

Reviews

Cosmic Dawn: The Origins of Matter and Life. By ERIC CHAISSON. Boston: Little, Brown & Co., 1981. 320 pages. \$14.95.

Since the last decade or so, a remarkable transformation has taken place in the technology available to astronomers and astrophysicists for exploring the space outside the earth's atmosphere. Radiotelescopes, space probes, returned moon-soil samples, and computer simulation have all supplied today's research astrophysicists with such a wealth of new materials that not surprisingly the experts have updated their understanding of the universe. What is surprising is that Eric Chaisson has taken time out from his own exciting research in the radio astronomical study of the Milky Way to write this excellent survey of our modern view of the origins of matter and life. He has spent many years explaining quasars, protogalaxies, and black holes to Harvard and Radcliffe undergraduates. We are fortunate indeed to have such a teacher give the public a clear, authoritative, and really elegant view of the modern picture of the cosmos.

Chaisson approaches the subject from the immense to the tiny. His prologue, "The Big Picture," starts with the instruction: "Exploring the whole Universe requires large thoughts. . . . If you've ever wanted to think big, now is the time!" In the following chapters he introduces the building blocks of astrophysics: relativity, mass, energy, particles, and force. Based on these, his informal explanation of the evolution of galaxies, stars, planets, and life neither intimidates the reader with complexity nor deviates from accurate technical descriptions of the processes involved.

Chaisson establishes the human animal as a logical product of biological evolution and then turns from physics, astronomy, and biology to his last two "epochs" (chapters), "Culture" and the "Future." In discussing cultural evolution he points out that humans are far from the only animal that has evolved an appropriate culture at the same time that he emphasizes the close interaction between biological and social evolution. He concludes that "the epitome of culture may well be the ability to seek the truth about ourselves and our Universe, but an even more basic factor of associated import concerns the ability we've developed to *desire* to seek the truth."

In discussing each of his main epochs—"Galaxies: Hierarchy of Structure," "Stars: Forges for Elements," "Planets: Habitats for Life"—Chaisson presents the arguments for the physics not only of the birth but also of the death of each form. He describes the origin and evolution of life in general and of humans in particular. He concludes with what most likely would bring about the destruction of the human species: overpopulation, self-destruction, genetic degeneration, and "silicon-based circuitry" (computers). This is a factual, not a pessimistic discussion. His "Epilogue" concludes: "The emergence of technologically intelligent life as the dominant constituent is a great transformation in the history of the Universe. It is the quintessential event in the development of matter, the threshold beyond which life forms can truly begin to fathom their role in the cosmos. Significantly, then, we have an obligation,

[*Zygon*, vol. 16, no. 1 (March 1981).]

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a responsibility to survive. The great experiment that intelligent life represents must not end in failure.”

A previous generation of scientists, theologians, and other thoughtful readers was guided by Harvard's great teacher-astronomer, Harlow Shapley, through what was then known of cosmic evolution. It is exciting to discover that we have a new guide from the same university, an expert in the modern sophistication of astrophysics, who is willing and able to keep us posted on the continuing search for understanding of the origins of matter and life.

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Goals for Mankind: A Report to the Club of Rome on the New Horizons of Global Community. Edited by ERVIN LASZLO et al. New York: New American Library, 1978. 374 pages.

The Inner Limits of Mankind: Heretical Reflections on Today's Values, Culture, and Politics. By ERVIN LASZLO. New York: Pergamon Press, 1978. 79 pages. \$18.25.

The Greek philosopher Thales is reputed to have purchased all the wine presses in the vineyards in a poor year only to make a killing in the abundant harvests of subsequent seasons. Few philosophers since this enterprising Ionian have so thoroughly shattered the stereotype of their trade. The philosopher, we are led to understand, is absent-minded toward practical reality and single-minded in his attention to pure reason and esoteric abstractions. Ervin Laszlo, editor of *Goals for Mankind* and author of *The Inner Limits of Mankind*, outdoes even Thales in his betrayal of this standard image. Laszlo is a senior fellow and project director of the United Nations Institute for Training and Research. His activities there address basic problems of human society on a planetary scale. For example, he recently orchestrated a seventeen-volume collection on the international economic order involving ninety-eight research institutes worldwide. Earlier, as professor of philosophy at the State University of New York at Geneseo, he wrote several books, including *An Introduction to Systems Philosophy* and *The Systems View of the World*. These secured his reputation as one of the founding fathers of an influential philosophical position based on general systems theory.

Goals and *Inner Limits* represent a most practical application of systems philosophy. One virtue of this approach lies in its use of a perspectival “macroscope” which permits observers to detect processes and structures across a wide range of diverse phenomena, that is, to perceive a larger “one” composed of the interrelated “many.” By discerning flows of energy, material, and information, as well as patterns of relationship among units such as nation-states, cultures, and economic systems, the systems theorist can diagnose problems that are invisible when attention is restricted to less comprehensive levels.

Goals illustrates the application of such a synoptic perspective. The book is the fifth in a series of reports to the Club of Rome. Most memorable of these reports is the first, *The Limits to Growth*, directed by Dennis Meadows. *Goals* is

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a worthy companion volume because it speaks to a neglected dimension of our planetary predicament, the dimension of values and aspirations. Admittedly there are few statistics on such matters. National and transnational intentions are often based on intangible and thus immeasurable qualities, on tacit world views, ideologies, and cultural traditions that are mostly immune to quantification. In order to approach his massive organizational task and its illusive quarry, Laszlo assembled an international project team of some three hundred persons who are specialists in the many nations, regions, and movements surveyed in this effort.

The book is divided into three parts. The first, "World Atlas of Contemporary Goals," is itself divided into two sections. One describes the goals of the world's nations and regions, while the other lists the goals of international and transnational institutions—the United Nations, multinational corporations, and the World Council of Churches. Part 2 is an attempt to extract common elements in these reports. Laszlo refers to these as "global goals." They include issues of security, food, energy, and development. Especially useful is the chapter on the goals gap. Condensed here are great masses of information displayed on two dozen charts which measure gaps between the narrow interests of governments and other institutions and the broader interests of the global community. The third part addresses the more difficult problem of the moral and intellectual resources in the world community. Laszlo expresses his strong belief that we must burst through the inner limits of world views, religious systems, and political ideologies and wisely employ their positive motivational resources before we can even begin to address the outer limits of food, populations, and security.

Inner Limits is a further elaboration on these latter themes. Here Laszlo criticizes modernism as wrong-headed and urges its replacement by a truly global perspective, eclectic in nature and based on perennial human values. *Inner Limits* succinctly enumerates both the emerging values and the ground rules for such a viable global system. Its most attractive feature is in fact the precise and uncomplicated exposition of the essential values that a planetary society must manifest.

Goals and *Inner Limits* introduce the reader to Laszlo's eclectic humanism. Quite clearly Laszlo is optimistic about human nature and its constructive capabilities. If humankind, using all the considerable power of science and technology at its disposal, would lucidly take control of its destiny, planetary interexistence would be assured. Religion, because of the vast human wisdom reposing in its various traditions, functions to support this task. Laszlo recognizes that, despite the ongoing process of secularization in the world, a great majority of persons outside the communist block are pledged to religious value systems. The distilled wisdom of these traditions—when combined with the highest ideals of secular world views and, one assumes, with the powerful tools of systems management as well—may lead us up from the isolationist parochialism of the nation-state system into an interlocking and human global society.

This evidently represents a shift in Laszlo's own position, for in an earlier book, *A Strategy for the Future*, he was less than sanguine about the practical power of religious institutions in contributing to long-term global interests. I wonder whether this altered perspective is sufficiently receptive to include religious orientations which are in severe opposition to secular humanism. Laszlo plays down the less attractive elements of religious conduct: its dogmatic exclusiveness, its occasional passion without proportion, its reactionary doctrines, its otherworldly attitudes. His understanding of religion is that of a

liberal, and one suspects that most of his resource persons in this area represent the liberal wing of their respective faiths. This selective approach is justified when Laszlo's intentions are to extract those values from religion most suitable for global solidarity. But the data are skewed when input comes almost exclusively from liberal sources. This is especially apparent in the display charts of the chapter "The Current Goals Gap." Here the opinion of the "spiritual leadership and hierarchy" most frequently enjoys a rating above the average on a scale measuring the degree of concern on global issues found in a particular nation. I have questions as to whether the evidence upon which these charts are based accurately reflects the sympathies of any but the liberal elite of each religious tradition consulted.

Especially interesting in this regard is Laszlo's discussion in *Goals* of a world-solidarity revolution led by religion and science. In this scenario the intellectual and religious leaders shift popular attitudes toward policies informed by long-range global interests. Through consumer behavior and voting patterns people succeed in sensitizing business and government to these issues and thus establish a responsive leadership. These institutions, in turn, effect international life and thereby contribute to global solidarity. Desirable as this scenario may be, its realization is made far more difficult, at least in the United States, by the emergence of conservative evangelical political movements and their impact upon national life as reflected in the 1980 national elections.

Goals is the result of a project enormous both in scope and in the sheer number of contributors. The reports are therefore numerous, uneven in quality, and diverse. One should expect to experience discontinuity from chapter to chapter. To avoid confusion one should become thoroughly familiar with the table of contents and the preface as these provide maps of a complex territory. The book is rich and rewarding despite its encyclopedic character, *Inner Limits* appears quite the opposite in form. In less than a hundred pages Laszlo succinctly reflects upon his experiences with the *Goals* project. Because of its reflective style and its brevity, *Inner Limits* is recommended to those who are seeking a lucid humanistic philosophy that addresses the emerging global system in an age of general confusion.

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Religious Reason: The Rational and Moral Basis of Religious Belief. By RONALD M. GREEN. New York: Oxford University Press, 1978. 303 pages. \$4.95.

That both rationalist and religious moralities have fallen on hard times is no secret. Rationalist ethics have been questioned by the existentialists in terms of their lack of an ontological grounding, attacked by situationalists in terms of their inapplicability, and reduced by linguistic analysts to justifications of subjectively determined values. Meanwhile, in an era of pluralism, religious positions have been relegated to relativity, left as matters of private choice. In this rationalist religious malaise Ronald M. Green has sought out the foundations for an enduring moral structure. He bases a rational ethic on the inevitability of moral reflection, seeking to overcome its deficiencies by drawing

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on historic religious traditions. In the process he offers an analysis of religion which subordinates pluralist peculiarities to some essential religious purposes in support of his claim that "religion is a fully rational activity" (p. 4). He develops a very strong argument.

Green uncovers in perceptive detail the considerations of theoetical, prudential, and moral reason implicit in the crucial reflection: "Why should I be moral?" Drawing on John Rawls and Immanuel Kant, he argues that societal progress requires both free assent and impartial choice according to common moral rules. But an answer to the question "Why should there be morality?" does not satisfy our personal concern ("Why should *I* be moral?"). Green offers a trenchant reconstruction of Kant's practical reasoning to take rationality as far as he believes it can go, where "impartial reason has been compelled, in order to render its whole enterprise coherent, to postulate certain necessary supra-empirical beliefs" (p. 73). Because as persons we seek our own happiness, we need the assurance of ultimate satisfactions to convince us to be moral when such a choice contradicts our immediate wants. Only a system of causality which reason itself cannot provide will lend us such assurance. What is more, the moral life has yet another pitfall, for the reflective person will ask, "How can I ever be morally worthy?" Despair over honest self-appraisal requires a sustaining belief in an agency "which is not strictly required always to act or judge morally as we are" (p. 106). Reason in its "moral employment" thereby pushes beyond itself to reason in its "religious employment."

Religious systems need not see themselves of course as fulfilling the requirements of moral reason. They will find their sources of truth in revelation, mystical realization, or wherever. A person's devotion to the good because God wills it is not inherently irrational, provided the particular good is not incompatible with reason. Green carefully outlines seven "requirements of pure religious reason" as axioms with which he analyzes Judaism, Christianity, and the religions of India. His venture in cross-cultural philosophy of religion is a remarkable achievement. To be sure, such analysis is inevitably encumbered by a certain ethnocentricity, seen here when Western notions of original sin are virtually forced into the Indian mind. However, historians of religion cannot but be impressed by Green's insights into the development of axiological Hindu and Buddhist principles, his sensitive treatment of Rabbinic teaching, and his luminous presentation of the Pauline position. The application of his analytical scheme is unquestionably productive. While he disclaims any ability to evaluate one religious tradition as superior to another, he in fact does so by criticizing the inadequacy of the *harma* doctrine and asserting that, in Hegelian fashion, religious reason had to clarify in Christianity the matter of the relation of God's justice and mercy left unclear in Judaism. Nonetheless each of the religious traditions is shown as basically fulfilling the requirements moral reason itself cannot supply. The goal of the book is to show that "a world which aspires to be rational must eventually draw upon the wisdom of mankind's religious past" (p. 255). But the result may be stated in an adaptation of John 3:16: "God sent his only begotten Son into the world that whosoever believeth in him" might fulfill the categorical imperative.

There's the rub. Green has given us, in the end, not the axioms of religious reason but a system whereby religious myths and doctrines are to be used as devices to keep rationalism afloat. The difficulty is that neither Judaism nor Hinduism nor Buddhism nor Christianity begins with the question of moral reason, "Why should I be moral?" but with a deeper one, "Why should I be

anything at all?" Religious reason affirms that the crucial issue is not in our moral confusion but in the human spirit and that the answer to the human problem is thus primarily spiritual rather than moral. The first table of the Decalogue has nothing explicitly to say about morality, and yet Judaism can acknowledge as a viable ethic only that which is built upon the injunction "You shall have no other gods before me." The five abstentions in Hinduism are but preliminary to that spiritual quest which is life's aim. And the goal of Christianity is only secondarily to nurture the morally upright—it is that people "might have life and have it more abundantly."

To be sure, religious reason as a way of comprehending reality can well be analyzed, but the task must be done on its own terms. In such a context the construction of a rationalist ethic will be seen as one attempt among others to deal with the human problem without the perspective of a transcendent dimension, a process which curiously misses the richness of what it is to be human. However, in such a context we can be extensively indebted to Green for his insight into the moral aspects of that problem of all problems.

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Ecodynamics: A New Theory of Societal Evolution. By KENNETH E. BOULDING.
Beverly Hills, Calif.: Sage Publications, 1978. 368 pages. \$15.00.

The past decade has seen the emergence in science of a vast new schema for understanding the universe and appreciating our own place within it. The tendency in science to elaborate descriptions ever more removed from perceived reality that began with heliocentrism and continues much expanded in areas of modern science such as particle physics can now be halted. We cannot underestimate the importance of this shift in paradigm; it signals nothing less than the end of man's estrangement from nature and the devaluation of our own role within it.

Kenneth E. Boulding, one of the founders of general systems theory, gives us *Ecodynamics: A New Theory of Societal Evolution* and thus adds his eloquent voice to a rising chorus of voices that enshrine the process of evolution—physical, biological, and social—as the guiding image for integrating humanity and human selves into the larger world. The emerging notion of evolutionary development and order through fluctuation was called by the Nobel Committee "a new ordering principle in nature" when in 1978 it awarded a Nobel Prize to Ilya Prigogine for his work in nonequilibrium thermodynamics which led to a generalized theory of process. This new paradigm is one that most values complexity and the factors which conserve and expand the density and diversity of connections in any system.

By such a view humanity is no longer involved in a confrontation with a natural world that is "mute," in Jean Paul Sartre's famous phrase. Rather we humans, most anomalous of animals, are able to regain our preeminence in nature by virtue of our cerebral cortex, most densely complex of all known natural objects, and by our production of culture, the most rapidly evolving of all natural domains. This is a stunning turnaround in the intellectual thrust

[*Zygon*, vol. 16, no. 1 (March 1981).]

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and self-image of science, and its impact has yet to be appreciated even within science. It is a view which moves humankind away from a role as mere spectator to the grand process of dynamic development and instead gives credence to the idea that we are a vital catalytic factor in the ongoing adventure of the becoming of the cosmos.

Boulding is among the first to attempt to articulate the large sweep of the new vision. He emphasizes "the importance of modesty, adaptability, variety and complexity" in the ongoing evolutionary process and in so doing shows the ways in which the new evolutionary vision can become a powerful counterforce against the excesses of Social Darwinism, Marxism, sociobiology, and behaviorism—all the fashionable isms largely responsible for the alienation that threatens to paralyze or hideously transform the ongoing search for a basis for an ethical and human society.

My only disappointment with the book is its failure to introduce the reader to the many voices and approaches that strive to articulate the evolutionary paradigm in its new form. The pioneering ideas of L. L. Whyte are not mentioned. Neither are Prigogine and René Thom, who represent different approaches within the "new" evolution. Prigogine's concept of "dissipative structures" merits mention because it offers an answer to the primary question of the generation of the potential to evolve. Boulding is silent on this central issue. A modern discussion of evolution that ignores Prigogine's idea of order through fluctuation does so at its own peril. Likewise Thom's notion of "catastrophe" is necessary for any full understanding of process. Others, such as Manfred Eigen, Eric Jantsch, and Rupert Riedl, also should have been discussed.

Nevertheless *Ecodynamics* makes a significant contribution to this exciting frontier of human thought. It is a rare pleasure to experience, even vicariously, the awe (Boulding's own word) that this mature and clear-thinking scientist feels in contemplation of the place in the cosmos that is rightfully humanity's and that has been obscured for so long by merely partial theories of how all nature is ordered by change.

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The Runaway Universe. By PAUL DAVIES. New York: Harper & Row, 1978. 205 pages. \$11.95.

Among the plethora of books written in recent years on cosmology and astronomy for lay consumption, most seem to follow a generally chronological description of the evolution of the universe, often including the solar system, earth, and man. Varying degrees of ingenuity and artistry are exhibited in explaining the associated principles of physics and biology through the use of elementary descriptive models and well-chosen analogies. Also occasional speculations about the future of the universe, the uniqueness of earth and mankind may be given. Perhaps the principal features which distinguish Paul Davies's approach are his quite free indulgence in such speculation and his extensive application of the second law of thermodynamics in discussing the ultimate decay of the cosmic order which arose out of the big bang.

[*Zygon*, vol. 16, no. 1 (March 1981).]

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On the whole Davies succeeds in accomplishing his purpose of presenting a readable and engaging description of the origin and evolution of the universe along with interesting speculations as to its death. Not only such speculations, but also those dealing with the possibilities of extraterrestrial life, interstellar travel, and communication are treated. However, in all of these speculations he is reasonably careful to confine himself to those conceivable within the framework of known physical laws.

In an almost conversational style Davies outlines the history of astronomy, the significant stages of the big bang and associated physical processes, the formation of galaxies and the solar system, and the evolution of earth and man. He devotes an entire chapter to a description of the sun, based on recent, well-founded theoretical models. After another chapter on the constraints on life, communication, and travel in the universe, he treats entropy and the second law of thermodynamics, which serves as an underlying basis for the rest of the book. It is from this point of view that he treats neutron stars, black holes, and theories of the future fate of the universe and describes the ultimate winding down and doom implied by the second law. Indeed some of his most stimulating speculations are in a further chapter (on extraterrestrial life, travel, and communication), which discusses how man's technology may be used to postpone this grim eschatology.

A few criticisms are perhaps appropriate and justified here. Davies's explanation of atomic and nuclear physics could have been somewhat more detailed, informative, and carefully done and still have been in keeping with his policy of not embroiling the reader in any mathematics. To give one simple example, he could easily have explained what a radioactive half-life is. Mistakes are few, but a glaring one is the statement that the two stable carbon isotopes have thirteen and fourteen neutrons, respectively. He may have meant thirteen and fourteen nucleons (which term he does not explain), but even this is incorrect; the two stable isotopes of carbon have twelve and thirteen nucleons, respectively.

Perhaps it is a small point, but Davies correctly states that the visualization of the big bang originating as a "fireball" is in error; however, he then proceeds to use the term throughout the rest of the book. A more serious criticism centers on his spending too much time belaboring the various aspects of, and phenomena exhibiting, the time reversal that might occur in the case of a closed universe where contraction instead of expansion ultimately would take place. Only passing mention is made of the anthropic principle, a fascinating subject which, if elaborated upon, could have added greatly to the interest of the book. Some of the thought of John Wheeler related to this also would have been a stimulating addition, and so would some of Freeman Dyson's ideas on the possibility of maintaining intelligence and communication indefinitely in the case of an open and expanding universe.

These faults aside, the book is quite worthwhile reading if only because of the range of subjects covered with a flowing, absorbing style and because of its refreshing indulgence in imaginative, yet not inconceivable, speculation.

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