from the Heights. The Alps are a kind of North Pole from the vertical point of view if the heights are taken into consideration, and from the horizontal the real North-Pole entered. The whole animal world was compressed together on the strip of ice-free territory stretching from west to east, and again south of the Alps. We must imagine that the Ice-Age formed a powerful barrier, with one street running through Germany in the North and one in the South along the Mediterranean. Now we have further to imagine that the various peoples streamed through this area. The separation into the northern and southern peoples because of the Alps was then much more pronounced than to-day.

On the other side, the Atlantic Continent disappeared and thousands of years passed, during which the temperature slowly rose after the Ice Age. The Ice Age represents a gigantic natural catastrophe progressing in various steps.

Slowly it became colder. The cold changed from Winter to Winter. This has been revealed by geological facts. Then we come to climatical conditions where the warmth must have increased and we find a vegetation of palm trees; petrified palm trees in our regions, where a tropical climate must have developed, if we go further back than this Ice Age. So we have the Ice Age effects of excessive cold, a natural catastrophe brining about enormous transformations, slowly producing the conditions of to-day. After the Ice Age mankind developed as we find it at present.

This is the time when, also according to very ancient traditions, the sun entered the zodiac constellation of the Cancer and the old Indian Cultural Epoch started. Then it moved through the constellations of the Twins, Taurus, the Ram to the Fishes and we arrive at the fifth post-Atlantean Cultural Epoch. These are the names Rudolf Steiner used for them. We must imagine the whole of mankind wandering towards the East, towards the Orient. This is an explanation for the wandering of mankind towards the East, and settling there in various places. Those who went furthest, the Indians, started the cultural development: "Ex Oriente Lux," "From the East comes the Light." Then it travelled back again from the East towards the West, having originated in the West. The cultural evolution comes from the East. We must go back until the time when the vernal point of the sun happened to be in the constellation of Cancer, that means about 8000 years B.C., for the beginning of the Ice Age. The Ice Age again is connected with the great flood, and this brings us to the Atlantean Continent.

Here, too, I would like to point out a few facts discovered by natural science. Theodore Arldt has published a book about Palaeontology. This is an excellent scientific work. Theodore Arldt began to produce publications when still a young man. He wrote many essays in 1907, collecting all scientific data which prove the existence of the Atlantic Continent. Rudolf Steiner has also given a description of the Atlantic Continent from his spiritual investigations. He described the men who lived in these remote times and how this catastrophe came about. If we take these two descriptions together: on the one hand the investigations of Arldt, and on the other these of Dr. Steiner, excluding all the more romantic descriptions which can be found to-day in literature; if we take all scientific facts carefully collected by Arldt, they do speak eloquently about the existence of such catastrophes in nature. It may well be asked: "How can natural science arrive at these conclusions?" By investigating the various mineral layers in America astounding analogies can be found. Until the previous Tertiary Epoch, that means shortly before the event of the Ice Age,

there is a complete analogy between the petrified plants and animals in America and Europe. The mammals for instance completely agree, and then a transformation suddenly begins. In the Eocene Period, the beginning of the Tertiary Epoch, about 35% of all the various animals correspond, then only 31%, then only 24%, 19% and finally, shortly before the Ice Age sets in, only 5% are alike in Europe and America. There are many fossils, many petrified animals, and it can be demonstrated that certain animals occur only in Europe, in Africa on the coast lines, and in America; for instance certain species of crabs, spiders and snails. They can only be found there, they are of Atlantic origin, because we find them on both coast lines and not for instance, in Asia.

A well known plant, the heather, grows in our countries, and also in similar latitudes in America. Overwhelming material has been collected about the similarity of the plant and animal worlds before a certain time, and how they differentiated later. That proves that the land-bridge disappeared. All this material leads Arldt to the conclusion that an Atlantean Continent must have existed where to-day the Atlantic Ocean stretches. There was a South and a North Atlantean Continent and between a kind of Mediterranean Sea. Perhaps there was not a complete separation, but in the middle a small sea existed, and north and south there was the Atlantean Continent. South Atlantis must have disappeared first. The sinking of the continent happened by degrees, from south towards the north. Later on there were still land bridges through Greenland. Various incidents prove this. The migrating birds, when they return from the north, take a certain direction, making a detour seemingly without any specific reason; it would be much shorter for them to fly round in a northern direction. There are birds which migrate from Greenland to North America, taking their flight according to certain land-bridges. This is a branch of research which is held to be perfectly scientific: the birds keep to the old land bridges.

It is also possible to show that the geological structure here and in America is very similar. The coal formations pass through Germany, by way of Upper Silesia, to the Ruhr district, reappear in Belgium, England and Ireland. There the coal formation breaks up and starts again at exactly the same latitude in New Foundland. An extensive literature exists about the strange character of the bed of the Atlantic Ocean, showing many hills and dales, elevations which correspond to similar mountainous regions in Europe and which continue towards the north of South America.

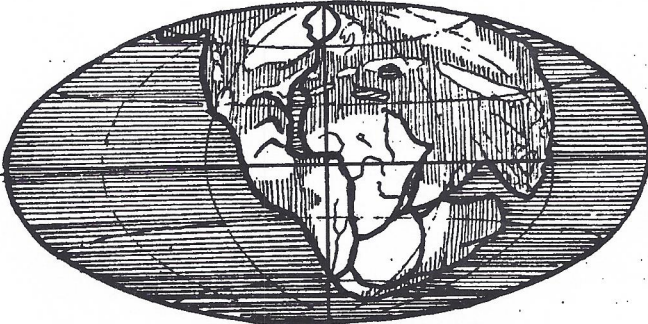
Something else may be added: the astonishing researches of Wegener had a revolutionary effect on the whole geological science. Imagine a map with Europe and Africa on the one side, and America on the other; you know that the

continents diverge. In the northern part only a short distance is between them and in the south they are widely separated. Wegener pointed out that if we make a certain displacement, having as the centre of rotation the North Pole, the continents fit into each other point by point, bay by bay. Every large peninsula in Africa fits into a bay of Northern America and vice versa. This can be demonstrated exactly: the East coast of America and the West coast of Europe fit into each other. Wegener formed the opinion that the continents underwent a displacement, and furthermore made the extraordinary statement — which at present is acknowledged nearly everywhere — that the various continents are not resting on a solid basis, but move on a liquid mass, on the fiery-fluid interior of the earth. The continents drift and we have to imagine that mountain ranges have split asunder, and a gap was formed between Africa and America. That this separation really must have happened can be demonstrated with the method of rotation mentioned before.

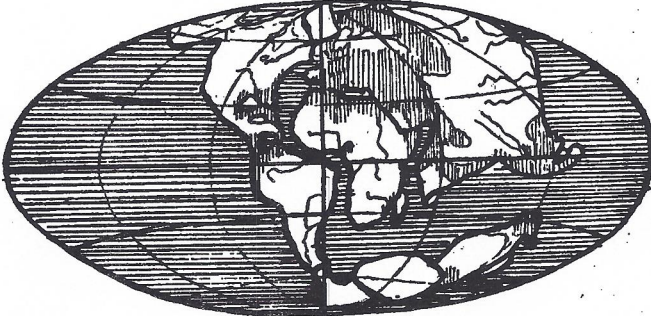
There are also those elevations at the bottom of the Atlantic Ocean, and if we bring all these facts together, with the ingenious theory of Wegener, the question arises: "What forces can cause such transformations? What forces can transport Continents?" Then we find out that such catastrophes happen at moments when the axis of the earth has a special direction towards the starry heavens. Everything is closely related to heavenly events. We will come back to this statement later in greater detail.

With Wegener's conception that the continents drift and the other one that the flood broke in — I owe this idea to Rudolf Steiner, who stressed the fact in connection with Wegener's researches — we might imagine that a whole continent sank down into the flood. If we imagine also that a continent splits in the middle, and moves, it is no longer astonishing that the coast lines fit into each other. The continent splits, the flood breaks in, and because the continents are movable, displacements happen. Wegener's theory of the Continental Drift, brought into connection with all the facts mentioned before, leads immediately to the conception that there must have been an Atlantic Continent.

On the other hand historical researches also bring us nearer and nearer to the Atlantic Continent. We can easily bring together the facts which lead to the Ice Age with those which lead to the great floods. Besides the formation of glaciers, wide spread areas in our country were under water — in the northern region of course — and not where there was the strip of land free of ice. That means there was partly ice and partly land submerged; in Siberia, for instance, a relatively short time before the Ice Age, the Ural mountains lay under the



**LATE CARBONIFEROUS**



**Eocene**



**EARLY PLEISTOCENE**

Distribution of the Continents according to Wegener's theory of Continental Drift.

the extensive flood. The northern, Scandinavian territories were not so much under water, but were covered with ice. In all those areas there was an intensive action of both cold and water. The conditions we find to-day in the southern hemisphere, were then prevalent in the northern hemisphere. The Ice Age and the submerging of the Atlantean Continent melt into one another. For a long time land-bridges seem to have existed in the North. So we come quite close to the catastrophe which stands at the end of the previous epoch of our planet earth. At the same time it marks the beginning of our historical events. From there starts the migration of peoples towards the East.

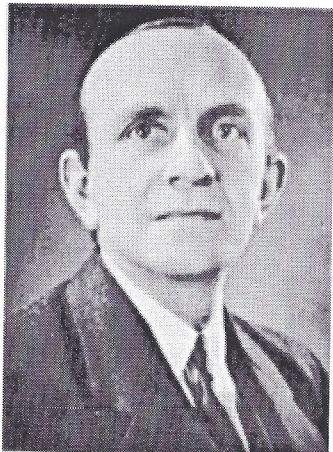
This event of the Ice Age is responsible for the more rapid development of the southern, rather than of the northern peoples, who were thrown, as it were, into a desert of ice. The difference between the Germanic peoples and those who lived in the South, arose then. This again is the reason why we have a northern and a southern stream of migrating people towards the East.

Natural science and historical research both lead us back to the catastrophe of the Ice Age and the destruction of the Atlantean Continent, from which the conditions of to-day were created.

We may ask how our planet earth looked during the Atlantean period. The time of transformation shows us the beginning of our present cultural epoch. We find the cultural epochs united with astronomical events; the spiritual evolution of mankind linked with the natural development of our earth. We can unite this with our thinking.

Thus we find, when we follow up the development of Nature and historical research, that we finally reach the starting point of cultural life and the beginning of our present earthly conditions. We come to the time of the Diluvium (Deluge), when the present earthly conditions, especially those of the northern hemisphere (which is particularly important for historical research), originated. If we look back to the Ice Age as the beginning of our present earth, then we may also say, that the laws of nature which we describe so minutely to-day, then became stable. Thinking only about the conditions during the catastrophe brings us to conditions so different from our own, that we have great difficulty in understanding them with our reasoning. That is best demonstrated by looking at all the contradictory opinions concerning these events.

In recent times the idea has become more and more prominent that an Atlantean Continent and Culture must have existed. You can read about this in Rudolf Steiner's books "Occult science" and "Our Atlantic Ancestors." Put this with the facts of to-day, and you will see a complete harmony established between natural science and spiritual science in the conceptions gained about the history of our planet earth.



## THE AUTHOR

EUGEN KOLISKO, one of Rudolf Steiner's most distinguished pupils, was educated at Vienna University as a doctor of medicine. He was also an authority on the Natural Sciences and History, and was a born teacher. As a lecturer in medicine, zoology, chemistry and history, he was much in demand, both in Europe and America. He died in London in 1939, at the age of 46.

Printed by  
Clunies-Ross Press  
Burley, Hants.

ISBN 0 906492 01 7