



▼ ADVISOR REVIEWS—COMPARATIVE REVIEW

Web of Science (2004 version) and Scopus

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Composite Score: Web of Science (2004) ★★★ 3/4
Composite Score: Scopus ★★★ 1/4

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Note: This review was written November 20–28, 2004, based on the databases as they were available over the period November 10–24, 2004. It was revised on December 5, 2004 to incorporate some significant changes in Scopus made on December 4, 2004.

INTRODUCTORY COMMENTS

Quick summary in one sentence: Keep Web of Science and buy Scopus if you can—once the publisher gets the data loaded.

This review compares version 7 of Web of Science from ISI, introduced during the summer of 2004, with the new database Scopus from Elsevier. Both products are multisubject academic databases that can be searched by citation as well as by keyword or other subject term.

Since Web of Science is the more familiar product, it will be discussed first for each point. A discussion of Scopus will follow, and then a comparison of the two products. Some common and satisfactory elements will be treated in summary fashion. Most details of exactly how to use specific features in each product are thoroughly treated in the online Help, and need not be discussed in detail in this review, but we will emphasize necessary details that the Help omits.

Scopus was released on November 10, 2004, after widely publicized beta trials at a few universities. In our opinion, the underlying data is not as complete as other products usually released by major vendors. Nonetheless, because of the great interest in this database, it is being reviewed on the basis of the content and other features available on the date of the release. When the publisher demonstrates that the basic data has been loaded, we will reevaluate the product.

ABBREVIATIONS USED

| | |
|-----------|---|
| Compendex | Engineering Index in any of its manifestations or names, including EI |
| Embase | Excerpta Medica in any of its manifestations or names, including EM |
| Medline | Medline in any of its manifestations or names, including PubMed |
| ISI | Institute for Scientific Information |
| JCR | Journal Citation Reports |
| SCI | Science Citation Index, the precursor of WoS |
| WoK | Web of Knowledge (the ISI platform that supports WoS and other databases) |
| WoS | Web of Science |

PRICING OPTIONS

WEB OF SCIENCE

Web of Science (WoS) is priced by a complicated set of criteria, including the size of the institution measured in FTE, the membership in a consortium, the total size of the consortium, the portion of the total file desired, and the number of simultaneous users wanted. The discount structure gives an advantage to very large consortia. Both separate and combination pricing for each of the three subject fields are available; because of the special virtues of WoS for interdisciplinary searching, most institutions try to buy all three subject groups, or at least the science and social science portions. The backfiles are avail-



“At a Glance” Comparative Review Scores

The maximum number of stars in each category is five.

| | Web of Science | Scopus |
|-----------------|----------------|-----------|
| Composite Score | ★★★ 3/4 | ★★★ 1/4 |
| Coverage | ★★★★★ | ★ 1/2 |
| Usability | ★★★ 1/2 | ★★★★★ 1/2 |
| Pricing | ★★ 1/2 | ★★★ |
| Contract | ★★★★★ | ★★★★★ |

able as groups of years, and each group must be purchased by a one-time payment. The size of the payment, potentially several hundred thousand dollars for a complete set, is reduced by a credit for the product previously owned in another format, such as print or CD. By now, essentially all potential subscribers will have owned some portion of the database previously. Most larger institutions try to have the complete backfiles to 1945, even if they cannot buy them all at first.

The publisher was unwilling to supply exact figures, but the complications noted here make it obvious that the prices for particular institutions cannot readily be specified. As a rough guide, the cost for a large university will be somewhat above \$100,000 a year, and the cost for a small college will be in the low five figures. (The annual cost is in addition to the one-time backfile purchase fee.) The additional charge per simultaneous user is \$500 each, a charge generally regarded by libraries as a minor but unjustified nuisance considering the total price. Most small universities subscribe for about 10 simultaneous users; most large ones for two or three times that number.

SCOPUS

Scopus is priced according to the size of the university measured in FTE, with the price per FTE varying in bands according to university size. There are discounts for some but not all consortia, and there are discounts for institutions subscribing to other Elsevier databases. The publisher was unwilling to provide exact figures, but the final price will probably be about 85 to 95 percent of the same institution's price for WoS.

COMPARISON

There are more important considerations than the relatively small expected differences in price.

PRODUCT DESCRIPTION AND INTENDED AUDIENCE

WOS

WoS, in spite of its name, is an index to scholarly periodical articles in three parts: *SCI Expanded* (*Science Citation Index Expanded*—the "Expanded" refers to increased content compared to the printed volumes); *SSCI* (*Social Science Citation Index*); and *A&HCI* (*Arts and Humanities Citation Index*). WoS in the sciences starts with 1945; in the social sciences with 1956, and in the humanities from 1975. It also includes the chemical databases *Index Chemicus* and *Current Chemical Reactions*, sold separately, which will not be discussed here. WoS is part of a more general platform called Web of Knowledge (WoK), which contains several other ISI and third-party databases, most of which can be integrated, as mentioned later in this review. The main

purpose of WoS is citation searching, but it can be used as an author and subject index. It is normally accessed through the internet, but can be accessed through an intranet or CDs. This database is widely used (or misused) by undergraduates as their single all-purpose database. In the sciences, coverage is sufficiently comprehensive that it can be used as a primary search tool; in the social sciences, such use becomes problematic, especially at higher levels of study; and in the humanities, it—or any other journal article citation database—can be of minor use only, especially since limited almost entirely to English language journals. The use of WoS in any field for subject searching is inevitably hampered by the lack of true subject headings; its subject searching capability is best viewed as a supplementary feature.

WoS originated as a printed database in very large volumes of very small type. The first issues were for 1965 published quarterly with annual cumulations, supplemented after a few years by separate subject indexes by word pairs, and by five-year cumulations sold separately. Major research libraries purchased at least one complete set, getting the cumulations as they appeared. Most smaller libraries where research was done purchased it as funds permitted. Many of the limitations and peculiarities of the database are derived from this print origin: there was, for example, a one-line limit for cited references, requiring shortening the journal titles to nonstandard abbreviations of no more than 20 characters. These abbreviations are still required today.

(It is appropriate to mention that there is also an excellent version of the science and social science components of this database available through Dialog, whose features permit more flexible searching than the WoS version, but whose pricing puts it out of the range of academic libraries.)

SCOPUS

Scopus is an index to scholarly periodical articles and other items, including Web sites, in science and social science. It can be used for citation searching, but is primarily intended for general author and subject searching in the sciences at all levels, including researchers, graduate students, and undergraduates. It is accessed through the internet, and sold as a single unit. It does not particularly emphasize its coverage of the social sciences, but it will be useful here also for undergraduates. There is no humanities coverage. It is not considered primarily as a citation database, but it can be used as one, and quite effectively.

It does not yet have any history of its own, though its earlier portions have been constructed using some of the components of several other indexes. The differing style of references and indexing in these different sources survive with minimal change in the Scopus entries, which show corresponding variation, and the ability to do true subject searching varies by topic and year. These details will be discussed under Time Scope later in this review. (See Table 1.)

Table 1. Index Comparison

| | SCI | SSCI | A&HCI | Scopus pre-1996 | Scopus 1996+ |
|------------------------------|------------|-----------|-------------|------------------------|---------------|
| First year covered* | 1945+ | 1956+ | 1975+ | varies: 1964+ to 1994+ | 1996+ |
| First year abstracts present | 1991+ | 1992+ | 2000+ | varies; 1964+ to 1994+ | 1996+ |
| Current journals** | 5900 | 1725 | 1144 | n.a. | 14,000 |
| current items added per year | 988,000 | 151,000 | 120,000 | n.a. | not yet known |
| current size | 28 million | 5 million | 3.2 million | 16 million | 11 million |

* Both WoS and Scopus cover earlier cited articles regardless of date.

** Both WoS and Scopus also include ceased and changed titles, subject to their limitations on time span.

CRITICAL EVALUATION

A) Subject Scope

WOS

The science portion of WoS covers all of the major English-language international journals, and a few particularly important ones in other languages. Almost all its journals are published in Europe or the U.S.; there is relatively little third world coverage. In some science fields, like molecular biology, this is essentially all that is needed; in others, like zoology, it does not cover important material of local significance. For such topics, the more comprehensive specialized indexes must be used as well, even by students. In the social sciences and humanities, WoS covers journal articles primarily, not books, although in many of these disciplines, books are of much greater significance. Furthermore, the journals used in these fields are by no means limited to the English language and thus not included in *A&HCI*. It is therefore particularly important that the appropriate specialized indexes be used as the basic research tools in these areas. The figures in Table 1 are for currently active journals only; WoS also includes the appropriate ceased or changed titles.

SCOPUS

Scopus' strengths lie in the sciences. In most science fields, it has significantly greater coverage of third world and other non-English language publications than WoS has for recent publications. The third world coverage for earlier publications varies by subject as it is derived from the wide scope of some of the earlier indexes whose data it uses. It also has significant but much less comprehensive coverage in the social sciences for recent years only. Disappointingly, it does not provide significant coverage for public affairs, history, or the humanities. In the sciences, it can be used as the single all-purpose index within its time limitations, using both its subject and its citation indexing capacities; in these fields, it is sufficient for all undergraduate and some graduate work, and usefully covers more popularly-oriented titles. In the social sciences, it should be supplemented by specialized indexes for even advanced undergraduate work.¹

COMPARISON

The need for wide geographical coverage is very subject-dependent. In most of the sciences, the coverage of WoS is sufficient, but the increased coverage of Scopus is still welcome. In other fields it is essential, unless provided by other indexes. In the social sciences unfortunately neither index is sufficiently strong for scholarly purposes, regardless of geography.

B) Time Scope

WOS

The very wide time scope of WoS is shown in Table 1: Index Comparison. In all cases, this refers to the date of the published articles; the earlier material cited by those articles can be of any date. Since there is no controlled subject metadata for any year, those years lacking abstracts provide only rudimentary subject searchability. Since its operation as a citation index does not need abstracts, it is excellent for all covered years. By mid-2005, an extension of science coverage to 1900 will be available—for a price.

SCOPUS

There are two questions here: what Scopus intends and what it has achieved. This section talks about the intent. Rather than misrepresent

it, we quote from their sales manager, describing the pre- and post-1996 portions.

We don't split them up, we just refer to cover-to-cover coverage from 1996 onwards, and abstracts going back to the mid 1960s.

We have determined—by experiment—that this cryptic statement means:

1. The 1996+ portion is meant to include all the items in all the journals included, which will be all the science titles they can get, however trivial.
2. The earlier period including 1966–95 (years vary by subject) is not now meant to include all the subjects in the later period. For some subjects it includes no journals; for other subjects it is meant to include some or all of the journals. For those journals that are included, it generally does not yet intend to include all the years, all the issues in a year, or all the items in an issue. What articles it does include will usually have abstracts.
3. The very early items before 1966 (years vary by subject) are meant to be included if they are cited by later items; they will not usually include abstracts, but merely provide identifying information.

We find the differences between the periods very much worth distinguishing; we will use the terms “recent,” “earlier,” and “very early.” The “recent” Scopus content includes all science and most social science subject fields, and all important and many minor journals along with all their published items. The “earlier” content is recognized as more variable in every respect. The “very early” content is intended to be only partial and incomplete in every respect.

The recent, complete material in Scopus is limited to the period from 1996 to the present, containing 10.8 million items; almost all have abstracts. The promotional materials for Scopus make a positive feature of the time limitation for complete coverage, claiming that 87 percent of searching requires only the most recent 10 years. This argument is aimed at the naive. The difference between a research library and an undergraduate library rests, among other things, on its much greater retrospective coverage—that 13 percent. The need for this does vary by field, with the social sciences and the descriptive natural sciences requiring much longer coverage than subjects such as engineering, physics, or molecular biology. The data for the 1996+ coverage is derived from the journals themselves, with the addition of indexing from several sources including Medline, Embase, and Compendex. It is the intent of the publisher to gradually extend this period of complete cover-to-cover inclusion backwards to earlier years.

The amount of earlier material is quite extensive, making a total of 16 million articles; a variable number have abstracts. It does not cover all science areas; according to the publisher, it includes, at the time of the review, only material from the databases shown in Table 2.

The experienced science librarian will recognize that these are indexes of very different importance and quality. Medline is the standard for

Table 2. Source Databases for Scopus pre-1996

| Source Database | Years Covered |
|---------------------|----------------|
| Medline | 1966 and later |
| Embase | 1970 and later |
| Compendex | 1970 and later |
| World Textile Index | 1970 and later |
| Fluidex | 1974 and later |
| Geobase | 1980 and later |
| Biobase | 1994 and later |

U.S. biomedical material; Embase is a widely used supplement for European coverage and additional drug data; Compendex is the standard engineering index for all fields except electrical engineering (which is better treated in Inspec). Unfortunately, Compendex is also an index with poor abstracts and erratic inclusion of material. World Textile Index and Fluidex appeal to specialized needs (presumably Elsevier added them because it owned them). Geobase is one of the standard indexes for earth sciences, where there is no single best index. Biobase is a feeble attempt of Elsevier's to compete in the subject, at approximately the level of Wilson's Biological and Agricultural Index. These services do index much material in other fields: a considerable number of articles in organic chemistry journals, for example, are indexed in Medline or Embase and thus included.

For many journals, some more complete coverage also extends before 1996, but the years covered do not seem to follow a consistent pattern by subject or publisher or likely index, nor are they necessarily continuous. It is immediately apparent that some represent the beginning of the backwards extension of cover-to-cover indexing as described previously. Some presumably represent the inclusion of earlier cited references.

For very early years, items cited by the later journal articles are added as what the publisher calls "dummy records," carrying just enough information for identification. There is considerable material from before 1966 or 1970, and we are not certain without further analysis on what basis all of it is being added, since very many of the necessary records seem not yet included, and some records contain more information than expected, even including abstracts (at least some of the abstracts are display-only, with their text not searchable).

The material processed from these indexing services is subject to the problems of incompleteness, poor abstracts, partial relevance, and inconsistent metadata that the services themselves may possess. For many journals, even entire years are missing from some indexes without explanation. A modern high-quality database cannot be constructed from such material without extensive editing. Even assuming that the gaps within the journals were filled and full coverage became available for the years and subjects stated, it would still be difficult to do serious academic work with a database whose time span varies from subject to subject in this fashion: if one sees results including some chemistry items from the 1970s, it is easy to forget that only a portion of the 1970s material is being examined; a prominent notice is required.

COMPARISON

For a citation index it is of particular importance that the longest chronological scope possible be available. The effectiveness of citation indexing rests upon using previously identified key articles that will be cited by later papers; typically one selects an article a few years back, but sometimes the best known article may be several decades old. Some fields, such as botany, cite much more slowly than others, such as cell biology. Following the cited/citing references forward and backwards in time is generally an excellent way to find related material, and works better if as many years are included as possible.²

C) Completeness

WOS

WoS has always been cover-to-cover in principle. Current material now actually is, but data from the early years sometimes did not include all the minor editorial items. Preliminary testing shows some few individual articles missing, and literal 100 percent accuracy has never been achieved by a large database.

SCOPUS

We now discuss what Scopus has actually achieved, not merely intended. For the period before 1996 covered by the specified sources, many journal titles have complete years missing; others have only fragmentary data for some years. This applies especially in the field of engineering, but affects all subjects to a considerable degree. Much is due to the selective indexing in the databases used, and much to errors in the databases. Some is unexplained. There is probably no way to restore this material except by going back and reindexing from the original sources. It is therefore understandable that, while Scopus hopes to do so eventually, it does not promise to do so very soon. What is not understandable is that no mention is made of the problem. The online Help and the publisher's promotional efforts do not mention the problem. The Scopus staff were willing to explain what we found, but did not volunteer anything, leaving the impression that they would have been quite willing to see an uninformed but favorable review.

For the period after 1996, where cover-to-cover material is promised, there should not be similar problems. This is not yet the case. Many of the journals, often in the field of engineering, but also in all other subjects, still show in this period missing articles, issues, or even years. Rather than misrepresent the situation, we quote once more from their sales manager:

Scopus' aim is to have cover-to-cover coverage of all listed journals from 1996 onwards. For the overwhelming majority of journals, including all the top journals, we will have cover-to-cover coverage by the end of January. The content is inhouse, is being processed and will be loaded by the end of that month. There are some journals listed for which we haven't yet sourced all the content—not through lack of trying, but because the major national libraries with whom we work can't trace them, and neither can we. We will continue with our efforts to locate this content and in the meantime, will work with publishers to load more backfiles from the pre-1996 years.

This describes accurately the apparent state of affairs in November, 2004. For January 2005, we do not share the confidence that the only cause for continuing incompleteness will be the failure to find some of the source journals. The meaning of "top" journals is somewhat unclear, especially from a publisher that emphasizes its extensive journal coverage, and we similarly question the exact meaning of "overwhelming majority." We consider the standard for practical completeness is that almost 100 percent of the content is present, not counting such known problems, with the problematic titles identified rather than ignored. We recognize the difficulties Scopus faces: it must simultaneously bring the addition of material to a more current basis and also add large amounts of earlier material quickly.

These difficulties are not intrinsic to the material but are of their own making: Elsevier could have delayed release until the spring, while increasing its availability as a beta version. The effort spent on premature publicity could have gone more appropriately into final development. They would have lost no sales: only a foolhardy or very secure library would buy a product this expensive until near the end of the budget year. Unfortunately, the extent of missing materials is so great that it will take heroic efforts to reach completeness in two months; we will congratulate the producers if they make their goal, but we do not expect them to, at least by our standards. Their own may be more easily attainable.

It is understandable that this problem of incompleteness did not bother the beta testers. For a test release, everyone knows that the product is almost certain to have the content incomplete and some features not

Table 3. Sample University Scopus and WoS Item Counts Per Year, 11/28/04

| Year | Scopus | WoS |
|------|--------|-------|
| 2004 | 1,622 | 2,006 |
| 2003 | 2,113 | 2,170 |
| 2002 | 1,419 | 2,043 |
| 2001 | 1,282 | 2,065 |
| 2000 | 1,580 | 1,902 |

working. To prevent misunderstanding, these limitations are almost invariably indicated prominently by both the publisher and the library. Since in most cases Scopus defaults to showing latest items first, it would have been the rare demonstration, short test, or trial search that looked much further down—especially when there were all the glories of the Scopus results screen to examine.

On the other hand, published material is expected to have all the features actually functioning properly, and all the content actually present. Thus, we find it especially unprofessional that Elsevier has released this material without a comment or alert anywhere in the product or the online Help. We ourselves were aware of the problem from earlier published reviews, but the company apparently was not. On being asked whether Scopus had any systematic way to detect or correct the omissions, one of the senior managers suggested that the company relied on the librarians. This was on the telephone, and the individual may have intended it as a joke, but we think it expresses the true state of affairs.

It is impossible to trust a database whose completeness varies in this unpredictable, inconsistent, and unannounced fashion. We draw an analogy: who would use a road atlas, some of whose maps had some large but unpredictable portions of the road network omitted?

COMPARISON

The customary way of assessing completeness involves comparing the results of searches. Unless only trivial searches are undertaken, the comparison involves the entire system, including the search engine and the data; a valid test of this sort is a major research project. A suitably chosen trivial search can, however, be representative: we have compared the item listings of one major research university for recent years, using only the SCI and SSCI portions of WoS (Table 3).

Our interpretation is that for the most recent year (2004), Scopus seems several months slower than WoS to add material. For 2003, the counts are equal; they ought to be, as the additional journals in Scopus are not the ones a major university would publish in. For 2002, 2001, 2000, these years are still incomplete on Scopus: between 15 to 40 percent of the items were not there.

It is irresponsible to release an incomplete index that people will depend on without even a warning. Having done so, the burden of proof is on the publisher that the situation is remedied. When the publisher announces that it is, and demonstrates so, we will be very willing to independently verify their assertion and say so in this publication and

Table 4. Comparing Updating in Web of Science and Scopus

| | Most Recently Published Issue | Most Recent Issue in WoS | Most Recent Issue in Scopus |
|----------------|----------------------------------|-----------------------------|--------------------------------|
| <i>Science</i> | 5,699 | 5,697 | 5,695 |
| <i>Nature</i> | 7,014 | 7,013 | 7,009 |

elsewhere. Normally, the products of a scholarly publisher are presumed to have the content that they are said to have; one generally debates their features and their value for money. But it would be unrealistic to credit any assurances from those involved in this database without independent testing. It has in fact long been the case that the deficiencies of publishers (and of users and authors) are met as best possible by the ingenuity of librarians.³

D) Updating

WOS

WoS is updated on a weekly basis. Articles from major journals generally appear within a few weeks of publication.

SCOPUS

Scopus is intended to be updated daily. There is a button for limiting time span to the most recent 7 or 14 or 30 days. It is clear from a few trials that the updates are irregular but substantial.

COMPARISON

We examined two key journal titles on Friday, Nov. 19, 2004 (Table 4). Considering the importance of these titles, it is clear that the work flow at Scopus still leaves much to be desired. Lack of prompt updating is easily visible: all scientists will expect to find their latest papers.

E) Nonjournal Coverage

WOS

WoS coverage is basically limited to articles in scholarly journals, but later years are comprehensive in material type, including book reviews and editorial material. Many book or symposia series are included in WoS, but they are treated as if they were journals. Conference proceedings and patents are covered by other WoK databases. Web content is covered as Current Web Contents, part of the coverage of Current Contents, an additional WoK database. These databases were not investigated here.

This is an appropriate place to mention that the *A&HCI* part of WoS contains unique cited content. An “implicit citation” to a work of art or music, or a literary work is added by WoS for articles where any of these is analyzed or reproduced, even if the author gives no explicit reference. This marvelous feature would be a real boon if the journal coverage was more extensive for these subjects.

SCOPUS

In addition to scholarly articles, conference proceedings, and some other books, Scopus has extensive coverage of Web sites, provided by Scirus. By itself, Scirus (a free service owned by Elsevier, and available at <www.scirus.com>) provides data from the Web and other sources, including Medline, Science Direct, and some Open Access journals. The portion of Scirus used for Scopus is only the true Web sites. All results in Scopus have tabs for the journal results, for Web results, for patent results, and the combination. The Web results always come up on Scopus regardless of the settings, even when there are no results of that type. They can be ignored, but not turned off. The default sorting for both the Web and combination results is by relevance, which here means frequency and location of the

specified terms, with number or location of links a very secondary factor. Interestingly, the Web results can also be sorted by date; the date used is the latest date of updating from the metadata in the header; this is only occasionally a meaningful date.

Analysis of the Web part of Scopus requires comparison with other Web search engines. During the preparation of this review, the availability of these increased from day to day. An adequate comparison is not possible in this review.

Patents now are available, but the only ones yet present are from the USPTO database, provided by a link to that database. Only records from 1996 and later are available through Scopus, though the subject portion of the USPTO database extends back to 1976. Patents are searchable in Scopus from the Basic and Advanced search modes, but not the Author or Cited Reference search screen.

COMPARISON

Scopus offers the interesting possibility of a truly unified database—but it is not alone in the quest.

F) General Navigation, Defaults, and User Options

WOS

The initial screen is a general WoK Welcome screen, offering WoS among other choices. It is possible to preset it to go directly to WoS, and to preset the defaults for selected years and database. There are also time selections for the most recent one, two, or four weeks. The introductory screen leads to the WoS screen for the choice of General Search, Cited Reference Search, and Advanced Search, along with options to limit to general subject or date. Navigation between the screens is usually logical, but there is often more than one way of doing things, not all equally useful. The Advanced Search mode will rarely be needed; especially because it does not include all the potential search fields. There are buttons or links for most of the necessary navigation, but it is sometimes more convenient to use the forward and back buttons on the browser.

The user can preset the defaults for selected years and databases, and associate this with an individual profile.

SCOPUS

The initial screen will usually be a screen of general information, offering a link to go to the Scopus home page. In the version reviewed, the initial pages contain quotations, presumably by users, selected by Scopus' publicity agents to proclaim the usefulness of the product. There are also time selections by year, and for the most recent 7, 14, or 30 days. The home page lists search tabs for Basic Search, Advanced Search, and Author Search. The Basic Search appears by default. The Advanced Search will rarely be needed, and there is no way to go directly to a citation search. Navigation between screens often relies entirely on the forward and back buttons on the browser.

COMPARISON

There are more possible choices in WoS, and thus more complicated pages. The variety of choices is an advantage if one wants the options, but otherwise it can be confusing. The lack of direct access to Citation Searching in Scopus is quite deliberate, intended to position the product as an all-purpose search tool; it is nonetheless a most peculiar decision.

G) Searching for a Subject

WOS

WoS has a Quick Search box that appears in the initial screen. It searches the default fields of article title, abstract, and keywords, subject to the time and other limits entered.

Most subject searching will be done from the General Search screen. The default setting treats multiple words as a phrase. If AND is intended, it must be specified. There is an Advanced Search screen, but it is needed only for special purposes. WoS sources of searchable subject terms are from the title, author's keywords, abstracts when available, and "KeyWords Plus"—generated from the titles of the cited references of an article. There is no controlled vocabulary indexing. Abstracts and keywords are available only for the later material as shown in Table 1. This essentially means that the earlier material cannot be searched by subject, since title alone is rarely enough for such a search. Searches can, of course, be limited to any of these fields. Searching by title only is useful when too many results are obtained with a more general search.

The defaults in WoS are set for the broadest possible results, 1945 to the present, and all three parts of the database. (If not all the segments are purchased, the choice will include only those that are available.) There is an option to limit the dates, but for most uses it is simpler to leave the options as set; the default display in reverse chronological order ordinarily makes limitation by year unnecessary, unless one is doing a search that exceeds the 100,000 item set limit. For searching in science it is sufficient to search all fields, because science is the great majority of the items. Furthermore, leaving all sections searchable will find the many interdisciplinary items, some unexpected, and so is also recommended for much social science searching.

SCOPUS

Scopus works similarly. Scopus has a Quick Search box that appears on most screens. It searches for author names in addition to the expected titles, keywords, and abstracts. Regardless of settings on the Search page, it always searches the default years, 1967 to the present.

More often, users will turn to the Basic Search screen. The default for terms entered in the search box is AND; quotation marks must be used for phrases. (We expect most experienced searchers have learned to use operators and quotation marks whether or not they are actually required—doing so rarely yields erroneous results, and often avoids error.)

The default time period is 1995 to the present. Since the controlled part of the indexing is specified as 1996+, this represents a strange decision that shows lack of coordination of the various parts of the product.

One of the most problematic features is the erratic subject indexing. Material coming from the extraneous sources listed in Table 2 include the indexing terms assigned by the source index, whether they come before or after the 1995/96 cutoff. Articles covered by more than one index include all the index terms. For example, the Embase indexing covers most drug names. In their native versions, these indexes all have elaborate thesauri and cross references, and most have a hierarchical subject classification in which one can search for broad subject terms and also get the results for all the narrower terms. These facilities are lacking in Scopus.

An even more problematic feature is the list of "subject fields" on the search page. They do not represent subjects of articles, but broad sub-

ject fields of journals as a whole. Fortunately, many journals are listed in several different fields, but the assignment of journals to the fields showed some inconsistency. This is essentially the way “subjects” are assigned in nonprofessional databases like EBSCO, and in our view it is a potential source of missed results. (Several articles on bacteria treat them in the context of possible life on other planets, and appear only in Monthly Notices of the Royal Astronomical Society, which will be missed unless “All” or “Physical Sciences” is selected.) The harm can of course be avoided by leaving the setting at the default: All Subjects, and the feature can sometimes be useful to resolve ambiguities or to separate authors with the same names. It is the intention of the publishers to introduce finer subject distinctions in mid-2005; it will be interesting to see if this worsens the problem of searching the wrong section.

COMPARISON

The Keywords Plus field in WoS is an automated attempt at controlled vocabulary, but not as useful as true subject indexing, as found in many of the Scopus components. The subject indexing in Scopus is most valuable for those who already know the search vocabulary, and remains of use even for those unfamiliar with it; it would be of more use if one did not have to guess to which articles it is applied. The subject category feature in Scopus is more likely to harm than help. On balance, subject searching by either the beginner or expert will work adequately in each database.

H) Searching for an Author, Institution, or a Known Work

WOS

Again, the user starts from the general Search screen and the Author Name field. There are now two alternatives, to browse for possible author names or to search directly. To browse, one clicks on the link Author Index, and there is an alphabetical author index, but it shows only the author names and the number of records. When looking for a well-known author, these counts may often be enough to locate the right person. There is a box to transfer the name to the search page—one cannot simply click on the name to search.

To search, enter the name in the author search box. All authors are entered with the surname, followed by a space and up to three initials. (WoS never uses given names). Since authors and journals are not consistent in use of middle initials, it is always necessary to truncate, as in “Watson, J*.” Likewise, it is always necessary to search allowing for all possible spellings and misspellings, since whatever name variant was on the original paper is copied exactly. Hyphenated names and those with apostrophes are entered either as unbroken character strings or with spaces, but not with the real punctuation. Besides the obvious traps such as umlauts and Chinese or Japanese names, there are many special cases; see the extremely detailed online Help on Author Names.

Author searching almost always gives many authors in addition to the one wanted. The usual solution is to also search for institution, which can be done for institution name, address, or zip code. If other than proper names are needed, the standard abbreviations are required, for example, “Univ”; fortunately, there is a list. The principal (corresponding) author is indicated, with the address given in full; unfortunately, the names of the other authors are not linked to their individual addresses. Therefore, the intersection of author names and addresses will almost always lose precision. Inevitably, this searching often omits many papers that do belong to the author, for the same author may publish from several different addresses during his career (including,

for example temporary address during visits or sabbaticals). Further, he may use different parts of the full institutional affiliation: omitting the zip code, department, or even the university. Sometimes, combining a general subject term for the subject worked on may be useful. The only truly precise technique is for someone with a detailed knowledge of the organization and staff of the relevant department(s) and institute(s) to examine every paper by every possible author. Searching for papers by all the authors from an institution adds the complication of needing to account for every possible location for every branch of the institution.

There also is, uniquely, a special field for corporate authors (NASA, for example) with a browseable alphabetic list.

To find a known item, the simplest way is to search for the last name of the author, truncated with an *, and also to enter a distinctive phrase from the title in the topic field, limiting to Title only. If this needs further restriction, publication year works.

SCOPUS

In Scopus, there are also two methods for this kind of search. The recommended way is to use the Author Search tab. This will lead to the appropriate portion of the Author Name list, and the list will show all the forms of the author’s name, together with the number of corresponding documents. The default years of 1996 to the present will be searched, regardless of the settings on the Search page. An alternative way is to enter an author search on the Basic Search page as in WoS, by selecting the author field in the search box, and entering last name, comma, first initial. The limits on the Search page will be observed. Truncation in author searching is not usually necessary, because of the automatic stemming. Any part of an author’s name will retrieve all names with such parts; the field is word indexed, not phrase indexed—a very unusual decision for an author name field. A search for “Watson, J” as the author located also people with names like “Bradley Watson, J.” As described for WoS, names with punctuation, diacritical marks, or similar difficulties, must be searched under all possible forms.

When there are two people with the same last name, index entries are made both for the name with an initial and also for the name with the first name given in full (if known). This feature—apparently unique—may cause some confusion, but it will also sometimes help get all the papers.

Using the affiliation is often necessary, as for WoS. In the display, the names of all the authors are linked to their own individual addresses by superscript letters, although there is still no way of searching that links a name and its proper address. Furthermore, there is no list of standard institutional abbreviations, so all likely variants must be tried. All affiliation searches will yield incomplete results for the same reasons as WoS, and the warnings apply here to an even greater extent.

To find a known item, the simplest way is to search for the last name of the author (no explicit truncation needed) and also to enter a distinctive phrase from the title in the subject field using quotation marks and limiting to title. Further restriction, can be done by publication year.

COMPARISON

Author searching is equally easy in both systems for well-known authors with relatively uncommon names who always use them consistently. If these restrictions do not hold, either system will require a similar amount of work. The ambiguities caused by Scopus’ automatic truncation seemed to us more often puzzling than useful.

I) Searching for a Journal Name

WOS

In WoS, there are two separate lists of journal names. One list is for the names used in General Search Mode—the full form of the names. The other is for the names used in Cited Reference Search mode, which are not standard abbreviations. Rather, that list is formed by truncating the name as appropriately as possible in no more than 20 letters—inexperienced searchers will not be able to guess or decode the truncations easily. The only practical way of finding either is by selecting it from the lists provided. In the General Search Mode, it is called the Full Source Tiles List. In the Cited Reference Search mode there are two choices: a cited Work Index giving only the abbreviations, or a Journal Title Abbreviations List giving both full and abbreviated titles, by the alphabetic order of the full title.

SCOPUS

In WoS, using the Journal Search mode automatically opens an alphabetic list. The user can then browse by letter, or enter all or part of the journal name in a search box. One can select to browse only the journals in one of the 11 subject areas. As with author names, the results include titles with the specified words in any position in the journal name. For example, it is apparently not possible to search directly for the journal *Science*. Using the journal name box in the Basic Search mode bypasses the index, but works similarly. Having found a journal, the user can select it and display the source information, which gives information about the publisher and also a list of years, showing each year the journal has items in the database and the number of items for each year. Clicking on a year in this list searches for the items. The years before 1996 are combined into a single “1995 and before.” (It is this information that was used to examine Scopus for completeness; when we did, the “1995 and before” years were listed separately for each year having documents; it will be much harder to do so again. This change may improve usability, but it certainly hides the gaps in the earlier records.)

COMPARISON

Both products work adequately, but neither works very well. Neither lists the ceased or changed titles that are nonetheless in the database.

J) Search Operators, Limits, Sets, and Fields

WOS

In WoS, searching can be limited at the beginning to any of the three subject sections, to any range of years among the years purchased, to any language, and to various document types. Some of these limits can be subsequently assigned to the results obtained for a more precise search.

The usual operators are present. The usual truncation symbols are present. There is a very extensive stopword list that may require some ingenuity to avoid.

The default field selection is the customary Title, Keywords, and Abstract. A small number of fields can be specified in the General Search mode, but some require the Advanced Search mode. Combining sets is now very practical by going to the Search History page and using the Combine Sets option. In previous versions, a very low size limit on retrieved sets made many useful combination searches exceed those size limits. The limits are now 100,000 items, greatly increasing the functionality of the product. Some sets will still exceed the number, such as a search for A* in the author field.

SCOPUS

In Scopus, searching can be limited at the beginning to any of the 11 journal subject categories, to any range of years, and to various document types, but not to language—an exceedingly odd decision considering its strength in non-English material. Some of these limits can be subsequently assigned to the results obtained for a more precise search in a complicated but fascinating manner described in the Results section below. There is a rather small stopword list.

The usual operators are present except for the lack of a SAME function. It is replaced by an exceedingly flexible system of specifying proximity. Unfortunately logical operations involving proximity have limitations that will sometimes produce unexpected results; it is usually best to get each term or pair in a separate set, and then combine them. We are not sure all combinations produce the results specified by the Help.

The default field selection for searching is the customary Title, Keywords and Abstract. If one selects All Fields, even the titles of the cited references will be searched. A small number of individual fields can be specified in the Basic Search mode, but most require the Advanced Search screen. Essentially all fields are available in this mode—this is, for example, the only way to specify language. The names of the fields are nonstandard, and must be entered exactly as in the Help. Combining sets is very straightforward, using the Search History at the bottom of the Search screen. There are no limits on how many items can be retrieved.

The most distinctive feature of searching in Scopus is automatic stemming. It works not just for singular and plural, but for pairs like bacteria/bacterial, and for author names. There is a somewhat similar feature in PubMed, and a choice to turn it off. In Scopus, this function cannot be turned off, another rather odd design choice.

COMPARISON

Everything is more or less as might be expected, though the details differ—except for the peculiar automatic stemming. It rarely prevents finding what is needed, but it sometimes yields unexpected results.

K) Searching for Citations to an Article or Other Item

WOS

There are several methods by which a user can look for citations. The one recommended by the publisher is to search for the item using the Cited Reference Search page, select the desired reference(s), click Finish Search, and wait for the list of cited articles to appear. There are numerous limitations in author searching in this mode. The journal names are entered as idiosyncratic abbreviations that must be selected from a list. Worse, only the first author’s name will be searched, except for articles also in the source index during the years of the index purchased. This multistep process and its limitations are a relic of the past.

An easier way to proceed is to first search for the article in General Search mode, then display the record, and finally click the link to Cited Records. The journal names here are full journal names, not abbreviations; there is a list, limited to current journals. It has never been easy for the occasional user to keep methods straight, but fortunately almost any route will work.

SCOPUS

There is only one way and it works very well: search and choose the article. The number of references will be on the same line; click it and you’ll see them.

COMPARISON

The simplicity of Scopus is appealing to all users; the additional functionality in WoS is very helpful for expert searchers.

L) Searching for Citations to All of a Particular Author's Work

WOS

The methods for searching for citations to all of an author's work in WoS depend on quite complicated factors. In particular, only the first author's name will be listed, except for articles also in the source index during the years of the index purchased. Retrieval of references citing articles before that date thus requires use of other indexes to first locate the articles, and then searching separately for references to each of them under the first author's name.

The basic technique is to first search for all the articles of an author in the General Search, remembering all the caveats for author searching, and determine which of the listings seem to really be by the author wanted. Then, transfer these items to the Marked List, and look for cited references. That search will give a merged list of the citations to the work of an author (up to 500 items). If the number of potential source items is more than 500, this procedure will not work. The best technique is to divide the search into several time periods and do each period independently, finally combining the sets of results and removing the duplications manually.

A cruder approach is to simply search for the author's name in the Cited Reference Search. One will need to truncate to get all variants, and the results will almost always include citations to papers of other authors. With luck, they can be removed by noticing their subject.

SCOPUS

There is no obvious way to look for citations to all of an individual author's work, and the online help gives no assistance. It might appear necessary to individually find each paper, search it for citations, and then manually remove the duplications. However, there is a shortcut known to the company but not included in the Help. Using the advanced search mode and the subfields given there for the REF field: REFAUTH, REFTITLE, REFSRCTITLE, REFPUBYEAR, and REF-PAGE (use the subfields, not the general field name; use them exactly as spelled in the Help). We have not yet figured out the details of how best to use the subfields, or the combined field References in the general search mode.

COMPARISON

Looking for citations to all of an author's work is a common task for all library patrons. In particular, most scientists rather frequently look for citations to all their papers. Scopus is not aware of the existence of the need (one of the FAQs asks how such a search can be done, and then gives a technique for finding the references to a particular paper), but such a search can be done nonetheless as we have described. WoS is aware of this need and gives instructions, but makes the task unduly difficult. But no matter how easy such as task is made, a major limitation for any database is and will be the lack of standardization of author names, and the presence of errors in citations. Although Scopus claims better consistency than WoS, recent WoS data is about as good (the earlier years have many unresolved errors and variations).

Authors are sometimes required by their academic administrators to demonstrate citations to their articles. For third world authors, citations from almost all the journals published in their nation—even to their articles in major international journals—will not be found in WoS.

They will be found in Scopus—when their coverage is complete, and if direct citation searching becomes practicable.

M) Viewing Results

WOS

The Search Results Summary screen shows at the top the search query and the selected limits for years, section, materials type, and language. The default sort is by reverse chronological order, but it can be changed at this point to a sort by relevance, or a sort by first author, Source Title, or Times Cited. It adds a link for the new Analyze function. It then shows, using additional pages as needed, the basic information for each item found: the first three authors, the title, the bibliographic information. It gives the month as well as the year the item was published, but does not indicate how many times the article has been cited. It also provides a check box for marking the record for further sorting or export, or for use in a citation search. It can also provide a link to full text, using either the internal WoS system or the chosen third-party system.

The Full Record shows the bibliographic information, the document type and language, the abstract, the keywords (including both author keywords and the Keywords Plus). There are also links to a list of cited references (by which is meant the earlier references cited by the original article), the citing references (by which is meant the later articles that cite this article.) A more confusing pair of names would be hard to find. There is also a link to Related References, as described later in this article. The link to full text and a link for adding the record to the marked list remain available. It may not be obvious what the purpose of the earlier cited records are, but they are very helpful when the actual article is not available.

SCOPUS

The results pages for Scopus are the best in both appearance and function that the reviewers have ever seen in a bibliographic database. The Search Results Summary screen initially shows at the top the query, the search limits, and four tabs for the retrieved items: Scopus (the journal articles), Web (Scirus), Patents, and Combined Results. The first two show the number of retrieved items automatically; the Patent and Combined tabs do so only if selected. All four display even if there are no results of that type; they can be ignored, but not turned off. Below that, but before the results themselves, is the extraordinarily useful Refine Results panel, described later in this section. The Query is shown as in Advanced Search mode, with the fields indicated, and can be edited from this screen.

The Scopus results tab is the default, and lists a summary of the items found, using successive pages as necessary. By default items are sorted in reverse chronological order. The information given for each item is the year, the title, the authors, the source title complete with volume and page information, and the number of later citing articles. An alternative sort useful at this point is by relevance, which here means primarily the number of key words present and their position. The user can now select results, and print, export, or-email the selected results, as described later in this article. Alternatively, the user can print the visible page, or follow the underlined links for the authors or the citing articles, or use the View at Publisher link to go directly to full text if available, as outlined later in this article. The most usual step, though, is to click on the Abstract+Refs link for an item, which then displays the full information about the article.

The full information—which the Scopus Help confusingly calls the Document display—appears in its default Basic format. It shows the

same information as the Search Results page, the source information, the DOI, the document title in English and the original language, the author names, their institutional affiliations, and (if available) the abstract. A link to search Scirus for the first author is relatively useless since it searches only the author's last name. Instead of merely showing the number of citing documents, it gives brief information on the three most recent, and a link to display them all. It gives the same links as the Search Results Summary screen, and a link for Related Documents. It also displays the author keywords from the article, and the index terms that may have matched search terms. (The controlled index terms—which Scopus confusingly call Index Keywords—come from the various sources used, as discussed previously.) There is also an Extended format, which lists all the index terms from all the covered indexes, and additional bibliographic information.

The displays for Patent results (sorted by date) and the Web and Combined results (sorted by relevance) are similar. The Combined display does not remove duplicate records from the other pages (no database has this function yet for Web searching). See Figure 1.

The Refine Results Panel. The Refine Results panel has several sections, arranged horizontally. The top has two choices “Limit To” or “Exclude.” The first section gives check boxes for a list of the three journals yielding the most results; the second for the three authors with the most results; the third for the three most recent years giving results; the fourth for the three leading document types, and the fifth for the three leading journal subject areas. A link for “More” gives a list of up to 160 items for all these fields: source titles, author names, years, document types, and journal subject categories. Checking the boxes for any items found there and clicking on “Limit To” selects for those results with the selected sources, names, dates, types, or fields. Alternatively, if the “Exclude” box is used, it eliminates the items. The Web Refine Results panel shows only (when expanded) 50 keywords (which can be single words or multiword phrases) listed alphabetically rather than by frequency. In the absence of information in the Help pages, we assume these are the most relevant 50. The Patent panel also shows only 50 keywords and key phrases, listed alphabetically. The Combined panel shows title, author, and broad subject area, all from the Scopus tab, and Web keywords.

Search Within the Results. Another box at the bottom of the Results Summary pages allows the user to Search Within the Results: this will be useful for restricting to terms other than those in the Refine Results lists. Curiously, the terms entered on this tab are searched in all fields, including the titles of the cited references. This has taken some time to describe, but it takes only a minute to understand and use properly.

COMPARISON

WoS now has clear functional displays. The displays in Scopus, however, are truly excellent, and much of the initial favorable opinion of Scopus has been based on this feature. Anyone having only WoS will much envy

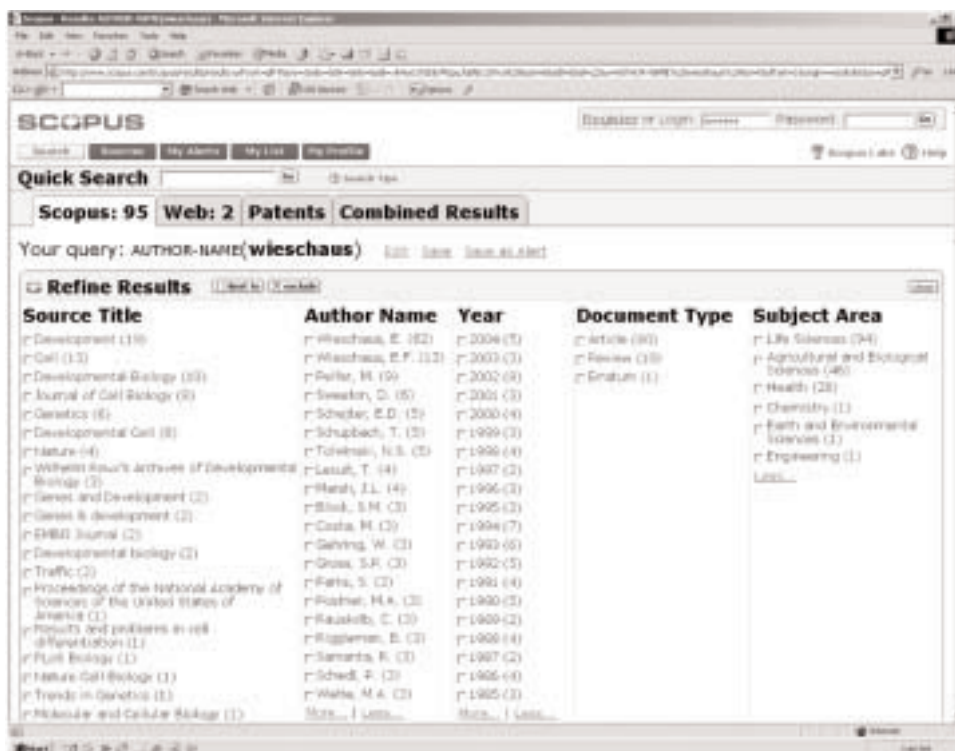


Figure 1. Scopus Results Screen Showing the “Refine Results” Function

the Scopus Refine Results feature. All databases should have results lists that work this way. The easiest way to see at least a glimpse is the demonstration at <http://scopus.landingzone.nl/index.php>.

N) Related Records

WOS

WoS finds related records to a document by listing all the articles that have references in common with the starting paper, and showing them in order of the number of shared references. This will often put relatively old records near the top; the first ones given should not be mechanically selected without noting their dates. In our experience this feature yields results that are sometimes helpful and, occasionally, both helpful and surprising. For even more surprising results, any of the listed Related References can be chosen and the cycle repeated.

SCOPUS

Scopus has a similar facility. All the articles that have references in common with the starting paper are selected but then arranged in order of date. Determining the most useful results requires resorting by relevance. All other relevance ranking features in Scopus except the initial link to related records is based on a different principle: see relevance as described in Sorting, in the following section.

COMPARISON

The same facility is available in both, but the necessary assistance to use it properly is provided much better in WoS. This is characteristic of Scopus. Scopus provides easy access to good basic functionality, but does not expect users to concern themselves with why things work

or the details of how they work. Trying to get meaningful results with the advanced features in Scopus may not be that easy.

O) Sorting and Printing

WOS

Simple sorts can be done directly on the results page, and the results can be printed from there. Anything more complicated, and almost any imaginable sort or field combination, can be performed in the Marked List. This requires marking items (or groups, or whole displayed pages) in their check boxes, and then displaying the Marked List, from a special link which then appears. There are unfortunately low limits on the number of items—usually 300. This is a fossil, preserving the limitations of processing speed present when WoS was first introduced.

Similarly, using the Marked List, WoS has a particularly flexible array of methods for exporting results in a variety of formats, to many programs, with any selected fields, and in any of a number of search orders.

SCOPUS

Sorting by date or relevance is possible by selecting the appropriate tab. After extensive attempts at clarification, it appears to us that the sort by relevance for journal, Web, or combined results works primarily on the basis of the number and location of search terms, and also to some extent the number and location of links. Additional options for sorting by Author name, Number of times cited, or Source title will meet most requirements. Similarly, there are only a few formats for printing or exporting, but they work well.

COMPARISON

The much greater flexibility of WoS is useful, but the functions provided by Scopus are sufficient for basic purposes.

P) Saving, Exporting, E-Mail, and Alerts

WOS

All these features are present, but the details need not be given here. For many of these features it is naturally necessary to register, giving the user's e-mail address, a password, and optionally the name. Most of these functions require use of the Search History page and the Marked List. Fortunately, there is excellent help for these functions, but some of it is in the separate WoK Help, not the WoS Help. It would not have been hard to include it in both places.

The user can save to a local disk, or save to the WoS facility and continue from any machine. The system has options to run the search again, with or without modifications. (That is how the year data for WoS in Table 3 was obtained). WoS has a particularly flexible array of methods for exporting results in a variety of formats, to many programs, with any selected fields, and in any of a number of search orders.

SCOPUS

All these features are present, but the details need not be given here. For most of these features it is naturally necessary to register, but registration requires giving the user's e-mail address, name and field(s) of interest (and optionally, several other questions). Most of these features work by means of a list, which may be either a temporary list called My List, or any number of permanent ones with names of the user's choice. Scopus offers many fewer choices in e-mail or export formats than does WoS, but it should nonetheless work well with most reference managers (we did not test this aspect). Excellent Help is provided.

COMPARISONS

Functions are comparable. The ability to e-mail new articles citing particular references is particularly useful, but this feature is now also provided by many specialized disciplinary indexes.

The Scopus registration policy is not appropriate. There is no reason for Elsevier to require all of this information to provide these services. What WoS requires is all that any such functions need: e-mail and a password. It should be library policy that outside services not require more user data than is needed for their functions. Some of Scopus's required information can have no other use than for advertising. Libraries should not purchase products that extract such information about their students. The information request screen could and must be redesigned.

Q) Extended Functionality and Analysis of Citations

WOS

WoS has a very flexible new function called Results Analysis. It allows the user to select a group of any number of items from a Results Summary screen and then sort them according to any field of the record. In sorting, WoS examines the values in the chosen field, extracts the items with the values over a chosen threshold in that field, and displays the highest of them, sorted alphanumerically either according to the value of the selected field, or the number of items in the field. For example, if you analyzed a set of articles by language, you could sort them either alphabetically by language, or by language occurring most often. The display shows both a count and a bar graph. (See Figure 2.)

The detailed operation, usefulness, and limits of this feature can be better learned by experimentation than from this review or the publisher's Help pages. The function is subject to a complicated pattern of limits on the number of results chosen, sorted, and displayed. The limits, and the available sorts, are sufficient for all ordinary purposes of a user, but not necessarily for specialized bibliographic analysis.

SCOPUS

Scopus has a similar function, called Document Citation Overview, distributed in beta, and universally praised in the earlier reviews, which were based upon that version. Unfortunately, it will not become available in the released product until mid-2005 at the earliest. One could formerly get a glimpse of it through its Help pages, but they have now been removed to avoid confusion.

Fundamentally, the function presents a two-dimensional array of the number of citations to articles by time period. First, the user chooses documents from a search, and saves them to a list. (Normally, the most cited documents would be chosen) The left-hand column shows a brief year and truncated title list of all the documents, with each linked to a box giving the full citation. The following columns give the number of times each document was cited in each of the years from the publication year on, within the range from 1996 to the present. Subtotals are available for a particular year or a particular document, and a grand total of all the citations is given as well. The citing document sets can be seen by clicking the appropriate number. The display is not as complicated as this description may indicate; trial users found it both obvious and desirable from the first glance.

COMPARISON

We think even moderately advanced users will make good use of either of these additional capabilities. The Scopus feature may change by its eventual release, but as demonstrated so far, it looks—as might be

expected—considerably more elegant than the WoS equivalent. That being said, Scopus appears to offer very much less flexible capability, being limited to the analysis of citations to an article. The WoS function has the advantage of being immediately available; it seems for some reason not to have attracted quite the attention it deserves. There is certainly no need to get Scopus for this particular functionality alone.

R) Online and Offline Help

WOS

The online Help is extensive, and covers all the complications in full detail. Unfortunately, the detail may be excessive for someone wanting relatively basic instructions. Good training material is available online, both general and detailed, through <<http://www.thompsonscience.com/crc>>.

The telephone Help provided has always been excellent, and e-mail help is also very good. Questions involving search technique can be better answered on the telephone, where a dialog can be established.

SCOPUS

Clicking on the Help button will place the user in the appropriate place in the Scopus Help, as will clicking on Search Tips. The Help itself contains linking references to related pages and links to a useful hierarchical table of contents (the true sections are not visible until it is expanded) and an index that, almost uniquely, gives too many index entries (including each word of the sample text of the examples used on the pages). The actual Help given is sufficient for the usual problems, but does not exhaust all the possibilities.

There is e-mail help that seems rapid and knowledgeable, and also telephone assistance. The quality of telephone assistance for Elsevier electronic products has often been considered less than satisfactory. Well aware of this, specially trained staff has been provided for Scopus, but will be available only weekdays from 9 to 5. The quality of the specialized assistance was reasonable for a new product.

COMPARISON

The most difficult problems requiring assistance are similar in both databases. Good citation searching requires user education and experience.

S) Integration with Other Databases

WOS

There are a number of other databases on the Web of Knowledge platform. Some are owned by ISI and provide complementary content, such as Current Contents Connect. Some, such as Biosis, provide subject-specific content. Some are owned by others publishers but searchable through WoK. The entire list is best seen with the WoK fact-sheet available from <<http://www.isiWebofknowledge.com/>>. They can generally be searched simultaneously, using the WoK CrossSearch fea-

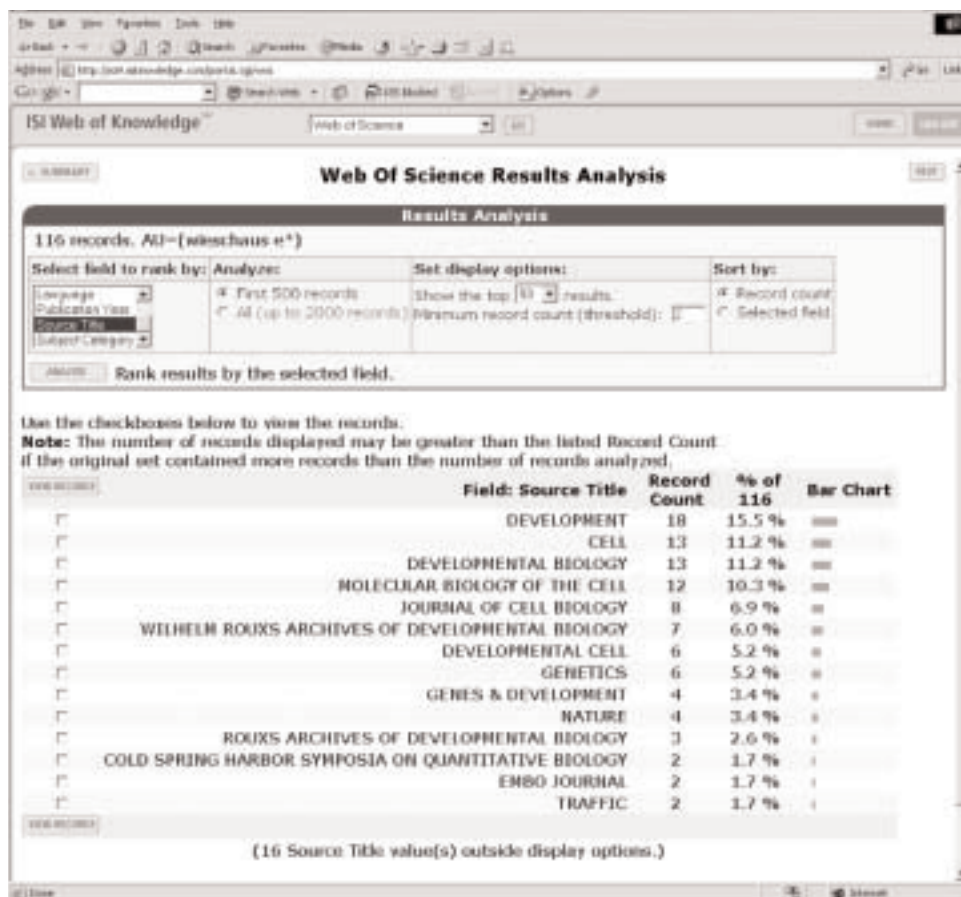


Figure 2. WoS Results Analysis Screen.

ture, which standardizes many fields across the entire range of supported databases. In addition, the built-in functionality can be supplemented by the federated searching services.

SCOPUS

There are a number of other databases besides Scopus available from the publisher. Many of the records in Scopus are derived from the corresponding records in other databases, including Embase and Compendex. Some of the specialized indexing is carried over directly into Scopus; the special functions, such as thesauri, are not. Thus, the ability to search them simultaneously remains meaningful. The status of integrated searching is under development. At present, one must use a separate federated searching service.

COMPARISON

The reviewers expect that all search services are already moving towards extensive integration. The extent to which this will prove useful may depend upon the implementation. The progress on integrating such specialized content as the WoK chemical databases with WoS is impressive.

T) Linking to Journal Information, Full Text, and Document Delivery

WOS

WoS provides built-in links to *Journal Citation Reports (JCR)*, and most libraries owning WoS will also own *JCR*. This provides the jour-

nal impact factor, to detailed information about the journals that each publication cites and is cited in, as well as information about publication changes and trends. *JCR* in turn provides links to Ulrich's, for historical data and general journal information.⁴

Before the introduction of modern linking agents such as SFX and Linkfinder Plus, WoS developed its own system of links. Most libraries will choose the option to use the more comprehensive services, since the work necessary to properly define the holdings for any one service is extremely high. Previously, WoS did not permit the replacement of the SFX link buttons with a libraries' custom button; fortunately, it now does.

WoS provides a capability for ILL and Document Delivery requests. It works best using their proprietary document delivery system, which will not be the choice of many academic libraries, but can be used with third party systems, or library Web pages, or by e-mail. Operation with third party systems does not transfer the article information; and for proper operation with library pages or systems, extensive additional configuration outside WoS will be necessary.

SCOPUS

Scopus has no equivalent journal information feature. The informational link found upon clicking on a journal title gives the publisher, but not the all-important dates of publication and earlier and later titles. It is possible to use its linking system to provide links to Ulrich's, if owned, but this is left up to the individual library.

Scopus provides facilities for use of both SFX and Linkfinder Plus, which provide the linking to full-text content. It can also be used if desired with the built-in links to publisher's site; these will work, of course, only if the library has purchased the journal involved, or if the relevant part of the journal is Open Access.

Scopus does not have a proprietary document delivery system, but has its own general-purpose document delivery form, not specific to any third party system. For most library systems, extensive external programs and configuration will be needed.

COMPARISON

The journal information in combination with *JCR* is unique to WoS. Otherwise, full-text links and document delivery options work similarly on the two systems. This linking capability is now an expected feature of any bibliographic database. Specialized products are almost universally used; the databases are expected only to support the capability. Document delivery links are now similarly expected, generally supported by external system.

U) General Conclusion About Usability

WOS

WoS has in the past been know—from its print days on—for presenting a difficult barrier to the inexperienced user. The current version has improved in various particulars, and at least the most basic of functions are easily accessible. Unfortunately, many of the basic difficulties remain. On many of the program's screens, it is still not obvious what step to take, and some choices the user makes may lead to unexpected and undesired consequences. A thorough study of the Help provided will explain most options. The lack of integration of the General Search mode and the Citation Search mode, along with the different types of journal names for each mode, have long been the most confusing of the problems. Better assistance is provided for them now, but the basically confusing split remains.

SCOPUS

Scopus has already gained a remarkable reputation for easy use. The praise in its advertisements are of course selected statements, but not unfairly so. Scopus is indeed easy to use, for almost all its features. Some few features do not work as expected, and many of the advanced features have inadequate information or none at all. In general, though, the ordinary user will immediately see what to do and will get results that will be helpful.

COMPARISON

Scopus is easier to use for most ordinary searches, but WoS in its present version is not far behind. For many more complicated searches, WoS is both somewhat less difficult and somewhat more flexible. (This comparison is being made with the present version of WoS, not the less refined version the librarian may remember from earlier years; It also recognizes that contemporary students have the relevant experience to figure out complicated electronic resources easily.)

Scopus gives a remarkably splendid appearance of being very much easier to use, even more than the difference really amounts to. Furthermore, WoS has a well known reputation for being difficult, more difficult than it now is. These appearances and reputations are matters worth considering, as all libraries wish to encourage even hesitant users to try the available resources, and then use them frequently as appropriate.

CONTRACT PROVISIONS

WOS

In most respects the contract provisions are standard, and COUNTER-compliant statistics are available.

However, the WoS content is sold, not leased. It is therefore necessary for a customer buying WoS for the first time to purchase the back year files wanted, which represents a very significant sum. The product can only be used optimally if all these files are purchased, and most larger libraries have done so, often in stages, in spite of the cost.

Consider the situation of a library wishing to change to Scopus, and retain the purchased WoS content for the earlier years. It is indeed possible to do so, and use a suitable database engine to search it. If the library stopped after, say, 2004, no new content from WoS would come for future years. For most other databases, such a situation would normally be only an inconvenience, requiring the patron to search two separate files. For a citation database, such as WoS, what would be lost are the post-2004 references to the pre-1995 content. It would be available neither in the old WoS, or in the new Scopus. This increasing gap is, in the reviewers' opinion, sufficient to rule out the substitution of Scopus for WoS in any serious research library. (Should Scopus ever reach parity with WoS in years completely covered, the situation will of course be different.)

SCOPUS

Scopus gives no such complicated problems. If you license it, you will have the full file as long as you continue to pay. In other respects the provisions are standard. COUNTER-compliant statistics will be available.

AUTHENTICATION

WOS

The number of simultaneous users limitation for WoS is a perennial source of difficulty. Users who pause in the middle of searching to read



Web of Science (2004) Review Scores Composite: ★★★ 3/4

The maximum number of stars in each category is five.

Coverage:

★★★★

Four stars, not five, because of its continuing weakness with non-English language journals, and journals from the third world generally.

Usability:

★★★ 1/2

Excellent features, improved usability—formerly only fair, but now improved.

Pricing:

★★ 1/2

Extremely expensive, by normal database standards; nuisance fee for simultaneous users; very large purchase fee for earlier years.

Contract:

★★★★★

an online article still remain connected, and the program does not disconnect them until 15 minutes or so of WoS inactivity. Users who walk away without actually quitting the program will remain connected the same length of time. In the past, WoS has sometimes not disconnected as soon as it should, and there have been occasions where a library has needed to call and ask that all sessions be terminated. Special arrangements are needed for a class instruction session, and those can be readily made in advance.

SCOPUS

Though usually authenticated by IP range, the password-protected access we tested times out after five minutes, which is probably unduly short. Access authorized by IP may be different.

COMPARISON

Both products are usually authenticated by IP. range; both can be used with the customary remote authentication techniques; both provide for password access if desired. We have never known any librarian satisfied with the workings of the WoS simultaneous user limits, but this is hardly a major decision factor.

REFERENCES AND OTHER REVIEWS

Review of Scopus.// Peter Jacso (Peter's digital Reference Shelf, September 2004) available at <http://www.gale.com/servlet/HTMLFileServlet?imprint=9999®ion=7&fileName=reference/archive/200409/scopus.html> (or first navigate to [http://www.gale.com/servlet/ReferenceReviewSearchPage Servlet/](http://www.gale.com/servlet/ReferenceReviewSearchPageServlet/)), then select Peter Jacso as the Reviewer and September as the month, and 2004 as the year.)

Review of Web of Science citation Indexes / Peter Jacso (Peter's Digital Reference Shelf, August 2004) available at <http://www.gale.com/servlet/HTMLFileServlet?imprint=9999®ion=7&fileName=1reference/archive/200408/Webscience.html> (or first navigate to [http://www.gale.com/servlet/ReferenceReviewSearchPage Servlet/](http://www.gale.com/servlet/ReferenceReviewSearchPageServlet/)), then select Peter Jacso as the Reviewer and August as the month, and 2004 as the year.)

ISI Web of Science, Scopus, and SportDiscus / Peter Jacso (Peter's Picks and Pans) *Online* 28(6) 51–54, November/December 2004.

UPDATES AND NEW INFORMATION

WOS

The publishers expect updates every half-year or so, more frequently than in the past. Probably we might expect in the near future updates involving higher limits for sorting and Marked records. We would hope that improvements in the fundamental data, including the combination of obvious variants for the same reference, would take a very high priority. Collection development librarians would particularly appreciate the ability to combine cited reference and subject searching in order to perform a search on all records citing anyone from their institution. At present, this can be done only in Dialog or as an ISI special report. Updates improving basic structural deficiencies, such as the need for the Marked List in the first place, are unfortunately not expected soon. It remains to be seen if WoS rises to the most important challenge of Scopus and increases its journal coverage, especially to other geographical areas. WoS already incorporates many Open Access Journals; perhaps it will find a way of also incorporating Open Access preprints and author postprints of individual items.

SCOPUS

The main improvements needed and expected are in the most basic area: loading the data. As mentioned, the publishers expect to have the journals completely loaded back through 1996 by January 2005. We are somewhat skeptical, based on their failure to so far correct specific omissions brought to their notice, and their slow rate of progress in recent months. How rapidly they will be able to fill the much more extensive hidden gaps in their coverage before 1995, and thus better compete with WoS, remains uncertain. Their advanced analytical features have been demonstrated, but are not expected until mid-2005. Scopus already incorporates many Open Access Journals, and the Scirus component incorporates Open Access preprints and author postprints of individual items. Both sides can be displayed, but not easily linked; perhaps they will find a really effective way of com-



Scopus Review Scores Composite: ★★★ 1/4

The maximum number of stars in each category is five.

Note: This is the composite score for Scopus as of the release date; the amount of coverage will no doubt be somewhat higher by the time the review appears, but we would not set the points higher until completeness can be verified.

Sum of scores: 13 (at time of review); potentially 15 1/2 when, or if, Scopus eventually adds all the material.

Coverage: ★ 1/2

The extensive and unmentioned gaps in the recent and earlier coverage would normally justify only a 1, the lowest possible score. Credit has, however, been given for its wide geographic scope, and its Web searching capability. When eventually all the gaps in the recent records can be shown to be filled, this score will become ★★★; when at some future date the earlier records might be shown to be as comprehensive, ★★★★. It will still not be ★★★★★, because of the limited time range as compared to WoS.

Usability: ★★★★★ 1/2

Splendid usability, but some key features imperfect or not yet implemented.

Pricing: ★★★

Extremely expensive, by normal database standards.

Contract: ★★★★★

Four, not five stars, because of unjustifiably excessive user data requirements for registration.

binning all the variants. Whether they plan to extend their journal coverage to the humanities also remains to be seen; their FAQ tells us they will do so if they find it profitable.

RECOMMENDATIONS

I) GENERAL VS SPECIALIZED INDEXES

The choice is not merely between these two products. The specialized indexes must also be considered. If a library with Embase and Compendex were to discontinue both, it would save over half the cost of adding Scopus. (To the extent Scopus could replace yet other databases, including those from other publishers, the potential savings would be greater, but it is impossible to give a general evaluation of the many tradeoffs.)

For Embase and Compendex, the basic material would remain, complete with most of its accustomed indexing. However, there would be some features lost in using only Scopus: the thesauri and some specialized content from both, and the older file segment from Compendex. A library with really major interests in these subjects will probably not consider this acceptable. A library with borderline interests—just enough to have justified these two expensive indexes before Scopus appeared—might think otherwise. A library with lesser interests would not have these databases in the first place: the typical nonmedical library will not have Embase, nor will the college without an engineering school have Compendex. For them, the additional medical and engineering coverage from Scopus would add at least slightly to its attraction.

II) WOS VS. SCOPUS

WoS

Small libraries will not need its strongest feature, the very long time coverage. Large libraries will not be happy about its weakest feature, the relatively narrow journal scope especially in the third world. All libraries can benefit from its most important unique features, the coverage of the Arts and Humanities segment, and the integration with *JCR*. The database is already loaded and is being extended back to 1900. Most graduate students and faculty will have considerable experience with WoS before arriving at their subsequent university, and will expect to find it, and have its full capabilities present. The usability is not as good as Scopus', but patrons figure it out.

SCOPUS

Small libraries will not need its strongest feature, the extremely wide journal scope in some subjects. Large libraries will not be happy about its weakest feature, the short time coverage. The most important additional factor is the greater ease of use and the better appearance of the product, though this is gained at the cost of some flexibility. Patrons, and to some extent librarians, sometimes decide on the basis of which product looks better—this is not absurd if it induces people to use the resource.

COMPARISON

It is unfortunate that the two greatly desired features of a comprehensive indexing service, deep time coverage and a very wide journal selection, are only available separately, one from each product. As they are

both excellent products, with complementary merits, and very useful special features, ideally a research library should have both.

Each library will have to decide if it can afford to add Scopus. This is a case of elastic demand: if the price were half, the sales might be three or four times as many. One possible way of paying for it, that is, by ceasing to subscribe to more specialized indexes in areas well-covered by Scopus, has been discussed above. The likely alternative is to discontinue other material. This leads to an often-discussed question: which is more important, the journals or the indexes? The authors will not discuss this anew. It is relatively easy to justify an index offering unique coverage; it is much harder to justify adding ones with duplicating or greatly overlapping coverage. Any librarian should be able to find multiple reasons to support any position.

Would it ever be rational for any library to discontinue WoS and subscribe to Scopus instead? We have explained under Contract Provisions the total inadvisability of a major research library doing so. A smaller library might appropriately consider changing to Scopus, if it did not have extensive backfiles of WoS, or did not consider them important. Usability might appropriately play a role in this decision. The trade-offs are significant, and this choice will not be an easy decision. (Fortunately it can be deferred, as Scopus is not yet in a state suitable for acquisition.) The smaller the library, the more likely the reviewers would be to recommend such a change; there is probably no ARL library for which it would be reasonable.

If a library has neither product, then it must consider its price for each, as well as the relative advantage of the wider (but possibly not very relevant) journal coverage and the greater ease of use of Scopus, as compared to the name recognition and possible eventual backfile purchase of WoS. For such a college, the reviewers would probably select Scopus—once it finishes loading its database at least back to 1996 and provides warnings about the earlier material.

III) WARNING

This recommendation of Scopus as a suitable complement to WoS for fortunate libraries able to afford them both, or as a general citation database for any library without one, is subject to a caveat. Acquiring Scopus should be postponed until Scopus fulfills its basic promise of practically complete coverage of the items from 1996 onwards and can so demonstrate. It is, unfortunately, not reasonable to expect Scopus to soon provide consistent coverage of the earlier material; libraries should recognize that all earlier years are incomplete until proven otherwise, and users need appropriate warning, both by the library on its database page and by the publisher in the product. We will not be comfortable with the publisher's candor until all its publicity specifies the true years of completed coverage. The library will still need to verify; given the nature of the present release, no library can safely assume the correctness of the publisher's assurances. We can draw the more general lesson that this is probably a wise precaution for every major product. Even the best independent outside review is but a starting-point.

APPENDIX A

REPRESENTATIVE INCOMPLETE TITLES IN SCOPUS, NOV. 24, 2004.

This is a possible nonrepresentative sample of the problems encountered, meant only to show the nature of the problems in both the earlier and recent periods, without attempting to indicate the proportion of affected titles. Our checking would not have detected single miss-

CONTACT INFORMATION

Web of Science

WoS is published by ISI, a division of the Thomson Corporation. The main contact Web page is <www.isinet.com>, and specific help sites and phone numbers for North America and other regions can best be obtained from this Web page; the options are too many and their interconnections too complicated for summary here.

Listing a few key contact points, training material is obtained through the multiple options on <<http://www.thompsonscience.com/crc>>. In North America their main telephone number is 1-800-336-4474 and the technical help desk is at 1-800-336-4474 extension 1591.

Scopus

Scopus is published and distributed by Elsevier, a division of Reed-Elsevier. In the Americas, information can be obtained by e-mail at <usinfo@scopus.edu> or telephone 1-888-437 4636, option 1. (This is a general number for many Elsevier electronic products.) Web addresses and telephone numbers for other areas are given on the main Scopus information page, <<http://www.scopus.com/contactus/index.shtml>>.

ing issues, or missing articles. (This list omits all titles that might have begun, or had title changes, in the period concerned, or that might show similar problems.)

| <i>Journal Title</i> | <i>Missing</i> |
|--|-------------------------------|
| <i>ASME: Noise Control and Acoustics</i> | '86, '88, '98, '01 |
| <i>Assessing Writing</i> | missing '97, '01 |
| <i>Australian Zoologist</i> | most issues in '99 |
| <i>Basin Research</i> | '95, '96 |
| <i>Civil Engineering Practice</i> | '90-'94 |
| <i>European Journal of Finance</i> | '96 |
| <i>Geological Journal</i> | some issues, '80 |
| <i>Journal Eur. de Hydrologie</i> | all but 2003 |
| <i>Journal of Aerospace Engineering</i> | some issues for '89 |
| <i>Journal of Chem. and Engineering Data</i> | '72, '73 '75 |
| <i>Journal of Composite Science and Technology</i> | '92 |
| <i>Journal of Comparative Physiology, pt A</i> | '88, '89, '97-'01 |
| <i>Journal of Documentation</i> | '83 |
| <i>Journal of Fusion Energy</i> | '84, '89 |
| <i>Molecular Aspects of Medicine</i> | most issues for '98, '99, '00 |
| <i>Monthly Notices of the Royal Astr. Society</i> | '97 |
| <i>Monthly Review</i> | '00, '01 |
| <i>Organizational Dynamics</i> | '96-'99 |

Endnotes

1. **Citation Indexing in General.** In citation searching, the user starts with a known article, preferably published a few years back, and the index then supplies later references. This is particularly useful in fields not covered well by conventional indexes. Some such fields, such as theoretical chemistry or molecular biology, have difficulty in assigning distinguishing keywords, as many teams work on very similar problems. Some, like environmental studies, fall under the domain of several different indexes, and using a single one will not get all the material. In all fields, citation searching is appropriately used to fill in any gaps left by conventional searching.

It should be noted that many other databases, both proprietary and noncommercial, are now offering citation searching within their con-

tents. With the long runs of online material now available, it is an obvious service to offer.

2. **Comparing journal lists.** Comparing journal lists from two sources, or checking whether a list of references is included in a source is not mechanical. If the full form of the name is used in both sources, there are nonetheless variations in how it will be entered; if one of more lists make use of abbreviations, even standard abbreviations, the variations multiply. Most journal coverage lists, including the lists in the products considered here, include only active titles. It will be necessary to also check each name not found in an index showing these changes, such as Ulrich's or the OCLC database.
3. **Determining journal indexing completeness.** Checking a journal holding for completeness has all the difficulties of comparing journal names, described above. In addition, it is necessary to check that each appropriate item was actually included. At a preliminary level, one can check for continuous page numbering, but this may miss special sections or articles at the end of a volume, while apparent lack of continuity may indicate only inappropriate material for that index, and some apparently missing issues may not have been actually published. At the next level of accuracy, a list can be compared against an online E-journal file. However, not all such files are complete, and the lack of completeness is not always apparent. It is thus necessary for higher accuracy to check against a physical file in a library that is known to carefully indicate lacks. (There may still be missing issues; a formal bibliographic search in the classic tradition includes checking several or even all identifiable physical copies.)
As a preliminary check, if an issue appears in one source but not another, an article can be searched by its title and author in the other source; this is frequently sufficient to detect various journal title forms, and changed titles.
4. **The journal impact factor.** This is a much used (and misused) value that represents the citations to the journal during the previous two years, divided by the number of articles published in that journal over those

same two years. This is often misused as a measure of overall journal quality. It is only valid for comparisons within each individual specific subject area, and then for comparisons of only journals of the same nature. The short time period furthermore limits its use to journals in rapidly moving fields; a two-year citation record is meaningless in many subjects. This data is subject to many other possible distortions, widely ignored but all explained fully in the *JCR* online help guides.

About the Authors

David Goodman is Associate Professor at the Palmer School of Library and Information Science, where he teaches courses in Academic Libraries, in Scientific and Technical Library Resources, and in Acquisition and Selection of Electronic Resources. He was, formerly, (in succession) Chemistry Librarian, Biology Librarian, and Research Librarian at Princeton University Library, and he is a founding member of the Executive Committee of COUNTER. David has a Ph.D. in Molecular Biology from the University of California at Berkeley, and a M.L.S. from Rutgers. Most of his many postings, on scientific journals and other electronic resources, can be found on lib-license. He recently was issue editor for a Special Issue of *Serials Review* on Open Access 30, no.4.

Louise Deis is the Science and Technology Reference Librarian at Princeton University, serving especially in the Biological Sciences and the Engineering Libraries. Most of her experience has been in academic libraries, and includes Rutgers, the Library of Science and Medicine, but she has also served in corporate (Best Foods Research & Engineering Research Center of Corn Products Co. International) and public libraries. She has coauthored other reviews for *The Charleston Advisor* comparing Bioline to BioOne, and Zoological Record on SilverPlatter, Cambridge Scientific, and Dialog. ■



▼ ADVISOR REVIEWS—COMPARATIVE REVIEW

EBSCO's Serials Directory and UlrichsWeb.com

Date of Review: November 2004

Composite Score: EBSCO's Serials Directory ★★ 7/8
Composite Score: UlrichsWeb.com ★★★★★ 1/4

Reviewed by: Sophie Bury
Business Librarian
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Pricing Options

Both EBSCO and Bowker offer pricing for institutional and individual subscribers. Pricing for both the Serials Directory and UlrichsWeb.com for academic libraries is based on number of FTE students. EBSCO's licensing for the Serials Directory with libraries allows for unlimited user access.

In the case of UlrichsWeb.com, libraries may choose between simultaneous user pricing (the price for each incremental user decreases as the number of users increases) or opt for site-wide access that allows unlimited user access. Bowker's Serials Analysis System (SAS), a col-

lection analysis tool, can be added to the UlrichsWeb.com product for an additional fee determined by the number of current unique periodical title subscriptions a customer has (the same title in different formats or sourced from different vendors will be counted only once for pricing purposes).

Both vendors indicated they are open to negotiation of consortial pricing for these products.

Pricing for the Serials Directory is lower than for UlrichsWeb.com. However, it is important to make clear at this point that pricing must be considered in relation to product content, searchability, etc., and