WHITEPAPER
THE INTELLECTUAL HERITAGE VAULT

ELECTRONIC JOURNAL ARCHIVES THEIR CREATION, ACQUISITION, AND USE: A GLOBAL MOVEMENT

SCIENTIFIC

THOMSON REUTERS

"KNOWLEDGE IS CUMULATIVE, AND EVERY GROUNDBREAKING DISCOVERY IS DETERMINED TO A LARGE EXTENT BY THE DISCOVERIES THAT CAME BEFORE IT."

— Frederic Lawrence Holmes,
Former Avalon Professor of the History of Medicine
Former Chair, History of Medicine, Yale University
Yale Bulletin and Calendar, Volume 29, 2000

"THE HISTORY OF SCIENCE HAS SUFFERED GREATLY FROM THE USE BY TEACHERS OF SECOND-HAND MATERIAL, AND THE CONSEQUENT OBLITERATION OF THE CIRCUMSTANCES AND THE INTELLECTUAL ATMOSPHERE IN WHICH THE GREAT DISCOVERIES OF THE PAST WERE MADE. A FIRST-HAND STUDY IS ALWAYS INSTRUCTIVE, AND OFTEN ... FULL OF SURPRISES."

— R.A. Fisher, 1955, Experiments in plant hybridisation
G. Mendel. Edinburgh : Oliver & Boyd, 1965

BUILDING THE DIGITAL LIBRARY

A WEALTH OF VALUABLE ARCHIVAL INFORMATION NOW EXISTS IN A VERY ACCESSIBLE FORMAT: DIGITAL BACKFILES.

Less than 10 years ago, the online publication of scholarly information was in its infancy. World-changing discoveries, from Max Planck's definition of "Planck's Constant", which laid the ground work for quantum theory to Thomas H. Morgan's research which established the chromosome theory of heredity, were found only in print archives, often hard to access and impossible to search swiftly and effectively.

The transition from a print-based to an electronic journal collection has taken place at a very swift pace. Digitization of journal backfiles has become a common objective of international publishers of peer-reviewed research. The top five commercial publishers of scholarly journal literature — Elsevier, Springer, Taylor & Francis, Blackwell, and Wiley — account for the production of approximately 5,500 journals. All have launched or plan to launch extensive backfile digitization projects.

But the creation of electronic journal archives is not limited to commercial efforts — society, not-for-profit and university presses are also very active in this area.

JSTOR, a dedicated archival full-text resource, provides a diverse selection of online backfiles from the natural and social sciences, arts and humanities. Over 3,945 participants/subscribers in 127 countries currently access this resource.

November 1998	>	January-September 2007
JSTOR		**JSTOR**
60+ scholarly journals		729+ scholarly journals
User accesses: @ 1.2 million per month		User accesses: @ 35 million per month
		Including more than 100 publications originating in the 1800s and over 300 founded between 1900 and 1950.

HighWire Press hosts a collection of extremely influential journals, with a focus on STM (science, technology, medicine) and a clear emphasis on the life sciences. Within this collection is the largest repository of free, full-text life sciences articles in the world, with over 1.8 million free articles from 290 journals. A few examples of historical, high-impact publications include:

- Journal of Experimental Medicine, from 1896
- PNAS — Proceedings of the National Academy of Sciences of the USA, from 1915
- Plant Physiology, from 1926
- Blood, from 1949

WHY DIGITAL BACKFILES?

You are giving users the tools they need for complete research — so they can discover both a breadth and depth of data.

You are providing the historical background and perspective needed for the formation of new ideas and discoveries. Backfiles provide a solid foundation for future efforts.

You are enhancing your library's reputation as a full-featured source of essential data — and enhancing your university's profile as an institution where world-class research takes place.

You are raising the visibility of your university's researchers. When their older research is online, it is more likely to be accessed and cited.

You are meeting your users' expectations of comprehensive online access. Online access is a "given" these days — for archival as well as current data.

You save valuable space. Backfiles often take up significant amounts of space but are not fully used by a library's patrons. When print backfiles are moved to cheaper, off-site storage locations, space is made available for other materials, studying, and library resource instruction.

Wiley Interscience:
"From breakthroughs to enduring influence to promising ideas that may acquire new resonance in the 21st century, backfiles bring elusive historical content and context back to the discovery process – and your desktop."

Blackwell Publishing:
"The expectation of researchers is increasingly that everything that's worthwhile should be available to them online, whether it was published in 1906 or 2006."
— Steven Hall, Journals Sales and Marketing Director

The University of California Libraries conducted a user preference survey in 2004.[1] More than 7,000 individuals – 77% of which were faculty and graduate students – replied. The response showed that electronic journals had been enthusiastically received, but one of the biggest barriers to their effective use was the unavailability of older issues in electronic form. In fact, 92% of faculty and graduate students and 76% of respondents overall identified this as a problem.

You will increase usage. As Dr. Eugene Garfield, the founder of ISI (now Thomson Scientific) notes, availability increases usage: "By making people bibliographically aware of the older literature, now they want it, and this is all happening at the same time that a lot of this literature is being made accessible electronically. So the legacy files are being created by dozens of publishers, coinciding with the (Thomson Scientific) efforts to index all that material. There is already huge evidence that the availability of these indexes and the availability of the electronic forms has increased use of the older literature astronomically ... So the ease of finding something affects its use."[2]

You are providing 24-hour access to important data — users can access backfile information when they need it.

> "Analysis of usage statistics of STM publishers' platforms has revealed that about 20-25% **of the downloaded articles are at least five years old**. Surprisingly, the percentage of old article downloads is higher in biomedical areas than in humanities... Scientists and researchers are using substantial amounts of older literature. Making these articles accessible via a nearby computer instead of a distant library would certainly be attractive for them. It is very likely that older articles will be used even more extensively if additional online functionality is added to these articles, such as links."
> – *Journal Backfiles in Scientific Publishing: A Marketing White Paper*, British Library

ACCESSING BACKFILES: DELIVERING CAPABILITIES AS WELL AS CONTENT

So now there is a great volume of valuable content available — in many different places. Now, this wealth of archival data needs to be brought together so it can be quickly discovered, managed, and analyzed. Dr. Eugene Garfield, who revolutionized scientific research with his concept of citation indexing and searching, has always been a proponent of the value of historical content. One of the core benefits of citation indexing has been to make the ties between past and present research more apparent and usable.

When he began publishing the first science citation index in 1964, he never could have predicted the World Wide Web, global digitization of historical content, and the tremendous availability and use of this information. However, Dr. Garfield's founding philosophies have certainly been implemented — and expanded — via today's technologies.

In 2005, Dr. Garfield discussed the importance of backfile access[3]: "No matter what field of research you're in, it's very rare that there isn't something relevant that was done 50-100 years ago in your work... The data show how often people refer back to this earlier primordial literature. There are hundreds and hundreds of papers that are still studied quite frequently and are important to people. The ability to use these as starting points in a search really enlarges one's scope."

WHY ACCESS DIGITAL BACKFILES VIA *ISI WEB OF KNOWLEDGE?*

You are supporting your investment in full-text archives by providing your users with more ways to access and use this data. Over 20 million researchers in 90 countries base their research on the content and analytics they find in ISI Web of Knowledge, and are likely to turn here first when seeking backfile data. In fact, Web of Science customers increase their investment in backfiles every three years on average, because this ISI Web of Knowledge resource is one of the most highly used databases in their libraries.

You are unifying your library's digital collections by providing easy navigation between databases and direct links to full text and your library's holdings.

You are matching the level of functionality your users can access for current data — and expect to see for all data.

You are enhancing the value of features already found in *ISI Web of Knowledge* databases, such as cited reference searching, the Analyze Tool, Citation Report and the all-database search. More backfiles means more linkages discovered and trends revealed by these powerful tools.

You are making a one-time investment that will pay off for decades. With backfiles, you have perpetual access rights to high-quality, multidisciplinary content.

You are completing and expanding journal collections. Print journal collections inevitably have gaps — misplaced or damaged issues, interrupted subscriptions, or those that did not start with

Volume 1, Issue 1. *ISI Web of Knowledge* backfiles offer comprehensive coverage that includes every issue of prestigious journals such as Nature and Cell.

You are matching the level of access that can be found at other major universities. More than half of *Web of Science* customers have more than 30 years of natural science coverage. Nearly 40% have more than 60 years of coverage.

You are providing easy access combined with functionality that goes way beyond that of any free Internet service. *ISI Web of Knowledge* is built to accommodate all levels of users' styles of discovery, and helps them find relevant, reliable results — whether they are writing a paper, looking for potential collaborators, or analyzing research performance.

Over half of Web of Science customers have more than 30 years of science backfiles.

Nearly a quarter have over one hundred years of science backfiles.

You are enabling users to not only seek and find older literature, but also understand its significance and put it into a wider context, by following links to cited and citing articles.

You are taking full advantage of the new *ISI Web of Knowledge* interface, a unified platform that links all its varied data and search terms together. Which means that when you search within *ISI Web of Knowledge*, your search terms will help you find all the relevant items that may be categorized differently. New terms will recognize old terms. Specialized terms from one database will recognize specialized terms from another.

WHAT *ISI WEB OF KNOWLEDGE* BACKFILES DELIVER

Breadth

Truly multidisciplinary, *ISI Web of Knowledge* serves all communities of scholars, researchers, and students in the sciences, social sciences, arts and humanities. *Web of Science* is the premier resource within *ISI Web of Knowledge* and a prime gateway to valuable historical journal content. But *Web of Science* is just the beginning. Over 70% of *Web of Science* customers also subscribe to at least one other *ISI Web of Knowledge* resource, and can benefit from full access to these resources' backfile data.

Depth

ISI Web of Knowledge makes over 150 years of backfiles available, in more than 250 disciplines.

Quality

ISI Web of Knowledge content is highly desired, highly influential, and highly relevant. This collection was made possible by rigorous editorial standards, specialized indexing, and over 50 years of experience in setting the standard for credibility and relevance.

Two Sandia National Laboratories researchers found [4]...

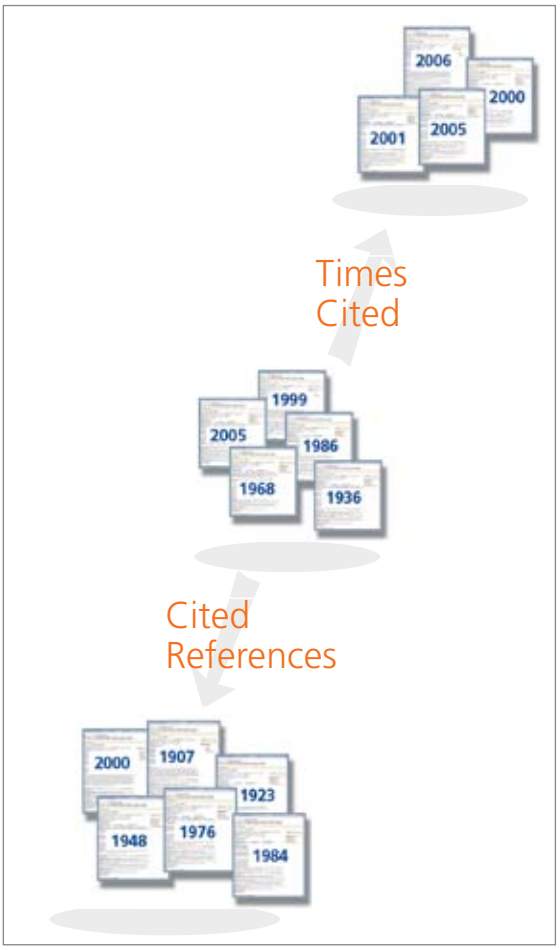
"... the new ease of access to information [Internet and novel technologies] has increased the proportion of older publications cited, despite a significant increase in the number of papers published each year, suggesting that scientists are relying less on their memory of recently published papers and relying increasingly on computer searches whose scope now extends to the last 50 years or so."

CAPABILITIES

Not only are older volumes made available digitally, they are also re-indexed with modern search terms and functions. A wide range of search and analysis capabilities enable greater access to backfile data:

Cited reference searching

Users can access authors' cited references for all years of content. Cited reference search results link research across time and disciplines, and reveal connections that cannot be found by standard search techniques.



Analyze Tool

A quick search in *ISI Web of Knowledge* shows that older research is still relevant today. Using the Analyze Tool provides significant insight into these works:

- Which older articles are still being highly cited by today's researchers?
- What papers are citing older works, and what are today's applications?
- Which authors are citing them the most?
- Which institutions, countries, and journals are most often turning to these works?

Full text

The full text of these influential articles is also easy to access. *ISI Web of Knowledge* links to archival full text within JSTOR, HighWire Press, and individual journal publisher and aggregator sites. *ISI Web of Knowledge* is also OpenURL compatible, so custom full-text links to archival content can also be implemented.

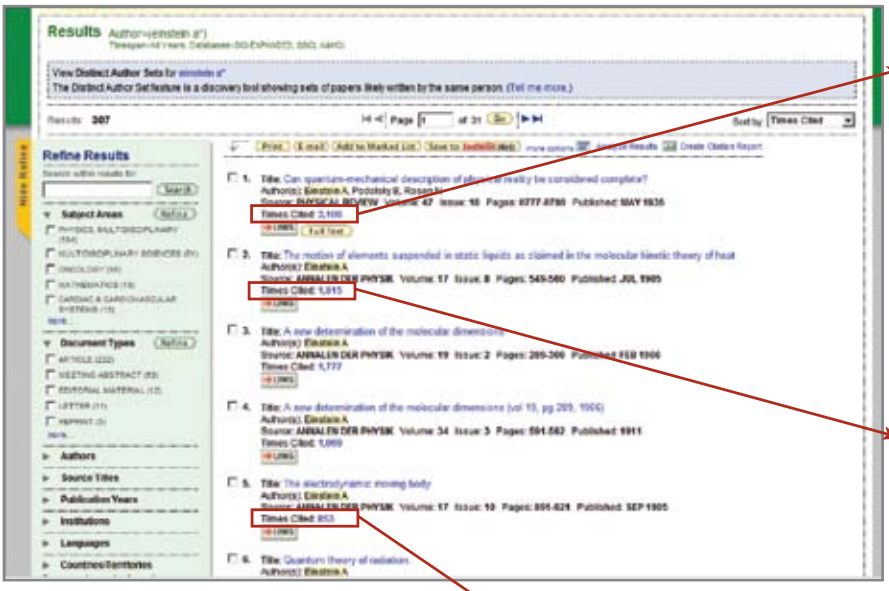
EXPLORE RESEARCH FROM SOME OF THE GREATEST CONTRIBUTORS TO OUR

INTELLECTUAL HERITAGE

These robust capabilities allow you to easily discover the connections between past and present research.

ALBERT EINSTEIN

An author search retrieves records for Einstein's published papers, and a Sort by Times Cited reveals those that have been the most highly cited.







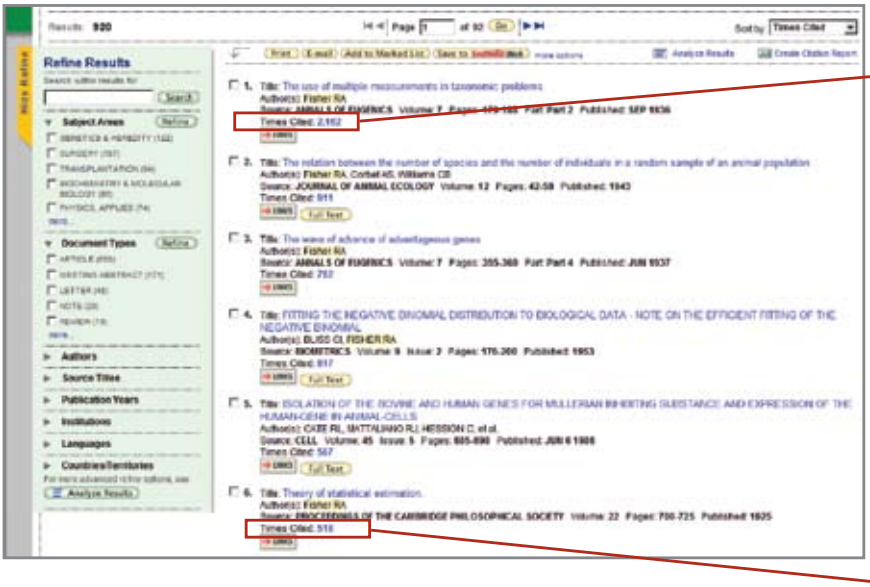


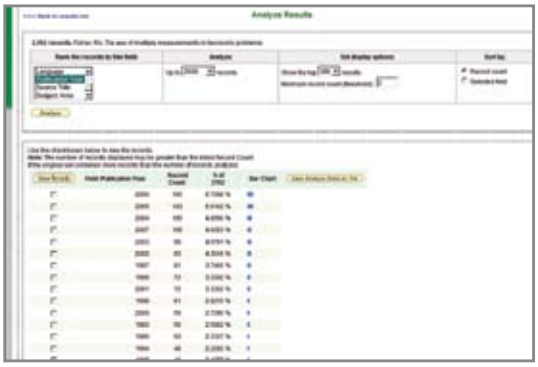
When you use the Analyze Tool to reveal trends, it becomes obvious that current researchers are still citing these articles – in fact, citing them more in recent years than ever before.

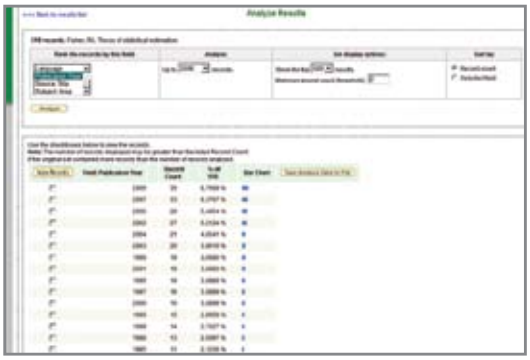
(CONTRIBUTORS TO OUR INTELLECTUAL HERITAGE, CONTINUED)

R.A. FISHER

R.A. Fisher, a renowned statistician, evolutionary biologist, and geneticist, has a vast influence on modern statistical thinking. Even though his last article was published over 40 years ago, a quick search shows that there is a resurgence of interest in Fisher's work from researchers who are attempting to derive the laws of physics from a Fisherian starting point, and applying his work in areas such as Artificial Intelligence. These papers – some published over 70 years ago — are being cited more now than ever.



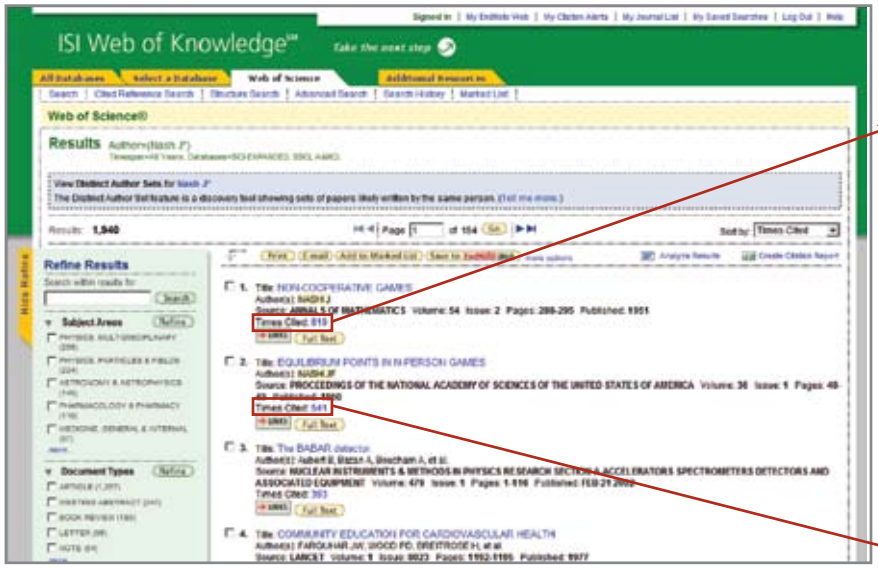


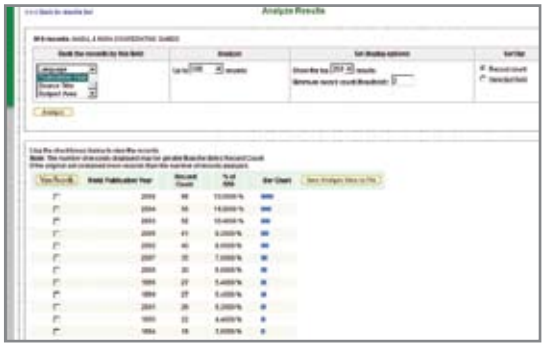


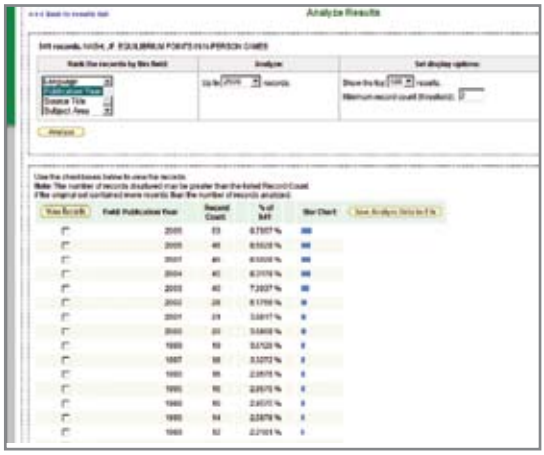
(CONTRIBUTORS TO OUR INTELLECTUAL HERITAGE, CONTINUED)

JOHN NASH

John Nash, Nobel Laureate in Economics, and subject of the movie "A Beautiful Mind", produced groundbreaking work in game theory and mathematics.





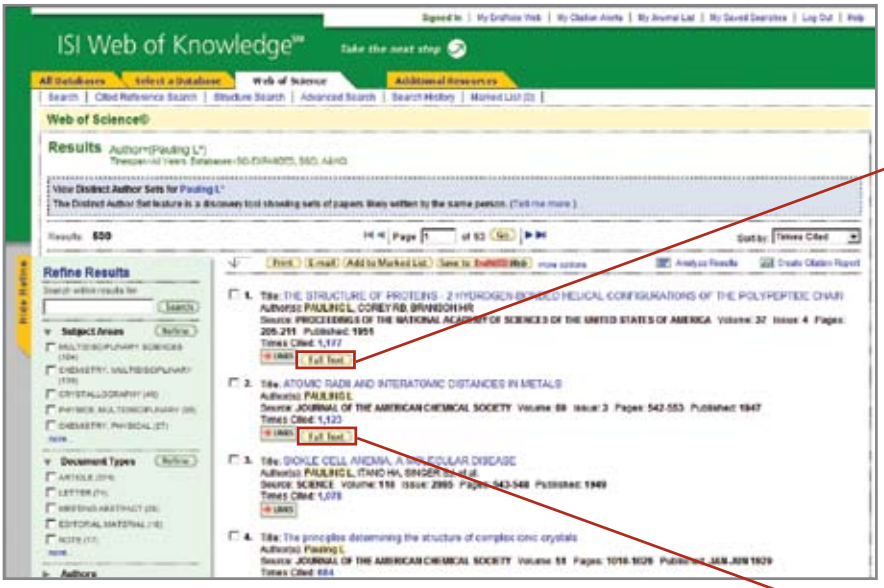


His seminal papers were widely influential when they were first published, and as the ISI Web of Knowledge Analyze Tool reveals, are being cited more in recent years than ever before.

LINUS PAULING

Linus Pauling is widely acknowledged as the greatest chemist of the twentieth century, and was chosen by the British journal New Scientist as one of the 20 greatest scientists of all time, along with Galileo, Charles Darwin, Isaac Newton and Albert Einstein.

Over 500 of Pauling's papers, letters, and editorials have been indexed in *Web of Science*. Many of these are seminal works published decades ago, yet remain influential and actively cited. The full text of these important items can easily be accessed via *ISI Web of Knowledge*.




THE STRUCTURE OF PROTEINS: TWO HYDROGEN-BONDED HELICAL CONFIGURATIONS OF THE POLYPEPTIDE CHAIN

By Linus Pauling, Robert B. Corey, and H. R. Branson*

During the past fifteen years we have been attacking the problem of the structure of proteins in several ways. One of these ways is the complete and accurate determination of the crystal structure of amino acids, peptides, and other simple substances related to proteins, in order that information about interatomic distances, bond angles, and other configurational parameters might be obtained that would permit the reliable prediction of reasonable configurations for the polypeptide chain. We have now used this information to construct two reasonable hydrogen bonded helical configurations for the polypeptide chain; we think that it is likely that these configurations constitute an important part of the structure of both fibrous and globular proteins, as well as of synthetic polypeptides. A letter announcing their discovery was published last year.[1]

The problem that we have set ourselves is that of finding all hydrogen-bonded structures for a single polypeptide chain, in which the residues are


ACS PUBLICATIONS
HIGH QUALITY. HIGH IMPACT.

Atomic Radii and Interatomic Distances in Metals[1]

DELIVERING A CONTINUUM OF KNOWLEDGE
IN THE DIGITAL AGE

Present discoveries owe their existence to past developments and theories. And until recently, information about many of these older developments were difficult or sometimes impossible to access.

The past decade, however, has seen an explosion of new digital availability of archival data. Some archives deliver data key to new directions. Others serve to caution those who would pursue an already-disproved theory. But all provide essential building blocks of data for today's researchers, students, and faculty.

ISI Web of Knowledge provides the centralized source and powerful access that makes these backfiles even more accessible and usable. This backfile resource helps you support your investment in full-text archives. You'll be able to match your users' expectations of easily finding complete data with full functionality. And you'll give users at your institution the solid foundation of content and tools they need to produce top-notch research.

References

1 *Collection Management Strategies in a Digital Environment:A Project of the Collection Management Initiative of the University of California Libraries.* Final Report to the Andrew W. Mellon Foundation, January 2004

2 *"Scientist, Inventor, Visionary: Chatting with Dr. Eugene Garfield"*, Thomson Scientific, 2006.

3 Ibid.

4 Boyak KW and Backer A, *"The Memory of Science"*, Submitted for Oral Presentation at the 9th International Conference on Scientometrics & Informatics, August 25-29 2003, Beijing China

Scientific
Regional Head Offices

Americas
Phone: +1 800 336 4474
+1 215 386 0100

Europe, Middle East and Africa
Phone: +44 20 7433 4000

Japan
Phone: +81 3 5218 6500

Asia Pacific
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