

Introduction to Journal Archives

Over 4 million articles from over 600 journals, sourced from 8 major publishers
1827-2009

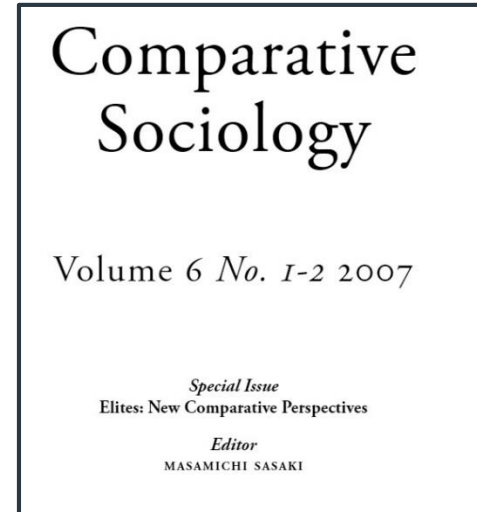
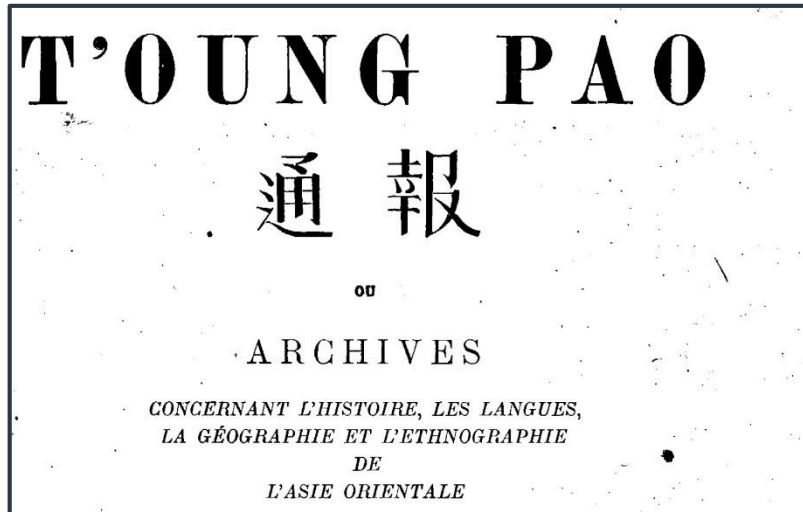
What is Journal Archives?

Journal Archives brings together over 600 journals from 8 major publishers, with material spanning the 19th and 20th centuries, encompassing a wealth of subject areas.

- » Brill Journal Archive Online - Part 1 (Vol 1 to 1999) and Part 2 (2000 -2009)
- » Cambridge Journals Digital Archive (1827 – 1996)
- » Institution of Civil Engineers Virtual Library Archive (1836-2001)
- » Institute of Physics (IOP) Journal Archive (1874-1998)
- » Periodicals Archive Online - Jisc Collections Selection (1891 – 2000)
- » Oxford Journals Archive and Archive Upgrade (Oxford University Press) (1849 - 1995)
- » Royal Society of Chemistry (RSC) Journals Archive (1841-2004)
- » Taylor & Francis Geography, Planning, Urban and Environment Online Archive (1885 to 1996)

Brill Journal Archive Online

Part 1 (Vol 1 to 1999) and Part 2 (2000 -2009)

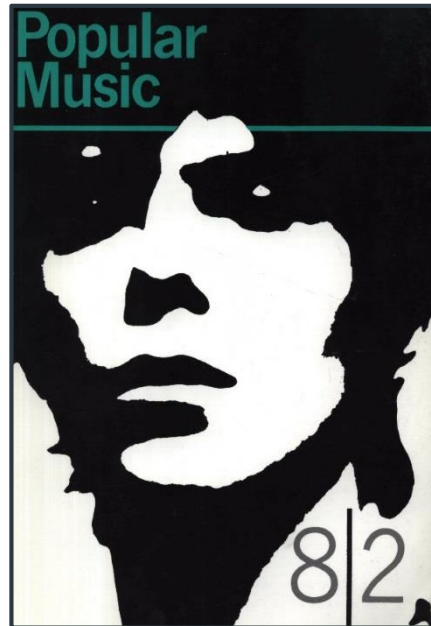
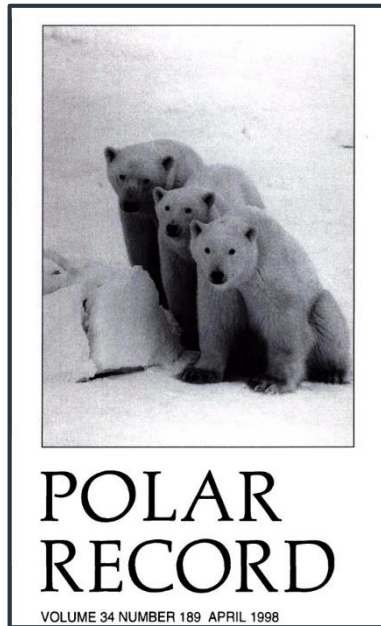


Over 50,000 articles from more than 80 journals published by Brill, Martinus Nijhoff and VSP prior to 2000.

Part 1 includes journals from the 19th and 20th century, usually starting from volume 1 issue 1 and going up to the last issue published in 1999. The collection covers a range of subject areas including humanities and social sciences, international law and human rights, as well as biology and science.

Part 2 provides the content of 154 journals published by Brill since 2000 from the subject areas of Humanities and Social Sciences, International Law and Human Rights, Science and Biology

Cambridge Journals Digital Archive



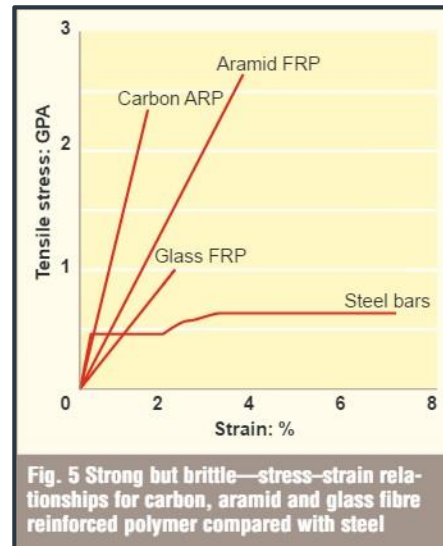
(1827-1996)



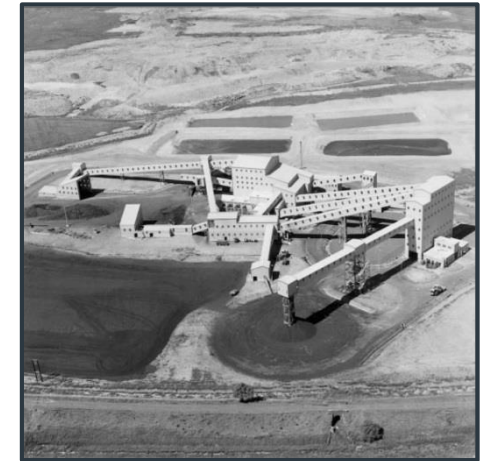
Over 350,000 articles from more than 171 journals published by Cambridge University Press, comprising the back volumes of all available Cambridge titles to volume 1 issue 1, with coverage starting from 1827 up to approximately 1996. There are three specific subject collections:

- » Scientific, Technical and Medical
- » Humanities and Social Sciences, Part 1: Economics History Law Politics and International Relations
- » Humanities and Social Sciences, Part 2: Anthropology and Archaeology, Asian Studies, Classics, Music, Drama, Language and Linguistics, Philosophy, Religion

Institution of Civil Engineers Virtual Library Archive



(1836-2001)



- » Incorporating every paper published by the Institution of Civil Engineers between 1836 and 2001, comprising over 200,000 pages providing a comprehensive civil and structural engineering archive of internationally renowned titles.
- » Specific subject areas covered include architecture, the built environment, building studies, construction, environmental studies, land management, property management, planning, transportation and urban design.

Institute of Physics (IOP) Journal Archive

(1874-1998)

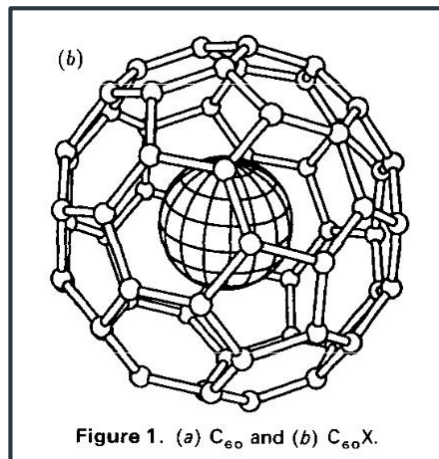
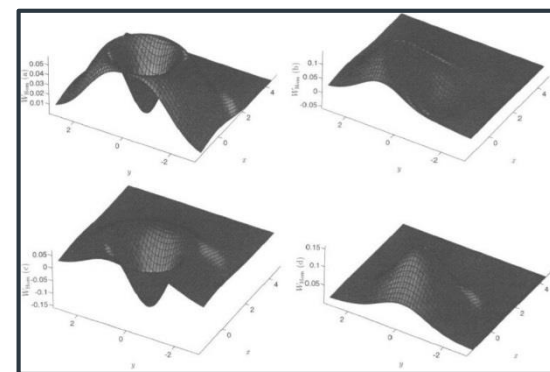


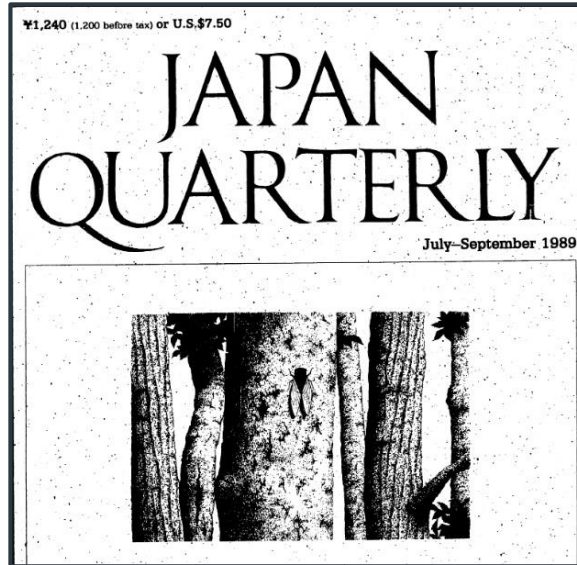
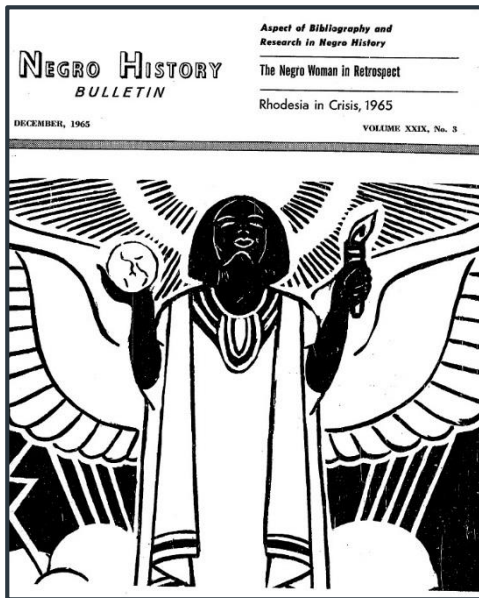
Figure 1. (a) C₆₀ and (b) C₆₀X.



Over 110, 000 articles from more than 50 journals published by the Institute of Physics between 1874 and 1998, providing a key research resource for the physical sciences.

Spanning over 800 volume years and covering the core subject areas of: applied physics, computer science, condensed matter and materials science, general physics, high energy and nuclear physics, mathematics, applied mathematics and mathematical physics, measurement science and sensors, medical and biological sciences, optical, atomic and molecular physics, physics education and plasma physics.

Periodicals Archive Online - Jisc Collections Selection (1891 – 2000)



Over 288,000 articles from a subset of 80 journal backfiles published between 1891 and 2000 from the Periodicals Archive Online collection.

Covering a range of subject areas including Arts, Business, History, Linguistics, Literature, Philosophy, Politics, Psychology and the Social Sciences.

Oxford Journals Archive and Archive Upgrade (Oxford University Press)

(1849 - 1995)

The Review of English Studies

VOL. XIX.—No. 73

JANUARY, 1943

THE DATE OF THE B-TEXT OF *PIERS PLOWMAN*

By A. Gwynn, S.J.

ALCOHOL AND ALCOHOLISM

International Journal

of the

Medical Council on Alcoholism

VOLUME CONTENTS AND AUTHOR INDEX,
VOLUME 18, 1983

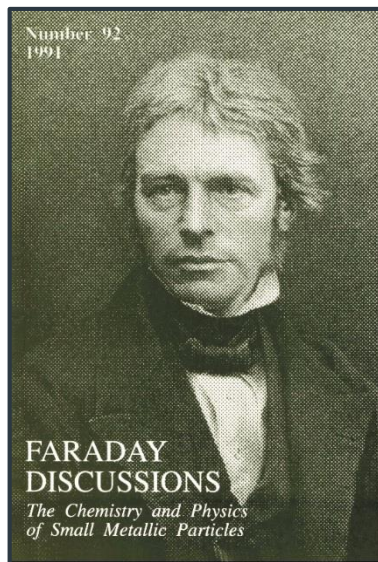
Oxford Journals Archive contains over 3 million articles from over 140 prestigious journals published by Oxford University Press between 1849 and 1995.

The Oxford Journals Archive Upgrade contains an additional 32 OUP journals that have been digitised since the original archive was purchased by Jisc Collections in 2006.

There are five subject based archives included: [Humanities](#), [Law](#), [Medicine](#), [Science](#) and [Social Science](#)

Royal Society of Chemistry (RSC) Journals Archive

(1841-2004)

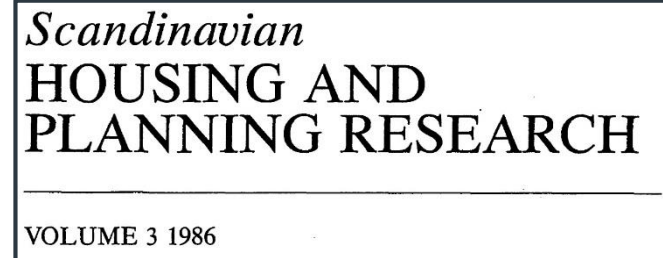
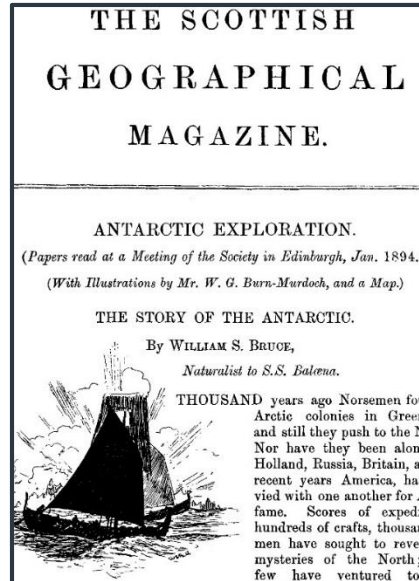
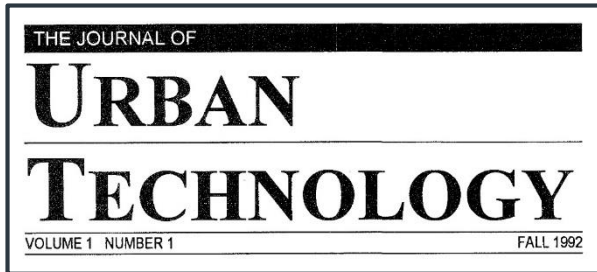


Over 238,000 peer reviewed articles of ground-breaking chemical science published by the Royal Society of Chemistry, and its forerunner societies, between 1841 and 2004.

Subjects covered include biology, biophysics, energy and environment, engineering, materials, medicine, physics and chemical sciences.

Taylor & Francis Geography, Planning, Urban and Environment Online Archive

(1885 to 1996)



Over 20,000 articles from the backfiles of 28 journals published under the Routledge imprint until 1996.

Providing a wealth of resources in environmental and architecture studies, geography, planning studies and urban studies, it includes a number of journals affiliated with organisations such as the 'Journal of Architecture', published jointly with the Royal Institute of British Architects.

Key features

- » Easy web access to four million articles via a simple user interface and article viewer.
- » Search by Author, Article Title, Journal Title, ISSN or across the full text.
- » View online or download articles as PDFs for offline use.
- » Provides online access to journal articles 24/7.
- » Enables search of eight publishers' archives in one place.

Search

The screenshot shows the Journal Archives website interface. A blue box highlights the search bar and the dropdown menu for search fields. Two blue arrows point to these elements with the text "Choose which fields to search on here" and "Enter your search terms here".

Search Bar: A text input field with a "Search" button.

Search Fields Dropdown: A menu with the following options: All, Article Title, Journal Title, ISSN/EISSN, Author.

Search Results: A grid of journal archives, each with a cover image and a brief description.

- Brill Journal Archive Online Parts 1 and 2** (Vol 1 to 2009): More than 80 journals published by Brill, Martinus Nijhoff and VSP prior to 2000 and 154 journals published by Brill from 2000 - 2009.
- Cambridge Journals Digital Archive** (1827 - 1996): Over 350,000 articles from more than 171 journals published by Cambridge University Press.
- Institution of Civil Engineers Virtual Library Archive** (1836 - 2001): Incorporating every paper published by the Institution of Civil Engineers between 1836 and 2001, comprising over 200,000 pages.
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- Oxford Journals Archive and Archive Upgrade** (1849 - 1995): Oxford Journals Archive contains over 3 million articles from over 140 prestigious journals published by Oxford University Press between 1849 and 1995.

Left Sidebar:

- download articles**
- from over 600 journals**
- Journal Archives contains the backfiles from 8 major publishers: Brill, Institution of Civil Engineers, Institute of Physics, ProQuest, Oxford University Press, Cambridge University Press, the Royal Society of Chemistry and Taylor and Francis.
- The rest of Journal Archives can be searched, but access to view and download articles is only available to UK HE and FE Institutions and Research Councils via [subscription](#).
- Contact Us**
- For enquiries about Journal Archives contact the Journal Archives helpdesk: journalarchives@jisc.ac.uk
- Join the JISC Mail Mailing list
- For enquiries about the removal of Spare Rib contact the [British Library](#)

Top Bar: Explore - Learning and research resources | Journal Archives | Home | About | Browse | Support

Footer: We've updated our privacy and cookies pages in line with the new requirements for GDPR. Please review the pages to find out more as well as how you can control the information stored and cookies set. 29 March 2019: The **Spare Rib Archive** is now no longer available following Brexit. Please visit our [news page](#) for more details.

Advanced search

The screenshot shows the 'Journal Archives' advanced search interface. At the top, there's a breadcrumb 'Explore » Journals' and the 'Journal Archives' logo. Below the logo is a search bar with a dropdown set to 'All' and the text 'blumlein'. The main section contains five search criteria, each with a radio button set to 'All' and a text input field:

- Date:** Input field 'Single year or range' with examples 'e.g. 1900 or 1905-1906 or 1950, 1953-1956'.
- Volume:** Input field 'Single volume or range' with examples 'e.g. 1 or 3-4 or 2, 6-9'.
- Issue:** Input field 'Issue number or information' with examples 'e.g. 5 or May'.
- Start page:** Input field 'Start page number' with examples 'e.g. 12 or 21-25 or 35, 40-49'.
- DOI:** Input field 'DOI number' with examples 'e.g. 10.1039/b715576j'.

A blue box highlights these five criteria. An arrow points from the text 'Additional search fields for Date, Volume, Issue, Start Page and DOI' to the 'Issue' input field.

Below the criteria is a row for combining filters. It starts with a dropdown set to 'MUST', followed by the word 'include', then a dropdown set to 'All', and a text input field containing 'stereo'. To the right are 'Remove' and '+ Add row' buttons. A blue box highlights this entire row. An arrow points from the text 'Add rows with search terms that MUST, MUST NOT or SHOULD be included' to the 'include' text.

Use the Advanced options to search by Date, Volume, Issue, Start Page or DOI. Add rows to combine filters with Boolean-style conditional logic.

Filter Results

The screenshot shows the Jisc Journal Archives search results interface. On the left, there is a sidebar with a 'Thumbnail images' toggle set to 'On'. Below it, the 'Filter results by' section is expanded for 'Journal Title', showing a list of journals with their respective result counts. The main content area displays search results, with the first two results visible. The top navigation bar includes tabs for 'Articles', 'Journals', and 'Year of Publication'. A dropdown menu for 'Relevance' is open, showing options for 'First', 'Previous', '1', '2', '3', '4', '5', 'Next', and 'Last'. Annotations with blue arrows point to these elements: 'Click these tabs to browse search results by Article, Journal Title or Year of Publication' points to the top navigation tabs; 'Click drop-down to order results by Relevance, Year or Journal Title' points to the 'Relevance' dropdown; and 'Filter by Journal Title, Author or Year of Publication' points to the 'Journal Title' filter section.

Thumbnail images: ☒ On ☐ Off

Filter results by

Journal Title

- Journal of Analytical Atomic Sp... (57)
- The Analyst (46)
- Journal of the Royal Institute of ... (32)
- Annual Reports on the Progress... (20)
- Reports on Progress in Physics (16)
- British Journal of Applied Physics (14)
- Annual Reports on the Progress... (13)
- International Journal of Environ... (12)
- Journal of the Chemical Society... (10)
- Journal of Petrology (9)
- Physics in Technology (9)
- Journal of Radiological Protection (8)
- Geological Magazine (7)
- Quarterly Review of the Chemic... (7)
- Analytical Proceedings (6)
- Annual Reports on Analytical At... (6)
- Journal of the Chemical Society... (6)
- Proceedings of the Society for A... (6)
- Annals of Occupational Hygiene (5)
- Foreign Affairs; an American Qu... (5)

Author

- Urch, D. S. (13)
- Pierce, T. B. (5)

Articles Journals Year of Publication

Relevance

First < Previous 1 2 3 4 5 Next > Last

1

Determination of ultra-trace amounts of uranium and thorium in high-purity aluminium by inductively coupled

Author: Takeda, Kikuo, Yamaguchi, Tokio, Akiyama, Hideaki, Masuda, Toshihiko

ANALYST, MAY 1991, VOL. 116 50 1 Determination of Ultra-trace Amounts of Uranium and *Thorium* in, determination of ultra-trace amounts of uran (ICP-MS). Uranium and *thorium* were separated from a sample, mass of 10 g, the detection limits for uranium and *thorium* are 7 and 8 pg 9-1, respec spectrometry; high-purity

Journal: The Analyst

Volume: 116 | Issue: 5 | Pages: 501 - 504

Publication date: 1991

DOI: 10.1039/AN9911600501

Download PDF

2

Determination of thorium in bovine bone by neutron-activation analysis

Author: Ohno, S., Ichikawa, T.

Analyst, August, 1972, Vol. 97, pp. 605-608 605 Determination of *Thorium* in Bovine Bone by, Sciences, 9-1, 4-chome, Anagawa, Chiba-shi, Japan) of the *thorium* in the bone by Korkisch's anion-exchange, precision of the method is better than f1 5 per cent. for samples with a *thorium* content exc important element for

Journal: The Analyst

Volume: 97 | Issue: 1157 | Pages: 605 - 608

Users can also toggle thumbnail images on and off, browse their results by page, and choose between a list or a tile view of their results

Browse whole catalogue

The screenshot shows the Journal Archives website interface. The top navigation bar includes 'Home', 'About', 'Browse', and 'Support'. The 'Browse' dropdown menu is open, showing 'Journal Title' and 'Date'. The main content area has tabs for 'Articles', 'Journals', and 'Year of Publication'. Below these is an alphabetical index from A to Z. The 'A' tab is selected, showing a list of journals under the letter 'A'. On the left, there are filter options for 'Journal Title', 'Author', and 'Year of Publication'. Annotations with arrows point to the 'Browse' dropdown, the 'Journals' tab, the alphabetical index, and the 'Journal Title' filter.

Click the tabs to browse by Article, Journal Title or Date

Click the Browse drop-down arrow, then select Journal Title or Date to start browsing

Click here to browse Journal Titles alphabetically.

Journal Archives

Home About Browse Support

Search

Journal Title
Date

Articles Journals Year of Publication

Filter results by

Journal Title
Author
Year of Publication

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

AJS Review (920 Articles)
Abstracts of Working Papers in Economics (661 Articles)
Adolescence (2953 Articles)
Advanced Composite Materials (449 Articles)
Advanced Powder Technology (526 Articles)
Advanced Robotics (850 Articles)
Africa Report (3888 Articles)
Africa Special Report (355 Articles)
African Affair (127 Articles)
African Affairs (5676 Articles)
African Diaspora (18 Articles)
African Yearbook of International Law Online / Annuaire Africain de droit international Online (158 Articles)
African and Asian Studies (1603 Articles)
Alcohol and Alcoholism (2235 Articles)
American Jewish Historical Quarterly (877 Articles)
American Jewish Historical Society, Publications (860 Articles)
American Jewish History (861 Articles)
American Journal of Epidemiology (6951 Articles)
American Journal of Germanic Linguistics and Literatures (295 Articles)
American Journal of Hygiene (2702 Articles)

Journal Archives allows users to browse (as opposed to search) the entire catalogue, by Article Title, Journal Title or Date should they wish.

Viewer

Journal Archives

Results

Click here to return to your search results

Home About Browse Support

Search

Click here to open the Search panel

Zoom in or out, or reset the view to the default size here

Drag the handle to resize the Search panel

Links to download the article as a PDF, access a permanent URL or print are found in the toolbar

Click here to open the Details panel

Drag the handle to resize the Details panel

Session 2

J. R. Dietrich

reactor, to examine the limitations placed on it by the use of natural uranium, and to observe the way in which enrichment of the fuel makes possible improvements in performance as well as making possible the use of entirely different reactor types. In addition to these general considerations some of the specific characteristics of reactor types under development at Argonne National Laboratory will be discussed briefly.

1. Discharge when productivity reaches initial value.
2. Use excess reactivity productivity, discharge when productivity reaches initial value.
3. Discharge when productivity reaches initial value when stage productivity reaches initial value.
4. Discharge when productivity reaches initial value when stage productivity reaches initial value.
5. Discharge when productivity reaches initial value when stage productivity reaches initial value.

FUEL LIFETIME (Y)

INITIAL CONVERSION RATIO (ICR)

Fig. 1. Fuel lifetime as limited by reactivity loss under various operating methods, plotted as function of atom in fuel (F) + initial conversion ratio (ICR), for ^{235}U - ^{238}U systems. The productivity is defined as the difference in rates of neutron production and loss per unit of flux time

CRITICALITY OF NATURAL-URANIUM REACTORS

A list of symbols and definitions will be found in the appendix

In designing the natural uranium reactor the first concern is usually to provide that the reactor be critical under all desired operating conditions. The requirements for criticality can be expressed approximately by the elementary criticality equation

$$\frac{k}{1 + M^2 B^2} = 1 \quad (1)$$

Here

k = number of second generation fission neutrons produced/number of first generation neutrons absorbed in the reactor;

Table 1. Comparison of properties of moderators

Moderator	Σ_a (cm ⁻¹)	Σ_s (cm ⁻¹)	Σ_a/Σ_s	ξ (unit)	$\sqrt{1/\Sigma_a \Sigma_s}$
Graphite ($\rho = 1.60$)	3.53×10^{-4}	0.0611	3.14	364	13
D ₂ O (room temperature)	1.68×10^{-4}	0.175	2.45	125	41
H ₂ O (room temperature)	0.0221	1.31	0.48	32	8

BRITISH JOURNAL OF APPLIED PHYSICS

The physics of advanced reactors

Session 2

independent of trap geometry. Equation (4) can then be a function of 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, 1/11, 1/12, 1/13, 1/14, 1/15, 1/16, 1/17, 1/18, 1/19, 1/20, 1/21, 1/22, 1/23, 1/24, 1/25, 1/26, 1/27, 1/28, 1/29, 1/30, 1/31, 1/32, 1/33, 1/34, 1/35, 1/36, 1/37, 1/38, 1/39, 1/40, 1/41, 1/42, 1/43, 1/44, 1/45, 1/46, 1/47, 1/48, 1/49, 1/50, 1/51, 1/52, 1/53, 1/54, 1/55, 1/56, 1/57, 1/58, 1/59, 1/60, 1/61, 1/62, 1/63, 1/64, 1/65, 1/66, 1/67, 1/68, 1/69, 1/70, 1/71, 1/72, 1/73, 1/74, 1/75, 1/76, 1/77, 1/78, 1/79, 1/80, 1/81, 1/82, 1/83, 1/84, 1/85, 1/86, 1/87, 1/88, 1/89, 1/90, 1/91, 1/92, 1/93, 1/94, 1/95, 1/96, 1/97, 1/98, 1/99, 1/100, 1/101, 1/102, 1/103, 1/104, 1/105, 1/106, 1/107, 1/108, 1/109, 1/110, 1/111, 1/112, 1/113, 1/114, 1/115, 1/116, 1/117, 1/118, 1/119, 1/120, 1/121, 1/122, 1/123, 1/124, 1/125, 1/126, 1/127, 1/128, 1/129, 1/130, 1/131, 1/132, 1/133, 1/134, 1/135, 1/136, 1/137, 1/138, 1/139, 1/140, 1/141, 1/142, 1/143, 1/144, 1/145, 1/146, 1/147, 1/148, 1/149, 1/150, 1/151, 1/152, 1/153, 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Session 2 *J. R. Durrison*

reactor, to examine the limitations placed on it by the use of natural uranium, and to observe the way in which enrichment of the fuel makes possible improvements in performance as well as making possible the use of entirely different reactor types. In addition to these general considerations some of the specific characteristics of reactor types under development at Argonne National Laboratory will be discussed briefly.

$\frac{1}{1 + M^2 B^2} =$ fraction of neutrons born which are absorbed in the reactor (i.e. which do not leak out of the reactor);

k , then, characterizes the process of neutron reproduction within the reactor, while the term $M^2 B^2$ characterizes the loss of neutrons from the reactor by leakage. M^2 , the migration area, is a property of the reactor composition, and is proportional to the mean square distance that would be travelled by fission neutrons between birth by fission and death by absorption if the reactor were infinite in extent. The geometrical buckling B^2 is the solution of the partial differential equation for the neutron flux ϕ in the reactor, with proper boundary conditions:

$$\nabla^2 \phi + B^2 \phi = 0 \quad (2)$$

Thus B^2 is a property of the reactor geometry alone. It is customary to define a material buckling B_m^2 for the reactor material alone, defined by the equation:

$$B_m^2 = (k - 1)/M^2 \quad (3)$$

Note that while equations (1) and (3) are formally identical, they express two quite different relationships. Equation (1) is a criticality condition; equation (3) defines a property of the reactor composition, regardless of criticality. The criticality condition in terms of B_m^2 is:

$$B_m^2 = B^2 \quad (4)$$

B_m^2 expresses, in a single number, the potentiality of a given reactor composition for criticality. If $B_m^2 > 0$ a critical reactor can be had by making the reactor dimensions large enough to satisfy equation (2b). In general B^2 is a sum of terms involving the reciprocals of the squares of the dimensions of the reactor (e.g. $B^2 = \pi^2/H^2 + 2.405/R^2$ for a cylinder of height H and radius R).

The moderators whose nuclear properties make possible $B_m^2 > 0$ with natural uranium are D₂O, graphite, heavy water, and BeO. Of these, only D₂O and graphite have been seriously considered for power reactor use. The important neutron properties of these two materials are tabulated in Table 1.

The quantities Σ_f , Σ_a and $\nu/(f\Sigma_a/\Sigma_f)$ are related to the ability of the moderator to sustain a high multiplication factor k in the reactor. Their significance can be appreciated by considering the usual four-factor formula for k , as it would apply to a reactor composed entirely of the moderator and natural uranium.

$$k = \eta \epsilon p f \quad (5)$$

where η is the reproduction factor, ϵ the fast-fission factor, p the resonance escape probability, and f the thermal utilization. For purposes of approximation, η and ϵ can be considered properties of the fuel alone. To simplify matters further, disadvantage factors will be ignored, and the resonant integral of ^{238}U in the fuel lump will be considered a constant.

CRITICALITY OF NATURAL-URANIUM REACTORS
A list of symbols and definitions will be found in the appendix.

In designing the natural uranium reactor the first concern is usually to provide that the reactor be critical under all desired operating conditions. The requirements for criticality can be expressed approximately by the elementary criticality equation

$$\frac{k}{1 + M^2 B^2} = 1 \quad (1)$$

Here k = number of second generation fission neutrons produced/number of first generation neutrons absorbed in the reactor;

Table 1. Comparison of properties of moderators

Moderator	Σ_f (cm ⁻¹)	Σ_a (cm ⁻¹)	$\nu/(f\Sigma_a/\Sigma_f)$ (cm ²)	ν (per fission)	$\nu/(f\Sigma_a/\Sigma_f)$ (cm ²)
Graphite ($p = 1.60$)	5.53×10^{-4}	0.0611	3.14	364	13
D ₂ O (room temperature)	1.05×10^{-4}	0.175	2.65	122	41
H ₂ O (room temperature)	0.0221	1.31	0.48	23	8

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BRITISH JOURNAL OF APPLIED PHYSICS

The physics of advanced reactors

Section 2

independent of time geometry. Equation (4) can then be a factor of 3.3 and hence the

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The screenshot displays the Journal Archives viewer interface. The main panel shows a document page from the British Journal of Applied Physics, titled "The physics of advanced reactors" by J. R. Dietrich. The document includes a graph of Fuel Lifetime (l) versus Initial Conversion Ratio (ICR) and a table comparing properties of moderators.

The details panel on the right shows the following information:

- Journal: British Journal of Applied Physics
- Article: The physics of advanced reactors
- Author: Dietrich, J R
- Volume: 7 | Issue: S5 | Pages: S9 - S23
- Publication date: 1956
- DOI: 10.1088/0508-3443/7/S5/302

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Section 2

J. R. Dietrich

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k , then, characterizes the process of neutron reproduction within the reactor, while the term $M^2 B_0^2$ characterizes the loss of neutrons from the reactor by leakage. M^2 , the migration area, is a property of the reactor composition, and is proportional to the mean square distance that would be travelled by fission neutrons between birth by fission and death by absorption (if the reactor were infinite in extent). The geometrical buckling B_0^2 is the solution of the partial differential equation for the neutron flux ϕ in the reactor, with proper boundary conditions:

$$\nabla^2 \phi + B_0^2 \phi = 0 \quad (2)$$

Thus B_0^2 is a property of the reactor geometry alone. It is customary to define a material buckling B_m^2 for the reactor material alone, defined by the equation:

$$B_m^2 = (k - 1)/M^2 \quad (3)$$

Note that while equations (1) and (3) are formally identical, they express two quite different relationships. Equation (1) is a criticality condition; equation (3) defines a property of the reactor composition, regardless of criticality. The criticality condition in terms of B_m^2 is:

$$B_m^2 = B_0^2 \quad (3a)$$

B_m^2 expresses, in a single number, the potentiality of a given reactor composition for criticality. If $B_m^2 > 0$ a critical reactor can be had by making the reactor dimensions large enough to satisfy equation (3a). In general B_m^2 is a sum of terms involving the reciprocals of the squares of the dimensions of the reactor (e.g. $B_m^2 = (\pi/H)^2 + (2.405/R)^2$ for a cylinder of height H and radius R).

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$$k = \eta \epsilon p f \quad (4)$$

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$$\frac{k}{1 + M^2 B_0^2} = 1 \quad (1)$$

Here

k = number of second generation fission neutrons produced/number of first generation neutrons absorbed in the reactor;

Table 1. Comparison of properties of moderators

Moderator	Σ_a (cm ⁻¹)	Σ_s (cm ⁻¹)	$\ln(\text{thermal})$ (cm)	ν (unit)	$\nu/(f\Sigma_a)$
Graphite ($\rho = 1.60$)	3.53×10^{-4}	0.0611	3.14	264	13
D_2O (room temperature)	1.05×10^{-4}	0.175	2.65	125	41
H_2O (room temperature)	0.0221	1.31	0.48	33	8

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Session 2

J. R. Dietrich

reactor, to examine the limitations placed on it by the use of natural uranium, and to observe the way in which enrichment of the fuel makes possible improvements in performance as well as making possible the use of entirely different reactor types. In addition to these general considerations some of the specific characteristics of reactor types under development at Argonne National Laboratory will be discussed briefly.

Fig. 1. Fuel lifetime as limited by reactivity loss under various operating methods, plotted as fissions/ ^{235}U atom in fuel (T) vs. initial conversion ratio (ICR), for ^{235}U - H_2O systems. The reactivity loss is considered the difference in rates of neutron production and loss per unit of flux time.

CRITICALITY OF NATURAL-URANIUM REACTORS

A list of symbols and definitions will be found in the appendix.

In designing the natural uranium reactor the first concern is usually to provide that the reactor be critical under all desired operating conditions. The requirements for criticality can be expressed approximately by the elementary criticality equation

$$\frac{k}{1 + M^2 B_g} = 1 \quad (1)$$

Here k = number of second generation fission neutrons produced/number of first generation neutrons absorbed in the reactor;

Table 1. Comparison of properties of moderators

Moderator	$\frac{\Sigma_a}{\Sigma_{tr}}$ (cm ⁻¹)	$\frac{\Sigma_a}{\Sigma_{tr}}$ (cm ⁻¹)	$\frac{\Sigma_a}{\Sigma_{tr}}$ (cm ⁻¹)	$\frac{\Sigma_a}{\Sigma_{tr}}$ (cm ⁻¹)	$\frac{\Sigma_a}{\Sigma_{tr}}$ (cm ⁻¹)
Graphite ($\rho = 1.60$)	3.53×10^{-4}	0.0611	3.14	364	13
D ₂ O (room temperature)	1.65×10^{-4}	0.175	2.45	125	41
H ₂ O (room temperature)	0.0221	1.31	0.48	33	8

BRITISH JOURNAL OF APPLIED PHYSICS

The physics of advanced reactors

Session 2

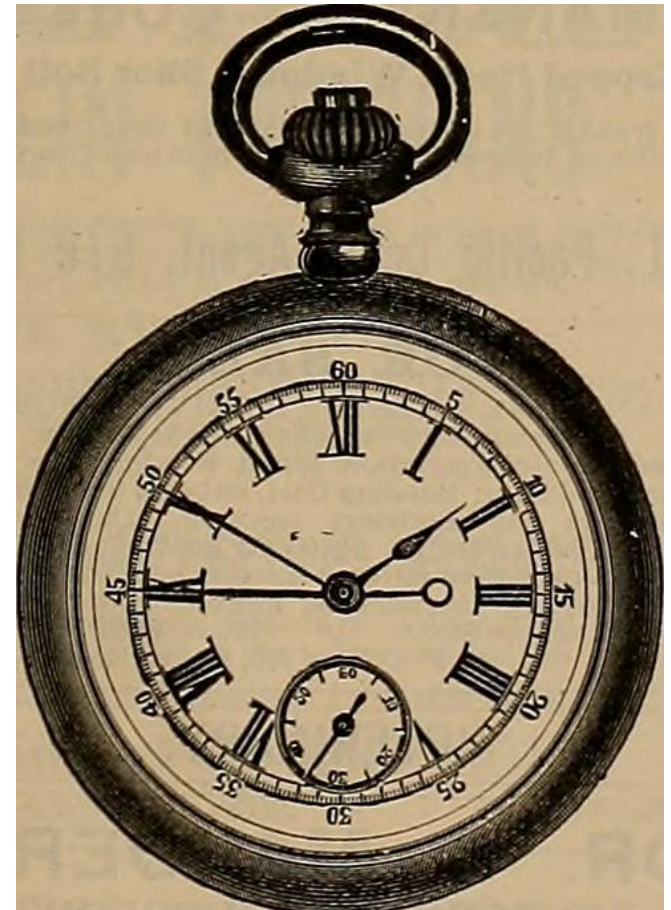
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