

Fundamentals of Biochemistry in the Light of Spiritual Science

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The English translation of Otto Wolff's *Fundamentals of Biochemistry* was first presented to the participants of the annual Natural Science Section meeting in Ann Arbor in May 2023. The translators, Arie van Ameringen and Judith Erb were given the opportunity to share the process and the fruits of their long-distance collaboration, namely, a high-quality print edition of this long-awaited book. Otto Wolff (1921-2003), the editor of the classic *Anthroposophic Approach to Medicine* was a pioneering physician, researcher, prolific writer, and educator who travelled extensively and taught the principles of anthroposophic medicine not only to generations of physicians in Europe but also in the Americas as well as in Africa.

A course in biochemistry is a prerequisite in the study of biological sciences and medicine which, together with biophysics, anatomy, physiology, and cell biology constitute the core curriculum of pre-clinical studies. Sufficiently awake students embarking on a study of biochemistry will be disheartened when they discover that the conventional approach to the 'chemistry of life' is no different from that adopted in the study of inorganic or organic chemistry. Various substances and metabolic pathways are explored in great depth; however, one experiences them abstractly, from a single-dimensional, 'external' perspective.

This book offers a refreshingly different perspective! In contrast to the conventional 'bottom-up' atomistic method, the author's point of departure is a holistic, 'spirit to matter' approach grounded in the anthroposophical understanding of substance. Far from losing the contact with reality, a reader familiar with the basic tenets of anthroposophy will be rewarded with a feeling that she or he, too, can participate in the 'inner experience' of the chemistry of life.

In place of a proverbial listing of chemical elements, amino acids, sugars, and fats, as is the case in conventional texts, the author offers a lucid description of life itself, its cosmic origin and of the nature of substances that serve in its support. In his own words:

"...today's way of thinking [...] assumes the primacy of matter and tries accordingly to explain the properties of substance, from living plants to humans, from the atomic "arrangement." [...] However, the starting point is not matter, but life. It is a fact that life can never arise from dead matter, but comes from light, that is from the preceding and superordinate forces." (p. 375)

In the introductory chapters the basic principles of spiritual-scientific biochemistry are discussed with the headings ranging from Life, Substance, Matter and Water to Acids and Bases, and Salt Formation. It is a remarkable fact that of the 92 naturally occurring chemical elements in the periodic system, hydrogen, oxygen, carbon, and nitrogen constitute the vast majority of substances which serve as 'vessels of life.' They are described ontologically from the perspective of the evolutionary development of the Earth as well as in their current state as mediators of cosmic and earthly forces. Carbon, in particular stands out as the carrier of structure and form of virtually all organic substances. Its importance is underscored by the fact that organic chemistry is generally known as the 'chemistry of carbon.' Many aspects of this remarkable element are revealed, above all, that carbon is the bearer of light and of the formative forces of the sun: "Only carbon can unite, absorb and retain this forming and living power of light, which can then be found in its structure." (p. 56)

Contemporary life sciences have been reduced to cell- and molecular biology and the trend prevails to view every disease process as a kind of genetic mutation and/or a chemical metabolic defect. It is the author's conviction that by reducing the phenomena of life to genes and chemical substances, one is precluded from the understanding of the forces and qualities "lying above the dead world". For example, the origin of the word "substance" (from Latin *sub-stare*) points to what *stands below* and is only a vessel for that which endows it with its essential characteristics, the imponderables, be it from the dimension of life, soul, or spirit. The latter may not be chemically detectable but can be perceived by an astute observer schooled in Goethean method and who, like the author, has learned to "read the book of nature." The methodology used by the author is explained in considerable detail in the final section of the book. It may be helpful to those less familiar with this approach to consult this chapter before delving into the middle part of the book where substances and metabolic processes are elaborated in greater detail.

Sugars, proteins, lipids, and minerals are systematically elaborated in terms of structure, synthesis and degradation in the core chapters of the book. Rather than being mere 'building blocks' which can be analyzed down to their chemical and atomic structure, these carriers of life, soul, and spirit become threads in the tapestry of creation. The statement by Francesco Redi (1626–1698) that "life comes only from the living," ascribed to medieval mysticism by conventional biology, is entirely confirmed in the living pictures masterfully narrated by the author.

In the penultimate chapter "The Periodic Table of Elements" the author shares his profound insights into the nature of the chemical elements, their place in the strata of the earth as reflected in the periodic system, and their relation to the chemistry of life.

"Finally, the peculiarity of the human being as a spiritual being consists in the fact that he can really connect with the earth through life, that is, the life bearing substances, especially carbon. In this respect he gains a possibility which is not given to higher spiritual beings. The mentioned universality of carbon makes possible not only the

infinite variety of life, but also the transformation of biological life into spiritual life. An image of this development can be the diamond. By extraordinary compression and the resulting hardness, it has absorbed intensively earth forces, but has led these to purity, clarity and permeability for the light. Therefore, since the ancient times it has been a symbol of the goal of the noblest development of humankind. Therefore, in the late Middle Ages, it was the goal of the Rosicrucian alchemists to reach wisdom through a spiritual knowledge of matter. So, they saw in the carbon or the diamond the philosopher's stone as a picture of this aspired development." (p. 378)

There is little doubt that the above paragraph summarizes the author's own, modern Rosicrucian path to knowledge. With this book Otto Wolf has succeeded in transforming the encompassing field of biochemistry in a way that will inspire all readers longing for a deeper understanding of the living processes in nature. The translators and the publishers are to be congratulated for making available this expertly translated and eminently readable text.

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