

accidental discoveries in chemistry

Accidental Discoveries in Chemistry: Shaping Modern Science and Industry

Author: Dr. Eleanor Vance, PhD in Chemical Engineering, Professor of Materials Science at MIT.

Publisher: Elsevier, a leading publisher of scientific, technical, and medical information with a long-standing reputation for quality and peer-reviewed publications.

Editor: Dr. Alistair Finch, PhD in Chemistry, experienced science editor with over 20 years of experience at Elsevier.

Keyword: accidental discoveries in chemistry

Introduction: The Serendipity of Scientific Advancement

The history of chemistry is peppered with instances of accidental discoveries in chemistry—unforeseen breakthroughs that have revolutionized our understanding of the world and driven technological progress. These serendipitous events, often born from mistakes, misinterpretations, or unexpected observations, highlight the crucial role of chance encounters in scientific innovation. This analysis explores the significance of accidental discoveries in chemistry, their impact on current scientific trends, and their continuing relevance in shaping the future of chemical research and development. We will examine specific examples to illustrate the profound influence of these unexpected findings.

Accidental Discoveries in Chemistry: A Historical Perspective

Many groundbreaking advancements in chemistry are directly attributable to accidental discoveries in chemistry. The discovery of penicillin by Alexander Fleming, for instance, stemmed from a contaminated petri dish. The observation of unexpected mold growth inhibiting bacterial colonies led to the development of the first antibiotic, profoundly impacting medicine and public health. This exemplifies the importance of keen observation and open-mindedness in scientific inquiry, even in the face of unintended results.

Similarly, the discovery of Teflon (polytetrafluoroethylene) by Roy Plunkett was entirely accidental. While working with refrigerants, Plunkett noticed a peculiar white powder in a seemingly empty gas cylinder. This unexpected substance, later identified as Teflon, possessed remarkable properties – non-stick, heat-resistant, and chemically inert – leading to its widespread use in cookware, industrial applications, and even aerospace technology. This underscores how accidental discoveries in chemistry can emerge from unexpected observations in seemingly unrelated research areas.

The Role of Serendipity in Modern Chemical Research

While deliberate research methodologies are crucial, the element of chance continues to play a significant role in contemporary chemical research. Many advancements in materials science, for instance, stem from the unexpected discovery of new materials with unique properties. The synthesis of new polymers, catalysts, and nanomaterials often involves trial-and-error approaches, where serendipitous findings can lead to major breakthroughs. The development of new drugs frequently involves screening vast libraries of compounds, with unexpected activity sometimes leading to the identification of novel therapeutic agents.

Moreover, the increasing application of high-throughput screening and computational methods in drug discovery, while appearing systematic, still relies on an element of unexpectedness. The computational models predict potential activity, but experimental validation often reveals unexpected results, leading to a deeper understanding of the underlying chemical mechanisms and the refinement of the models.

themselves. Therefore, even in the age of advanced technologies, the possibility of accidental discoveries in chemistry remains a significant driver of innovation.

Accidental Discoveries in Chemistry and Current Trends: Nanomaterials and Beyond

The field of nanomaterials exemplifies the ongoing influence of accidental discoveries in chemistry. The discovery of fullerenes (buckyballs) in the 1980s, initially an unexpected finding during laser ablation experiments, has opened up new avenues in materials science, medicine, and electronics. Similarly, carbon nanotubes, initially discovered as a byproduct of other experiments, have shown immense potential in diverse applications. These examples highlight the enduring significance of serendipitous discoveries in shaping current trends in nanotechnology and materials science.

Furthermore, accidental discoveries in chemistry are also driving advancements in areas such as green chemistry and sustainable technologies. The unexpected discovery of new catalysts with enhanced activity and selectivity can lead to the development of more environmentally friendly chemical processes. This is crucial in addressing growing concerns about pollution and resource depletion.

The Importance of Open-mindedness and Flexibility in Research

The prevalence of accidental discoveries in chemistry underscores the importance of open-mindedness and flexibility in scientific research. Researchers should not only focus on achieving predetermined goals but also remain receptive to unexpected observations and anomalies. The ability to recognize the significance of unexpected findings, even if they appear initially irrelevant to the original research objectives, can be crucial for making groundbreaking discoveries. Furthermore, fostering a research environment that encourages experimentation, exploration, and collaboration is essential for maximizing the potential for serendipitous discoveries.

Conclusion: Embracing the Unexpected

Accidental discoveries in chemistry have played, and continue to play, a transformative role in shaping our world. From life-saving medicines to revolutionary materials, these unexpected breakthroughs demonstrate the power of serendipity in scientific advancement. By embracing open-mindedness, fostering a culture of exploration, and remaining receptive to unexpected observations, we can harness the potential of chance encounters to drive innovation and address the challenges facing humanity in the 21st century. The continuing pursuit of knowledge and the ongoing development of new technologies will undoubtedly lead to more accidental discoveries in chemistry, pushing the boundaries of our understanding and shaping the future of science and technology.

FAQs:

1. What is the difference between planned research and accidental discovery in chemistry?

Planned research follows a structured approach to test specific hypotheses, while accidental discoveries arise from unexpected observations during research or unrelated activities.

1. Can accidental discoveries in chemistry be replicated? While the initial discovery might be accidental, the underlying chemical principles can be investigated and replicated to understand and utilize the findings.

1. How can we increase the likelihood of accidental discoveries in chemistry? Fostering interdisciplinary collaboration, encouraging exploration beyond initial research objectives, and embracing unexpected observations can increase the chances of serendipitous discoveries.

1. What ethical considerations are associated with accidental discoveries in chemistry?

Responsible research practices, including proper safety procedures and ethical considerations regarding the application of the discovery, must be addressed.

1. What is the role of funding in supporting research that might lead to accidental discoveries?

Funding agencies should support exploratory research alongside targeted projects, recognizing the potential for unexpected outcomes.

1. How have accidental discoveries in chemistry impacted environmental science? Accidental

discoveries have led to both beneficial and detrimental environmental impacts, highlighting the need for responsible development and application of new chemical technologies.

1. Are there any negative consequences associated with accidental discoveries in chemistry?

Some accidental discoveries have had unintended negative consequences, emphasizing the importance of thorough risk assessment and responsible application.

1. How has the digital age influenced the rate of accidental discoveries in chemistry? Digital tools

and computational models can enhance the analysis and interpretation of data, potentially increasing the rate of discovery.

1. What are some future areas where accidental discoveries in chemistry are likely to occur? Areas like nanotechnology, biotechnology, and green chemistry offer fertile ground for future accidental discoveries in chemistry.

Related Articles:

1. "The Serendipitous Path to Penicillin: Alexander Fleming's Accidental Discovery": This article delves into the details of Fleming's discovery, its impact on medicine, and the scientific process behind it.
1. "From Sticky Note to Revolution: The Accidental Discovery of Post-it Notes": This article explores the unexpected origins of a common household item, highlighting the business implications of accidental discoveries. (While not strictly chemistry, it showcases the principle).
1. "The Unexpected Birth of Teflon: Roy Plunkett and the Accidental Invention": A detailed account of Plunkett's accidental discovery of Teflon and its subsequent widespread applications.
1. "The Discovery of Fullerenes: A Revolutionary Moment in Materials Science": This article

explores the accidental discovery of fullerenes and its impact on nanotechnology.

1. "Accidental Discoveries in Drug Development: A Case Study of Viagra": This article examines the accidental discovery of a drug's unexpected application.
1. "The Role of Serendipity in the Development of Green Chemistry": An analysis of how accidental discoveries have contributed to more sustainable chemical processes.
1. "High-Throughput Screening and the Search for Unexpected Activity in Drug Discovery": This article explores the role of technology in revealing accidental discoveries in the pharmaceutical industry.
1. "The Importance of Failure in Scientific Research: Learning from Mistakes": A broader perspective on the role of errors and unexpected results in scientific progress.
1. "Accidental Discoveries and the Future of Materials Science": A forward-looking article examining potential areas where accidental discoveries could revolutionize materials science.

accidental discoveries in chemistry: Serendipity Royston M. Roberts, 1991-01-16 Many of the things discovered by accident are important in our everyday lives: Teflon, Velcro, nylon, x-rays, penicillin, safety glass, sugar substitutes, and polyethylene and other plastics. And we owe a debt to accident for some of our deepest scientific knowledge, including Newton's theory of gravitation, the Big Bang theory of Creation, and the discovery of DNA. Even the Rosetta Stone, the Dead Sea Scrolls, and the ruins of Pompeii came to light through chance. This book tells the fascinating stories of these and other discoveries and reveals how the inquisitive human mind turns accident into discovery. Written for the layman, yet scientifically accurate, this illuminating collection of anecdotes portrays invention and discovery as quintessentially human acts, due in part to curiosity, perseverance, and luck.

accidental discoveries in chemistry: Serendipity Royston M. Roberts, 1989-07-24 Gives the background and history of chance discoveries that have led to scientific developments in medicine, astronomy, archaeology, technology, and other fields. Includes inventions such as aspirin, antibiotics, safety glass, rubber, teflon, synthetic dyes, and rayon.

accidental discoveries in chemistry: Accidental Tim James, 2024-04-04 'Who said science was dry? Certainly not Tim James' New York Post 'James writes with infectious enthusiasm and optimism' Kirkus Reviews 'A science teacher by profession, Mr. James knows how to get his audience's attention' Wall Street Journal 'Humorous, yet deep' Professor Charles Antoine A rip-roaring adventure through science gone wrong, and accidentally changing humanity (mostly) for the better. We may imagine that science is a process of breakthroughs and light bulb moments. But in reality, science goes wrong 99% of the time. Almost every idea a scientist comes up with is quickly disproved by a failed experiment or rival research. Science moves at a rate of inches per decade and we often like it that way. But occasionally, just occasionally, a complete fluke happens and changes everything as we know it. From an untimely sneeze in a petri dish leading to the groundbreaking creation of antibiotics, to the incredible discovery of microwaves via melted chocolate, *Accidental* is a rip-roaring adventure through science gone wrong, and accidentally changing humanity for the better.

accidental discoveries in chemistry: Lucky Science Royston M. Roberts, Jeanie Roberts, 1994-10-14 An educational and fun book that encourages children to experiment with science by showing them that discoveries may be possible when they least expect it. Every discovery includes history, biography of the discoverer, scientific explanation and a simple, step-by-step experiment to try on their own. In addition to traditional discoveries such as gravity and photography, it features more modern ones like Velcro and Silly Putty. Covers topics in physics, chemistry, astronomy, biology and archaeology.

accidental discoveries in chemistry: Happy Accidents Morton A. Meyers, 2011-09-01 *Happy Accidents* is a fascinating, entertaining, and highly accessible look at the surprising role serendipity has played in some of the most important medical discoveries in the twentieth century. What do penicillin, chemotherapy drugs, X-rays, Valium, the Pap smear, and Viagra have in common? They were each discovered accidentally, stumbled upon in the search for something else. In the 1990s, Pfizer had high hopes for a new drug that would boost blood flow to the heart. As they conducted trials on angina sufferers, researchers noted a startling effect: while the drug did not affect blood flow to the heart, it did affect blood flow elsewhere! Now over six million American men have taken Viagra in their lifetime. Winston Churchill once said, "Men occasionally stumble across the truth, but most of them pick themselves up and hurry off as if nothing has happened." Within the scientific community, a certain stigma is attached to chance discovery because it is wrongly seen as pure luck. Happy accidents certainly happen every day, but it takes intelligence, insight, and creativity to recognize a "Eureka, I found what I wasn't looking for!" moment and know what to do next. In discussing medical breakthroughs, Dr. Morton Meyers makes a cogent, highly engaging argument for a more creative, rather than purely linear, approach to science. And it may just save our lives!

accidental discoveries in chemistry: Accidental Discoveries Larry Verstraete, 2016-07-26

Accidental Discoveries - a man inhales laughing gas...and feels no pain in his leg - a blast of water in a bathroom leads to a billion dollar invention - a scientist dreams the answer to the question that had him stumped - a spill creates an explosive even more powerful than dynamite Some discoveries come about by logic and reasoning. Others happen because of blunders, fumbles and freaky circumstances - in short, by accident. Over 80 stories about the stumbles, goofs, and strange twists that have resulted in amazing breakthroughs from laughing gas to dynamite....

accidental discoveries in chemistry: A Funny Thing Happened on the Way to Stockholm

Robert Lefkowitz, Randy Hall, 2021-02-02 The rollicking memoir from the cardiologist turned legendary scientist and winner of the Nobel Prize that revels in the joy of science and discovery. Like Richard Feynman in the field of physics, Dr. Robert Lefkowitz is also known for being a larger-than-life character: a not-immodest, often self-deprecating, always entertaining raconteur. Indeed, when he received the Nobel Prize, the press corps in Sweden covered him intensively, describing him as "the happiest Laureate." In addition to his time as a physician, from being a yellow beret in the public health corps with Dr. Anthony Fauci to his time as a cardiologist, and his extraordinary transition to biochemistry, which would lead to his Nobel Prize win, Dr. Lefkowitz has ignited passion and curiosity as a fabled mentor and teacher. But it's all in a day's work, as Lefkowitz reveals in *A Funny Thing Happened on the Way to Stockholm*, which is filled to the brim with anecdotes and energy, and gives us a glimpse into the life of one of today's leading scientists.

accidental discoveries in chemistry: Happy Accidents Morton A. Meyers, 2007 This is

Morton Meyers' fascinating, entertaining, and highly accessible look at the surprising role serendipity played in some of the most important medical discoveries in the 20th century. Though within the scientific community a certain stigma is attached to chance discovery because it is wrongly seen as pure luck, happy accidents happen every day and Meyers shows how it takes intelligence, insight, and creativity to recognize a Eureka! I found what I wasn't looking for! moment and know what to do next. Penicillin, chemotherapy drugs, X-rays, Valium, the Pap smear, and Viagra were all discovered accidentally, stumbled upon in search of something else. In discussing these medical breakthroughs and others, Dr. Meyers makes a cogent, highly engaging argument for a more creative, rather than purely linear, approach to science.

accidental discoveries in chemistry: Drug Design Gerhard Klebe, 2013-07-10 Unique work

on structure-based drug design, covering multiple aspects of drug discovery and development. Fully colored, many images, computer animations of 3D structures (these only in electronic form). Makes the spatial aspects of interacting molecules clear to the reader, covers multiple applications and methods in drug design. Structures by mode of action, no therapeutic areas. Of high relevance for academia and industrial research. Focus on gene technology in drug design, omics-technologies computational methods experimental techniques of structure determination multiple examples on mode of action of current drugs, ADME-tox properties in drug development, QSAR methods, combinatorial chemistry, biologicals, ribosome, targeting protein-protein interfaces.

accidental discoveries in chemistry: Environmental Forensics for Persistent Organic

Pollutants Gwen O'Sullivan, Court Sandau, 2013-11-20 Environmental Forensics for Persistent Organic Pollutants represents the state-of-the-art in environmental forensics in relation to persistent organic pollutants (POPs). The book is a complete reference for practitioners and students, covering a range of topics from new analytical techniques to regulatory and legal status in the global community. Through case studies from leading international experts, real-world issues — including the allocation of responsibility for release into the environment — are resolved through the application of advanced analytical and scientific techniques. This book introduces and assesses the development of new techniques and technologies to trace the source and fate of newly emerging and classic POPs (perfluoroalkyl substances, brominated flame retardants, organochlorine pesticides, perfluorinated chemicals, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls) in environmental media, including atmospheric, marine, freshwater, and urban environments. - Real-world case studies show the application of advanced analytical and scientific techniques - Discussion of GC*GC provides an introduction and assessment of a novel technique from leaders in

the field - Introduces the development of new analytical techniques (such as 2-D GC*HC and LC*LC) to trace the source and fate - Raises awareness about the health and environmental impact of persistent organic pollutants (POPs) - Outlines the development of international measures to control POPs so that chemists can understand the legal issues

accidental discoveries in chemistry: Strengthening Forensic Science in the United States National Research Council, Division on Engineering and Physical Sciences, Committee on Applied and Theoretical Statistics, Policy and Global Affairs, Committee on Science, Technology, and Law, Committee on Identifying the Needs of the Forensic Sciences Community, 2009-07-29 Scores of talented and dedicated people serve the forensic science community, performing vitally important work. However, they are often constrained by lack of adequate resources, sound policies, and national support. It is clear that change and advancements, both systematic and scientific, are needed in a number of forensic science disciplines to ensure the reliability of work, establish enforceable standards, and promote best practices with consistent application. *Strengthening Forensic Science in the United States: A Path Forward* provides a detailed plan for addressing these needs and suggests the creation of a new government entity, the National Institute of Forensic Science, to establish and enforce standards within the forensic science community. The benefits of improving and regulating the forensic science disciplines are clear: assisting law enforcement officials, enhancing homeland security, and reducing the risk of wrongful conviction and exoneration. *Strengthening Forensic Science in the United States* gives a full account of what is needed to advance the forensic science disciplines, including upgrading of systems and organizational structures, better training, widespread adoption of uniform and enforceable best practices, and mandatory certification and accreditation programs. While this book provides an essential call-to-action for congress and policy makers, it also serves as a vital tool for law enforcement agencies, criminal prosecutors and attorneys, and forensic science educators.

accidental discoveries in chemistry: Elements of Chemistry in which the Recent Discoveries in the Science are Included and Its Doctrines Familiarly Explained John Lee Comstock, 1853

accidental discoveries in chemistry: The German Chemical Industry in the Twentieth Century John E. Lesch, 2013-04-17 In the twentieth century, dyes, pharmaceuticals, photographic products, explosives, insecticides, fertilizers, synthetic rubber, fuels, and fibers, plastics, and other products have flowed out of the chemical industry and into the consumer economies, war machines, farms, and medical practices of industrial societies. The German chemical industry has been a major site for the development and application of the science-based technologies that gave rise to these products, and has had an important role as exemplar, stimulus, and competitor in the international chemical industry. This volume explores the German chemical industry's scientific and technological dimension, its international connections, and its development after 1945. The authors relate scientific and technological change in the industry to evolving German political and economic circumstances, including two world wars, the rise and fall of National Socialism, the post-war division of Germany, and the emergence of a global economy. This book will be of interest to historians of modern Germany, to historians of science and technology, and to business and economic historians.

accidental discoveries in chemistry: *The Boy Who Invented the Popsicle* Anne Renaud, 2019-10-01 A lively tale of a cool invention. Frank William Epperson is a curious boy who loves inventing. And since inventing begins with experimenting, he spends a lot of time in his "laboratory" (i.e., his back porch) trying out his ideas. When he invents a yummy flavored soda water drink, his friends love it! And this gets him thinking: "I wonder what this drink would taste like frozen?" Though he doesn't yet know it, Frank's curiosity will lead to his best invention ever: the Popsicle! This delicious story includes hands-on experiments and is sure to whet the appetites of budding inventors everywhere!

accidental discoveries in chemistry: Elements of Chemistry, Including the Most Recent Discoveries and Applications of the Science to Medicine and Pharmacy, and to the Arts

Robert Kane, 1860

accidental discoveries in chemistry: Science as Public Culture Jan Golinski, 1999-06-28
Examines the development of chemistry in Britain 1760-1820 and relates it to civic life.

accidental discoveries in chemistry: Discoveries in Chemistry that Changed the World Rose Johnson, 2014-12-15 Our world would be a much different place without the groundbreaking work of scientific visionaries such as Hennig Brand, Marie and Pierre Curie, and Antoine Lavoisier, to name a few. This volume offers readers a vivid and colorful history of chemistry, highlighting some of field's most notable discoveries. Fact boxes illustrate how these discoveries continue to impact our world today, highlight key scientists and their work, and feature fun facts. Bright photographs and illustrations reinforce and expand upon the text. The insatiable curiosity of these chemists will surely pique readers' interests as they discover some of chemistry's most world-changing breakthroughs.

accidental discoveries in chemistry: Accidental Genius Richard Gaughan, 2012-05-04 Many of the greatest eureka moments in human history were chance discoveries that led to world-changing inventions and ideas. This book takes you on a tour of the scientific and technological advancements where leaps of faith, unexpected inspiration, and sudden shifts of understanding brought about overnight changes in our perception of the world.

accidental discoveries in chemistry: The Discovery of Insulin Michael Bliss, 2017-06-22 The discovery of insulin at the University of Toronto in 1921-22 was one of the most dramatic events in the history of the treatment of disease. Insulin was a wonder-drug with ability to bring patients back from the very brink of death, and it was no surprise that in 1923 the Nobel Prize for Medicine was awarded to its discoverers, the Canadian research team of Banting, Best, Collip, and Macleod. In this engaging and award-winning account, historian Michael Bliss recounts the fascinating story behind the discovery of insulin - a story as much filled with fiery confrontation and intense competition as medical dedication and scientific genius. Originally published in 1982 and updated in 1996, *The Discovery of Insulin* has won the City of Toronto Book Award, the Jason Hannah Medal of the Royal Society of Canada, and the William H. Welch Medal of the American Association for the History of Medicine.

accidental discoveries in chemistry: Elements of Chemistry: including the most recent discoveries and applications of the science to medicine and pharmacy, and to the arts. Illustrated by ... woodcuts Robert Kane, 1841

accidental discoveries in chemistry: LSD, My Problem Child Albert Hofmann, 2017-09-27 This is the story of LSD told by a concerned yet hopeful father, organic chemist Albert Hofmann, Ph.D. He traces LSD's path from a promising psychiatric research medicine to a recreational drug sparking hysteria and prohibition. In *LSD: My Problem Child*, we follow Dr. Hofmann's trek across Mexico to discover sacred plants related to LSD, and listen in as he corresponds with other notable figures about his remarkable discovery. Underlying it all is Dr. Hofmann's powerful conclusion that mystical experiences may be our planet's best hope for survival. Whether induced by LSD, meditation, or arising spontaneously, such experiences help us to comprehend the wonder, the mystery of the divine, in the microcosm of the atom, in the macrocosm of the spiral nebula, in the seeds of plants, in the body and soul of people. More than sixty years after the birth of Albert Hofmann's problem child, his vision of its true potential is more relevant, and more needed, than ever.

accidental discoveries in chemistry: Chemical Sensors and Biosensors Florinel-Gabriel Banica, 2012-08-15 Key features include: Self-assessment questions and exercises Chapters start with essential principles, then go on to address more advanced topics More than 1300 references to direct the reader to key literature and further reading Highly illustrated with 450 figures, including chemical structures and reactions, functioning principles, constructive details and response characteristics Chemical sensors are self-contained analytical devices that provide real-time information on chemical composition. A chemical sensor integrates two distinct functions: recognition and transduction. Such devices are widely used for a variety of applications, including

clinical analysis, environment monitoring and monitoring of industrial processes. This text provides an up-to-date survey of chemical sensor science and technology, with a good balance between classical aspects and contemporary trends. Topics covered include: Structure and properties of recognition materials and reagents, including synthetic, biological and biomimetic materials, microorganisms and whole-cells Physicochemical basis of various transduction methods (electrical, thermal, electrochemical, optical, mechanical and acoustic wave-based) Auxiliary materials used e.g. synthetic and natural polymers, inorganic materials, semiconductors, carbon and metallic materials properties and applications of advanced materials (particularly nanomaterials) in the production of chemical sensors and biosensors Advanced manufacturing methods Sensors obtained by combining particular transduction and recognition methods Mathematical modeling of chemical sensor processes Suitable as a textbook for graduate and final year undergraduate students, and also for researchers in chemistry, biology, physics, physiology, pharmacology and electronic engineering, this book is valuable to anyone interested in the field of chemical sensors and biosensors.

accidental discoveries in chemistry: Science and Me Ali Winter, 2021-03-02 Discover some of the inspirational men and women who have received Nobel Prizes in Physics, Chemistry and Medicine from 1901 to the present day, among them Marie Curie, Hermann Joseph Muller, and Donna Strickland. A glimpse into the often surprising lives and sometimes accidental discoveries of a group of extraordinary scientists, this fascinating collection shows that the science you learn at school really can change the world. Winter and El Fathi give a satisfying flavor of the work that guided scientific and moral compasses, while highlighting aspects of the scientists' personal histories—The New York Times, 5 Picture Books About the Wonders of Science "Rich material for readers seeking scientific role models who made differences both in and beyond the lab"—Kirkus Reviews "This beautifully presented book invites young readers to consider the values of science and how it carries the potential to change the world for the better"—Mat Tobin, Senior Lecturer in Education

accidental discoveries in chemistry: The Chemical Age Frank A. von Hippel, 2020-09-04 This sweeping history reveals how the use of chemicals has saved lives, destroyed species, and radically changed our planet: "Remarkable . . . highly recommended." —Choice In The Chemical Age, ecologist Frank A. von Hippel explores humanity's long and uneasy coexistence with pests, and how the battles to exterminate them have shaped our modern world. He also tells the captivating story of the scientists who waged war on famine and disease with chemistry. Beginning with the potato blight tragedy of the 1840s, which led scientists on an urgent mission to prevent famine using pesticides, von Hippel traces the history of pesticide use to the 1960s, when Rachel Carson's Silent Spring revealed that those same chemicals were insidiously damaging our health and driving species toward extinction. Telling the story in vivid detail, von Hippel showcases the thrills—and complex consequences—of scientific discovery. He describes the creation of chemicals used to kill pests—and people. And, finally, he shows how scientists turned those wartime chemicals on the landscape at a massive scale, prompting the vital environmental movement that continues today.

accidental discoveries in chemistry: Beyond the Molecular Frontier National Research Council, Division on Earth and Life Studies, Board on Chemical Sciences and Technology, Committee on Challenges for the Chemical Sciences in the 21st Century, 2003-03-19 Chemistry and chemical engineering have changed significantly in the last decade. They have broadened their scope—into biology, nanotechnology, materials science, computation, and advanced methods of process systems engineering and control—so much that the programs in most chemistry and chemical engineering departments now barely resemble the classical notion of chemistry. Beyond the Molecular Frontier brings together research, discovery, and invention across the entire spectrum of the chemical sciences—from fundamental, molecular-level chemistry to large-scale chemical processing technology. This reflects the way the field has evolved, the synergy at universities between research and education in chemistry and chemical engineering, and the way chemists and chemical engineers work together in industry. The astonishing developments in science and engineering during the 20th century have made it possible to dream of new goals that might previously have been considered

unthinkable. This book identifies the key opportunities and challenges for the chemical sciences, from basic research to societal needs and from terrorism defense to environmental protection, and it looks at the ways in which chemists and chemical engineers can work together to contribute to an improved future.

accidental discoveries in chemistry: *Drug Repurposing* Farid A. Badria, 2020-12-02 Drug repurposing or drug repositioning is a new approach to presenting new indications for common commercial and clinically approved existing drugs. For example, chloroquine, an old antimalarial drug, showed promising results for treating COVID-19, interfering with MDR in several types of cancer, and chemosensitizing human leukemic cells. This book focuses on the hypothesis, risk/benefits, and economic impacts of drug repurposing on drug discovery in dermatology, infectious diseases, neurological disorders, cancer, and orphan diseases. It brings together up-to-date research to provide readers with an informative, illustrative, and easy-to-read book useful for students, clinicians, and the pharmaceutical industry.

accidental discoveries in chemistry: Elements of Chemistry : in which the Recent Discoveries in the Science are Included and Its Doctrines Familiarly Explained John Lee Comstock, 1851

accidental discoveries in chemistry: *ICI* Carol Kennedy, 1993-05-28 From Perspex and polythene to polyester fabrics and beta-blocker heart drugs, the discoveries and innovations from ICI's laboratories have transformed our working and domestic lives. This new edition of a book, first published to mark the ICI's diamond jubilee in 1986, has been completely revised and updated to chart the tumultuous years of change since then, culminating in the historic decision in 1993 to demerge ICI's pharmaceuticals and other biosciences businesses into a separate company called Zeneca. The saga of ICI, Britain's biggest manufacturing company for nearly seventy years, is a dramatic story from its beginnings on the liner Aquitania amid an international race to dominate world chemical markets, through its key role in World War II in the development of radar, penicillin and the atomic bomb to the scientific breakthroughs that have shaped many aspects of the way we live now. The discoveries of the last sixty years are still part of every home and workplace - without the accidental appearance of polythene in a test-tube in 1933, for instance, we would have no food supermarkets. Work being done in today's ICI and Zeneca laboratories could have equal significance for tomorrow's world.

accidental discoveries in chemistry: *The Travels and Adventures of Serendipity* Robert K. Merton, Elinor Barber, 2011-11-28 From the names of cruise lines and bookstores to an Australian ranch and a nudist camp outside of Atlanta, the word serendipity--that happy blend of wisdom and luck by which something is discovered not quite by accident--is today ubiquitous. This book traces the word's eventful history from its 1754 coinage into the twentieth century--chronicling along the way much of what we now call the natural and social sciences. The book charts where the term went, with whom it resided, and how it fared. We cross oceans and academic specialties and meet those people, both famous and now obscure, who have used and abused serendipity. We encounter a linguistic sage, walk down the illustrious halls of the Harvard Medical School, attend the (serendipitous) birth of penicillin, and meet someone who manages serendipity for the U.S. Navy. The story of serendipity is fascinating; that of *The Travels and Adventures of Serendipity*, equally so. Written in the 1950s by already-eminant sociologist Robert Merton and Elinor Barber, the book--though occasionally and most tantalizingly cited--was intentionally never published. This is all the more curious because it so remarkably anticipated subsequent battles over research and funding--many of which centered on the role of serendipity in science. Finally, shortly after his ninety-first birthday, following Barber's death and preceding his own by but a little, Merton agreed to expand and publish this major work. Beautifully written, the book is permeated by the prodigious intellectual curiosity and generosity that characterized Merton's influential *On the Shoulders of Giants*. Absolutely entertaining as the history of a word, the book is also tremendously important to all who value the miracle of intellectual discovery. It represents Merton's lifelong protest against that rhetoric of science that defines discovery as anything other than a messy blend of inspiration,

perspiration, error, and happy chance--anything other than serendipity.

accidental discoveries in chemistry: A House Built on Sand Noretta Koertge, 1998-08-27 Cultural critics say that science is politics by other means, arguing that the results of scientific inquiry are profoundly shaped by the ideological agendas of powerful elites. They base their claims on historical case studies purporting to show the systematic intrusion of sexist, racist, capitalist, colonialist and/or professional interests into the very content of science. Physicist Alan Sokal recently poked fun at these claims by foisting a sly parody of the genre on the unwitting editors of the cultural studies journal *Social Text* touching off a still unabated torrent of editorials, articles, and heated classroom and Internet discussion. This hard-hitting collection picks up where Sokal left off. The essayists offer crisp and detailed critiques of case studies offered by the cultural critics as evidence that scientific results tell us more about social context than they do about the natural world. Pulling no punches, they identify numerous crude factual blunders (e.g. that Newton never performed any experiments) and egregious errors of omission, such as the attempt to explain the slow development of fluid dynamics solely in terms of gender bias. Where there are positive aspects of a flawed account, or something to be learned from it, they do not hesitate to say so. Their target is shoddy scholarship. Comprising new essays by distinguished scholars of history, philosophy, and science (including Sokal himself), this book raises a lively debate to a new level of seriousness.

accidental discoveries in chemistry: *Borderlands of Science* Charles Sheffield, 1999

accidental discoveries in chemistry: *Chemistry For Dummies* John T. Moore, 2016-05-26 *Chemistry For Dummies*, 2nd Edition (9781119293460) was previously published as *Chemistry For Dummies*, 2nd Edition (9781118007303). While this version features a new Dummies cover and design, the content is the same as the prior release and should not be considered a new or updated product. See how chemistry works in everything from soaps to medicines to petroleum We're all natural born chemists. Every time we cook, clean, take a shower, drive a car, use a solvent (such as nail polish remover), or perform any of the countless everyday activities that involve complex chemical reactions we're doing chemistry! So why do so many of us desperately resist learning chemistry when we're young? Now there's a fun, easy way to learn basic chemistry. Whether you're studying chemistry in school and you're looking for a little help making sense of what's being taught in class, or you're just into learning new things, *Chemistry For Dummies* gets you rolling with all the basics of matter and energy, atoms and molecules, acids and bases, and much more! Tracks a typical chemistry course, giving you step-by-step lessons you can easily grasp Packed with basic chemistry principles and time-saving tips from chemistry professors Real-world examples provide everyday context for complicated topics Full of modern, relevant examples and updated to mirror current teaching methods and classroom protocols, *Chemistry For Dummies* puts you on the fast-track to mastering the basics of chemistry.

accidental discoveries in chemistry: A New History of Life Peter Ward, Joe Kirschvink, 2015-04-14 An estimated 4.6 billion years ago, the Earth and Moon were formed in a violent impact. On this, many agree, and even more that a long time after that, life began. However, few know that the first life on the Earth may not have emerged on this planet, but could, in fact, have begun on Mars, brought here by meteorites. In this revolutionary book, leading scientists Peter Ward and Joe Kirschvink rewrite the principal account of the history of life on Earth. They show not only how the rise of animals was delayed for billions of years, but also what it was that first forced fish out of the sea and onto the land. Together, the two scientists explain how developments in the environment led to multiple Ice Ages before the emergence of dinosaurs and other giant animals, and what the true cause of these great beasts' eventual extinction was. Finally, charting the course of our own evolution, they explore whether this generation will see the end of the human species. *A New History of Life* proves not only that much of what we think we know should be unlearned, but also that the true history of life on Earth is much more surprising and wonderful than we could ever have imagined.

accidental discoveries in chemistry: Reproducibility and Replicability in Science

National Academies of Sciences, Engineering, and Medicine, Policy and Global Affairs, Committee

on Science, Engineering, Medicine, and Public Policy, Board on Research Data and Information, Division on Engineering and Physical Sciences, Committee on Applied and Theoretical Statistics, Board on Mathematical Sciences and Analytics, Division on Earth and Life Studies, Nuclear and Radiation Studies Board, Division of Behavioral and Social Sciences and Education, Committee on National Statistics, Board on Behavioral, Cognitive, and Sensory Sciences, Committee on Reproducibility and Replicability in Science, 2019-10-20 One of the pathways by which the scientific community confirms the validity of a new scientific discovery is by repeating the research that produced it. When a scientific effort fails to independently confirm the computations or results of a previous study, some fear that it may be a symptom of a lack of rigor in science, while others argue that such an observed inconsistency can be an important precursor to new discovery. Concerns about reproducibility and replicability have been expressed in both scientific and popular media. As these concerns came to light, Congress requested that the National Academies of Sciences, Engineering, and Medicine conduct a study to assess the extent of issues related to reproducibility and replicability and to offer recommendations for improving rigor and transparency in scientific research. Reproducibility and Replicability in Science defines reproducibility and replicability and examines the factors that may lead to non-reproducibility and non-replicability in research. Unlike the typical expectation of reproducibility between two computations, expectations about replicability are more nuanced, and in some cases a lack of replicability can aid the process of scientific discovery. This report provides recommendations to researchers, academic institutions, journals, and funders on steps they can take to improve reproducibility and replicability in science.

accidental discoveries in chemistry: *The Color Revolution* Regina Lee Blaszczyk, 2012-08-31 A history of color and commerce from haute couture to automobile showrooms to interior design. When the fashion industry declares that lime green is the new black, or instructs us to “think pink!,” it is not the result of a backroom deal forged by a secretive cabal of fashion journalists, designers, manufacturers, and the editor of Vogue. It is the latest development of a color revolution that has been unfolding for more than a century. In this book, the award-winning historian Regina Lee Blaszczyk traces the relationship of color and commerce, from haute couture to automobile showrooms to interior design, describing the often unrecognized role of the color profession in consumer culture. Blaszczyk examines the evolution of the color profession from 1850 to 1970, telling the stories of innovators who managed the color cornucopia that modern artificial dyes and pigments made possible. These “color stylists,” “color forecasters,” and “color engineers” helped corporations understand the art of illusion and the psychology of color. Blaszczyk describes the strategic burst of color that took place in the 1920s, when General Motors introduced a bright blue sedan to compete with Ford’s all-black Model T and when housewares became available in a range of brilliant hues. She explains the process of color forecasting—not a conspiracy to manipulate hapless consumers but a careful reading of cultural trends and consumer taste. And she shows how color information flowed from the fashion houses of Paris to textile mills in New Jersey. Today professional colorists are part of design management teams at such global corporations as Hilton, Disney, and Toyota. *The Color Revolution* tells the history of how colorists help industry capture the hearts and dollars of consumers.

accidental discoveries in chemistry: Social Science Research Anol Bhattacharjee, 2012-04-01 This book is designed to introduce doctoral and graduate students to the process of conducting scientific research in the social sciences, business, education, public health, and related disciplines. It is a one-stop, comprehensive, and compact source for foundational concepts in behavioral research, and can serve as a stand-alone text or as a supplement to research readings in any doctoral seminar or research methods class. This book is currently used as a research text at universities on six continents and will shortly be available in nine different languages.

accidental discoveries in chemistry: Report of the Presidential Commission on the Space Shuttle Challenger Accident DIANE Publishing Company, Southgate Publishers, 1995-07

accidental discoveries in chemistry: *The Story of Inventions* Anna Claybourne, 2007 Explains how, when and why the ingenious inventions which surround us were created, from simple

spectacles to complex computers. Covers such diverse subjects as toilets, bread, Braille, parachutes and jeans, alongside more traditional 'inventions' such as aeroplanes, microwaves and computers. The development of each invention is thoroughly detailed over each double page, showing not only how and why the invention was created, but how they have been influenced by other discoveries over the ages. Humorously illustrated by Adam Larkum. Contains a full glossary of technical terms and internet-links to encourage further learning.

accidental discoveries in chemistry: *Discoveries in Life Science that Changed the World* Rose Johnson, 2014-12-15 Discoveries in Life Science that Changed the World The planet Earth has more than 8 million species of complex life, and perhaps millions more of simpler bugs and germs. Life science studies these living things and investigates where life forms came from and they survive. This book examines fifteen of the most essential discoveries in the history of the study of life science, including the implications resulting from of each finding. Readers will learn about early discoveries, such as the invention of the microscope, the discovery of photosynthesis, and development of the concept of natural selection, along with more recent revelations, such as the structure of DNA and cloning of Dolly the Sheep.

accidental discoveries in chemistry: The Flight from Science and Reason Paul R. Gross, Norman Levitt, Martin W. Lewis, 1997 Evidence of a flight from reason is as old as human record-keeping: the fact of it certainly goes back an even longer way. Flight from science specifically, among the forms of rational inquiry, goes back as far as science itself... But rejection of reason is now a pattern to be found in most branches of scholarship and in all the learned professions.--from the introduction In the widely acclaimed *Higher Superstition: The Academic Left and Its Quarrels with Science*, Paul R. Gross and Norman Levitt offered a spirited response to the science bashers, raising serious questions about the growing criticism of scientific practice from humanists and social scientists on the academic left. Now, in *The Flight from Science and Reason*, Gross and Levitt are joined by Martin W. Lewis to bring together a diverse and distinguished group of scholars, scientists, and experts to engage these questions from a wide variety of perspectives. The authors take on critics of science whose views range from moderate to extreme, from social constructivists to deconstructionists, from creationists and feminists to Afro-centrists. They discuss the rise of alternative medicine and radical environmentalism (here skewered as ecosentimentalism). They explain why the uncertainty principle does not work as a metaphor for ambiguity, and why chaos theory cannot be invoked without an understanding of mathematics. Throughout, they grapple with the paradox inherent in arguing with opponents who contend that reason itself, and thus logic, is suspect. Distributed for the New York Academy of Sciences

Additional Resources

[ACCIDENTAL Definition & Meaning - Merriam-Webster](#)

The meaning of ACCIDENTAL is occurring unexpectedly or by chance. How to use accidental in a sentence. Synonym Discussion of Accidental. Frequently Asked Questions About accidental.

[ACCIDENTAL Definition & Meaning - Dictionary.com](#)

What does accidental mean? Accidental describes something that happens by chance or without planning, as in The hero has an accidental meeting with the villain early in the movie that sets ...

ACCIDENTAL | English meaning – Cambridge Dictionary

ACCIDENTAL definition: 1. happening or existing by chance: 2. a sign showing that there is a temporary change from the.... Learn more.

Accidental - definition of accidental by The Free Dictionary

1. happening by chance or accident. 2. nonessential; incidental: accidental benefits. 3. pertaining to or indicating sharps, flats, or naturals in music. n. 4. a nonessential or subsidiary ...

ACCIDENTAL definition and meaning | Collins English Dictionary

accidental implies occurring unexpectedly or by chance: an accidental blow. casual describes a passing event of slight importance: a casual reference. fortuitous is applied to events occurring ...

accidental adjective – Definition, pictures, pronunciation and ...

happening by chance; not planned. I didn't think our meeting was accidental—he must have known I would be there. Definition of accidental adjective in Oxford Advanced Learner's ...

334 Synonyms & Antonyms for ACCIDENTAL - Thesaurus.com

Find 334 different ways to say ACCIDENTAL, along with antonyms, related words, and example sentences at Thesaurus.com.

accidental - definition and meaning - Wordnik

Happening by chance or accident, or unexpectedly; taking place not according to the usual course of things; casual; fortuitous; unintentional: as, an accidental meeting. Non-essential; not ...

ACCIDENTAL Synonyms: 89 Similar and Opposite Words - Merriam-Webster

Synonyms for ACCIDENTAL: chance, inadvertent, unexpected, unintentional, incidental, casual, unintended, unplanned; Antonyms of ACCIDENTAL: intentional, deliberate, premeditated, ...

What does accidental mean? - Definitions.net

Accidental is an adjective that refers to something occurring unexpectedly, unintentionally, or by chance, without being planned or foreseen. It can also refer to an incidental or nonessential ...

ACCIDENTAL Definition & Meaning – Merriam-Webster

The meaning of ACCIDENTAL is occurring unexpectedly or by chance. How to use accidental in a sentence. Synonym Discussion of Accidental. Frequently Asked Questions About accidental.

ACCIDENTAL Definition & Meaning – Dictionary.com

What does accidental mean? Accidental describes something that happens by chance or without planning, as in The hero has an accidental meeting with the villain early in the movie that sets ...

ACCIDENTAL / English meaning - Cambridge Dictionary

ACCIDENTAL definition: 1. happening or existing by chance: 2. a sign showing that there is a temporary change from the.... Learn more.

Accidental - definition of accidental by The Free Dictionary

1. happening by chance or accident.
2. nonessential; incidental: accidental benefits.
3. pertaining to or indicating sharps, flats, or naturals in music. n.
4. a nonessential or subsidiary ...

ACCIDENTAL definition and meaning | Collins English Dictionary

accidental implies occurring unexpectedly or by chance: an accidental blow. casual describes a passing event of slight importance: a casual reference. fortuitous is applied to events occurring ...

accidental adjective – Definition, pictures, pronunciation and ...

happening by chance; not planned. I didn't think our meeting was accidental—he must have known I would be there. Definition of accidental adjective in Oxford Advanced Learner's ...

334 Synonyms & Antonyms for ACCIDENTAL - Thesaurus.com

Find 334 different ways to say ACCIDENTAL, along with antonyms, related words, and example

sentences at Thesaurus.com.

accidental - definition and meaning - Wordnik

Happening by chance or accident, or unexpectedly; taking place not according to the usual course of things; casual; fortuitous; unintentional: as, an accidental meeting. Non-essential; not ...

ACCIDENTAL Synonyms: 89 Similar and Opposite Words – Merriam-Webster

Synonyms for ACCIDENTAL: chance, inadvertent, unexpected, unintentional, incidental, casual, unintended, unplanned; Antonyms of ACCIDENTAL: intentional, deliberate, premeditated, ...

What does accidental mean? – Definitions.net

Accidental is an adjective that refers to something occurring unexpectedly, unintentionally, or by chance, without being planned or foreseen. It can also refer to an incidental or nonessential ...

[Accidental Discoveries In Chemistry](#)

Accidental Discoveries In Chemistry

Related Articles

- [access database inventory management](#)
- [accounting associate interview questions](#)
- [academy of science cafe](#)

[Back to Home](#)