

Alchemy And Chemistry In The 16th And 17th Centuries

Bridging Traditions explores the connections between apparently different zones of comprehension and experience[magic and experiment, alchemy and mechanics, practical mathematics and geometrical mysticism, things earthy and heavenly, and especially science and medicine]by focusing on points of intersection among alchemy, chemistry, and Paracelsian medical philosophy. In exploring the varieties of natural knowledge in the early modern era, the authors pay tribute to the work of Allen Debus, whose own endeavors cleared the way for scholars to examine subjects that were once snubbed as suitable only to the refuse heap of the history of science.

Ideas of the alchemists -- Origin of alchemical practice -- First alchemists -- Earliest alchemical signs and symbols -- Chinese alchemy -- Alchemists of Islam -- Alchemists in Europe -- Alchemy in the fourteenth century -- English alchemists -- Alchemical symbolism -- Stories of transmutations -- From alchemy to chemistry -- Hermetic philosophy -- Relation of alchemy to science.

Alchemists are generally held to be the quirky forefathers of science, blending occultism with metaphysical pursuits. Although many were intelligent and well-intentioned thinkers, the oft-cited goals of alchemy paint these antiquated experiments as wizardry, not scientific investigation. Whether seeking to produce a miraculous panacea or struggling to transmute lead into gold, the alchemists radical goals held little relevance to consequent scientific pursuits. Thus, the temptation is to view the transition from alchemy to modern science as one that discarded fantastic ideas about philosophers stones and magic potions in exchange for modest yet steady results. It has been less noted, however, that the birth of atomic science actually coincided with an efflorescence of occultism and esoteric religion that attached deep significance to questions about the nature of matter and energy. Mark Morrisson challenges the widespread dismissal of alchemy as a largely insignificant historical footnote to science by prying into the revival of alchemy and its influence on the emerging subatomic sciences of the late 19th and early 20th centuries.Morrisson demonstrates its surprising influence on the emerging subatomic sciences of the late 19th and early 20th centuries. Specifically, Morrisson examines the resurfacing of occult circles during this time period and how their interest in alchemical tropes had a substantial and traceable impact upon the science of the day. Modern Alchemy chronicles several encounters between occult conceptions of alchemy and the new science, describing how academic chemists, inspired by the alchemy revival, attempted to transmute the elements; to make gold. Examining scientists publications, correspondence, talks, and laboratory notebooks as well as the writings of occultists, alchemical tomes, and science-fiction stories, he argues that during the birth of modern nuclear physics, the trajectories of science and occultism---so often considered antithetical---briefly merged.

A History of Chemistry from Alchemy to the Buckyball

Chymistry and the Experimental Origins of the Scientific Revolution

Bridging Traditions

Chemistry's Lively History From Alchemy To The Atomic Age

The Four Books of Pseudo-Democritus

Distilling Knowledge

Praise for From Alchemy to Chemistry in Picture and Story "The timeline from alchemy to chemistry contains some of the most mystifying ideas and images that humans have ever devised. Arthur Greenberg shows us this wonderful world in a unique and highly readable book." –Dr. John Emsley, author of The Elements of Murder: A History of Poison "Art Greenberg takes us, through text and lovingly selected images, on a 'magical mystery tour' of the chemical universe. No matter what page you open, there is a chemical story worth telling." –Dr. Roald Hoffmann, Nobel Laureate and coauthor of Chemistry Imagined "Chemistry has perhaps the most intricate, most fascinating, and certainly most romantic history of all the sciences. Arthur Greenberg's essays-delightful, learned, quirky, highly personal, and richly illustrated with contemporary drawings (many of great rarity and beauty)-provide a kaleidoscope of intellectual landscapes, bringing the experiments, the ideas, and the human figures of chemistry's past intensely alive." –Dr. Oliver Sacks, author of Awakenings From Alchemy to Chemistry in Picture and Story takes you on an illustrated tour of chemistry's fascinating history, from its early focus on the spiritual relationship between man and nature to some of today's most cutting-edge applications. Drawing from rare publications and artwork that span over five centuries, the book contains nearly 200 essays and over 350 illustrations-including 24 in full color-that tell the engaging story of the development of this fundamental science and its connection with human history. Join Arthur Greenberg as he combines the "best of the best" from his previous works (as well as several new essays) to paint a colorful picture of chemistry's remarkable origins! Well-researched study traces history of alchemy, chronicling search for philosopher's stone and elixir of life, alchemist's laboratory and apparatus, symbols and secret alphabets, famous practitioners, plus contributions to field of chemistry. 77 black-and-white illustrations, 31 plates.

Transforming Matter provides an accessible and clearly written introduction to the history of chemistry, telling the story of how the discipline has developed over the years.

Alchemy and chemistry in the seventeenth century: papers read by A.G.Debus and R.P.Multhauf at a Clark Library Seminar, March 12, 1966

Prelude to Chemistry

Alchemy Tried in the Fire

Exhibited at the Grolier Club ... New-York, Jan. 16th to Jan 26th, 1891

The Chemical Choir

Real Alchemy

Reacting to the perception that the break, early on in the scientific revolution, between alchemy and chemistry was clean and abrupt, Moran literately and engagingly recaps what was actually a slow process. Far from being the superstitious amalgam it is now considered, alchemy was genuine science before and during the scientific revolution. The distinctive alchemical procedure--distillation--became the fundamental method of analytical chemistry, and the alchemical goal of transmuting "base metals" into gold and silver led to the understanding of compounds and elements. What alchemy very gradually but finally lost in giving way to chemistry was its spiritual or religious aspect, the linkages it discerned between purely physical and psychological properties. Drawing saliently from the most influential alchemical and scientific texts of the medieval to modern epoch (especially the turbulent and eventful seventeenth century), Moran fashions a model short history of science volume.

The Four Books of pseudo-Democritus, written in the first century AD, rank among the very earliest known alchemical writings. In this volume, Matteo Martelli presents not only a fresh edition and translation of the surviving Greek fragments, but also, for the first time, additional materials preserved in Syriac. The volume also presents important examples of the medieval and early modern reception of these writings, including the dialogue of Synesius and Dioscorus – the most influential Byzantine commentary on the Four Books – and previously unpublished Latin translations of both the Four Books and Synesius' commentary made by Matthaeus Zuber in 1606. Accompanied by a full introduction and commentary, these sources offer new and significant insights into the world of ancient chemistry: practical recipes and lists of ingredients, clues to the doctrinal content of ancient alchemy, and early hints of a tradition that linked the alchemist' Democritus' to the wisdom of Egypt and Persia.

Alchemy is one of the most evocative subjects in the history of science. Alchemy made important contributions to the development of modern science while firing popular imagination so strongly that portrayals of the alchemist at work pervaded the arts. The more celebrated goals of alchemy, like transmutation of base metals into gold, still tease and tantalize. Transmutations offers a thoughtful look at the role of the alchemist in the 17th and 18th centuries, as depicted in a selection of paintings from the Eddleman and Fisher Collections housed at the Chemical Heritage Foundation. This beautiful full-color book reveals much about the beginnings of chemistry as a profession.

Transforming Matter

Alchemy and Chemistry

A Chemical History Tour

Selected Works from the Eddleman and Fisher Collections at the Chemical Heritage Foundation

The Chemistry of Alchemy

The Secrets of Alchemy

This volume consists of two parts. The first deals with alchemy andprelavoisian chemistry with papers on Democritus, Christine of Pizan, vanHelmont, de Clave, Matte La Faveur, Marie Meurdrac and Galvani. The secondpart includes papers on chemistry in the 20th century in its political, academic and industrial context
CHAPTER I THE EXPLANATION OF MATERIAL CHANGES GIVEN BY THE GREEK THINKERS. For thousands of years before men had any accurate and exact knowledge of the changes of material things, they had thought about these changes, regarded them as revelations of spiritual truths, built on them theories of things in heaven and earth (and a good many things in neither), and used them in manufactures, arts, and handicrafts, especially in one very curious manufacture wherein not the thousandth fragment of a grain of the finished article was ever produced. The accurate and systematic study of the changes which material things undergo is called chemistry; we may, perhaps, describe alchemy as the superficial, and what may be called subjective, examination of these changes, and the speculative systems, and imaginary arts and manufactures, founded on that examination. We are assured by many old writers that Adam was the first alchemist, and we are told by one of the initiated that Adam was created on the sixth day, being the 15th of March, of the first year of the world; certainly alchemy had a long life, for chemistry did not begin until about the middle of the 18th century. No branch of science has had so long a period of incubation as chemistry. There must be some extraordinary difficulty in the way of disentangling the steps of those changes wherein substances of one kind are produced from substances totally unlike them. To inquire how those of acute intellects and much learning regarded such occurrences in the times when man's outlook on the world was very different from what it is now, ought to be interesting, and the results of that inquiry must surely be instructive. If the reader turns to a modern book on chemistry (for instance, The Story of the Chemical Elements, in this series), he will find, at first, superficial descriptions of special instances of those occurrences which are the subject of the chemist's study; he will learn that only certain parts of such events are dealt with in chemistry; more accurate descriptions will then be given of changes which occur in nature, or can be produced by altering the ordinary conditions, and the reader will be taught to see certain points of likeness between these changes; he will be shown how to disentangle chemical occurrences, to find their similarities and differences; and, gradually, he will feel his way to general statements, which are more or less rigorous and accurate expressions of what holds good in a large number of chemical processes; finally, he will discover that some generalisations have been made which are exact and completely accurate descriptions applicable to every case of chemical change. But if we turn to the writings of the alchemists, we are in a different world. There is nothing even remotely resembling what one finds in a modern book on chemistry. Here are a few quotations from alchemical writings: "It is necessary to deprive matter of its qualities in order to draw out its soul.... Copper is like a man; it has a soul and a body ... the soul is the most subtle part ... that is to say, the tinctorial spirit. The body is the ponderable, material, terrestrial thing, endowed with a shadow.... After a series of suitable treatments copper becomes without shadow and better than gold.... The elements grow and are transmuted, because it is their qualities, not their substances which are contrary." (Stephanus of Alexandria, about 620 A.D.)

The present volume owes its ongm to a Colloquium on "Alchemy and Chemistry in the Sixteenth and Seventeenth Centuries", held at the Warburg Institute on 26th and 27th July 1989. The Colloquium focused on a number of selected themes during a closely defined chronological interval: on the relation of alchemy and chemistry to medicine, philosophy, religion, and to the corpuscular philosophy, in the sixteenth and seventeenth centuries. The relations between Medicina and alchemy in the Lullian treatises were examined in the opening paper by Michela Pereira, based on researches on unpublished manuscript sources in the period between the 14th and 17th centuries. It is several decades since the researches of R.F. Multhauf gave a prominent role to Johannes de Rupescissa in linking medicine and alchemy through the concept of a quinta essentia. Michela Pereira explores the significance of the Lullian tradition in this development and draws attention to the fact that the early Paracelsians had themselves recognized a family resemblance between the works of Paracelsus and Roger Bacon's scientia experimentalis and, indeed, a continuity with the Lullian tradition.

The History of Chemistry

Their Changing Roles from Alchemical Times to the Mid-twentieth Century

The Aspiring Adept

The Story of Alchemy and Early Chemistry (The Story of Early Chemistry)

Chemistry, Alchemy, and the New Philosophy, 1550-1700

Reproduction of the original: The Sceptical Chymist by Robert Boyle

Broad, humanistic treatment focuses on great figures of chemistry and ideas that revolutionized the science. Much on alchemy, also development of modern chemistry, atomic theory, elements, organic chemistry, more. 50 illustrations.

The Aspiring Adept presents a provocative new view of Robert Boyle (1627-1691), one of the leading figures of the Scientific Revolution, by revealing for the first time his avid and lifelong pursuit of alchemy. Boyle has traditionally been considered, along with Newton, a founder of modern science because of his mechanical philosophy and his experimentation with the air-pump and other early scientific apparatus. However, Lawrence Principe shows that his alchemical quest--hidden first by Boyle's own codes and secrecy, and later suppressed or ignored--positions him more accurately in the intellectual and cultural crossroads of the seventeenth century. Principe radically reinterprets Boyle's most famous work, The Sceptical Chymist, to show that it criticizes not alchemists, as has been thought, but "unphilosophical" pharmacists and textbook writers. He then shows Boyle's unambiguous enthusiasm for alchemy in his "lost" Dialogue on the Transmutation and Melioration of Metals, now reconstructed from scattered fragments and presented here in full for the first time. Intriguingly, Boyle believed that the goal of his quest, the Philosopher's Stone, could not only transmute base metals into gold, but could also attract angels. Alchemy could thus act both as a source of knowledge and as a defense against the growing tide of atheism that tormented him. In seeking to integrate the seemingly contradictory facets of Boyle's work, Principe also illuminates how alchemy and other "unscientific" pursuits had a far greater impact on early modern science than has previously been thought.

Robert Boyle and His Alchemical Quest

From Alchemy to Chemistry

Through Alchemy to Chemistry

Breaking Up and Making Up (again and Again) : Dibner Library Lecture December 11, 2014

Occultism and the Emergence of Atomic Theory

The Historical Background of Chemistry

Take a stroll through this one-of-a-kind book that offers readers an illustrated tour of how chemistry developed, from alchemy to the emergence of chemistry as a scientific discipline in the early 17th century, and, finally, modern-day chemistry. Discover this rare collection of more than 180 illustrations spanning 400 years of chemical publications, with each illustration accompanied by an essay discussing its significance in the context of historical scientific beliefs as well as modern chemical science. The author's knowledge and enthusiasm for the books, images, and subject matter are clearly reflected throughout the very readable, informative, and frequently funny essays. High-quality, full-page reproductions from the author's art collection, published from 1599 to the present, are eloquently displayed.

A provocative history of the people behind the greatest discoveries in chemistry

Classic popular account of the great chemists Trevisan, Paracelsus, Avogadro, Mendeléeef, the Curies, Thomson, Lavoisier, and others, up to A-bomb research and recent work with subatomic particles. 20 illustrations.

Alchemy, Chemistry, and Paracelsian Practices in the Early Modern Era

The Sceptical Chymist

From Dragon's Blood to Donkey Dung, How Chemistry Was Forged

Atoms and Alchemy

Creations Of Fire

Picturing Chemistry from Alchemy to Modern Molecular Science

A ground-breaking modern manual on an ancient art, Real Alchemy draws on both modern scientific technology and ancient methods. A laboratory scientist and chemist, Robert Allen Bartlett provides an overview of the history of alchemy, as well as an exploration of the theories behind the practice. Clean, clear, simple, and easy to read, Real Alchemy provides excellent directions regarding the production of plant products and transitions the reader-student into the basics of mineral work—what some consider the true domain of alchemy. New students to practical laboratory alchemy will enjoy reading Real Alchemy and hopefully find the encouragement needed to undertake their own alchemical journey. Bartlett also explains what the ancients really meant when they used the term “Philosopher’s Stone” and describes several very real and practical methods for its achievement. Is the fabled Philosopher’s Stone an elixir of long life or is it a method of transforming lead into gold? Judge for yourself.

Early practical chemistry. Scientific ideas of the ancient world. Greek science. Hellenistic culture and the rise of alchemy. Chinese alchemy. Arabic alchemy. The transmission of chemistry to the west. The fourteenth and fifteenth century, a periodic of technical chemistry. Chemical practice and theory in the first half of the seventeenth century.

The spread of atomistic theories. Theories of the eighteenth century: phlogiston and affinity. Laboratory discoveries of the eighteenth century: the chemistry of gases. Lavoisier and the foundation of modern chemistry. The laws of atomic combination. Electrochemistry and chemical affinity. The development of organic chemistry: the radical and unitary theories. Organic chemistry from the theory of types to the structural theory. The systematization of inorganic chemistry. Physical chemistry in the nineteenth century. The development of chemistry as a profession during the nineteenth century. Radioactivity and atomic structure.

An accessible history of alchemy by a leading world authority explores its development and relationship with myriad disciplines and pursuits, tracing its heyday in early modern Europe while profiling some of history's most colorful alchemists and describing the author's recreation of famous alchemy recipes.

Founders of Modern Chemistry

From Alchemy to Chemistry in Picture and Story

The Story of Alchemy and the Beginnings of Chemistry

A Procession of Ideas & Personalities

A New System of Chemical Philosophy ...

Alchemy, Chemistry, and Pharmacy

Through Alchemy to ChemistryA Procession of Ideas & PersonalitiesThe Chemistry of AlchemyFrom Dragon's Blood to Donkey Dung, How Chemistry Was ForgedPrometheus Books

Since the Enlightenment, alchemy has been viewed as a sort of antiscience, disparaged by many historians as a form of lunacy that impeded the development of rational chemistry. But in *Atoms and Alchemy*, William R. Newman—a historian widely credited for reviving recent interest in alchemy—exposes the speciousness of these views and challenges widely held beliefs about the origins of the Scientific Revolution. Tracing the alchemical roots of Robert Boyle’s famous mechanical philosophy, Newman shows that alchemy contributed to the mechanization of nature, a movement that lay at the very heart of scientific discovery. Boyle and his predecessors—figures like the mysterious medieval Geber or the Lutheran professor Daniel Sennert—provided convincing experimental proof that matter is made up of enduring particles at the microlevel. At the same time, Newman argues that alchemists created the operational criterion of an “atomic” element as the last point of analysis, thereby contributing a key feature to the development of later chemistry. *Atoms and Alchemy* thus provokes a refreshing debate about the origins of modern science and will be welcomed—and deliberated—by all who are interested in the development of scientific theory and practice.

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Transmutations--alchemy in Art

A Primer of Practical Alchemy

The Story of Chemistry from Ancient Alchemy to Nuclear Fission

Starkey, Boyle, and the Fate of Helmontian Chymistry

Papers Read at a Clark Library Seminar, March 12, 1966

Catalogue of Works on Alchemy and Chemistry

A unique approach to the history of science using do-it-yourself experiments along with brief historical profiles to demonstrate how the ancient alchemists stumbled upon the science of chemistry. Be the alchemist! Explore the legend of alchemy with the science of chemistry. Enjoy over twenty hands-on demonstrations of alchemical reactions. In this exploration of the ancient art of alchemy, three veteran chemists show that the alchemists' quest involved real science and they recount fascinating stories of the sages who performed these strange experiments. Why waste more words on this weird deviation in the evolution of chemistry? As the authors show, the writings of medieval alchemists may seem like the ravings of brain-addled fools, but there is more to the story than that. Recent scholarship has shown that some seemingly nonsensical mysticism is, in fact, decipherable code, and Western European alchemists functioned from a firmer theoretical foundation than previously thought. They had a guiding principle, based on experience: separate and purify materials by fire and reconstitute them into products, including, of course, gold and the universal elixir, the Philosophers' stone. Their efforts were not in vain: by trial, by error, by design, and by persistence, the alchemists discovered acids, alkalis, alcohols, salts, and exquisite, powerful, and vibrant reactions--which can be reproduced using common products, minerals, metals, and salts. So gather your vats and stoke your fires! Get ready to make burning waters, peacocks' tails, Philosophers' stone, and, of course, gold!

Describes the origin and development of alchemy from the practices of mining and metallurgy in ancient Egypt and Greece to the beginnings of modern chemistry in the eighteenth century

This book is written as a result of a personal conviction of the value of incorporating historical material into the teaching of chemistry, both at school and undergraduate level. Indeed, it is highly desirable that an undergraduate course in chemistry incorporates a separate module on the history of chemistry. This book is therefore aimed at teachers and students of chemistry, and it will also appeal to practising chemists. While the last 25 years has seen the appearance of a large number of specialist scholarly publications on the history of chemistry, there has been little written in the way of an introductory overview of the subject. This book fills that gap. It incorporates some of the results of recent research, and the text is illustrated throughout. Clearly, a book of this length has to be highly selective in its coverage, but it describes the themes and personalities which in the author's opinion have been of greatest importance in the development of the subject. The famous American historian of science, Henry Guerlac, wrote: 'It is the central business of the historian of science to reconstruct the story of the acquisition of this knowledge and the refinement of its method or methods, and-perhaps above all-to study science as a human activity and learn how it arose, how it developed and expanded, and how it has influenced or been influenced by man's material, intellectual, and even spiritual aspirations' (Guerlac, 1977). This book attempts to describe the development of chemistry in these terms.

Alchemy and Alchemists

A History of Alchemy

The Alchemists

An Outline of Alchemy, Its Literature and Relationships

Studies in the History of Science and Medicine

Alchemy and Chemistry in the Seventeenth Century

Discusses the lives and scientific contributions of more than fifty women chemists from antiquity through the present day.

Alchemy is an idea based on superstition and philosophical global traditions spanning hundreds of years. Alchemists made medicines and pharmaceuticals from the earth's materials and purified objects through philosophy, magic, and spirituality. Chemistry is based on the material principles of mixed bodies, and spans all natural or physical sciences in its practices. This book on alchemy and chemistry shows the scientific method at work and proves and disproves the subjects at hand. It explores a branch of modern science or a major scientific milestone, comparing and contrasting it with an older idea that has been proved wrong or fails to meet the strict and studied standards of science.

Winner of the 2005 Pfizer Prize from the History of Science Society. What actually took place in the private laboratory of a mid-seventeenth century alchemist? How did he direct his quest after the secrets of Nature? What instruments and theoretical principles did he

employ? Using, as their guide, the previously misunderstood interactions between Robert Boyle, widely known as "the father of chemistry," and George Starkey, an alchemist and the most prominent American scientific writer before Benjamin Franklin as their guide, Newman and

Principe reveal the hitherto hidden laboratory operations of a famous alchemist and argue that many of the principles and practices characteristic of modern chemistry derive from alchemy. By analyzing Starkey's extraordinary laboratory notebooks, the authors show how this

American "chymist" translated the wildly figurative writings of traditional alchemy into quantitative, carefully reasoned laboratory practice—and then encoded his own work in allegorical, secretive treatises under the name of Eirenaeus Philalethes. The intriguing "mystic"

Joan Baptista Van Helmont—a favorite of Starkey, Boyle, and even of Lavoisier—emerges from this study as a surprisingly central figure in seventeenth-century "chymistry." A common emphasis on quantification, material production, and analysis/synthesis, the authors argue,

illustrates a continuity of goals and practices from late medieval alchemy down to and beyond the Chemical Revolution. For anyone who wants to understand how alchemy was actually practiced during the Scientific Revolution and what it contributed to the development of

modern chemistry, *Alchemy Tried in the Fire* will be a veritable philosopher's stone.

Alchemy, Chemistry, and the Scientific Revolution

Alchemy and Chemistry in the 16th and 17th Centuries

Crucibles

Modern Alchemy

Women in Chemistry