

## REFERENCES AND NOTES

- (1) Howe, W. J.; Hagadone, T. R. "Molecular Substructure Searching: Computer Graphics and Query Entry Methodology". *J. Chem. Inf. Comput. Sci.*, **1982**, 22, 8-15.
- (2) Ray, L. C.; Kirsch, R. A. "Finding Chemical Records by Digital Computers". *Science*, **1957**, 126, 814-819.
- (3) Lefkowitz, D. "Substructure Search in the MCC System". *J. Chem. Doc.* **1968**, 8, 166-173.
- (4) Rössler, S.; Kolb, A. "The GREMAS System, an Integral Part of the IDC System for Chemical Documentation". *J. Chem. Doc.* **1970**, 10, 128-134.
- (5) Adamson, G. W.; Cowell, J.; Lynch, M. F.; McLure, A. H. W.; Town, W. G.; Yapp, A. M. "Strategic Considerations in the Design of a Screening System for Substructure Searches of Chemical Structure Files". *J. Chem. Doc.* **1973**, 13, 153-157.
- (6) Feldman, A.; Hodes, L. "An Efficient Design for Chemical Structure Searching. I. The Screens". *J. Chem. Inf. Comput. Sci.* **1975**, 15, 147-152.
- (7) Graf, W.; Kaindl, H. K.; Kniess, H.; Schmidt, B.; Warszawski, R. "Substructure Retrieval by Means of the BASIC Fragment Search Dictionary Based on the Chemical Abstracts Service Chemical Registry III System". *J. Chem. Inf. Comput. Sci.* **1979**, 19, 51-55.
- (8) Sussenguth, E. H. "A Graph-Matching Algorithm for Matching Chemical Structures". *J. Chem. Doc.* **1965**, 5, 36-43.
- (9) Ming, T. K.; Tauber, S. J. "Chemical Structure and Substructure Search by Set Reduction". *J. Chem. Doc.* **1971**, 11, 47-51.
- (10) Figueras, J. "Substructure Search by Set Reduction". *J. Chem. Doc.* **1972**, 12, 237-244.
- (11) Lynch, M. F.; Harrison, J. M.; Town, W. G.; Ash, J. E., Eds. "Computer Handling of Chemical Structure Information"; Macdonald: London, 1971; pp 73-74.
- (12) Brown, H. D.; et al. "The Computer-Based Chemical Structure Information System of Merck Sharp and Dohme Research Laboratories". *J. Chem. Inf. Comput. Sci.* **1976**, 16, 5-10.
- (13) Farmer, N. A. "The Proposed Chemical Abstracts Service's Substructure Search System". Proceedings of the Technical Information Retrieval Committee of the Manufacturing Chemists Association, Arlington, VA, Aug 1977; McNulty, P. J., Smith, R. B., Eds.; Manufacturing Chemists Association: Washington, DC, 1977.

## Evaluation of the Quality of Symposia Papers. Status Report on the Symposium on Photochemistry in Japan

AKIHIDE KITAMURA\* and KUNIO OOHASHI

Department of Chemistry, College of Arts and Sciences, Chiba University, Yayoi-cho, Chiba 260, Japan

TATSUO ARAI and KATSUMI TOKUMARU

Department of Chemistry, the University of Tsukuba, Sakura-mura, Ibaraki 305, Japan

MASAYUKI YOSHIDA

University of Library and Information Science, Yatabe, Ibaraki 305, Japan

Received December 29, 1981

Papers presented at the annually held Symposium on Photochemistry in Japan were reviewed to ascertain which of these had subsequently been published. Certain research trends became evident in reading through the papers; in particular, it appeared that studies on photoreductions had been prevalent in the Symposium in recent years. From the investigation regarding the quantity and yield of the published papers it appears that a high proportion of the papers presented at the Symposium have been subsequently published, and it is concluded that the general level of quality of the papers is accordingly also high.

### INTRODUCTION

In order to keep abreast of current developments, chemists actively engaged in research may scan regularly the contents of seven or eight journals devoted to their research speciality.<sup>1</sup> However, most chemists feel that "current" information from primary printed sources is not necessarily current, since it can take from 3 months to over 1 year before an article submitted to a journal is finally published.<sup>2</sup> Therefore, active research chemists tend to obtain pertinent "current" information at meetings and symposia; but while such information may be of value for current awareness, the quality of the information so obtained is another question. With this in mind, the present investigation took the annually held Symposium of Photochemistry in Japan and, using statistical analysis, scrutinized its status as revealed in the published literature.

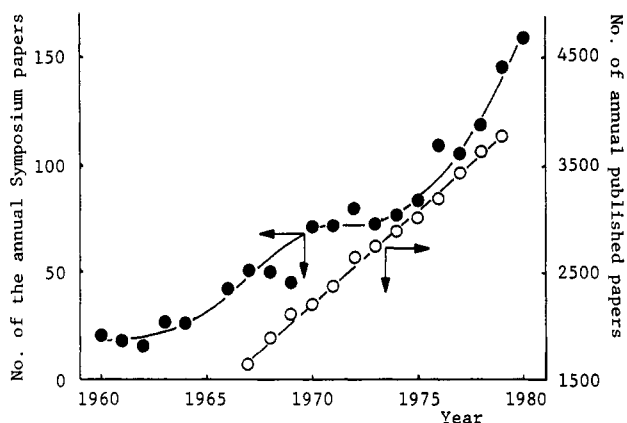
### RESEARCH TRENDS OBSERVED IN THE SYMPOSIUM ON PHOTOCHEMISTRY AND THE PUBLISHED LITERATURE

During the last 25 years photochemistry has grown rapidly into a major interdisciplinary field of research. Because of that trend, the Symposium on Photochemistry in Japan was

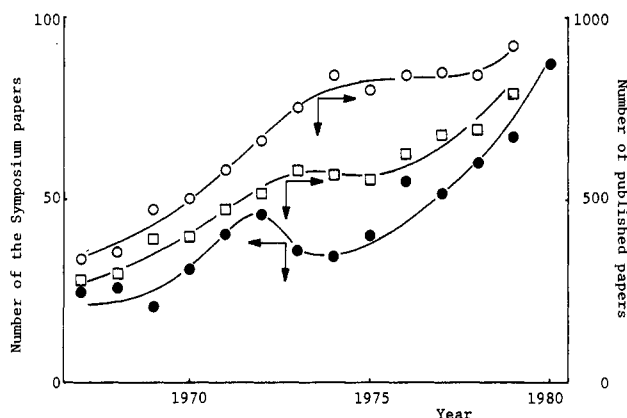
first organized in 1960 and has been held every year between September and December since that date. As shown in Figure 1, the number of papers presented at symposia increased slowly from 1960 to 1970 and then stagnated in 1971-1975. The number began to grow again in 1976 and has been increasing ever since. As the annual Symposium has become one of the representative symposia in Japan, during the same period the number of papers on photochemistry cited in *Chemical Abstracts* has continued to increase steadily, suggesting that the field of photochemistry is still in a state of development.

The difference in pattern between the curves for (a) the papers presented at the Symposium and (b) published papers may be ascribed to the difference in the fields covered. The general literature on photochemistry includes a wide variety of photochemical studies, while the Symposium papers are limited to those related to pure chemistry. Any comparison of general research trends with those covered in the Symposium should be based on an identical field. Thus a start was made in this investigation by examining the growth of papers on photochemical reactions.

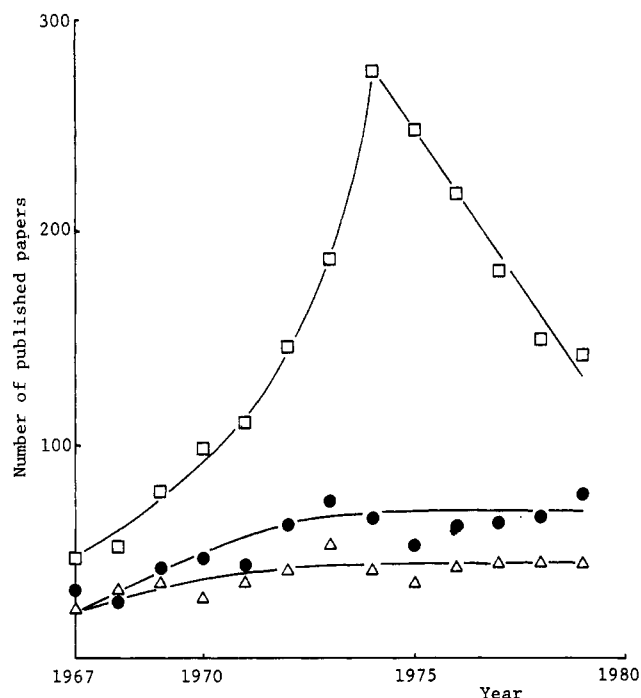
In Figure 2 is shown the difference in the growth curves between the published papers on the one hand and Symposium papers on the other. The latter show a maximum in 1972 and



**Figure 1.** Growth of the Symposium papers and published papers on photochemistry: ●, the Symposium papers; ○, published papers.

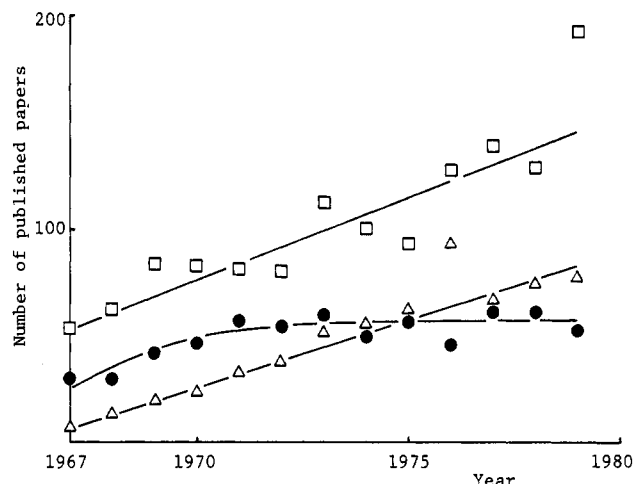


**Figure 2.** Growth of papers on photochemical reactions: ●, the Symposium papers; ○, total published papers; □, published papers after subtracting photopolymerizations.

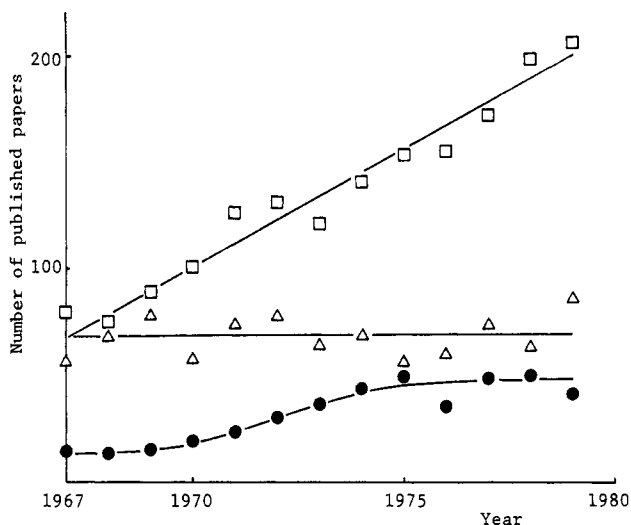


**Figure 3.** Growth of published papers on photodecompositions (Δ), photorearrangements (●), and photopolymerizations (□).

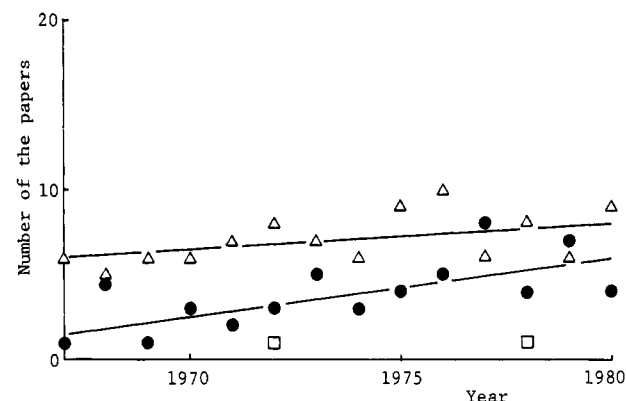
a small fall in 1973–1975, but the former show no apparent maximum, the stagnation starting in 1974. For analysis of the difference between the two curves, the growth was examined for each type of reaction, viz., photooxidations, photo-



**Figure 4.** Growth of published papers on photoadditions (●), photoisomerizations (□), and photocatalyses (Δ).



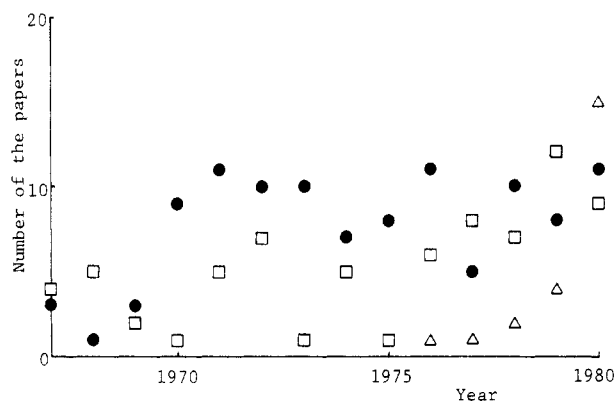
**Figure 5.** Growth of published papers on photoreductions (●), photosubstitutions (Δ), and photooxidations (□).



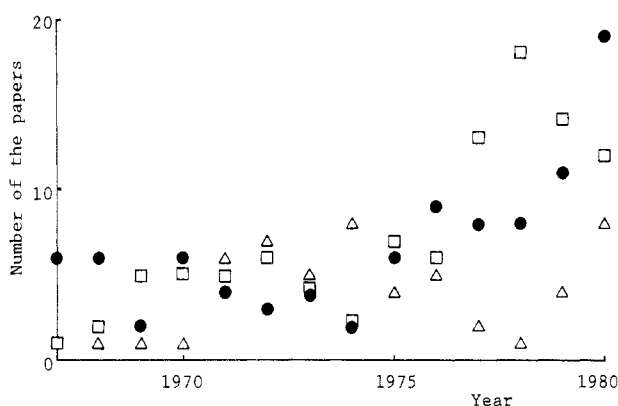
**Figure 6.** Growth of the Symposium papers on photodecompositions (Δ), photorearrangements (●), and photopolymerizations (□).

isomerizations, photocatalyses, photodecompositions, photoadditions, photorearrangements, photoreductions, photosubstitutions, and photopolymerizations. A survey of the growth curves shows that the literature on photodecompositions, photorearrangements, photoadditions, photoreductions, and photosubstitutions is in a state of stagnation (Figures 3–5). The growth of literature on photopolymerizations shows a peak in 1974, but studies in this area are now declining (Figure 3).

Symposium papers on photodecompositions, photorearrangements, and photoadditions also reached a state of stag-



**Figure 7.** Growth of the Symposium papers on photoadditions (●), photoisomerizations (□), and photocatalyses (Δ).



**Figure 8.** Growth of the Symposium papers on photoreductions (●), photosubstitutions (Δ), and photooxidations (□).

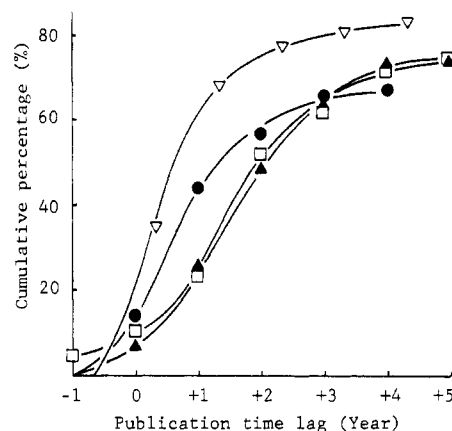
nation (Figures 6 and 7) and showed trends similar to those in the published literature. In the following reaction sections, however, research trends in the Symposium papers are different from those in the published literature. While, as shown in Figures 7 and 8, the plottings were badly scattered, on visual inspection it can be seen that the number of Symposium papers on photoreductions, photoisomerizations, and photocatalyses seems to be growing in recent years. The prevalence of studies on photooxidations reached a maximum in 1978 but is now declining (Figure 8); studies on photosubstitutions have not shown any definite trend (Figure 8).

The greatest difference between Symposium papers and the published literature was evident in the field of polymerizations, a subject on which hardly any papers have been presented (Figure 6), and this may account for the fall in Symposium papers illustrated in Figure 2. Indeed, subtraction of photopolymerization papers from the total published literature on photochemical reactions gave a curve similar to that for the Symposium papers (Figure 2) and in which a maximum appeared 1 year after the date of the Symposium. Although the number of Symposium papers is small, there is an indication in these figures as to a change in emphasis, i.e., that Symposium studies on photoreductions are increasing.

All of the Symposium papers were carefully read, and each one was then classified by its main topics. The Symposium papers in each specific field were then counted and plotted against the year as in Figures 6–8. The data for the literature were obtained by using CA SEARCH in the Lockheed Corporation's DIALOG system. The search procedure was as follows. A paper on photooxidations was defined if the words "photooxidat?" or "photo? and ?oxidat?" (expressed as "photo(F)oxidat?" by DIALOG symbology) were included in its title, descriptor, or identifier fields, in which question marks indicate truncations. A set was then formed containing all

**Table I.** List of Search Terms

field	search terms
photodecomposition	photodecomp? or photo(F)decomp?
photorearrangement	photorearrange? or photo(F)rearrang?
photopolymerization	photopolymeriz? or photo(F)polymeriz?
photoaddition	photoaddit? or photo(F)addit?
photoisomerization	photoisomeriz? or photo(F)isomeriz?
photocatalysis	photocataly? or photo(F)cataly?
photoreduction	photoreduct? or photo(F)reduct?
photosubstitution	photosubstitut? or photo(F)substitut?
photooxidation	photooxidat? or photo(F)oxidat?
photochemistry	photochemi? or photo(F)chemi? or photoreact? or photo(F)react? or photoly? or "all search terms which are described above"

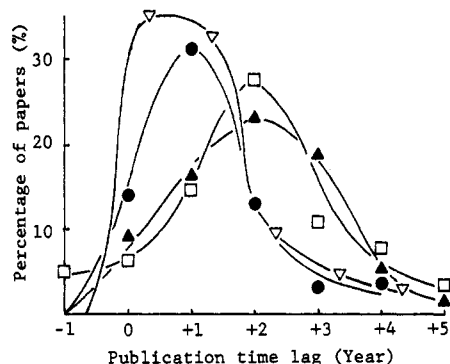


**Figure 9.** Cumulative percentages of published papers: □, 1970; ▲, 1974; ●, 1976; ▽, IUPAC 1976. The IUPAC symposium was held 3–5 months ahead of the symposium in Japan. With this time difference taken into account, the curve for the IUPAC symposium was shifted to right for 4 months.

the papers on photooxidations, and the number of papers in the set was recorded. Sets on each of the other reaction types were prepared in a similar way. For papers on photochemistry, sets were prepared for the words "photochemi? or photo(F)-chemi?", "photoreact? or photo(F)react?", and "photoly?", respectively. All of the above sets, including those for reaction types (see Table I), were combined by a Boolean "OR" operator, and the number of papers on photochemistry was recorded. Accordingly, a paper which contained more than one topic was counted separately for the data illustrated by Figures 3–5. In Figures 1–5, the "year" for the primary papers corresponds to the date of publication.

#### EVALUATION OF THE SYMPOSIUM BY PUBLICATION STATUS

The question arises as to what percentage of Symposium papers are eventually published, and over what period of time. The quantity and yield of published papers for the total number of Symposium papers could become a critical parameter for evaluation of the Symposium as a medium of current awareness. Thus the publication status of the Symposium papers for the years 1970, 1974, and 1976 was investigated. For an accurate picture as to the final fate of these Symposium papers, the Author Indexes of *Chemical Abstracts* were checked for each author. Since in many cases the titles had been changed for publication, each abstract was compared with that for the paper as delivered at the Symposium. Once the correct paper had been located in *Chemical Abstracts*, the data relating to publication, as well as the name of the respective journal, were noted. It has been assumed that if a paper has not appeared in a journal over a 4–5-year period



**Figure 10.** Annual publication curve for the Symposium papers: □, 1970; ▲, 1974; ●, 1976; ▽, IUPAC 1976. See the caption in Figure 9.

subsequent to the Symposium, it is unlikely to be published.

In Figure 9 the cumulative percentage of published papers is shown as plotted against the interval between presentation at the Symposium and appearance in a journal, indicating the publication time lag. It was found that 47 papers (75%) of the total of 63 papers at the Symposium in 1970 were published in various journals: 19 in *Bulletin of the Chemical Society of Japan*, 5 in *Tetrahedron Letters*, 4 in *Chemistry Letters*, 4 in *Tetrahedron*, and 15 in other journals. The remaining 16 papers could not be located. Out of a total of 74 papers presented at the Symposium in 1974, 55 were published (73%), of which 18 appeared in *Bulletin of the Chemical Society of Japan*; a further 18 (6 in each journal) appeared in *Chemistry Letters*, *Chemical Physics Letters*, and *Journal of the American Chemical Society*. The remainder of the published papers were found distributed among 12 journals. The residual 19 papers were not located. Out of a total of 108 papers presented at the Symposium in 1976, 71 papers (66%) had been published by various journals 4 years later. The *Bulletin of the Chemical Society of Japan* had published 20 papers, *Chemistry Letters* published 13, and the *Journal of Physical Chemistry* published 6. The remaining 32 published papers were found distributed among 20 journals. The residual 37 papers were not located. In summary, about 70% of the total number of Symposium papers were published, mostly in *Bulletin of the Chemical Society of Japan* and

*Chemistry Letters* over a subsequent 4–5-year period.

Publication rate could be a critical parameter to define the quality of the Symposium. For the symposia held in 1970 and 1974 the majority of papers appeared in journals within 2 years of presentation (Figure 10). For the Symposium held in 1976 the publication time lag for maximum appearance of papers in journals was shortened to 1 year. In the year of presentation 14 papers were published, of which 5 (36%) appeared in *Chemistry Letters*. In the year of maximum publication (1977), 6 from a total of 34 papers (18%) were published in *Chemistry Letters*. This high percentage of papers appearing in *Chemistry Letters* may be responsible for the shortening of the publication time lag.

A similar investigation was carried out for the 6th IUPAC Symposium of Photochemistry, Aix-en-Provence, France, held July 19–23, 1976. A cumulative percentage of 83% for published papers was reached within a 4-year period (Figure 9). The annual publication curve for the IUPAC papers shows that about two-thirds of them appeared in journals within 1 year of presentation, whereas in the case of the Symposium in Japan the majority of papers appeared within 2–3 years, as shown in Figure 10. Apparently the publication rate is faster for the IUPAC Symposium than for the Symposium in Japan. If we take into account the time lag between the receipt and the publication of an article, we can safely say that for most of the papers presented at the Symposium in Japan the work had been completed at the time of presentation and that some papers had already passed the scrutiny of journal editors. Thus it is concluded that the Symposium papers are high in quality and that the content of the Symposium is reliable. One can get fairly accurate and complete information from the Symposium at an earlier date than from the journals.

This conclusion should remain valid so long as the organizers of future symposia maintain the existing standard by inviting knowledgeable speakers and/or accepting worthwhile contributions. Furthermore, the method described here might be applicable in the evaluation of any series of symposia on a specialized topic.

## REFERENCES AND NOTES

- (1) Weiske, C. "Information und Dokumentation aus der Sicht des Benutzers". *Nachr. Chem. Tech.* 1970, 18, 250.
- (2) Yamamoto, M. *Kagaku to Kogyo (Tokyo)* 1980, 33, 661.