

Cosmochemical Evolution And The Origins Of Life Proceedings Of The Fourth International Conference On The Origin Of Life And The First Meeting Of The 25 28 1973 Volume Ii Contributed Papers

This overview for the interested layman reviews the attempts of scientists to find answers to the question of where life comes from. After an historical introduction, he surveys the origin of the universe, the solar system, our Earth, meteorites and comets. The proposal of the School was made in 1998 to three institutions, which responded enthusiastically: The Abdus Salam International Centre for Theoretical Physics (ICTP), its main co-sponsor, the International Centre for Genetic Engineering and Biotechnology, both in Trieste, Italy, and the Chancellor's Office, Universidad Simon Bolívar (USB). The secretarial and logistic support was provided in Trieste by the ICTP and in Caracas by USB and the IDEA Convention Center. In addition the event was generously supported by the following institutes, agencies, foundations and academies: NASA Headquarters, European Space Agency, TALVEN Programme, (Delegacion Permanente de Venezuela ante la UNESCO), The SETI Institute, Centro Latinoamericano .de Ffsica, The Third World Academy of Sciences, Academia de Ciencias Ffsicas, Matematicas y Naturales, Red Latinoamericana de Biologfa, The Planetary Society, The Latin American Academy of Sciences (Fondo ACAL), Alberto Vollmer Foundation, Inc, Fundacion J. Oro, Associated to the Catalanian Research Foundation, Red Latinoamericana de Astronomfa and Colegio Emil Friedman. A total of 36 lectures were delivered by 20 lecturers, of which 14 were from the following countries: Argentina, Mexico, Italy, Spain and the USA. Six lecturers were from the host country. In addition there were 5 chairpersons from the host country that were not participants; two participants acted as chairpersons (Pedro Benitez and Tomas Revilla).

The first comprehensive overview of planet formation for students and researchers in astronomy, cosmochemistry, laboratory astrophysics and planetary sciences.

4th International Conference on the Origin of Life, and Its Meeting of the International Society for the Study of the Origin of Life, Barcelona, June 1973, Proceedings. Invited papers

The Origin of Life in Fire and Ice

Probing the Origin and Chemical Evolution of the Solar System

Proceedings of the Fourth International Conference on the Origin of Life and the First Meeting of the International Society for the Study of the Origin of Life, Barcelona, June 25–28, 1973 Volume II: Contributed Papers

Strickberger's Evolution

This publication, in two volumes, includes most of the scientific papers presented at the first meeting of the International Society for the Study of the Origin of Life (ISSOL), held on June 25–28, 1973 in Barcelona, Spain. The first volume contains the invited articles and the second volume the contributed papers, which also appear in the 1974 and 1975 issues, respectively, of the new journal Origins of Life, published by D. Reidel. A relatively large number of meetings on the subject of the origin of life have been held in different places since 1957. In terms of its organization, scope, and number and nationality of participants, the Conference celebrated last year in Barcelona closely followed the three international conferences held earlier in Moscow, U.S.S.R., 1957, Wakulla Springs, U.S.A., 1963, and Pont-a-Mousson, France, 1970. For this reason the first ISSOL meeting was also named the 4th International Conference on the Origin of Life.

How did the Solar System's chemical composition evolve? This textbook provides the answers in the first interdisciplinary introduction to cosmochemistry. It makes this exciting and evolving field accessible to undergraduate and graduate students from a range of backgrounds, including geology, chemistry, astronomy and physics. The authors – two established leaders who have pioneered developments in the field – provide a complete background to cosmochemical processes and discoveries, enabling students outside geochemistry to understand and explore the Solar System's composition. Topics covered include: – synthesis of nuclides in stars – partitioning of elements between solids, liquids and gas in the solar nebula – overviews of the chemistry of extraterrestrial materials – isotopic tools used to investigate processes such as planet accretion and element fractionation – chronology of the early Solar System – geochemical exploration of planets Boxes provide basic definitions and mini-courses in mineralogy, organic chemistry, and other essential background information for students. Review questions and additional reading for each chapter encourage students to explore cosmochemistry further

In The Origin of Life in Fire and Ice, the author proposes a simple and direct path which may have caused the formation of one of the earliest organisms described using observations found in scientific literature: the last universal common ancestor (LUCA). The path is proposed to take place in the environment provided by hot springs in the presence of snow and ice, thus creating the ‘fire and ice’ conditions. The author guides the reader through several steps that ultimately lead to the beginning of life on our planet as we know it. The journey starts from the delivery of water and organic compounds to the early Earth by comet and asteroid impacts, progressing to the formation of vesicles in geysers, the entrapment of clay particles, amino acids and other ingredients in the vesicles, the formation of template-directed peptides, the elongation to peptides with catalytic activity, the association of catalytic peptides with aromatic compounds (including purines and pyrimidines), peptide catalyzed development of nucleotides, polymerization of nucleotides to RNA, the RNA world, and the stereochemical association with amino acids and peptides into the RNA-peptide world. These steps allow the RNA world to develop a code which forms the basis of the genetic code and ushers in the advent of LUCA. The fiery and icy path to the origin of life is simplified in this book for anyone interested in this intriguing subject.

Cosmochemical Evolution and the Origins of Life

Exobiology: Matter, Energy, and Information in the Origin and Evolution of Life in the Universe

From the Big Bang to the Present Day

An Astrobiological Perspective

Cosmochemistry and the Origin and Early Evolution of Life

Thoroughly updated and reorganized, Strickberger's Evolution, Fourth Edition, presents biology students with a basic introduction to prevailing knowledge and ideas about evolution, discussing how, why, and where the world and its organisms changed throughout history. Keeping consistent with Strickberger's engaging writing style, the authors carefully unfold a broad range of philosophical and historical topics that frame the theories of today including cosmological and geological evolution and its impact on life, the origins of life on earth, the development of molecular pathways from genetic systems to organismic morphology and function, the evolutionary history of organisms from microbes to animals, and the numerous molecular and populational concepts that explain the earth's dynamic evolution. Important Notice: The digital edition of this book is missing some of the images or content found in the physical edition.

Astronomy and Astrophysics Abstracts, which has appeared in semi-annual volumes since 1969, is devoted to the recording, summarizing and indexing of astronomical publications throughout the world. It is prepared under the auspices of the International Astronomical Union (according to a resolution adopted at the 14th General Assembly in 1970). Astronomy and Astrophysics Abstracts aims to present a comprehensive documentation of literature in all fields of astronomy and astrophysics. Every effort will be made to ensure that the average time interval between the date of receipt of the original literature and publication of the abstracts will not exceed eight months. This time interval is near to that achieved by monthly abstracting journals, compared to which our system of accumulating abstracts for about six months offers the advantage of greater convenience for the user. Volume 12 contains literature published in 1974 and received before March 15, 1975; some older literature which was received late and which is not recorded in earlier volumes is also included. Beginning with volume 11 some minor changes of our classification scheme have been made. We acknowledge with thanks contributions to this volume by Dr. J. Bouska, who surveyed journals and publications in the Czech language and supplied us with abstracts in English, and by the Commonwealth Scientific and Industrial Research Organization (C.S.I.R.O.), Sydney, for providing titles and abstracts of papers on radio astronomy.

Thoroughly updated to include exciting discoveries from spacecraft missions and laboratory analyses, as well as new teaching resources.

Proceedings of the Fifth College Park Colloquium on Chemical Evolution, University of Maryland, College Park, Maryland, U.S.A., October 29th to 31st, 1980

Proceedings of the Fourth International Conference on the Origin of Life and the First Meeting of the International Society for the Study of the Origin of Life Barcelona, June 25-28, 1973. Volume I: Invited Papers

Evolution

Cosmochemical Evolution and the Origins of Life: Contributed papers

Literature 1974, Part 2

The general topic of this book concerns the origin, evolution, distribution, and destiny of life in the Universe. It discusses the transition from inert matter to cellular life and its evolution to fully developed intelligent beings, and also the possibility of life occurring elsewhere, particularly in other environments in our own and other solar systems. The theoretical framework of Astrobiology may be probed with a forthcoming series of space missions, which at the time of writing are being planned for the next 10 to 15 years. Advanced extraterrestrial life can also be probed by means of radioastronomy in the well-established project of search for extraterrestrial intelligence. Astrobiology pays special attention to the robust growth in our capacity to search for microorganisms, as well as signals of extraterrestrial life, with recent significant technological progress in planetary science and radioastronomy. The progress of the main space agencies is highlighted. Audience: This volume is aimed at advanced undergraduate and graduate students, as well as researchers in the many areas of basic, earth, and life sciences that contribute to the study of chemical evolution and the origin of life.

For the first time in human history, developments in many branches of science provide us with an opportunity of formulating a comprehensive picture of the universe from its beginning to the present time. It is an awesome reflection that the carbon in our bodies is the very carbon which was generated during the birth of a star. There is a perceptible continuum through the billions of years which can be revealed by the study of chemistry. Studies in nucleosynthesis have related the origin of the elements to the life history of the stars. The chemical elements we find on earth, Hydrogen, Carbon, Oxygen, and Nitrogen, were created in astronomical processes that took place in the past, and these elements are not spread throughout space in the form of stars and galaxies. Radioastronomers have discovered a vast array of organic molecules in the interstellar medium which have a bearing on prebiological chemical processes. Many of the molecules found so far contain the four elements, C, N, O, H. Except for the chemically unreactive He, these four elements are the most abundant in the galaxy. The origin of polyatomic interstellar molecules is an unresolved problem. While we can explain the formation of some diatomic molecules as due to two atom collisions, it is much more difficult to form polyatomic molecules by collisions between diatomic molecules and atoms. There may be other production mechanisms at work such as reactions taking place on the surface of interstellar dust grains.

This Carnegie volume discusses the origin and evolution of elements in our galaxy and others.

Solar System Evolution

Proceedings of the Fourth International Conference on the Origin of Life and the First Meeting of the International Society for the Study of the Origin of Life, Barcelona, June 25-28, 1973

In Honour of Severo Ochoa

Reflections on Biochemistry

Proceedings of the NATO Advanced Study Institute held at Maratea, Italy, June 1–12, 1981

Biotic Crises in Ecological and Evolutionary Time emerged from the third Field Museum Spring Systematic Symposium held in May 1980. The symposium attempted to explore the nature and effects of crisis over as wide a range of temporal and spatial scales as possible. To this end, contributions were included from such diverse fields as astronomy, paleobiology, ecology, and anthropology. The kinds of crises considered ranged from events in the cosmological history of the universe all the way to the effects of a single introduced species on a present-day living community. The book begins by providing a definition of "crisis" and a general discussion of methods and approaches to the study of crises. The subsequent chapters present studies on topics such as the physical mechanisms underlying the cosmological framework in which life evolved; physical disturbance in the life of plants; the impact of species introductions; and evolutionary aspects of pre- and post-interchange fossil land mammal faunas in South America.

How did life begin on the early Earth? We know that life today is driven by the universal laws of chemistry and physics. By applying these laws over the past 4.5 billion years, enormous progress has been made in understanding the molecular mechanisms that are the foundations of the living state. For instance, just a decade ago, the first human genome was published, all three billion base pairs. Using X-ray diffraction data from crystals, we can see how an enzyme molecule or a photosynthetic reaction center steps through its catalytic function. We can even visualize a ribosome, central to all life, translate genetic information into a protein. And we are just beginning to understand how molecular interactions regulate thousands of simultaneous reactions that continuously occur even in the simplest forms of life. New words have appeared that give a sense of this wealth of knowledge: The genome, the proteome, the metabolome, the interactome. But we can't be too smug. We must avoid the mistake of the physicist who, as the twentieth century began, stated confidently that we knew all there was to know about physics, that science just needed to clean up a few dusty corners. Then came relativity, quantum theory, the Big Bang, and now dark matter, dark energy and string theory. Similarly in the life sciences, the more we learn, the better we understand how little we really know. There remains a vast landscape to explore, with great questions remaining.

First multi-year cumulation covers six years: 1965–70.

Proceedings of the Fifth Trieste Conference on Chemical Evolution: An Abdus Salam Memorial Trieste, Italy, 22–26 September 1997

Origins from the Big-Bang to Civilisation Proceedings of the Iberoamerican School of Astrobiology Caracas, Venezuela, 28 November– 8 December, 1999

Cosmochemistry and the Origin of Life

Biochemistry

Current Catalog

The Evolution of Matter explains how all matter in the Universe developed following the Big Bang and through subsequent stellar processes. It describes the evolution of interstellar matter and its differentiation during the accretion of the planets and the history of the Earth. Unlike many books on geochemistry, this volume follows the chemical history of matter from the very beginning to the present, demonstrating connections in space and time. It provides also solid links from cosmochemistry to the geochemistry of Earth. The book presents comprehensive descriptions of the various isotope systematics and fractionation processes occurring naturally in the Universe, using simple equations and helpful tables of data. With a glossary of terms and over 900 references, this volume is a valuable reference for researchers and advanced students studying the chemical evolution of the Earth, the Solar System and the wider Universe.

Cosmochemical Evolution and the Origins of LifeProceedings of the Fourth International Conference on the Origin of Life and the First Meeting of the International Society for the Study of the Origin of Life Barcelona, June 25-28, 1973. Volume I: Invited PapersSpringer

Leading researchers in the area of the origin, evolution and distribution of life in the universe contributed to Exobiology: Matter, Energy, and Information in the Origin and Evolution of Life in the Universe. This volume provides a review of this interdisciplinary field. In 50 chapters many aspects that contribute to exobiology are reviewed by 90 authors. These include: historical perspective of biological evolution; cultural aspects of exobiology, cosmic, chemical and biological evolution, molecular biology, geochronology, biogeochemistry, biogeology, and planetology. Some of the current missions are discussed. Other subjects in the frontier of exobiology are reviewed, such as the search for planets outside the solar system, and the possible manifestation of intelligence in those new potential environments. The SETI research effort is well represented in this general overview of exobiology. This book is the proceedings of the Fifth Trieste Conference on Chemical Evolution that took place in September 1997. The volume is dedicated to the memory of Nobel Laureate Abdus Salam who suggested the initiation of the Trieste conferences on chemical evolution and the origin of life.

Audience: Graduate students and researchers in the many areas of basic, earth, and life sciences that contribute to the study of chemical evolution and the origin, evolution and distribution of life in the universe.

Origin and Evolution of Earth

Origin and Evolution of the Elements: Volume 4, Carnegie Observatories Astrophysics Series

Comets and the Origin of Life

An Interdisciplinary Approach

Cosmochemistry

The Present Volume Provides An Excellent Up-To-Date Account Of The Course And Development Of Biochemistry. The Text Revolves Around The Basic Principles Of Biochemistry As Well As Molecular And Biochemical Control Mechanisms Responsible For Structural, Informational And Behavioural Properties Of Cells Resulting In A Composite Picture Of Modern Biochemistry. The Book Is Organized Into Five Sections That Follows An Introductory Chapter Dealing With Biochemical Basis Of Life. Part I Treats The Foundations And Fundamentals Which Includes Four Chapters To Help Prepare A Student Finally To Enter The Realm Of Biochemistry. This Part Is Especially Designed To Clarify The Basic Concepts And Introducing Quantitation In Biochemical Sciences And Represents A Distinctive And Crucial Feature Above All The Existing Texts. Part Ii Deals With Molecular Structure And Organization Of Biomolecules. This Part Is Composed Of Five Chapters Describing In Detail, The Biochemical Organization Of Information Molecules In Living Cells. Part Iii Represents Biosynthesis Of Biomolecules Covering Five Chapters Describing In Detail The Biochemical Control Of Traffic Of Information Molecules In The Living Cells. Part Iv Describes The Dynamics Of Energy Transformation And Represents Six Chapters Dealing With The Maintenance And Expenditure Of Energy In Biochemical Processes. Part V Deals With Enzymology And Special Aspects Of Metabolism And Includes Eleven Chapters Especially Devoted To Cover Recent Developments And Topics Of Current Importance. This Volume Concludes With A Chapter Dealing With The Place And Relevance Of Biochemistry On An Interdisciplinary Platform. Every Chapter Is Followed By A Short List Of Selected General References Pertaining To That Particular Subject. There Are Seven Indices Following The Complete Write Up And Is Primarily Directed Towards Providing Additional And Extra Information Useful To Establish A Link Between All The Sections And Chapters.In View Of Academic Curriculum Existing In Various Universities And Institutions (Including Agricultural Universities), The Present Book Should Conform To The Requirements And Interests Of Honours And Postgraduate Students In Life Sciences In General Including Biochemistry, Botany, Zoology, Genetics And Microbiology.

This publication, in two volumes, includes most of the scientific papers presented at the first meeting of the International Society for the Study of the Origin of Life (ISSOL), held on June 25–28, 1973 in Barcelona, Spain. The first volume contains the invited articles and the second volume the contributed papers, which also appear in the 1974 and 1975 issues, respectively, of the new journal Origins of Life, published by D. Reidel. A relatively large number of meetings on the subject of the origin of life have been held in different places since 1957. In terms of its organization, scope, and number and nationality of participants, the Conference celebrated last year in Barcelona closely followed the three international conferences held earlier in Moscow, U.S.S.R., 1957, Wakulla Springs, U.S.A., 1963, and Pont-a-Mousson, France, 1970. For this reason the first

ISSOL meeting was also named the Ath International Conference on the Origin of Life.

This book describes the origin and evolution of the solar system, with an emphasis on interpretation rather than description. Starting with the Big Bang 15-20 billion years ago, it traces the evolution of the solar system from the separation of a disk of gas and dust, the solar nebula, 4.7 billion years ago. The problems of the formation of the Sun and the planets are considered beginning with Jupiter and the other gas giants, and ending with the formation of the Earth, the other rocky inner planets and the Moon. All planets, satellites and rings are different and random encounters have played a major role in the evolution of the system: the Moon is the product of a chance collision. The author concludes that the solar system is probably unique; other planetary systems may be common, but will probably not resemble ours either in numbers or types of planets.

Astrophysical and Cosmochemical Perspectives

Proceedings of the Fourth International Conference on the Origin of Life and the First Meeting of the International Society for the Study of the Origin of Life, Barcelona, June 25 – 28, 1973, Volume I: Invited Papers and Volume II: Contributed Papers

Proceedings of the Fourth International Conference on the Origin of Life and the First Meeting of the International Society for the Study of the Origin of Life, Barcelona, June 2,28, 1973

Protoplanetary Dust

Origins of the Earth, Moon, and Life in the Solar System: An Interdisciplinary Approach presents state-of-the-art knowledge that is based on theories, experiments, observations, calculations, and analytical data from five astro-sciences, astronomy, astrobiology, astrogeology, astrophysics, and cosmochemistry. Beginning with the origin of elements, and moving on to cover the formation of the early Solar System, the giant impact model of the Earth and Moon, the oldest records of life, and the possibility of life on other planets in the Solar System, this interdisciplinary reference provides a complex understanding of the planets and the formation of life. Synthesizing concepts from all branches of astro-sciences into one, the book is a valuable reference for researchers in astrogeology, astrophysics, cosmochemistry, astrobiology, astronomy, and other space science fields, helping users better understand the intersection of these sciences. Includes extensive figures and tables to enhance key concepts Uses callout boxes throughout to provide context and deeper explanations Presents up-to-date information on the universe, stars, planets, moons, and life in the solar system Combines knowledge from the fields of astrogeology, astrophysics, cosmochemistry, astrobiology, and astronomy, helping readers understand the origins of the Earth, the moon, and life in our solar system

Questions about the origin and nature of Earth and the life on it have long preoccupied human thought and the scientific endeavor. Deciphering the planet's history and processes could improve the ability to predict catastrophes like earthquakes and volcanic eruptions, to manage Earth's resources, and to anticipate changes in climate and geologic processes. At the request of the U.S. Department of Energy, National Aeronautics and Space Administration, National Science Foundation, and U.S. Geological Survey, the National Research Council assembled a committee to propose and explore grand questions in geological and planetary science. This book captures, in a series of questions, the essential scientific challenges that constitute the frontier of Earth science at the start of the 21st century.

The return of Halley's Comet in 1986 has generated much excitement in the scientific community with preparations already afoot for an International Comet Watch and a comet launch by the European Space Community, the Japanese and Soviet Space Scientists. The meeting held at the University of Maryland in October 1980 was primarily stimulated by the preparations for further study of this comet and by one of the most important unanswered questions related to comets, namely, whether they may have made a contribution to the origin of life on earth. Our understanding of the role of comets in the origin of life must necessarily come from our studies of the astronomy and the chemistry of comets. Some clues to the processes which led to the formation of organic molecules and eventually to the appearance of life have come from these studies of comets, perhaps the most ancient of all objects in our solar system. Whether there is, however, a biology of comets still remains to be seen, although some claims have been made that perhaps comets might themselves provide an environment for even the beginnings of life. Scientists with the latest available information on comets and differing opinions as to the role of comets in the origin of life attended this symposium. The formal papers presented are now being made available to the students of chemical evolution within the pages of this volume.

Origins and Evolution of Life

4th International Conference on the Origin of Life, and 1st Meeting of the International Society for the Study of the Origin of Life, Barcelona, June 1973, Proceedings. Contributed papers

Chemical Evolution and the Origin of Life

The Evolution of Matter

Contributed papers

Devoted to exploring questions about the origin and evolution of life in our Universe, this highly interdisciplinary book brings together a broad array of scientists. Thirty chapters assembled in eight major sections convey the knowledge accumulated and the richness of the debates generated by this challenging theme. The text explores the latest research on the conditions and processes that led to the emergence of life on Earth and, by extension, perhaps on other planetary bodies. Diverse sources of knowledge are integrated, from astronomical and geophysical data, to the role of water, the origin of minimal life properties and the oldest traces of biological activity on our planet. This text will not only appeal to graduate students but to the large body of scientists interested in the challenges presented by the origin of life, its evolution, and its possible existence beyond Earth.

Proceedings of the Fourth International Conference on the Origin of Life and the First Meeting of the International Society for the Study of the Origin of Life (ISSOL), Barcelona, June 25-28, 1973. Vol. II: Contributed Papers

Reflections on Biochemistry: In Honour of Severo Ochoa offers reflections on a wide range of topics relating to biochemistry, including energy metabolism, lipids and saccharides, regulation, nucleic acids and the genetic code, protein biosynthesis, and cell biology. The essays celebrate Severo Ochoa's outstanding contributions to biochemistry spanning nearly half a century. This book is comprised of 47 chapters and begins with a biography of Ochoa and his scientific work in the field of biochemistry, particularly his research on intermediary metabolism, RNA synthesis, and the genetic code. The discussion then turns to energy metabolism, photosynthesis, and fermentation, touching on topics such as the role of lactic acid in the development of biochemistry and the biosynthesis of cell components from acetate. The next section is devoted to lipids, saccharides, and cell walls and includes chapters that deal with biotin, sulfur biochemistry, and dipicolinic acid. Subsequent chapters explore hormonal regulation of adipose tissue lipolysis; the structural relationship between genes and enzymes; bacteriophages, colicins, and ribosomes; and cell biology and neurobiology. This monograph will be of interest to biochemists and students of biochemistry.

Astrobiology

Origins of the Earth, Moon, and Life

Origins from the Big-Bang to Civilisation : Proceedings of the Iberoamerican School of Astrobiology, Caracas, Venezuela, 28 November-8 December 1999

Biotic Crises in Ecological and Evolutionary Time

Research Questions for a Changing Planet