Time and Space.

By Dr. W. WYNN WESTCOTT, IX°, Supreme Magus of the S.R.I.A.

A LONG time has passed since any branch of Astronomical Science has been considered at a Convocation of the Metropolitan College. I am not an astronomer, so I must be permitted to quote somewhat largely from books and from the writings of my friend, Brother Sydney Turner Klein, F.R.A.S., yet I hope to direct your thoughts to some considerations which are related to the Aims of our Society, for they lead to conceptions of the Infinite which pertain alike to Science, Religion, and Mystery, and to the so-called Magical Arts of Clairvoyance and Clairaudience.

The words Time and Space convey but little meaning to the ordinary man of the world, but they connote World Mysteries of which we can form only vague ideas; they are conceptions which are almost, if not quite, incomprehensible, and they make us realise how restricted is the human intellect, and how small a part of universal knowledge even our most learned scientists are yet possessed of.

The Space around us in which we live and move and have our being is but a tiny spot on our globe, and is a microscopic point only in this Solar Universe. The short time occupied by the longest human life is but a span, even if it exist at all, except in our own consciousness.

In the hundred years just passed over, Modern Science has taught us much, but chiefly it has demonstrated how little we know and how little we can ever know of the Almighty works of Creation. Infinity and Eternity are words easily spoken, but when we ponder deeply on what they may mean, we are appalled at these boundless conceptions, and shrink with a vague horror from our insignificance.

Increase of knowledge has proved the World to be a globe of comparatively very small size, and shows us only as microbes upon its surface. In the Middle Ages, man thought a great deal of himself and believed this world was made for him alone, and the sun and moon to minister only to his needs.

For only 400 years have we realised that our world is not the Centre of a System, and that it is only one planet of several

moving around our Sun, and that our Great Sun is only one star of millions of other Systems.

Our forefathers were taught that a man had lived a thousand years since Jesus, and only forty centuries before His Mission; we now believe that the origin of man on Earth must be set back many tens of thousands of years, and we grant that the history of our Earth goes back millions of years.

It may be that the origin of life on our Earth has been due to germs which have come from other worlds through millions of miles of space. The origin of life *de novo* is unknown as an occurrence of to-day on Earth, and men of science assert that it never does occur, and there is no evidence before us that it ever did occur *in our world*.

If it be true that man is the present culmination of all animal evolution on Earth and that animal life has arisen from vegetative life, and all gross vegetables from microscopic germs, then the germs, microbes, or bacilli may well have come with Life from other planets perhaps now in decay and dissolution (in the state our own Moon is seen to be), and may have reached such planets from other Solar Systems, whose existence the present day man can hardly imagine; and so Life may be eternal, endless, and without beginning, and individual lives may be only points in a vast incomprehensible circle or spiral of being, of evolution, and manifestation.

Let us first consider Space. There are still some persons who are born in a village and never leave it: their idea of space must be very limited. Nowadays most of us see hundreds of miles of space, and some of us thousands. But our whole world is but a speck in space. Our Earth has a diameter of only 8000 miles, and a circumference of about 25,000 miles, and a man may now make its circuit in 100 days. It is rotating in space at about 92 millions of miles from the Sun, the centre of our System; of eight great planets, it is third nearest the Sun.

Although a dark planet itself, our Earth has its subsidiary planet, the Moon, which is only about 238,000 miles from us; it revolves around us in a little more than 27 days; its diameter is only about 2,000 miles. It shines only by reflected light, as do the other planets; it is a dead world.

Being so near us, the Moon is the most notable object away from our world, which is to be seen by us. It has at all times been a source of the greatest interest to wild and civilised man, and has been the theme of much of the world's poesy, and for a vast number of superstitions.

For ages before the modern science of Astronomy, founded on accurate observation by modern instruments, and upon mathematical computations, became notable, the study of Sun, Moon and stars was deemed of the greatest importance, alike by priests

and sages. Indeed, in many lands, and at all ages, the heavenly bodies have been deemed to influence human life, and they have often been looked upon as the visible forms of gods, who ruled, helped, and hindered men. Even after the deification of the planets ceased to be believed, the planetary influences remained as powers of vital importance.

We must remember that although we may be able to know that the surfaces of other planets must differ so much from our own, that the animals we know of could not live there, yet there may be on other worlds, beings of a different form and composition who may be even more advanced in evolution, and more able to discover the secrets of Earth, than we are able to search out the mysteries of distant stars.

Let us consider in a few words the planets which move around the Sun of our System.

The nearest planet is Mercury, a little world only 36 million miles from the Sun ; it is 3,000 miles in diameter, and has a year of only 88 days. It is so near the Sun that it is difficult for us on earth to obtain accurate information, but it has a moist atmosphere.

The next planet is Venus, which the Greeks called Hesperus when seen at evening, and Eosphorus at the dawn. Her distance from the Sun is 67 million miles, her size is only 400 miles smaller than our Earth ; she also has a damp, cloudy air and may well have vegetable and animal life, as we know these.

Next in distance from the Sun is our Earth, at 93 millions of miles.

Then next is ruddy Mars only 50 million miles further off. This planet is very easily seen by our telescopes, and its surface is found to be curiously marked with network lines ; conditions here may be very like those on Earth in many ways, as its day is about $24\frac{1}{2}$ hours, but its year is 687 days long. Oceans and land may be seen, and ice plateaux at the poles, but these are probably less extensive than those of our own globe.

There follows a vast area in which circulate a great number of small bodies, the Asteroids, which some think are fragments of a disrupted planet.

Each of the remaining planets is about twice as far from the Sun as its predecessor.

Jupiter, the largest and most glorious planet is the next world ; it is a thousand times the size of our Earth, its year is twelve earth years long, and it has seven moons to our one. It is probably still a red hot mass of matter, and over its surface move furious hurricanes.

Then follows Saturn with its seven moons and its vast rings, a grand and impressive scene, representing the old Father of the Gods, Chronos, Time. Its movement is very slow, and for that

reason the ancients associated this planet with the metal Lead ; it was also deemed by astrologers to be the bearer of all misfortunes.

If still we continue across space, the other planets grow dim, and the Sun shrinking to a luminous point, we discover at 1,300 million miles the planet Uranus with its four moons ; it is sixty times the size of our world home, and was the first planet discovered by the use of the telescope, by Herschel, in 1781.

Still deeper in space at 2,800 million miles from the Sun, Neptune was found by Leverrier in 1846. It is believed to rush around the Sun at the rate of 22,000 miles an hour, and its long year is equal to 164 of our years.

If we preserved our old powers of sight unchanged we should see from this last planet only Uranus, for Saturn and Jupiter would be no longer visible, and our Sun would appear no larger than a fixed star as seen from the earth.

We have passed to the limits of our Solar System, 3,000 millions of miles from whence we set out : can any one of us conceive such a position? Such immensity? The human mind stands aghast at such unknown depths of Space.

And yet we are but at the threshold of other Solar Systems, of number inconceivable and not to be counted.

From this planet of Neptune at the confines of the Universe we should see all around us stars as many as we see from earth, of all degrees of brilliance, and with our telescopes from Neptune we should find as many more stars brought into vision, as our telescope used here brings into view. Such numbers and such distances palsy the senses and disorder the intellect. By considerations of the velocity of light alone can we get any glimpse of knowledge of the stars beyond us. Now light is known to travel at the rate of 186,000 miles a second, that is 12 million miles in a minute. Let us count then ; from Neptune to the Sun whose faint light we see, sight takes about four hours to traverse. But Light, to reach across the vast space which still separates us from the nearest fixed star, will take not hours, nor days, nor months : for to cover the space would need long years of our time, before Light travelling with its enormous velocity could arrive at the end of the vast distance.

To speak once more of Earth, although all around our sky we see myriads of stars, yet there are certain parts where we see a misty white cloudy appearance with bright stars dotted about it. This zone is the Milky Way, and this appearance is due to the aggregation of immense numbers of distant stars as our telescopes show. This mist resolves upon myriads of myriads of stars, and it is said that our most powerful glasses may enable us to see even through this assemblage into the boundless and unfathomable abyss of Space.

Light, which needs ten years to pass from the nearest fixed stars to our eyes, would require, it is estimated, quite ten thousand years to penetrate to us from the beyond of the star-clusters of the Milky Way.

It is supposed that our Solar System is situate about the centre of this great star assemblage. It may be that the whole firmament is only a corner of a still more vast scheme. Yet there is no end, in surety, no stay for the amazed mind to rest and contemplate. Our souls can only cry out: there is no end. As my friend, the astronomer Klein, has said :—"In spite of all its striving and groping by the aid of speculative philosophy, the finite mind of man cannot attain to Infinity, nor get any nearer to where the mighty sea of time breaks in noiseless waves upon the dim shores of eternity."

Let us now turn our minds to the other World Mystery which I have named, Time: it is no more easy of comprehension. We have been concerned with Light and Sight, we will now think of Hearing and Sound, as they are related to Time. The sounds we hear are due to vibrations which affect the ears; now Sound travels in our atmosphere at about 1030 feet only per second of time. If the air is made to vibrate sixteen times in a second, the human ear will detect a musical sound; below this rate most persons would hear separate beats.

The science of Acoustics shows that the second octave is produced by doubling the number of vibrations, and the next by quadrupling. As the rate increases the sounds become sharper and sharper. At last, at about the twelfth to the fourteenth octave, the ears of men cease to hear the sounds produced.

There is reason to think that some other earth dwellers, some animals, and some insects, can detect as sounds, vibrations which we are powerless to perceive. Scientists have shown that we have need only to progress about 40 octaves before we reach those intense vibrations which are perceptible by our human eyes as Light. At first the Light would be red, then orange, yellow, green, blue, indigo, and at last violet—all within one octave more—and then the eye fails to teach our brains even of colour and light. All would be darkness to the human eye, but our human minds have succeeded in designing instruments which detect even higher vibrations, we discover rays with chemical powers, called *actinic*; these are used in our arts of photography and enable us to trace about a further half-octave. Beyond these are rays still more marvellous and difficult of perception and comprehension—they are the X and Röntgen rays of quite recent discovery.

Science further points to still more remote vibratile influences which must be investigated as electric and magnetic currents, which may also be only modes of motion. We have arrived at the limits imposed by our senses and by our brain-powers of

comprehension. We can appreciate alone a small portion of the pathway which leads down from the Creator to the finite creation.

Let us pause and realise that we have as yet only passed from common perception in one direction—upward. The downward direction also leads us to the Infinite. We started with sixteen vibrations in a second as the lowest number audible as a musical sound. Let us now think downwards, descending by octaves. The first gives eight vibrations per second, the next four, and then two; then one vibration per second. Our minds need not stop there, conceive one vibration in two seconds, then one in four, eight, and sixteen, and so on—think on—to one per thousand seconds, one per day per year, until it is possible that one vibration per thousand years might be perceptible by a Being whose senses are Infinite, and to whom the passing of ages has no objective reality.

To humble man, this way lies madness from amazement. Let us begin again with space and time. With our greatest efforts we fail to get relatively any distance from the *here* of Space and the *now* of Time.

The word *Present*, what does it mean? It is intangible, it cannot be measured or retained. Is it not a point in a wave ever rolling on? The point we call Present is hurrying along a line stretching from *past* to *future*; are we in reality any nearer one than the other?

Remember that although they are fast travellers, neither Sound nor Light are instantaneous; they take time to pass from place to place, from object to eye, from organ to ear. I will quote again a vivid illustration: Look around the room, and note the different objects it contains. Even in this small room, objects are at various distances from your eyes: you never see any object as it is, but as it was. The objects farthest from you in distance are not seen by you so recently as those nearer you. These differences are of course very minute, so minute as to be of no importance, but the fact is essential. Let us extend our view and our thoughts. Look at the Moon, it is 240,000 miles from us. We never see the Moon as it is, but as it was one second and a quarter ago.

Let us think of one of the nearest fixed stars; we see it as it was in the distant past; that star might have exploded several years ago, and yet we should still see it shining away in distant space; and we should continue to see it until the long line of light had run itself out. All around us are the appearances of blazing suns as they were ages ago, and by the aid of our telescopes we catch the light which started from stars perhaps of other firmaments thousands of years long past.

Let us reverse the consideration. Let us fancy ourselves upon the surface of the Moon, we should see the Earth as it was a

second and a quarter ago, and the Sun as it was eight minutes before.

If we landed upon Jupiter and looked towards the Earth, we should see what was occurring there an hour ago. If we went to a fixed star and looked back, we should see what was happening here in 1898. If we went to a star very far off, and had power to see, we might see upon Earth the appearance of the First Man, and all the events which have taken place from that remote time to the present would, as time rolled on, reach us in the same succession as they followed each other on our insignificant globe.

Let us come in imagination from some far off star. If we traversed the whole distance in a year, we should see all the events of the history of man, only thousands of times more quickly than they occurred.

Imagine the journey made in a month, a day, an hour, or a second of time, and all past events, from the grandest to the most trivial, will be acted in an infinitesimal portion of time. If then there be an Omnipresent Being, to Him an Eternity may be compressed into a moment, or a moment spun out to an eternity, and to such a One neither time nor space can have any objective reality, and may be said not to exist: in this mode of thought alone am I able to conceive a Being who can be Omnipresent and Omniscient.

Every event of history has been and will be for ever indelibly recorded: each incident whether occurring hundreds or thousands of years ago will be to all eternity depicted in space. May it be that in some future age man will evolve such senses as will be able to perceive such awful records?

From similar considerations it might be shown that Form also has no absolute objective existence.

Our researches into Space and Time must have a close relation to the claims of Ancient Magic which, we are told, taught the arts of Clairvoyance, Clairaudience, Thought Transmission, and Action at a distance. These should be possible if space be only a myth, an idea born of human ignorance, and if Time be only an idea, and there is only an Eternal Now.

Man's present evolution has resulted in the activity of our present senses, which are the functions of our present brains and organs—which, although they render possible the cognition of ideas, the perception of sounds, and the view of external objects, may, from another point of view be the fetters—from their imperfection—which limit our thoughts, our hearing and our sight.

For example, our organs vary in excellence; some can hear more acutely than others, and the best of us cannot hear as well as some of the lower animals. The dog's power of scent surpasses that of any man. Our sight has great variations; the light by which we perceive depends upon vibrations of Ether of various

intensities, and by these some can see colours which to others are invisible, and we know that at each end of the spectrum of sunlight, there are rays which no man can see, but which we can demonstrate by apparatus designed to show heat, penetration or photographic results.

Hence it may well be that either by birthright or by culture some men of some races may be able to see at great distances, hear sounds to other men unheard, or send to distant friends messages of words and thoughts. On these bases we may understand that in all ages among many nations, and in most priesthoods, there have been men who claimed such so-called magical powers—wonderful extensions of the senses and faculties of ordinary man, and there may have been true Magicians. Hence, too, there are even to-day some who seek, perhaps in vain, to gain these mysterious powers, which have to all of us a weird fascination.