THE

NEW ASTRONOMY

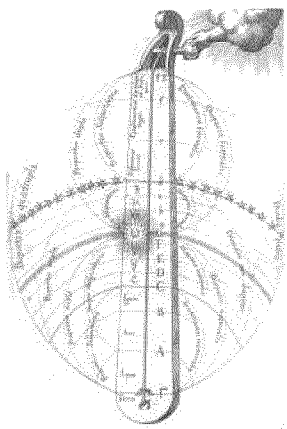
AND

COSMIC PHYSIOLOGY

An Introduction to the Subject

by

G. E. SUTCLIFFE



CONTENTS

PREFACE

DURING the last sixty years, two announcements have been made by Presidents of the British Association which aptly characterize the most striking feature of scientific controversy during the period. The first announcement was by Professor Tyndal, who told us that in matter was the power and potency of all future life. The second announcement was by Professor Crookes, who said that in life was the power and potency of all future matter. These two statements may appear contradictory, but need not be really so. They may be related like steam and the steam-engine. The steam makes manifest

the power and potency of the engine, but the engine also makes manifest the power and potency of the steam.

The main efforts of Science during the preceding century have striven to show that life is a process in physical chemistry, a mere by-product similar to the energy transformations in a chemical reaction. In this effort, Science has not succeeded, and now freely confesses its failure, as is shown by the quotation from "Nature" given in (4) on page 33. It now seeks to explain physical chemistry by life. The most noticeable illustration of this *volte-face* in the scientific attitude is given in J. S. Haldane's recent book, "The Sciences and Philosophy", which contains the Gifford Lectures for 1927-28 at the University of Glasgow; in this it is clearly laid down that the only solution of the problem of physics, as of biology, lies in the recognition of an all-pervading life.

It is through consciousness that the life of the universe can be studied, and consciousness makes the most intimate contact with Nature by the sense of vision. It is normally through the small range of electromagnetic waves known as the visible spectrum that we make this contact, but we know that the actual range of such waves is enormous compared with the narrow ribbon that affects our sight. Why should not consciousness be able to contact this wider range? We know that in the case of a wireless receiving set, contacting different wave-lengths is a matter of a small adjustment in the mechanism. Why should not consciousness be able to train itself to make adjustments in a similar way, and thus become aware of many different orders of the activities of Nature?

It is this training of consciousness to be a more efficient instrument for the explora-

tion of Nature that is the marked feature of Eastern schools. The West makes many instruments which come to the aid of consciousness but leave consciousness itself in its ordinary state of limitation. The East trains the consciousness to make adjustments, and thus become a receiving set for a greatly increased range of electromagnetic and magnetic vibrations.

Why not combine the instrumental efficiency of the West, with the consciousness efficiency of the East, and apply this combination to the great problems of physics? The instrumental efficiency gives us exact measurements, and the quantitative relationships of Nature's mechanism, whilst the consciousness efficiency gives us pictures of the actual mechanism. Surely these in combination should be mutually helpful?

The New Astronomy and Cosmic Physiology is the result of just such a

combination; we have brought to the elucidation of physical problems a consciousness trained by the methods of the East. Such a consciousness, it should be understood, is merely the ordinary waking consciousness trained to respond to a greatly increased range of electromagnetic vibrations.

Modern physics arose mainly from Astronomy, for it was by Dynamics and Newtonian Mechanics that physics became an exact science. If, therefore, physical forces have to be interpreted in terms of life, life must become capable of quantitative expression, a change which may again require an astronomical foundation. This important function of Astronomy becomes possible by the methods of research herein described, but it is first necessary to demonstrate that the phenomena disclosed by it are reliable. This can be done when a portion of the new facts are confirmed by the established forms of research. Objects

seer by the trained observer should also be found with the telescope.

The group of investigators commenced work in 1926, with an exploration of the interior of magnets, the mechanism of radiation, and the forces operating in the atom. From this it passed to Astronomy and the flow of forces within the solar system. It was only after entering the field of Astronomy that the reliability of the process could be genuinely put to the test. The developed observer may tell us much about the atom, etc., but how is he going to convince us that what he sees is true and reliable, since it is impossible to check his observations? In the case of Astronomy this difficulty does not arise, for the planetary configurations are recorded for each day, and the positions as seen by the observer can be compared with these. Such tests, frequently repeated, fully convinced the group as to reliability, but was

not sufficient to convince the public, who might prefer to regard the whole group as a fraud, rather than accept the facts which observation had disclosed.

Here again fortune favoured us, for the observer of planetary configurations could not distinguish between known and unknown planets, and when he saw a planet he gave its position, whether known or unknown. In this way we have added four additional planets to our solar system, and located their longitudes and approximate distances. For the first time, therefore, we are able to give an unmistakable test of reliability, which is not open to any of the usual objections. If the astronomer doubts our observations, our reply is, turn your telescope to a certain part of the heavens, and see for yourself.

But although the finding of new planets from its dramatic character may at first appear the most convincing evidence of

the reliability of these methods of research, it may well turn out that the other evidence presented will have the greatest effect on scientific opinion, and particularly on the opinion of the mathematical physicist. As an instance of this, we may here refer to what we have termed the "Master Key" to the solar system. This was published in part, in "Nature" (vol. 55, p. 559), as early as April, 1897, and, for a time, occupied the attention of astronomers. But it was not then in a form that could be interpreted. It is only these researches that have enabled us to complete it, and give it a definite physical meaning. This Master Key links up the sun's mass, and the masses and distances of all the planets. It is a geometrical series, having a common ratio. The numerical value of this ratio is based on the observations of astronomers as recorded in the text-books. Its truth does not depend on these researches, though

they explain it, and give it a physical meaning.

The efforts of physicists to find the links between molecular energy and the radiant energy of space have so far been unsuccessful. The secret of the process is hidden beneath this Master Key. Hence, although of astronomical origin, it is the key to one of the most fundamental processes of physics. But the physics to which it is a key is not the old physics, it is the physics which has emerged since 1925 from the new quantum mechanics, developed by Heisenberg, de Broglie, Einstein, and others. This new physics which is rapidly sweeping away old concepts is confirmed by these researches. The Master Key explains the radiation constant of Wien, and the constant of Planck. It provides an integral relationship for the fundamental mass units of Nature, such as the mass of the proton, and the mass of the electron. The proof

of this does not depend upon the reliability of our methods, the proof is open to all. It is the meaning of the relationships, and their rationale in the processes of Nature, that is disclosed by our research.

But the principle feature of the New Astronomy, as here presented, is the proof that our solar system is a living, organic whole, from which no part can be removed without destroying the whole. It therefore justifies its title of "The New Astronomy and Cosmic Physiology". At present, the sciences connected with life are not truly quantitative.

This was the condition of the physical sciences before Galileo and Newton. The physical sciences were made quantitative by means of Astronomy. It seems probable that the same science may enable the biological sciences to become quantitative.

We would point out that this is merely an introduction to a much larger work, which is in manuscript. In this introductory volume we have treated the subject briefly, and only given the most salient features. In the larger work we give a detailed account of the observations on which the new science is based, and there the life side of Nature's forces is much more prominent.

The real foundation of the science is the life which thrills through the whole of Nature. As shown in the first chapter, physicists present Nature as an ocean of death, with a modicum of life, which appears to be the result of a freak. The picture which these researches give to us is, that Nature, on the contrary, is an ocean of life.

The first few chapters are occupied with a summary of the researches of physicists during the last four years, and embody

the results deduced by Whitehead, Jeans, Eddington, and the Continental physicists, by means of the new quantum mechanics. This was necessary in order to render our observations intelligible, for to the physics of the epoch preceding 1925 they were discordant. The contact with the new physics is made mainly through the recent writings of Dr. Whitehead. The theories, as distinguished from the facts, of the older physics, are vitiated by what Dr. Whitehead terms "the Fallacy of Misplaced Concreteness". The atom, as such, is not an entity, it is one phase in a cycle of several organic transformations, as physicists have shown by their recent experiments.

The crucial difficulty in modern physics is to find the links between the molecular energy represented by kT, and the radiant energy represented by hn. When n is the frequency giving maximum energy at the temperature T, the ratio hn/kT is a constant,

which, at present, has no physical meaning. This constant, however, turns out to be one of the factors in the common ratio which links together the masses and distances of the planets, and which we have termed the Master Key to the solar system. Our researches enable us to give the above constant a physical meaning, for it is due to the vascular circulation of life-energy which makes the solar system an organic whole.

The atom is not the physical unit, it is the terminus of a line of force, the other terminus being in the body of the sun. The real physical unit is these two termini with the line of force between them. Hence, every planetary atom has a corresponding atom in the sun, between which there is a constant flux of energy connecting the two. This energy flow is in both directions, it is a completed circuit. The link between molecular energy and radiant energy is not

made at the planetary end of the line of force, but at the solar end, where all the planets are in juxtaposition. Planetary interaction, therefore, is independent of distance. It is not a question of their gravitational pull upon each other across space, but of the vascular interchange of energy within the body of the sun.

De Broglie and others have recently shown that such rays, or lines of force, consist of a sheath and a core, the velocity of the core being in general greater than the sheath, and the characteristics of these is popularly described by Eddington in his latest book, "The Nature of the Physical World". The researches of the group disclose the fact that a line of force is constituted like an Atlantic cable, in which current passes along the sheath and returns along the core, or vice versa. These lines of force are the veins and arteries for the

flowing life of Nature, and constitute the basis of Cosmic Physiology, which appears to us to be the real key to the problems which now occupy the minds of physicists.

THE NEW ASTRONOMY AND COSMIC PHYSIOLOGY

CHAPTER I

OUR UNIVERSE OF DEATH

(1) If we accept the latest available conclusions of Science, its origin and history are briefly as follows :— After an eternity of time had elapsed, the expanse of space, a portion of which appears to us as the vault of Heaven, was filled with a nebulous mass of matter, consisting probably of the lighter elements known to chemistry, upon which the force of gravity began to operate. One effect of this was to cause irregular groupings of this nebulous mass

which eventually resulted in the system of stars which is disclosed by our telescopes.

These stars also formed themselves into groups, and one of these groups, consisting of many millions of stars, is situated about 60,000 light-years from the centre of the sidereal system (Shapley, "Nature", vol. 122, p. 482, Sept. 29th, 1928).

One of the stars in this large group is worthy of our notice. It is quite ordinary in its general characteristics, but in one respect "it is a freak" (Eddington, "Harper's Magazine", vol. 157, p. 574, October, 1928). "The researches of Sir J. B. Jeans lead to the conclusion that rotational break-up produces a double star and never a system of planets." But we know this particular solar system has developed a system of planets, because we happen to live in it.

(2) The solar system in which we live, therefore, is somewhat unique. Roughly, it began its existence about five millions

of millions of years ago, and it is only a few million years back that human beings began to exist on one of the planets, the earth (ib. p. 570). There is just a possibility that life may have developed on two other planets, Venus and Mars, though, in the case of Venus, this is doubtful (ib. p. 571).

Now, two important conclusions may be drawn from the history of the universe as above set forth. One conclusion is that the universe normally consists of a vast quantity of dead matter, and the other the converse of this, that the association of life and matter is exceptional, and more or less an accident, or in the nature of a freak.

CHAPTER II

OUR UNIVERSE OF LIFE

(3) The preceding history of the universe, which to some will be regarded as a *reductio ad absurdum*, contains a certain element of unfairness, and probably the physicists of eminence who would endorse it would be few. It seemed desirable in the first instance, however, to present it in its crudest and most unqualified form, in order to accentuate the points of difference between the conclusions of pure physics, and those we shall attempt to deduce from this new presentation of Cosmic Physiology. In Astronomy, the life element is subordinate and vanishingly small; in Cosmic Physiology the life

element is dominant and all-pervading. Sir J. B. Jeans regards the universe as having a beginning, and thinks there is no reason against supposing that the whole universe may have been created, or come into being, at the same instant ("Astronomy and Cosmogony", p. 373). Thus, the possibility of the existence of a Creator is not excluded, one attribute of Whom, presumably, is that of being the source of life. The real crux of the difficulty against this hypothesis arose from the fact that up to 1927, the physicist considered that the material forces of Nature were determinate. That is to say, given the forces, then from the laws of physics the future results of the working out of these forces could be predicted. When life is present, this is not the case. The physical forces operating on a dog could possibly be defined, but we could not determinate from these when the dog would wag its tail, for this event would be governed, not

by physical, but by life, forces. But in 1927 it was found that the result of forces on individual atoms, or groups of atoms, was indeterminate ("The Nature of the Physical World", Eddington, pp. 220 and 294). Hence, in the case of the atom, we were placed in the same difficulty as in the wagging of a dog's tail. In other words, in 1927 the epoch-making discovery was made that there was a hiatus in Nature which could possibly be filled by life forces. We had made room for the Divine Immanence in the physical universe. Henceforth, this universe need be no longer worked by physical forces alone, but by a combination of physical and living forces. In place of Astronomy, we had opened the door to Cosmic Physiology. Astronomy may be defined as the laws of the interactions of the forces of the universe, and Cosmic Physiology as the laws of the interactions of the life-forces of the universe.

Astronomy is a body, Cosmic Physiology a body and a soul.

(4) The fundamental postulate previously indicated, that there is no such thing as dead matter, and that in fact every atom of matter under all conditions contains an element of life, is not so contrary to present scientific views as may at first be supposed. Men of science for many decades have attempted to distinguish between living and dead matter, but so far without success. This is well set forth in a recent article in "Nature", by Professor A. E. Boycott, F.R.S. (vol. 123, p. 91, Jan. 19th, 1929), where he suggests that "the vitalistic controversy in anything like the form it has taken during the last forty years is out of date, that instead of emphasizing the difference between live and dead things we should make as much as we can of their similarities, and that instead of dividing the world into two distinct categories we

should regard it as being made up of one series of units with properties which differ more in degree than in kind. . . . While we have been waiting for life to be explained in terms of chemistry and physics, a good deal has been done towards stating chemistry and physics in terms of life. Of course, no 'explanation' of either live or dead matter has been given; the behaviour of an atom is just as mysterious as the behaviour of a wasp. . . . But it is something of a comfort if we can believe that at bottom they both behave in much the same way."