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Paper 1 September 2012

Memorandum

**Physical Science**

**Paper 1 September**

**2012 Memorandum**

New Scientist magazine was launched in 1956 "for all those men and women who are interested in scientific

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discovery, and in its industrial, commercial and social consequences". The brand's mission is no different today - for its consumers, New Scientist reports, explores and interprets the results of human endeavour set in the context of society and culture.

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THE CHEMICAL NEWS AND  
JOURNAL OF PHYSICAL  
SCIENCE. The Chemical News and  
Journal of Physical Science  
Chemical news and Journal of physical  
science The Publisher The Journal of  
the Publishing Industry Fort Saint  
George Gazette ERDA Energy

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Research AbstractsWalther Nernst  
and the Transition to Modern Physical  
ScienceCambridge University Press  
Scientific Information Notes  
ERDA Energy Research Abstracts  
A Critical Review of the Role of the  
Laboratory in Science Teaching  
Research in Education

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The Publishers' Circular and  
Booksellers' Record

*From the interior of the Sun, to the upper atmosphere and near-space environment of Earth, and outward to a region far beyond Pluto where the Sun's influence wanes, advances during the past decade in space physics and solar physics--the*

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*disciplines NASA refers to as heliophysics--have yielded spectacular insights into the phenomena that affect our home in space. Solar and Space Physics, from the National Research Council's (NRC's) Committee for a Decadal Strategy in Solar and Space Physics, is the second NRC decadal survey in heliophysics.*

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*Building on the research accomplishments realized during the past decade, the report presents a program of basic and applied research for the period 2013-2022 that will improve scientific understanding of the mechanisms that drive the Sun's activity and the fundamental physical processes underlying near-Earth plasma*

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*dynamics, determine the physical interactions of Earth's atmospheric layers in the context of the connected Sun-Earth system, and enhance greatly the capability to provide realistic and specific forecasts of Earth's space environment that will better serve the needs of society. Although the recommended program is directed*



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*primarily at NASA and the National Science Foundation for action, the report also recommends actions by other federal agencies, especially the parts of the National Oceanic and Atmospheric Administration charged with the day-to-day (operational) forecast of space weather. In addition to the*

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*recommendations included in this summary, related recommendations are presented in this report.*

*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*

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*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*

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*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*

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*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*

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*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*

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*prosecutors and attorneys, and forensic  
science educators.*

*The Publisher*

*A Path Forward*

*Walther Nernst and the Transition to  
Modern Physical Science*

*Restricted Data*

*Chemical news and Journal of physical*

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*science*

This compendium provides a comprehensive collection of the emergent applications of big data, machine learning, and artificial intelligence technologies to present day



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physical sciences ranging from materials theory and imaging to predictive synthesis and automated research. This area of research is among the most rapidly developing in the last several years in areas

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spanning materials science, chemistry, and condensed matter physics. Written by world renowned researchers, the compilation of two authoritative volumes provides a distinct summary of the

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modern advances in  
instrument — driven data  
generation and analytics,  
establishing the links between  
the big data and predictive  
theories, and outlining the  
emerging field of data and

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physics-driven predictive and  
autonomous systems.

Vols. for 1971- include annual  
reports and statistical  
summaries.

New Scientist

ERDA Research Abstracts

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Ferrous Ammonium Sulfate -  
Cupric Chloride Solutions for  
Dosimetry of a Kilocurie  
Cobalt-60 Source  
Science Progress  
University of Glasgow  
Calendar

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"Nuclear weapons, since their conception, have been the subject of secrecy. In the months after the dropping of the atomic bombs on Hiroshima and Nagasaki, the American scientific establishment, the American

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government, and the American public all wrestled with what was called the "problem of secrecy," wondering not only whether secrecy was appropriate and effective as a means of controlling this new technology

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but also whether it was compatible with the country's core values. Out of a messy context of propaganda, confusion, spy scares, and the grave counsel of competing groups of scientists, what



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historian Alex Wellerstein calls a "new regime of secrecy" was put into place. It was unlike any other previous or since. Nuclear secrets were given their own unique legal designation in American law ("restricted data"),

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one that operates differently than all other forms of national security classification and exists to this day. Drawing on massive amounts of declassified files, including records released by the government for the first time

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at the author's request,  
Restricted Data is a narrative  
account of nuclear secrecy and  
the tensions and uncertainty that  
built as the Cold War continued.  
In the US, both science and  
democracy are pitted against

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nuclear secrecy, and this makes its history uniquely compelling and timely"--

Attention in the AI safety community has increasingly started to include strategic considerations of coordination

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between relevant actors in the field of AI and AI safety, in addition to the steadily growing work on the technical considerations of building safe AI systems. This shift has several reasons: Multiplier

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effects, pragmatism, and urgency. Given the benefits of coordination between those working towards safe superintelligence, this book surveys promising research in this emerging field regarding AI

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safety. On a meta-level, the hope is that this book can serve as a map to inform those working in the field of AI coordination about other promising efforts. While this book focuses on AI safety coordination, coordination is

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important to most other known existential risks (e.g., biotechnology risks), and future, human-made existential risks. Thus, while most coordination strategies in this book are specific to superintelligence, we



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hope that some insights yield “collateral benefits” for the reduction of other existential risks, by creating an overall civilizational framework that increases robustness, resiliency, and antifragility.

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News Notes of California  
Libraries

Solar and Space Physics

The Journal of the Publishing  
Industry

Scientific Meetings

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***The following paper represents work to date on the deformation method for quadratic programming and thus may be regarded as a sequel to Zahl, S. (1964) A Deformation Method for Quadratic Programming,***

***Research Note AFCRL-63-132. It gives an explanation of a modified Iverson programming language and uses this to give a detailed algorithm for the Zahl Deformation Method of Quadratic Programming.***

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***Research and innovation in the life sciences is driving rapid growth in agriculture, biomedical science, information science and computing, energy, and other sectors of the U.S. economy. This economic activity,***

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***conceptually referred to as the bioeconomy, presents many opportunities to create jobs, improve the quality of life, and continue to drive economic growth. While the United States has been a leader in***

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***advancements in the biological sciences, other countries are also actively investing in and expanding their capabilities in this area. Maintaining competitiveness in the bioeconomy is key to***

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***maintaining the economic health and security of the United States and other nations. Safeguarding the Bioeconomy evaluates preexisting and potential approaches for assessing the value of the bioeconomy and***



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***identifies intangible assets not sufficiently captured or that are missing from U.S. assessments. This study considers strategies for safeguarding and sustaining the economic activity driven by research and innovation in the***

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***life sciences. It also presents ideas for horizon scanning mechanisms to identify new technologies, markets, and data sources that have the potential to drive future development of the bioeconomy.***

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***Artificial Superintelligence***

***The Chemical News and Journal  
of Physical Science***

***Journal of the American Society  
of Mechanical Engineers***

***Glasgow University Calendar***

***Accessions of Unlimited***

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***Distribution Reports***

Primarily a scientific biography of Walther H. Nernst (1864–1941), one of Germany's most important, productive and often controversial scientists, this 1999 book addresses a set of specific scientific

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problems that evolved at the intersection of physics, chemistry and technology during one of the most revolutionary periods of modern physical science. Nernst, who won the 1920 Nobel Prize for Chemistry, was a key figure in the

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transition to a modern physical science, contributing to the study of solutions, of chemical equilibria, and of the behavior of matter at the extremes of the temperature range. A director of major research institutes, rector of the Berlin

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University, and inventor of a new electric lamp, Nernst was the first 'modern' physical chemist, an able scientific organizer, and a savvy entrepreneur. His career exemplified the increasing connection between German

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technical industry and academic science, between theory and experiment, and between concepts and practice.

Aqueous solutions of ferrous ammonium sulfate with cupric chloride were studied as a means



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for determining the uniformity of the dose rate around a multikilocurie cylindrical array of cobalt-60. Ferric ion was measured spectrophotometrically at 305 millimicrons. The solution selected to satisfy the requirements for

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dosimetry contained 0.0005 M ferrous ammonium sulfate and 0.005 M cupric chloride in 0.001 N sulfuric acid. Spectrophotometric measurements of ferric ion were made in solutions brought to 0.15 N acid concentration, instead of the

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conventional 0.8 N, in order to minimize spurious oxidation. The molar extinction coefficient at this normality proved to be the same as that in 0.8 N solutions. The G value, as compared to the standard ferrous-ferric dosimeter, was 0.65.

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Using these solutions, no detectable variation in dose rate was found at symmetrically equivalent positions at the center of the cobalt-60 source. The average dose rate at each end of the cylindrical array proved to be 12

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percent lower than that at the center. The dose rate was also less uniform at the ends, varying by = 4 percent from point-to-point. At a distance of fifteen inches from the center of the source array, the dose rate decreased as the square of the

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distance. (Author).

Safeguarding the Bioeconomy

THE CHEMICAL NEWS AND

JOURNAL OF PHYSICAL

SCIENCE.

The History of Nuclear Secrecy in  
the United States

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The Labor Market and Employment  
Security

1874 - 1876. 3, 1874 - 1879, 1