Books

Modern Science and the Nature of Life
by William S. Beck
Harcourt, Brace and Co., N.Y. $5.75

The Dawn of Life
by J. H. Rush
Hanover House, N.Y. $4.50

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These are exciting days in the biology laboratory. Viruses are disemboweled and reassembled in ways that promise to reveal the innermost molecular secrets of these simplest of known living systems. The structure of the protein molecule and the sequences of its amino acid building blocks are yielding to the patience and persistence of chemists. The detailed structure of deoxyribonucleic acid (DNA) is understood in ways that promise to tell us how this carrier of genetic information is reproduced at each cell division with almost unbelievable precision. And we are close to an understanding of the manner in which this gene material undergoes mutation—the basis of all organic evolution—and the mechanism by which the information coded within it is used in the synthesis of the thousands of kinds of protein molecules of which we are so largely built.

Biochemists seem on the verge of a complete synthesis of nucleic acid of the type that could have been the beginning of organic evolution on earth. If man succeeds in making such a primitive "living" molecule in a test tube—living because it can both reproduce and evolve—it will no longer seem miraculous. The mystery of life is rapidly being replaced by understanding—the deep and rewarding understanding that is the goal of all science.

Many of these breakthroughs in biology have been made by chemists and physicists who have responded to the challenge of the problems of biology.

With Sputniks, Explorers and Vanguards, public interest in science in general has been raised to a high pitch, even though the orbiting satellites are not themselves science but are rather spectacular technological applications of science.

We are barraged with information and misinformation about fallout from tests of nuclear weapons and its mutation-producing properties. The man in the street argues with the doctor about whether that recommended X-ray examination or treatment will make monsters of his children. The ninth-grade member of the Science Club asks: "What is the difference between DNA and RNA?"

It is good that the urge to know about science in general and biology in particular has grown to such proportions, for more and more the decisions that affect the future of our free and democratic society involve science and its applications.

The two books reviewed here should go a long way toward satisfying the non-specialist's thirst for knowledge about the new biology, and for an understanding of its proper place in the science that has become such an important part of man's culture.

William Beck's delightfully written book is the more general of the two. It describes science as science, and examines it from a sound and informative philosophical point of view.

In the author's own words: "This book is being written in the belief that science and scientific methods are the best means available to us for solving the problems of our cultural crisis. Science is, beyond question, the outstanding feature of modern civilization. Our world is, to an increasing extent, dominated, if not by pure science itself, then by the conceptions of the public at large and its leaders concerning the nature of science. More and more, this idea of science, misunderstood through it is, has gained in influence, and, as its status has changed, great new problems have arisen, many of which have yet even to be identified as problems by the majority of people.

"It can be argued, I think (and I intend to argue), that much of humanity's present difficulty stems from the paradoxically strained relations between science and the other areas of knowledge, and from the surpassing paradoxes within science itself, the very ingredients which make it such a frustrating and delightful mistress to its practitioners.

"These paradoxes are an important cause of the present crisis; they are its consequences and one of its best examples. For the essence of science is paradox and, in trying to explain science, this is one of the main points I hope to get across.

"To the mid-twentieth-century citizen, science is an almost grotesquely ambivalent phenomenon: it is at the same time highly systematic in its approach to the real world, yet it is never complete and never reaches final conclusions. It is the model of certainty in its methodology and logic, yet its driving force is deliberate doubt, and its results are probable, never certain. It requires of its workers absolute discipline, yet it is the fountainhead of exciting new ideas and new ways of thought. Though it may be local in origin, its conclusions are universal. For its creators it is a supreme adventure of the spirit, while at the same time it is the sole basis of endless reams of myth and superstition. It is the healer and builder and the propagator of untold suffering and death. Is it any wonder that science, the strong, the promising, the unforeseeable, the anarchical force in our modern world, should be the cause of acute anxiety?"

Beck goes on to discuss such topics as the nature of science, how biology became a science, what is certainty, the cell as a unit of life, how life evolves, the nature of life, the technique of discovery, genes, viruses, the origin of life, the problem of cancer and the nature of mind. All these

things he does with wit, skill and a refreshing literary style.

Rush concerns himself mainly with living systems. His is a more nearly straightforward presentation of the subject matter of modern biology. The thread of continuity is evolution, inorganic and organic, from the primordial earth to the present.

More and more we are coming to see that evolution is a continuous process from the hydrogen of the primitive universe, through elements, inorganic molecules, complex carbon compounds, simple virus-like systems, and on to man himself.

At first thought this concept may seem crudely and revoltingly materialistic. It seems to leave no room for a Creator. But when one asks the question, "Does it require less faith in a universe so designed as to be capable of giving rise to man by an orderly process of evolution than it does to accept the creation of man in his present state?" one sees that modern science has in no way changed the problem of what lies beyond the knowable.

Dawn of life

Rush, a physicist, tells us in his preface how he became interested in biology and what he attempts to accomplish in his book:

"Sometime between the formation of the earth and the advent of man, the first tentative organic systems crossed the uncertain boundary line from the non-living world to that of the living. The origin of life is a uniquely appealing mystery. It is something that unqestionably happened, an event in the finite past. Yet the idea of a world without life, and the manner by which life came into it, both challenge the imagination to the utmost. I developed an active interest in the subject out of my professional work in physics and astronomy. No one, I believe, can be concerned with the throng of planets and stars and galaxies that fill the depths of space without wondering whether other worlds than ours—Mars, perhaps, or Venus, or the unknown planetary families attending other stars—are peopled by life and even intelligence. This preoccupation leads one immediately to wonder about the adaptability of life to radically different environments, and to make some educated guesses as to the conditions that prevail on other planets. It is but a step from such thoughts to the more fundamental question of the origin of life, on earth or elsewhere.

Showing the way

"This book is not intended to give an answer to the riddle of life's origin, but to point a direction. The principle of rational inquiry, of reasoning logically from experience, has served us well. Its range of application broadens as science consolidates its gains. Yet we have only very recently learned enough of astronomy and physics, of the earth's history, of chemistry and biology, to be able to bring the origin of life out of the realm of pure conjecture. The detailed ideas and interpretations set forth in this book undoubtedly will be drastically modified as our understanding grows; but I do not believe that the direction in which they lead our thinking will be changed. That direction is expressed in the conviction that life is a natural phenomenon in the same sense that the phenomena of inanimate matter are natural, and that life will develop out of non-living material wherever suitable conditions prevail for a sufficient time."

The book includes a discussion of the ever-fascinating possibility of life on other solar planets and elsewhere in the universe. It concludes with a chapter on the emergence of mind, that remarkable product of evolution that has made it possible for man to add cumulative cultural inheritance, including science, to the blind biological inheritance of his evolutionary forbears.

I know of no easier or more enjoyable way to learn about the new biology than to read these two books.

But how did the first organisms on the only known home to life in the universe develop from the primordial soup? One theory involved a "shocking" start. Another idea is utterly chilling. And one theory is out of this world! Inside you'll learn just how mysterious this all is, as we reveal the different scientific theories on the origins of life on Earth. It started with an electric spark. (Image credit: stock.xchng). Lightning may have provided the spark needed for life to begin. Electric sparks can generate amino acids and sugars from an atmosphere loaded with water, methane, a