

A Measures Toolkit for Librarians
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Collection Evaluation in a World of Shrinking Budgets

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I will begin by thanking Susan for her invitation to speak here today, and for this opportunity to share some of my experiences in evaluating Caltech's journal subscriptions over the years.

I had the good fortune to attend the ASEE Engineering Libraries Division meeting in Edmonton, Alberta in 1994, where I heard what I thought at the time was a really absurd suggestion: Engineering libraries should cancel all journal subscriptions and instead depend on interlibrary loan or direct purchase of articles from publishers.

It wasn't until some years later that I began to realize that there was a subtle wisdom in this suggestion. When you stop to consider the history of library–publisher relationships, the only real bargaining power that libraries have is their willingness to seriously consider this seemingly absurd suggestion and to walk away, as it were, from specific subscriptions—especially when dealing with a publisher whose subscription pricing bears only a marginal relationship to one's institutional use, or when a publisher's cost of production, as measured by cost/article or cost/page far exceeds that of the benchmark non-profit or society publishers.

This *can be* a very liberating insight, but effective implementation requires a substantial effort to educate your user community on the costs of many commercially published journals versus the cost of non-profit or society counterparts; and development of a very effective document-delivery system.

When these two requirements have been met, journal cancellations can be initiated on a rational cost/use basis, and librarians are, in our experience, no longer subject to unreasonable pressure by individuals demanding retention of their favorite titles. With these thoughts in mind, I would like to review Caltech's experiences, with document delivery, with user education, and finally with use data.

The Caltech Library System was very fortunate to have developed a journal-article photocopy-request system in the mid-1960s. A user fills out a paper form, either leaves it in the library or sends it through the campus mail, and either picks-up the photocopies or has them delivered by campus mail the next day. The high point in terms of usage was reached in the mid-1990s, when, after a long Fourth-of-July weekend, library staff returned to find 786 requests waiting to be processed.

CALTECH LIBRARY SYSTEM
DOCUMENT DELIVERY/INTERLIBRARY LOAN REQUEST FORM
For authorized Caltech users only.
(PLEASE PRINT)

Acct. # _____ Name _____ Date _____

Status: F G UG S Dept. _____ Phone (ext.) _____ Mail Code _____

BOOK Author/Editor _____

JOURNAL ARTICLE Title (Book or Journal) _____

TECH. REPORT _____

THESIS Publisher _____ Place _____

PATENT Volume # _____ Issue # _____ Page # _____ to _____ Year _____

PLEASE NOTE:
If item is not available at
CTI, requests are forwarded
to Interlibrary Loan for further
processing.

Source of Reference _____

Not needed after _____/_____/_____. Check for Will Call
Otherwise, photocopies will be sent in campus mail.

STAFF USE ONLY

QUANTITY	UNIT PRICE	BASE FEE	TOTAL

WARNING: Provisions of copyright law title 17 US code apply.
White copy-Library Yellow-Billing/Notification Pink-Requester

Figure 1. Caltech Photocopy Request Form

Fortunately, the Caltech science libraries have subject-focused journal collections, on separate floors, shelved in alphabetical order. We also had highly motivated staff members who could pull and deliver, on average, 1–2 requests per minute.

With a combination of multiple photocopier machines, experienced operators, and participating supervisors, it took only a short time to clear this backlog of requests.

The success of this system was based on a very reasonable cost-recovery business model and the fact that very few users needed a photocopy of an article immediately. Rather, most users simply wanted a dependable mechanism to immediately take care of the transaction and ensure that the article photocopy would be available to them within a few days. The introduction of reasonably priced self-service photocopier machines in the late 1980s had very little effect on the steady increasing volume of photocopy requests.

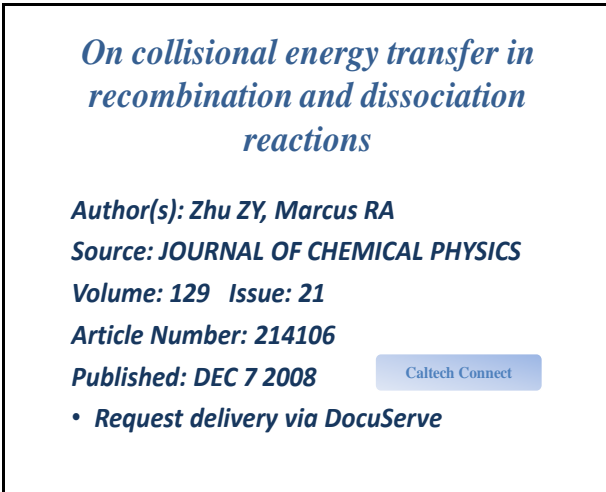
Caltech first introduced an electronic version of Web of Science in 1989 by purchasing tapes from ISI, loading them locally, and running them on BRS software. The philosophy behind this in-house database service was to provide searchable access to articles in the journals Caltech was currently subscribing to. An added benefit was being able to populate photocopy-request forms directly from the WoS records, which were printed out for processing twice a day.

Ariel software became available a few years later, and promised to greatly speed up delivery of article copies from other institutions. In 1992, Caltech and UCLA entered into an agreement whereby Caltech paid for an estimated year's worth of photocopies in advance, and received preferential one-day turn around delivery for these requests; on receipt of the electronic files, we printed these out and mailed them to our requesters. This agreement continues, but is now supplemented by improved services offered by other libraries, including the British Library, CISTI, and Linda Hall, as well as by direct purchase from publisher websites.

As an aside, I would like to put in a plug for increased dependence on the comprehensive libraries, such as UCLA, CISTI and Linda Hall, and decreased dependence on local storage facilities. As time goes on, use of the older materials

will diminish, and the comprehensive libraries may well need your business to remain viable.

Beginning in 1999, Caltech introduced a new document delivery system (IBID) that was based on the ILLiad (3) software developed at Virginia Tech, and which is now marketed by OCLC. Caltech's IBID service allows the receipt of photocopy requests electronically, and provides electronic delivery of material scanned or downloaded from our collections, as well as articles received via Ariel from other libraries. We also scan and deliver PDF files for the material received in print from other libraries. The IBID system also eliminated the necessity of the paper photocopy request slips and greatly simplified the accounting system for charge-backs to individual users' research accounts.



On collisional energy transfer in recombination and dissociation reactions

Author(s): Zhu ZY, Marcus RA

Source: JOURNAL OF CHEMICAL PHYSICS

Volume: 129 **Issue:** 21

Article Number: 214106

Published: DEC 7 2008 [Caltech Connect](#)

- Request delivery via DocuServe

Figure 2. Sample Web of Science record

An additional improvement, developed in house, expands our ability to directly populate requests from Web of Science via an SFX link (the *Caltech Connect* button) that appears in the individual article records.

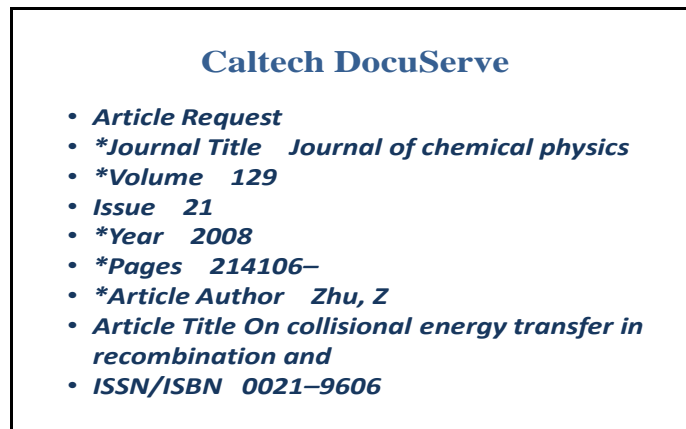


Figure 3. Caltech DocuServe request from Web of Science

The volume of photocopy requests at Caltech increased each year, reaching a peak of 6000/month, until the introduction of online journals in the late 1990s, when it began steadily decreasing. We didn't see a marked decrease in requests until 2002, when they dropped off to the current level of about 1000 requests per month. These come primarily from four sources:

- 1) the Humanities faculty,
- 2) the Einstein Project (now located at Caltech),
- 3) as a result of searches in the Century of Science collection in WoS, and
- 4) those faculty members who prefer to have library staff create PDF copies of journal articles for them after they search WoS.

Faculty Education at Caltech

Beginning with the availability of the Ariel service in 1992, significant barriers to quickly obtaining articles from other libraries were suddenly removed. This led to internal discussions about the continuing need for library subscriptions to little-used journals that were considered essential by only a few faculty members.

Cancellation of these titles would obviously require a comprehensive price/use evaluation of all journal subscriptions. This evaluation could also inform all faculty

members about the dramatic differences in subscription prices between society and commercial journals.

Attempts to educate faculty members to relative journal-subscription pricing began in the late 1980s, and were originally limited to very simple cost comparisons.

Journal	Cost (\$)
<i>ACS Package(25)</i>	10,980
<i>Biochim. Biophys. Acta</i>	7,322
<i>J. Chem. Soc. Package(6)</i>	6,489
<i>Tetrahedron Combo(3)</i>	10,936

Figure 4. Example of cost comparison data

Many faculty were shocked by this comparison, especially by the similarity in price of the ACS package (25 journals) and the Tetrahedron combination (three titles), and the fact that BBA was more expensive than the six titles in the RSC package; both examples elicited very vocal responses.

We expanded this educational effort to other subject areas, and expanded the scope to include cost/page and cost/page/IF data, examples of which have been presented at several previous SLA Annual Conferences (1).

On an historical note, the 1960s saw some, but certainly not all, Caltech researchers join other authors in avoiding the page charges traditionally requested by society journals by submitting their research papers to commercially published journals. This practice began to decline beginning in the mid-1990s, presumably due to increasing faculty awareness of the enormous subscription price

differences between society and commercially published journals, and the elimination of page charges by many society journals.

The number of Caltech papers published in society and open-access journals is increasing, with several examples: In the neurosciences, several faculty members participated in the formation of a new open-access journal, *Frontiers in Neuroscience*; contributions to *Physical Review D*, at the expense of its commercial counterparts, is steadily increasing; and the choice to publish in *Organic Letters* rather than *Tetrahedron Letters* is gaining popularity. It is interesting to note that Caltech's experience is not unique, and seems to have been fairly widespread.

Figure 5 compares three commercial journals, *Phys. Lett. B*, *Nucl. Phys. B*, and *Eur. Phys. J. C*, with three society journals, *Phys. Rev. D*, *J. High Energy Phys.*, and *Phys. Rev. ST-A&B*, and shows that the percentage of commercially published, high-energy-physics journal articles with a Caltech author, a US author, or even a CERN author decreased from 1997/1998 thru 2007/2008; with each showing a steady, linear decline.

Percentage of HEP Articles in Commercial Journals				
<i>Phys. Lett. B</i>		vs	<i>J. High Energy Phys.</i>	
<i>Eur. Phys. J. C</i>			<i>Phys. Rev. D</i>	
<i>Nucl. Phys. B</i>			<i>Phys. Rev. ST-A&B</i>	
Article	Authorship	1997/1998	2007/2008	
	Caltech	60%	9%	
	USA	60%	21%	
	CERN	88%	51%	

Figure 5. % of HEP articles in commercial journals

During this same period, two of the three commercial journals also showed declines in the total number of articles, while society journals all showed substantial increases: *Physics Letters B* declined by 46% and *Nuclear Physics B* by 59%; *Physical Review D* grew by 65%.

Journal	1997/8	2007/8
<i>Phys. Lett. B</i>	3290	1768
<i>Nucl. Phys. B</i>	1602	662
<i>Eur. Phys. J. C</i>	545	622
<i>Phys. Rev. D</i>	3115	5128
<i>J. High Energy Phys.</i>	(166)	2527
<i>Phys. Rev. ST-A&B</i>	(0)	246

Figure 6. Articles published in major HEP journals

To Elsevier's slight credit, the subscription prices for both *Physics Letters B* and *Nuclear Physics B* actually decreased in 2008 and 2009; the 2009 price was 32% less than the 2007 price, presumably to compensate for the sharp decline in the article count. This data suggested that a comparison of recent price/article data would be interesting.

Year	Price (\$)	# Articles	Price (\$)/Article
2009	11,570		
2008	13,612	349	39
2007	17,015	313	54
2006	16,166	405	40
2005	15,360	522	29
2004	15,360	476	32

Figure 7. Price/Article data for Nucl. Phys. B

As you can see, the price per article for *Nuclear Physics B* is in the range of \$30–\$50. Comparing its \$39 price/article in 2008 with the \$1.83 Level 5 price/article for *Physical Review D*, and with the \$1.54 price/article for *J High Energy Physics*, however, gives one more than a little pause, as this disparity is not an isolated example(2).

Collection of Use Data

In the 1970s, the Caltech Library's first attempt to measure use as a criteria for subscription decisions was to check-mark re-shelved volumes, and manually total the marks. This data was matched with subscription costs to identify possible titles for cancellation. (As an aside, it is hard to believe that the exchange rate in the 1960s was 4 DM to the Dollar; the sudden change in the 1970s to a rate of 3 DM to the Dollar resulted in a 30 percent increase in the cost of library materials from Germany, such as Beilstein, Gmelin, and Landolt-Bornstein; as these were the essential databases, the purchase of books and journals published in Europe suffered greatly.)

Later attempts to develop use data tabulated all references appearing in the published papers of Caltech's biologists and chemists for the 1980 calendar year; these results largely corroborated the check-mark data.

To capture really solid use data, the Caltech Library System fortunately adopted Innovative Interface's OPAC in 1990, which easily allowed us to record each re-shelving of individual journal issues and of bound volumes. This data was then used for cancellation projects in the early 1990s.

In 1995, however, at the prompting of the Caltech's provost, library staff and professorial faculty began a comprehensive review of all journal subscriptions. The provost's charge was to prepare a list of absolutely essential titles, as determined by individual faculty members. The provost promised to help fund these essential titles from a separate account, thereby relieving the library system from having to deal with annual subscription price increases.

In addition to the in-house journal-use data, statistics for Caltech data on citing and cited journals were purchased from the Institute for Scientific Information. Ultimately, the project goals were accomplished with a very high level of faculty cooperation and a willingness to give up individual favorites that showed little use, largely due to the success of our very efficient in-house document delivery service and to the dramatic advances in document delivery from outside sources that began a few years earlier.

Just prior to this project, the Caltech Library staff had begun thinking more broadly about subscription equity, namely that there should be a balance between the essentially freely available articles from subscribed journals and the increasing expense to users for articles obtained thru ILL, which at Caltech required a

charge-back to individual research accounts for both the Copyright Clearance Center (CCC) fees and the in-house document delivery charge.

In conjunction with the Provost's journal-subscription cancellation project, the library began to subsidize the CCC cost for articles from unsubscribed journals. While the annual cost of this policy has been very reasonable when compared with subscription costs, the policy was recently modified to require a faculty member's approval for any article with a CCC fee in excess of \$50. Surprisingly, with very few exceptions, users cancel their request as being of insufficient importance to warrant purchase at an unreasonable cost.

The current availability of COUNTER statistics for electronic journal articles has greatly simplified the record keeping for individual journal usage. In conjunction with electronic availability of publisher's journal prices, this allows for a very efficient annual determination of price/use data for each journal. We currently use \$30 per use as the cut-off for proposing a possible journal cancellation.

Conclusion

The ability to cancel lesser used journals requires that libraries have maximum flexibility in their relationships with the various publishers. Caltech has studiously avoided any '*Big Deals*', since again, the only bargaining power libraries have with publishers is the ability to walk away, which in this discussion involves canceling individual journal subscriptions and/or withdrawing from consortium arrangements. While this approach may sound problematic, it has not been for Caltech; continually educating faculty members about the excessive costs of some commercially published journals and providing our users with reasonably priced and very quick access to unsubscribed journal articles works!

In closing, I would also like to say a few words about SCOAP3 and Open Access.

I find SCOAP3 very problematic for the following reasons.

- 1) The funding proposal that locks in current institutional expenditures for HEP journals. This effectively ignores the enormous disparity in pricing between commercial and non-commercial articles that was highlighted by Gene Sprouse in an e-mail to *PAMNet* in December 2007.
- 2) The questionable benefit of OA for HEP articles. It appears to be a given that HEP scientists use the arXiv for their daily work and that there is likely little interest outside the users of the arXiv in reading these articles. So, what is the essential benefit that SCOAP3 will provide to the HEP community?
- 3) The percentage of HEP articles appearing in commercially published journals has been rapidly decreasing over the past decade. Why don't we just let nature take its course? This action would leave us with the non-profit subscription journals, which are easily affordable to those who are interested in HEP.
- 4) (and most important): the lack of a coherent business model. This puts non-profit publishers at substantial risk if SCOAP3 were to fail. The difficulties for non-profit publishers in re-assembling a subscription model should not be underestimated; they would be at an enormous disadvantage compared with their commercial counterparts.

In regards Open Access, and the seeming plethora of new commercial OA publishers, one must wonder if there is a clear, widespread understanding of the expertise required to publish a quality scientific journal. Given the very high rejection rates for quality journals, it is easy for me to imagine commercial Open Access publishers drifting away from quality peer review toward what could eventually amount to vanity publication.

I am also concerned about the inherent unfairness of putting the expense of journal article publishing on a relatively small number of authors for the benefit of a

very large number of readers. Once upon a time, non-profit journals maintained an effective balance between author and reader contributions: Authors paid a reasonable page charge, and readers paid a reasonable subscription price. This balance was almost completely undone by a dramatic rise in the number of commercial journals that did not ask for page charges and by libraries that willingly paid more and more money to subscribe to these for-profit journals and their '*big deals*'.

My sense is that many libraries are finally beginning to recognize the futility of trying to maintain subscriptions to grossly overpriced commercial journals; and that the current dysfunctional market will self-correct and return to a balance of page charges and reasonable subscription pricing.

1a. Roth, Dana L. (2002) Chemistry Journals: Cost-Effectiveness, Seminal Titles and Exchange Rate Profiteering. *Science & Technology Libraries*, 22 (3/4). pp. 59-70.

1b. Roth, Dana L. (2004) Electrochemical Journals, AIP's Scitation, Cost-Effectiveness. California Institute of Technology. [CaltechLIB:2004.001]
<http://caltechlib.library.caltech.edu/64/>

1c. Roth, Dana L. (2005) Subscription costs, exchange rates, and cost/page/impact factor data for selected organic and inorganic chemistry journals. In: 2005 SLA Annual Conference, 5-8 June 2005, Toronto, Canada. [CaltechLIB:dzrSCE05]
<http://caltechlib.library.caltech.edu/84/>

1d. Roth, Dana L. (2006) Value and Quality Measures for Chemistry Research Journals. In: Special Libraries Association Annual Conference, 11-14 June 2006, Baltimore, MD. [CaltechLIB:2006.003]
<http://caltechlib.library.caltech.edu/101/>

2. Douglas, K. & Roth, D.L., Looming threats to society journals. *Chem. Eng. News* (2006), November 20, p. 82-84.

3. About Illiad [<http://www.ill.vt.edu/AboutILLiad.htm>]