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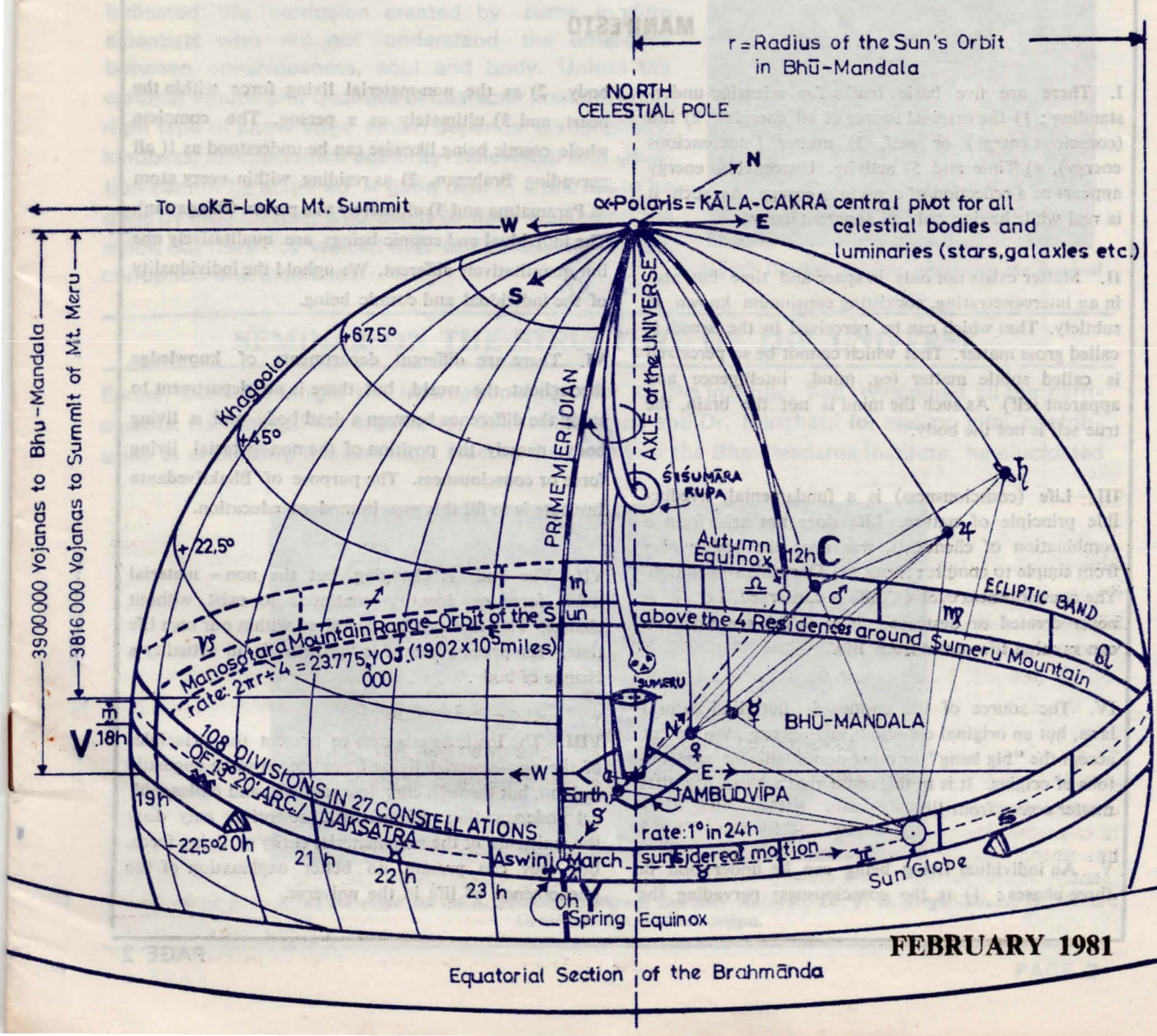

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THE BASIC FEATURES OF THE ABSOLUTE TRUTH

ACCORDING TO MODERN SCIENCE

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THE goal of scientific investigations is to seek the ultimate cause of all phenomena, governing matter, life, and the universe we perceive. In the course of history, many great scientists and philosophers have encountered considerable difficulties in this attempt, and many have acutely felt the limitations of the human intellect. Nonetheless, the search for knowledge is an inherent quality of the inquisitive mind, and it will go on.

In modern science, the concept of the ultimate cause, or the absolute truth, seems to be vaguely incorporated into the physical laws called the laws of nature. According to the theory of evolution, these laws of nature, and nothing else, have the power to select the most suitable forms from among different possibilities. We shall therefore briefly examine what these laws are.

The physical sciences - physics, chemistry, and mathematics–are devoted to the study of matter only. Copernicus, Galileo, Kepler, and Newton in the fifteenth, sixteenth, and seventeenth centuries were pioneers in the study of gross material phenomena, such as the planetary motions. These objects of study were found to obey certain mathematical regularities, which were termed "laws of nature," and the discovery of such laws became the target of scientific investigations. People were greatly impressed by the discovery of Newton's law of gravitation, Kepler's laws of planetary motion, and so on. Thus the more ambitious scientists came to think that all the phenomena underlying nature could be described by simple mathematical equations.

Among the more enthusiastic ones, the French scientist Pierre de Laplace proudly announced in the beginning of the nineteenth century that "all the effects of nature are only the mathematical consequences of a small number of immutable laws[1]". He believed that the universe was made up of atomic particles and that the exact condition of the universe at any one time could be given by specifying the exact positions and velocities of those particles with respect to a system of coordinates. He claimed that given these positions and velocities, he could, at least in principle, calculate the entire past and future of the universe from the laws of motion governing the particles. (Laplace, of course, could not have lived up to his boast, and any honest scientist might have thought that such big statements would not survive the test of time.

The discovery of the periodic law of chemical elements by the Russian scientist Mendeleev during the nineteenth century greatly impressed chemists and physicists all over the world. With this discovery, as well as with the discovery of many other laws, such as the ideal gas laws, the laws of dilute solutions, and the laws of thermodynamics, scientists became firmly convinced that exact laws underlying the phenomena of nature actually exist.

Similarly, since the discovery of the chemical structure of benzene by the German scientist Kekule in the nineteenth century, the study of organic structural chemistry has received greater and greater attention. gradually many organic chemists became interested in the chemistry of living bodies and the different chemical reactions inside living cells. This branch of chemistry became known as biochemistry. More recently, molecular biology has developed as a specialized section of biochemistry.

If nature has laws governing matter, then it is quite conceivable that there must also be

laws governing life. The tendency, however, has been to assume that the laws governing life are nothing more than the laws discovered for inanimate matter. Even though the biochemists have discovered chemical processes of ever increasing complexity and apparent sophistication within the living cells, the prevailing assumption has been that all phenomena of life can be accounted for by the same ordering principles that were discovered in the study of simple arrangements of gross matter.

Towards the end of the nineteenth century and the beginning of the twentieth, with the discovery of the fundamental praticles-electrons, protons, etc.–the quantum mechanical equations were developed because the earlier equations of classical physics could not describe the behavior of these finer particles of matter. Chemistry and physics have since become more and more unified in the study of atoms and subatomic particles. For example, the earlier concepts of the valence bond theory of chemistry have been dealt with by the atomic and molecular orbital theories derived from quantum mechanics, giving better results in many cases. The well known Woodward-Hoffmann rule of electrocyclic reactions is also an attempt in this direction[2] In the present scientific community, a great many scientists are hoping that quantam mechanics will provide the necessary framework for the ultimate understanding of all the phenomena of nature. A summary of the quantum mechanical laws for chemistry is given in Figure 1.

(a) $$H\Psi = i\hbar \frac{\partial}{\partial t}\Psi$$

(b) $$H = \sum_n \frac{-\hbar^2 c^2 \frac{\partial^2}{\partial q_n^2} + \eta_n^2 q_n^2}{2} + \sum_k \frac{-\hbar^2 \nabla_k^2}{2m_k} + \sum_k \frac{i\hbar e_k}{m_k c} \bar{A}(\bar{Q}_k)\cdot\nabla_k + \sum_k \frac{e_k^2}{m_k c^2} |\bar{A}(\bar{Q}_k)|^2 - \sum_k \frac{e_k}{2m_k c} \bar{\sigma}_k \cdot \nabla_k \times \bar{A}(\bar{Q}_k) + \sum_{i>j} \frac{e_i e_j - G m_i m_j}{|\bar{Q}_i - \bar{Q}_j|}$$

$$\bar{A} = \sum q_n \bar{A}_n$$

Figure 1 The laws of nature underlying chemistry.

FLAWS OF THE BASIC TENET

The basic tenet that matter is measurable, calculable, and understandable in terms of physics and chemistry continues to guide the majority of scientists. This reductionistic approach of the physicists and chemists has been borrowed by the molecular biologists and molecular evolutionists, who faithfully assume that life can also be fully understood in terms of atoms and molecules and their interactions. Thus, the well-known physicists Erwin Schrodinger[3] and Niels Bohr[4-5] expressed great hope that life could be completely understood in terms of physics. Similarly, molecular theorists of life such as Watson[6], Crick[7], and many others are absolutely convinced that life is a product of chemical reactions. Yet, an analysis of the equations listed in Figure[1] strongly suggests that this reductionistic position is not justified.

We will not discuss these equations in detail here. Readers interested in more details about these equations are referred to Monograph 3 of this series[8]. The first equation is the basic equation of motion, and is known as the Schrodinger equation. This is a second order partial differential equation. The second equation defines the Hamiltonian operator, or the sum total of the various kinetic and potential energy terms believed to be significant in chemical phenomena[9].

According to the viewpoint of the molecular biologists, the final cause underlying all the phenomena of life is represented by these mathematical equations. These equations may thus be taken as expressing the modern scientific view of the absolute truth, at least as far as life is concerned.

Yet, if these equations are analyzed conceptually, they are seen to involve nothing more than some simple pushes and pulls between

particles. There is a "free radiation" term, which can be visualized in terms of vibrating springs; a kinetic energy term; a term for the 'push' between a charged particle and an electromagnetic field; a term for the 'pull' between field and magneric moment; and a term for the pushes and pulls between charged particles. The basic idea is illustrated in Figure 2.

Figure 2 sums up the interactions betwean molecules as seen in both the classical and quantum mechanical theories. In the quantum mechanical picture, the particles are described by "quantum waves," which give only a statistical estimate of their positions and momenta. It may even be said that in quantum mechanics the very idea of definite particles has become untenable. Nonetheless, the forces governing nature remain the same : just simple pushes and pulls. In summary, then, the modern scientific viewpoint reduces the absolute truth to nothing more than these pushes and pulls between particles: the universe consists of a vast number of particles interacting with one another by simple mechanical rules, having started from some chaotic arrangement. One might well wonder whether mere pushes and pulls can be solely responsible for all the diverse aspects of the world and ourselves that we experience in life. Are molecular biologists and molecular evolutionists going too far in claiming that life is nothing but a coordinated chemical reaction? What are the motivations and justifications for such a claim?

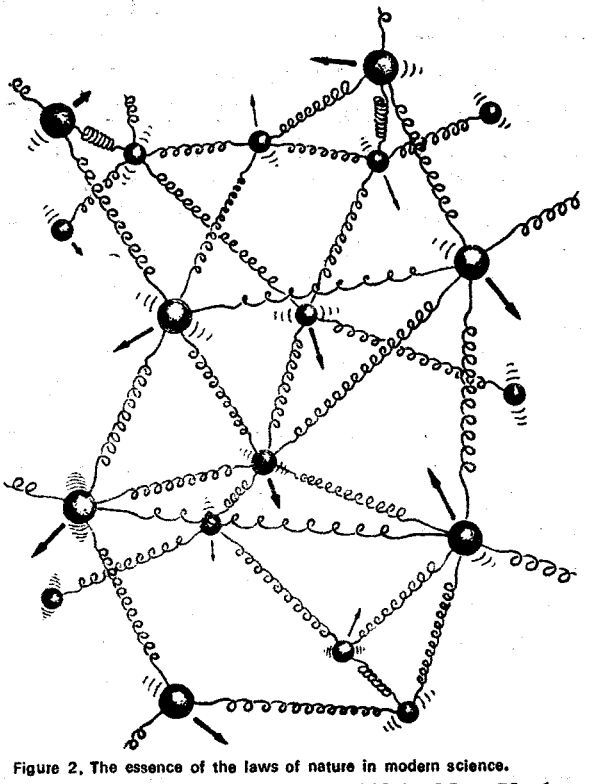

Figure 2. The essence of the laws of nature in modern science.

Refrences:

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2. Woodward, R. B. and Hoffman, R. **The Conservation of Orbital Symmetry,** Verlag Chemie GmbH, Academic Press, 1970
3. Schrodinger, E. **What is Life?** New York, Macmillan, 1945, p.2
4. Bohr, N. **Atomic Physics & Human Knowledge.** New York: John Wiley and Sons, 1958
5. Heisenberg, W. **Physics and Beyond.** New York : Harper and Row, 1971, pp. 110–111
6. Waston, J.D. **Molecular Biology of the Gene,** 2nd ed. Menio Park, California : W. A. Benjamin, 1970
7. Crick, F. **Of Molecules and Man.** Seattle and London : University of Washington Press, 1976
8. Thompson, R. L.. **Consciousness and the Laws of Nature,** Bhaktivedanta Institute Monograph Series, No. 3. Boston : Bhaktivedanta Institute, 1977
9. This is relativistic Hamiltonian.

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