Where are we going?

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CHAPTER 1. THE STARS FALL

The study of the heavens reveals new difficulties and evokes unanswerable questions at every step.

Nevertheless, the efforts of the seekers have not been without great triumphs. The mathematician has analysed the celestial movements and discovered laws in the midst of apparent disorder. The chemist has revealed by the aid of new instruments the substances that keep the furnaces of the sky alight. The astronomer adds daily to the number of known stars and their interrelation.

From the tiny earth we look at ‘the stars in the rare intervals of leisure we can snatch from the frivolities that occupy our lives, and it seems to us that night after night the stars occupy the same position in relation to each other. The only apparent change is that caused by the revolution of the earth on its axis around the sun.

In fact, our constellations seem the same as those described by the shepherds on the plain of Chaldea, by the priests of Babylon, by Homer and Vergil. Civilisations pass, the stars seem to look down unmoved.

And yet the facts of science prove that this is not the case. No. There is no repose from end to end of the universe. All the worlds, suns, and planets are carried along in an unceasing race.

Why, then, it will be asked, do we not see the change? On account of the immense distance that separates us from the stars. The stars are so far away from us, and from each other, that the relative change of position would scarcely be seen by the naked eye over a period of 2000 years, A star that takes 6000 years to traverse the diameter of the moon is considered a fast moving star. Besides, very few of the fastest moving stars are visible to the naked eye, and even these are small ones.

Looking from a window over a country landscape you may see a fast express train passing in the extreme distance. You know it is travelling at a speed of 60 miles per hour. Yet a cyclist or even a pedestrian on a road much nearer you will pass from one extreme of your field of vision to the other in a shorter time than the express train. He appears to be moving faster. The further an object is from the focus of vision, the slower its apparent speed. If the moving object is travelling towards you, scarcely any motion is apparent until it comes quite near. Or, again, it may move in a combination of the former two movements, partly at a tangent and partly in the direction of the focus of vision. In this third case it can travel a considerable distance with only a very small apparent change of position.

Since the stars may be travelling in any of these ways - at a tangent, directly towards or away from us, or partly towards us and partly at a tangent - it is clear that the measurements of their actual speed and change of position is a difficult matter.

In fact, a telescope is unable to give satisfactory answers, But here again the spectroscope has been able to supply extraordinarily detailed accounts.

For Arcturus we have to take account only of its tangential motion. It is the fastest moving star we know, travelling over 20 million miles a day. It would cover the distance from the earth to the sun in four days, and in a little over 330 years would pass from the earth to the nearest star, Alpha of the Centaur.

Such speed is beyond the limit of our imagination. It cannot be explained by the simple sidereal attraction of our universe, and unless this universe possesses unknown gravitational influences, such very fast moving stars as Arcturus must be merely passing through in a straight line to continue their voyage into the depths of space.

What will interest us most is the part played by our sun in this dread drama of a million ages. It follows a mysterious course, yet one which is necessary to it for its conservation and for the preservation of life.

Suppose the sun were suddenly brought to a halt, it would undergo very considerable changes. All its planets would be instantly destroyed, and the sun would begin to fall towards the nearest star. Very, very slowly at first, in fact, only a fraction of an inch the first month, gradually faster and faster until the great collision would occur at the end of fourteen million years.

However, this is not the case. The sun is really in motion. But it is the more difficult to make out the exact plan of this motion because all the other stars are moving too. From independent calculations of astronomers over a long period of time it seems certain, however, that the sun and its attendant bodies are moving towards the constellation Hercules at a speed of about twelve miles per second. At this speed we should reach our destination, Alpha of Centaur, in about 69,000 years, that is to say, of course, if we are going there.

For, in spite of our apparent motion in that direction, it may also be that we are moving in a circle round a centre. This centre is not any particular star, but merely the centre of gravity of the entire system. It is not known where this centre is or how long it takes us to revolve round it, but there is evidence in favour of a point in the constellation of the Pleiades and a period of revolution of about 20 million years.

According to another theory, there are really two Universes or groups of stars, each with a separate centre of attraction. These stars are not separated in space by systems, but the stars of the one system move partly through the same space as that of the other system. Perhaps also these two currents travelling in different directions result from the different movements of molecules in the original nebula, so that stars still preserve the original direction of movement, which has, however, been modified by the attraction of their neighbours and of the great external ring of stars, the Milky Way.

When shall the end come? We cannot say. Certain it is that before the sun shall have come to the end of the line in which it is moving, it will have burned out, life will have left the planets, and the Solar System will be but one more of the hundreds of dead systems in the Milky Way.

CHAPTER 2. THE FUTURE OF THE SUN

The sun is the source of all the heat and life on the earth. It is the principle of all the movements that take place around us. It is the reservoir from which are drawn all the forces, steam, electricity, gunpowder, which man has learned to direct.

But what is the origin of the sun's heating power? Why does the radiation of heat continue always the same? And still more important, how long is this source of heat to continue its supply of the necessities of life to us?

In our ordinary coal fires, the heat is due to a combination of carbon and oxygen. Now, except in the sunspots, there are no combinations in the sun. The temperature is so high that the greater part of the usually associated bodies are dissolved into their elements. Nevertheless, so great is the radiation from the sun that, if nothing came to restore the heat dissipated in space, the sun would soon grow cold.

From Geology we know that the temperature of the earth has not changed substantially for 50 million years. That means that the radiation of heat from the sun must have been similarly constant during this period.

At one time it was thought that the source of radiation was to be found in showers of meteorites constantly raining in on the sun from the outer universe, the Impact of which would generate immense heat.

However, while this may be a partial cause of the sun's heat, the main cause is to be found elsewhere. As already explained, the entire universe was once an immense nebula, which gradually condensed and contracted on itself, forming the planets and the sun. In the course of condensation the temperature rises as the pressure increases, and it has been calculated that the entire heat evolved in the condensation of a nebula of the proportions of the Solar System to its present state would produce 25 million times the amount of heat radiated each year from the sun.

Contraction is still in progress in the sun. To continue its present rate of radiation this contraction should lessen the sun's diameter about 250 feet each year. Even with the most powerful telescopes it would need a thousand years' contraction to diminish the apparent size of the sun. In about seven million years the diameter of the sun will be decreased to half its size, if the rate of present radiation is to continue.

From this theory also it is clear that the heat is not infinitely great. The sun must have had a beginning and will have an end. Already the spectroscope shows it is well past its prime and it is beginning to cool down and sink into an old age of darkness and night. Here again we have yet another argument leading to the conclusion many times stressed in this series of pamphlets, that the world is not self-sufficient, that its very composition shows its beginning must have come from outside, that, in fact, it is the creation of the all-Powerful and all-Wise God.

CHAPTER 3. THE FUTURE OF THE WORLD.

The earth's surface is constantly changing. Mountains rise up in the valleys and hills become level plains, the sea advances over countries and recedes from their shores, rivers change their courses and their volume. Internal forces constantly strive to push the earth out. External forces are always at work to level it down. Everyone knows the destructive agents, rain, floods, rivers, the sea, winds, frost, earthquakes, volcanoes.

The rain falling on the high lands and descending in streams and rivers carries with it tiny particles of earth, more or less according to the quantity of water, force of fall, and constitution of river bed. Often one notices huge rocks which have been left where the softer material around was swept away. In the Colorado in Western America, there are some such 300 feet high.

A part of the material carried down finally arrives at the river mouth, where it it deposited, and forms, when the amount is great, a delta, as at the mouths of the Nile, Ganges and Mississippi.

It may be asked how long this levelling action must go on to break down all mountains on the surface of the globe, granted that the dynamic action remains constant. Roughly, three or four million years.

But other forces are at work to counteract this. Violent earthquakes show that the crust of the earth is still far from equilibrium. A scientific investigation of earthquake shocks studied over twenty years, which was published in 1937, has given some interesting conclusions about the constitution of the earth's interior. More than 16,000 minor tremors and sixty or seventy big shocks, recorded each year on delicate Seismographs, form the basis of this study. Taking the density of water at the earth's surface as standard, tables have been drawn up which show rocks of increasing density, from granite, through basalt, to olivine, forming an outside crust of the earth.

At 250 miles depth, the density is four times that of water, and the temperature of 12,000 degrees is twice that at the surface of the sun. At 1800 miles the rock ends, and we arrive at the earth's molten core of iron, which probably contains a small admixture of nickel. Its density, at the centre of the earth is about 12} times that of water, and the heat is such as not to permit any state but that of gas.

From Astronomy we reach the same conclusion. It has been made possible by Kepler and Newton to weigh the earth. Its mean density is about five times that of water. Since the mean density on the surface is only twice that of water, it must approach seven times its density lower down, more or less that of iron. The flattening of the earth round the poles leads to the same conclusion, that the materials are arranged in layers of increasing density, following a law applicable only to fluids.

Thus in another way we reach the same conclusion that the earth was originally entirely fluid.

Even now, as the interior loses heat by radiation through the crust, it shrinks, causing the crust to collapse. Thus the mountains were formed. Thus volcanoes begin. At present there is a period of comparative calm. Yet even today in some parts of the world there are terrific earthquakes, which show that the crust of the earth is still settling down. Later in the world's history another violent period will probably come, raising mountains in the vast East European plain and a new continent south of Africa.

And when the crust shall have solidified to a depth that shall render impossible periodic eruptions, the position will only have become worse. It is likely that the scarred and mutilated face of the moon shows today a planet in which the spasms of a frightful volcanic agony put an end to all life. Perhaps the same will happen one day to the earth. It may be that the scenes of the end of the world described so graphically in the Apocalypse of St. John will take place in accordance with this natural law.

CHAPTER 4. THE EARTH'S DEATH AGONY.

Long before this happens the earth will have been menaced by many dangers. First of all the cold. Even at present the intense heat of the interior does not affect the surface temperature. Still less will it do so as the crust thickens.

The study of the first living things shows that the temperature of the earth was practically uniform from the equator to the poles. Coral organisms, which can live only in warm waters, are to be found in primary deposits in all parts of the world. Vegetation, too, was the same in the most northerly latitudes as at the equator.

The difference is not to be explained by the greater heat of the sun, which has not changed considerably since the origin of life, but by the fact that the internal heat of the earth came through the crust. As this decreased the tropical vegetation gradually receded and the ice began to creep south from the poles.

The sun's heat, too, while little changed since the origin of life, has passed its maximum. The ice will continue to move slowly further and further south until one day the temperature of the earth will be the same as that of the surrounding space.

Yet before death can come by cold it shall have come by thirst. This is strange, for the seas cover the greater part of the earth, and the water they hold seems to be inexhaustible. On the other hand, the mean depth of the seas is scarcely three miles, and this is nothing in comparison with the total mass of the earth, which is constantly absorbing water. Not only is there direct absorption by the rocks, but the quantity of water is also decreased by crystallisation and chemical changes.

The thickening of the earth's crust and the decrease of internal heat will hasten the process. Only heat will be able to withdraw the water that will have been absorbed. And no heat will be available.

The day will come when the men will gather in the ocean beds to nurse the last drops of water of the dried up seas. A similar scene is to be observed on Mars today. In the midst of vast deserts a green oasis can be seen here and there. Falls of snow, especially at the poles, show there is still some water left. If there are intelligent beings on Mars, surely they must spend their days trying to save up as much of it as possible.

Tomorrow we shall have to imitate them. Heat is deserting the earth. Water is deserting it. Even the atmosphere does not remain. At an earlier period the air was much richer in carbonic acid gas and in oxygen. It daily becomes poorer, loosing its power by flying off into space and by forming chemical combinations with the elements of the earth.

Let us see the world of the future.

The atmosphere no longer exists. The rocks, minerals and salts have absorbed it. 'The water of the ocean has sunk into the porous ground. The cold of space has frozen the last drop of moisture. Harvests no longer ripen in the fields. The earth has become sterile. Grass and trees alike have disappeared.

Before the advancing relentless cold, men have fled towards the equator, where a little heat remains. At the end of some millions of years polar vegetation only has been able to withstand the cold even at the equator. Different species of animals are frozen to death in turn. The last men have buried themselves in houses deep underground. In these last catacombs their frozen bones now lie.

CHAPTER 5. IN THE PATH OF A COMET.

It may well be we shall not have to wait for this end to life on earth. A thousand other possibilities face us.

At all periods of history mysterious bodies have appeared in the sky rushing towards the earth. They are composed of a brilliant circular head, behind which a tail floats out for millions of miles. These are comets.

The comet's head is in reality composed of a myriad of small bodies, ranging from the size of grains of sand to rocks of 20 tons or more. Each is really a tiny planet moving through space at a relatively large distance from its neighbours, the whole enveloped in a light gaseous atmosphere.

But the popular appeal of the comet lies in its tail, the strange luminous pathway that stretches out behind the main body often for a hundred and fifty million miles. Strange enough, this exists only when the comet is near the sun. Light exercises a powerful repulsion on very fine dust particles, which it drives before it. Under the pressure of the sun's light rays, the fine gaseous particles are driven away millions of miles in the opposite direction.

The gases which constitute the tail of a comet, as shown by spectroscopic examination, are principally a combination of carbonic acid gas and hydrogen. Traces of cyanogen, a very highly poisonous gas, are very often to be found also, and it was at one time feared that if the earth came in contact with the tail of a comet, life would be entirely destroyed by poisonous gases.

In point of fact, this danger does not exist. The gases in a comet's tail are in a state of rarefaction greater than any that can be produced by the most perfect vacuum pump. The atmosphere of the earth is relatively so much denser that it would brush the comet's tail aside without the least part of it being absorbed. And this has actually happened on various occasions, for example, in 1861, when Halley's comet passed between us and the sun on the night of the 18th to 19th of May.

Of course, it would be very different if the head of the comet were to come in contact with the earth. There are in all hundreds of millions of these bodies in the solar system, travelling in long eclipses through space, but bound to return at one time or another to the central sun with which they move.

Imagine one of them coming at last to meet the earth. Astronomers would have announced well in advance the hour and minute of arrival and the exact point of the earth which would receive the visitor. What a scramble of the entire population to the antipodes! Motor cars, steamers, aeroplanes, all in one dread rout!

For some hours before the impact, terrified mankind would witness dreadful spectacles. Swayed by the unusual attraction, rivers and seas would leave their beds and sweep over the plains. From the mountain tops the survivors would see the yellow disc of the sun through the atmosphere of the planet. The first particles of the comet burning in the atmosphere of the earth would present a spectacle at once marvellous and terrible, A few seconds later the continents would be overwhelmed in a storm of fire. The waters of the sea would burst forth in burning steam, sweeping before them every living thing.

And those who had gathered at the other end of the earth, would they survive the earthquake? We cannot say. But surely men will think that day of the words of Our Lord: -

"Wheresoever the body shall be, there shall the eagles be gathered together. And immediately after the tribulation of those days, the sun shall be darkened, and the moon shall not give her light, and the stars shall fall from heaven, and the powers of the heavens shall be moved: and then shall

appear the sign of the Son of Man in heaven; and then shall all the tribes of the earth mourn: and they shall see the Son of Man coming in the clouds of heavens with great power and majesty. And He shall send His angels with a trumpet, and a great voice: and they shall gather together His elect, from the four winds, from the farthest parts of the heavens to the utmost bounds of them...

“Amen, I say to you, this generation shall not pass till all these things be done. Heaven and earth shall pass away, but my words shall not pass away.”

CHAPTER 6. THE STARS FALL

Suppose for one reason or another the sun were to increase vastly in splendour and cast rays twenty, thirty, a hundred times stronger than the present, into the sky.

That would be for us the beginning of an insupportable summer. At the end of one such day, the grass, corn and forests would have been consumed to ashes, men would crawl prostrate into caves and mines to shade themselves from the dreadful heat.

In a short time the ocean would have dried up. Heavy clouds, driven on by cyclonic winds, would blow up from the horizon to fall in living cataracts of water on parched ground and scrape away the surface of the earth. A perpetual storm would rage over the land, and in a fortnight cities, towns, villages, monuments, all would have been laid low. Not a stone would stand to testify to the centuries of man’s life.

Such catastrophes are of frequent occurrence in the heavens. In March, 1912, to take an example, a tiny star in the constellation of Castor and Pollux, increased in two days from the eleventh magnitude to that of the Pole Star in the Little Bear, which is of the second magnitude. The peaceful inhabitants of whatever earth may have been warmed by its rays found themselves in two days in a furnace of fire. And scarcely a year passes without a similar catastrophe being recorded by astronomers.

A sudden change of this kind may be due to a variety of causes. At times it is a collision of two stars hurtling through space. Again, it is a star which has suddenly entered into a nebula lighting up the entire rarified matter for a distance of hundred of million of miles. Usually the cause is that which produced mountains and makes the earth to quake and volcanoes to burst forth, the internal gases of the sun, compressed thousands of times more than anything on this earth, because of the greater masses of the stars, breaking forth under the influence of cold with a violence we can scarcely understand.

A heavy shower of meteoric stones, caused by the sun passing through a meteor cloud, would have equally disastrous results for us. In contact with thousands of these projectiles the external envelope of hydrogen which surrounds the sun would heat and light up brilliantly. The great increase in heat would certainly burn up the earth, if it had not already been destroyed by the showers of meteoric stones.

Finally, there is the possibility of colliding with the stars. It is true that the stars are separated from each other by immense distances, and there is every probability of our universe going on indefinitely through space without crossing the path of any of them. But it is also possible that we may come up against one of the stars we can see shining in the sky, or a dead star, burnt out for centuries, moving darkly through space.

About a year beforehand the astronomers would be able to announce the news, and all the press agencies of the world would soon be busy with stop presses and scare head lines about the dead star in our path. Three months later the monster would be visible to the naked eye. Its huge mass would be felt by the planets, and the orbit of the earth would be considerably modified. Our watches would no longer correspond with sun time, the seasons of the year would be upset, and it would be impossible to make astronomical calculations.

Three weeks before the crash the black sun will reach the orbit of Neptune. Its apparent size will then be one-third of the moon. The sun will begin to manifest alarm. Great spouts of fire will leap forth from its outer covering. The heat on the earth will increase.

A month of anxious waiting. Men live now with only one thought. Churches are thronged day and night. Death is written on every face.

The daylight takes on an unaccustomed splendour. From the mountain tops the perpetual snow flows down in melting torrents. The excessive exaporation from the sea fills the air with moist, warm fog. Rains and storms devastate entire countries. Dusk comes without darkness. All night long there is a fiery glow. On the horizon the obscure star reflects the rays of the sun. Each day its disc grows larger. Soon it is as big as the moon, and gives with the light of the moon a new glory to the night. The planets glisten in the vault of heaven, soon to be obscured by a heavy wall of cloud in which the thunders roll interminably.

Two days yet remain.

The sky is on fire here and there. Shooting stars light up the atmosphere in a stupendous display of fireworks. Bonfires blaze at every point of the vault of heaven.

And trembling mankind recalls the Apostle's word: "Men withering away from fear and expectation of what shall come upon the whole world. For the powers of heaven shall be moved."

Still one day. Astronomers have long since calculated the final minute and second. For the last time the sun, now deformed into a sausage-like mass, sinks below the horizon.

Tomorrow! Every human eye, looks on the body relentlessly approaching.

Never was night more splendid. From the sunken sun a wave of purple and red spreads its mantle across the sky, broken by a huge disc of pale silver, the wandering star from the end of space.

Morning breaks. It is yet an hour to the appointed time. Suddenly there is another jet of light in the sky. The dead star, under the unaccustomed attraction of the sun, bursts once more into flame, an from its convulsed sides the interior gases rush forth. In such a scene the collision takes place.

The matter of the sun is scattered in space as far as the orbit of Mercury. Spirals of fire burst out wider and wider. In four hours they have reached Venus, and the morning star burns like tinder. The earth is insufferably hot. The seas have burst out over the continents. Forests are blazing, towns toppling down, mountains moved from their positions. Volcanoes are bursting forth all over the earth. Men are hiding in caves and mines.

Wireless reports come to the survivors. London is destroyed, Paris, New York, Tokyo, Sydney. Then silence. A long silence, broken only by the lapping tongues of fire.

The earth continues to rotate round a new sun. And an astronomer who had been looking on from a world in Vega, would have seen nothing of the destruction of Humanity: The note in his log would read: -

“The sun, a star of the fifth magnitude, which was approaching us, has suddenly increased in splendour. Inexplicably, too, it has changed its direction and is now moving towards the Southern Cross.”

CHAPTER 7. CONCLUSION

Astronomy, Physics, Chemistry, Zoology, and Geology, all helped to roll back a little the mysterious veil and enlighten us somewhat about our origin and the destiny of the Earth.

The, solid earth has formed from unsubstantial gas. We do not know how, but have been able to make probable guesses.

Even the gas contained atoms and particles too complicated to be original. Perhaps their former state was that of ether. And even ether contains reserves of power. There must have been movement before it existed.

Yet there must have been a moment when matter first moved. This follows logically and irrefutably from all we have learned about matter. It follows a necessary law. It begins in an unstable and fluid condition, vague, diffuse, unformed. It grows and develops through life, just as human beings do, rises to its greatest perfection and sinks again into the nothingness whence it came. If it had always moved, its movements would now be finished. For matter is finite and imperfect. And all things finite end. Imperfect things depend on the perfect.

We are irresistibly drawn to the idea of a Creator, an eternal necessary Being unbounded by laws of space and time. Existing outside time, He has created time. Not confined by space, He has made all those things which occupy space.

He is the Almighty God, Creator of heaven and earth.

This is the decision of science, of Science which the ungodly had taught us to believe had done away with the necessity for God.

Then at a certain moment life appeared on the earth. Why? How? In what circumstances?

There are no scientific answers to these questions. Evolution explains nothing. It is a convenient word, but it does not bear scientific examination. In fact, the theory no longer exists. Only the word has been preserved as a sop to the ignorant and a convenient subject for pseudo-scientific popular writers.

There is only one theory that fits all the facts, the theory which we know from revelation to be true. “In the beginning God created Heaven and Earth... And God said: Let the earth bring forth the living creature in its kind. And it was so done. ...And He said: Let us make man to our own image and likeness...

“And God saw all the things that He had made, and they were very good.”

Man is on a different level from the animals. The passage of Scripture just quoted shows him made like unto God Himself. We have already seen that his soul and intellect could not have come from any of the lower animals. They must have been separately created. The pre-man of evolution has

never been discovered because he never existed. The reputed progress of the animal to consciousness and reason needs only to be stated to refute itself. Were it not for the malevolent purpose for which it was devised to destroy the faith of the simple - it might he dismissed with a laugh as a foolish old wives' tale.

Our present scientific knowledge confirms the Bible story that all men have come from one stock. Differences of race are explained by environment, climate and manner of life.

Science has no objection to offer to our belief that man was created in a more perfect state, from which he fell. Yet even in his fall he kept some traces of his primitive greatness. His religious sentiment was always to be seen in his reverence for the dead. He had ritual ceremonies. He retained belief in a supreme being.

No, the theories elaborated in armchairs about the irreligosity of primitive man have no desire to come in contact with the facts. When they are examined in the light of the science they profess, it is soon seen how flimsy and absurd they are.

Much has still to be learned about the age of the world, life and mankind. As to the origin of life, it is one of the mysteries of the Creator. We do not know if it will ever be solved. So far there is no reason to doubt the literal exactitude of the Bible narrative which suggests that God directly created life.

Science must again be content with approximations and generalisations when we ask for our position in space and the story of the system to which we belong. Still less it tells us where we are going or what the end of the world will be.

To all these points human science can find no answer and must rest content with the answer given by inspiration. It can in no way contradict our religious beliefs, which rest on solid foundations. It cannot destroy our invincible faith in Him who has deigned to speak to man by His miracles, His revelation, and His Gospel.

Away, then, with all the human science, which forgets the words of Christ: - "I am the way, the Truth and the Life."

I am the way, He tells us, and this way 1 have shown you by My entire life.

I am the Truth, for I am the Word, that is to say, the infinite intelligence who have been in the beginning in God, who have been God Himself, and through whom everything which exists has been created. Ail science comes from Me and cannot be opposed to Me.

I am the Life, that is to say, the light, of man, the light which all must follow. * This alone will conduct you to that happiness which you seek, which you can never obtain in this world.

On all these matters science has yet to pronounce and cannot object to the solution offered by religion which it is not in a position to judge. And we have seen in the past pages how powerfully it has confirmed the Bible narrative about the creation and progress of the world and of man from the beginning unto now; and even dimly to the end of the world described in the Apocalypse. And after that we have the testimony of Revelation:

"And I saw a new heaven and a new earth. For the first heaven and the first earth was passed away and the sea is no more...

“And night shall be no more: and they shall not need the light of a lamp, nor the light of the sun; for the Lord God shall enlighten them and they shall reign for ever and ever.”
