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134. F. R. Moulton and Ware Cattell jointly edited the journal from 1939. For some unknown reason, James McKeen Cattell's name was also listed as editor through 1942.
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147. I thank the WPI Chapter of Sigma Xi for support; M. L. Aldrich, H. Cravens, D. J. Kevles, S. G. Kohlstedt, H. Nussbaum, H. Plotkin, J. L. Sturchio, J. Walsh, and D. Wolfle for critical readings of earlier drafts of this article; and S. Orszulak for secretarial help.

# *Science* in Transition, 1946 to 1962

John Walsh

At the end of World War II the American Association for the Advancement of Science faced a double challenge. As a scientific organization, the AAAS had to adapt to the drastically altered postwar circumstances of American science. At the same time, the association was obliged to master the tasks of publishing a major scientific periodical. Although *Science* had been the official journal of the AAAS since 1900, it had been sent to members under an arrangement with James McKeen Cattell, the previous owner and editor. The transfer of control of *Science* to the AAAS at the beginning of 1946 coincided with the opening of an era of unprecedented expansion for American science. Although the association's leaders recognized that unparalleled opportunities existed for the AAAS and its periodicals, initially, at least, the response was uncertain. And, until the AAAS could establish its own identity, it was unable to turn full attention to the management of *Science* or seriously address the question of what sort of publication it should be.

The period under discussion falls into two major phases. Figures on circulation and advertising revenue show that for nearly a decade after the war *Science* went through the doldrums. From 1946 to 1954 the magazine had a half dozen editors (Table 1), none of whom had sufficient time or independence of action to exert decisive influence. In these same years the association dealt inconclusively with fundamental policy questions of control and financing inherent in the relationship between the AAAS and *Science*.

In 1953 an open conflict between the AAAS's elected officials and its chief administrative officer had the side effect of beginning a cycle of significant change. The key figure in initiating the new phase was Dael Wolfle, who joined AAAS as executive officer in 1954 and served for a crucial period as acting editor of *Science*. Under Wolfle a series of steps were taken which affected both the editorial and the business operations of *Science* and proved decisive in imparting momentum to the magazine. In 1958, after Graham DuShane had assumed the editorship of *Science* and with Wolfle as publisher, *Science* was combined with *The Scientific Monthly*, a second AAAS periodical, resulting in a further strengthening of *Science*. By the early 1960's a steadily rising flow of advertising income had created conditions for expansion: a modus vivendi had also been established in AAAS-*Science* relations. The readership of *Science*, however, had not in-

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creased in proportion to advertising revenue and it was only after the arrival of Philip H. Abelson as editor in 1962 that there was a sustained increase in circulation that roughly doubled to 150,000 by the end of the decade.

As indicated, the story falls into a before-and-after pattern with the break occurring at the beginning of the Wolfle era. The focus here will be on the formative editorial and organizational decisions taken in the middle and late 1950's. Equally important but much more elusive were the interactions between the AAAS and *Science* throughout the period. Detailed discussion of these matters is impossible in the space available and the contributions of many individuals will necessarily be slighted and significant issues oversimplified.

The AAAS-*Science* relationship was inevitably governed by objectives and tensions different from those prevailing in commercial publishing. An association of scientific societies devoted to the advancement of science, the AAAS has other purposes besides the publishing of *Science*. Since it was recognized that *Science* was the association's most valuable property and chief source of income, it was also clear that the best hope for increasing general revenues was to improve the quality and thereby the circulation and advertising income of *Science*. The operative questions were of two kinds. How much of the limited resources available should AAAS devote to improving *Science* and how much to other AAAS activities? And how and to what extent should AAAS control the content and editorial policy of *Science*?

Especially in the early postwar years AAAS retained many of its prewar characteristics. Historically, because of the absence of a strong national organization for biology such as served physics and chemistry, the AAAS held a strong attraction for biologists, who had, for example, come to regard the AAAS convention as their national meeting. By the same process, *Science* had become a major medium for publication of short research reports in a number of fields of biology.

Within the AAAS, however, pressure for change was mounting. Leading scientists who had participated in the wartime mobilization of science shared a perception that relations between government and science had been permanently altered and felt that the AAAS, as the most broadly based of national scientific organizations, should redefine its purposes in accord with the new circumstances. To the would-be reformers this meant that the AAAS should increase the disciplinary mix of its membership and address public policy issues in which science figured. They felt that both objectives should be reflected in the program of the AAAS meeting and in the pages of *Science*.

Table 1. Editors and assistant editors of *Science*, and chairmen of the AAAS Editorial Board, 1946 to 1956.

| Date | Officer and appointment |
|---|---|
| 6 January 1946 | Willard L. Valentine, editor through 5 April 1947 (date of death) |
| 15 October 1948 | George Baitsell, editor-in-chief through 29 July 1949 |
| 5 August 1949 | Howard A. Meyerhoff, chairman, AAAS Editorial Board through 27 March 1953 |
| 15 October 1948 | Bentley Glass first listed as a member, AAAS Editorial Board |
| 10 April 1953 | Bentley Glass, chairman, AAAS Editorial Board |
| 1 May 1953 | Bentley Glass, acting chairman, AAAS Editorial Board |
| 24 July 1953 | William L. Straus, Jr., acting chairman, AAAS Editorial Board |
| 25 September 1953 | Bentley Glass, acting chairman, AAAS Editorial Board |
| 4 January 1954 | Duane Roller, editor through 28 January 1955 |
| 4 February 1955 | Dael Wolfle, acting editor through 13 January 1956 |
| 20 January 1956 | Graham DuShane, editor through 20 July 1962 |
| 6 January 1946 | Mildred Atwood, assistant editor |
| 4 July 1947 | Mildred Atwood, acting editor through December 1948 |
| 4 February 1949 | Beth Wilson, executive editor of *Science* through 25 August 1950 |
| 20 October 1950 | Gladys M. Keener, executive editor through 27 March 1953 |
| 10 April 1953 | Ruth C. Christman, executive editor through 5 May 1953 |
| 1 May 1953 | Ruth C. Christman, acting executive editor through 5 March 1954 |
| 12 March 1954 | Charlotte V. Meeting, assistant editor |

## Internal Pressures

These internal pressures doubtless hastened the formation by biologists of stronger national organizations. There can also be little doubt that the dominance of the biologists left an imprint on the AAAS and on *Science* which still persists. To broaden its appeal, *Science* had to overcome a view that it was a biology journal with something of a reputation for slow publication. As it expanded in size in the latter 1950's *Science* was able to cut its lag time in publishing reports, but had only modest success in redressing the imbalance in biology. Ironically, despite its reputed bias for biology, many scientists working on what were then regarded as the most exciting research frontiers in biology—molecular biology and biochemistry—preferred to publish their work in the British journal *Nature*. A commercial publication with professional editors firmly in charge, *Nature* was able to offer preferential treatment and quick publication to a group of researchers in the "new biology" and reaped the reward of being the favored medium for publication for the ablest researchers in the field, including many Americans, to the chagrin of those involved with *Science*.

In appearance and content, *Science* in the postwar decade fairly closely resembled the journal under its previous editor, Cattell. If it seems that the task of upgrading went painfully slowly it is perhaps in part because it is hard now to appreciate the difficulties under which the staff operated. To its new role as scientific publisher AAAS brought little relevant editorial or business expertise. *Science* lacked a corps of editors, writers, and production people competent to improve the quality of the magazine. Resources were chronically short and the staff for a number of years was overworked and underpaid. Policy was made by part-time AAAS officers and committee members for whom AAAS publications were only one area of concern in association activities, but who frequently injected themselves into publication operations. As a result, lines of authority remained unclear.

It took a decade or more for the issue of editorial control to be resolved. The first AAAS editor of *Science*, Willard L. Valentine, a psychologist with experience in journal publishing, had, in fact, been formally granted a considerable measure of independence. This apparently established a principle of operating autonomy for *Science*'s editor. However, Valentine died in April of 1947, a little more than a year after he took the post, and before he had a chance to make a deep impression. While a new editor was sought, much of the editor's powers were delegated provisionally to *Science*'s Editorial Board, which had evolved out of a panel of part-time editorial advisers. George Baitsell of Yale, chairman of the Editorial Board, became de facto editor and then was given the title of editor-in-chief in October of 1948. Day-to-day running of the magazine was overseen by Mildred Atwood, who had

Table 2. Statistics for selected years.

| | 1946 | 1950 | 1955 | 1960 |
|---|---|---|---|---|
| Members | 28,725 | 46,775 | 50,189 | 62,097 |
| Circulation, *Science* | 21,008 | 32,285 | 33,147 | 64,819 |
| Circulation, *Scientific Monthly* | 14,222 | 22,789 | 27,909 | |
| Number of pages, *Science* | 2,639 | 2,870 | 2,768 | 3,904 |
| Number of pages, *Scientific Monthly* | 1,240 | 1,032 | 892 | |
| Advertising | $97,377.97 | $148,342.91 | $153,670 | $588,337 |

been assistant editor under Valentine and held the title of "acting editor" from July 1947 through 1948. Atwood was the first in a succession of women who carried a heavy burden of responsibility for day-to-day operation of the magazine without receiving adequate recognition or recompense. As it turned out, authority over policy and operations of the magazine were diffused for several years and, certainly, the failure to fix the terms of editorial control contributed to arresting the development of *Science* in these years.

In late 1948 came the retirement as AAAS administrative secretary of F. R. Moulton who oversaw the transfer of the *Monthly* and then of *Science* to AAAS control. Moulton's replacement was Howard A. Meyerhoff, a geologist and professor at Smith College. When he took over the top staff post Meyerhoff found the device of Editorial Board management of *Science* unsatisfactory. His proposed solution, which the AAAS board approved, was that he become chairman of the Editorial Board of the two magazines, thus replacing Baitsell. Still unsettled, however, was the contest for power between the Editorial Board's members and the chairman-editor. There was never any question, however, that Meyerhoff favored centralized direction of the publications and thought that they should serve AAAS interests.

Meyerhoff by his own account brought a business view to his management of the AAAS. He felt that priority should be placed on construction of a new AAAS headquarters building, a project initiated by Moulton. "My bright idea," says Meyerhoff, "was to conduct a holding operation, to use whatever surplus I could get out of the [recent] raise in dues for the building." When he left in 1953 the AAAS had the major portion of the funds necessary for the building, but his plan had required that AAAS defer investment in *Science* and other programs. It was this policy of restraint, however, that contributed to the blowup which caused Meyerhoff's abrupt departure. The events leading to the collision are too complex to be detailed here, but in large measure the differences arose from discussions of AAAS policies and programs which led to the so-called Arden House conference of 1951. The precipitating cause of the showdown was a clash between Meyerhoff and physicist Edward U. Condon, who was moving into the AAAS presidency in early 1953, and the conflict was probably the inevitable result of an encounter of two strong-minded individuals with differing interpretations of the role of association officials and of priorities for the organization.

The departure of Meyerhoff left AAAS without an administrative secretary and *Science* without an editor or second in command, because Gladys M. Keener, executive editor of *Science* and *The Scientific Monthly* also resigned. To fill the editor's chair the AAAS called on biologist Bentley Glass of Johns Hopkins, an experienced member of the editorial board. For much of the next year Glass commuted from Baltimore to handle the editing chores for *Science* and *Scientific Monthly*. He was spelled during the summer of 1953 by William L. Straus, Jr., a Hopkins faculty colleague, while Glass filled prior commitments that took him out of the country. During the Glass-Straus regime an attack was made on the backlog of accepted papers and Glass made an effort to expand *Science* coverage of important research developments with short articles written by members of the Editorial Board.

As it began the search for a new administrative secretary and editor, the AAAS board reasserted the important policy decision that the two posts should be separated. To fill the top staff job the board opened discussions with Dael Wolfle, a psychologist who was then director of the Commission on Human Resources and Advanced Training, which was preparing to publish a major postwar manpower study and report. Wolfle had been an administrator in the wartime Office of Scientific Research and Development and after the war served as secretary of the American Psychological Association. The AAAS job was offered to Wolfle, but he says he wished to do some more exploring and delayed an answer. In the meantime, the board felt impelled to fill the editor's post and offered it to Duane Roller, a physicist who was well regarded for his work as founding editor of the *American Journal of Physics*.

Wolfle subsequently accepted the AAAS post. When he came aboard it was as an administrative secretary who had not been consulted on the choice of an editor with whom he would have to collaborate. Roller, a hard worker, made some changes in the publications, but within a year he announced he was leaving. When he moved up the date for departure and it was clear that the search for another editor would be time consuming, Wolfle was made acting editor effective January 1955.

### A Search for Solutions

It was at this time that the Association and *The Scientific American* opened talks that were viewed as offering a possible way out of the AAAS's chronic difficulties with its publications. Under discussion was a proposal for a joint venture by which *Scientific American* would assume responsibility for the management and editing of *Science*. The negotiations were actually the second between the two parties in the postwar period. In the spring of 1949 *Scientific American* publisher Gerard Piel had approached AAAS with a proposal that *Scientific American* be merged with AAAS's *Scientific Monthly* and the former become an official organ of the AAAS. The revamped *Scientific American* was making encouraging progress, but was suffering from a shortage of working capital and anticipated a funding crisis. The AAAS board was seriously interested in taking over *Scientific American* and converting it to a nonprofit magazine but was concerned about the difficulties of raising the necessary tide-over money for *Scientific American*; the board also had questions about editorial control. In the end, the board declined with regret and wished *Scientific American* well. *Scientific American* did, of course, stay afloat and was soon self-sustaining.

Five years later, positions were reversed. *Science* was apparently becalmed financially and editorially and a new sort of joint venture, with *Scientific American* editors taking over management of *Science*, was seen as a way out. The original form of the agreement provided that AAAS would retain possession of *Science* while *Scientific American* would operate *Science* and be responsible for losses if any. The *Scientific American*'s board, however, then asked

that risks be shared, and Piel felt that this midstream change in terms obliged him to call off negotiations. The AAAS board had itself suffered misgivings centered mainly on the problem of maintaining the character of *Science* as a AAAS publication under outside editors. Warren Weaver, then AAAS president, expressed these views in a memo, summing up the doubts with the question "Can the science group wisely delegate [setting of basic policies] to a journalist group?"

*Science* benefited in several ways from the negotiations. A detailed plan for making *Science* into a "news magazine of science" prepared by the *Scientific American* staff was one source of changes that were soon to be made. On the business side, *Scientific American* made an even more direct contribution, giving advice on promotion techniques, nominating Earl Scherago as advertising agent for *Science*, and when he was appointed, helping Scherago organize to attack *Science*'s advertising problems.

After the negotiations, the AAAS opted for self-reliance. In Wolfle they had an association executive who gave top priority to improving *Science* and was prepared to act decisively. In a move that had more significance than, prima facie, might appear, he gained immediate authorization to increase the page size of *Science* from an idiosyncratic $6^1/_8$ by $8^1/_2$ inches to 7 by 10 inches, a popular magazine size that would accommodate standard cuts for advertisements. The 1 July 1955 issue was the first to appear in the new page size. For the same issue, Wolfle and his staff had gone ahead with a major redesign of the magazine without waiting for a new editor to be appointed. In appearance, *Science* acquired a decidedly "cleaner" look typographically; readability was enhanced by a more sharply defined departmentalization of the contents. Except for the cover, which carried a table of contents rather than the picture it was to display a few years later, the redesigned *Science* was the recognizable original of the evolved form of today. The explanatory editorial on the new format stated in no uncertain terms that "The principal reasons for the change of page size is the expectation of greater income—income that can be used for a larger and stronger, and hence more expensive editorial staff that can make *Science* a more useful journal."

The same issue carried notice of the appointment of Earl Scherago as AAAS exclusive advertising representative. Scherago, who had done graduate study in science before moving into work in advertising for scientific publications, was being counted on to exploit the opportunities created by the new page size and format. He opened an office in New York and turned his considerable energies to the task.

Wolfle served as editor from April 1955 to January 1956. The choice for new editor was Graham DuShane, a Stanford biologist who had won recognition as a researcher, had a reputation as a capable teacher, and had some experience with journal publishing. DuShane's appointment resuscitated the principle of separation of the jobs of editor and AAAS top administrator. Wolfle, however, went on to apply what he had learned about budgeting, advertising, printing, and other business aspects of the enterprise by assuming the functions performed by the publisher of a commercial magazine and later taking the title.

### A Decision to Merge

Perhaps the major milestone of DuShane's term as editor was the merger of *Science* and *The Scientific Monthly*. The merger was made effective with the *Science* issue of 3 January 1958; *Scientific Monthly* ceased publication. The merger permitted the staff to concentrate on producing one journal, but, again, the decisive arguments were financial. Existence of two AAAS journals split the readership; each journal's circulation singly was too small to be really attractive to advertisers. *Scientific Monthly* had continued to lag as an advertising medium and was felt to be losing its audience to *Scientific American*. A single journal, which presumably would retain most of the combined circulation of the two, would permit higher advertising rates. And an augmented *Science* with its readership dominated by research scientists would have a strong appeal to manufacturers of scientific instruments and supplies who were the main targets of advertising efforts. At the time of the merger circulation of *Science* was 37,940 and of *Scientific Monthly*, 29,606. The circulation of *Science* the year after the merger was 61,245.

The disappearance of *The Scientific Monthly* as a separate entity was a cause of regret to some AAAS leaders and of complaint from *Monthly* loyalists. The journal had a quaint catholicity which many found appealing. Despite the emphasis the AAAS board and editors had placed on *Science*, the *Monthly* had kept its share of readers and even narrowed the circulation gap. In addition to discussing current scientific developments in terms accessible to generally educated readers, it published articles ranging across science education and the history and philosophy of science, and carried the ruminations of senior savants and occasional quirky excursions on the fringes of science.

The intention was to infuse a strain of *Scientific Monthly* articles into the combined magazine. An editorial by DuShane on the occasion of the merger pledged that *Science*'s "section devoted to lead articles will be enlarged to permit publication of articles of the type formerly published in the *Monthly*." The graft did not take. Two months after the merger Wolfle addressed a memo to the editors phrased with uncharacteristic sharpness. "The former readers of [*Scientific Monthly*] who write that what we have done is to kill the magazine and send *Science* to everyone have considerable justification for the charge." Wolfle had done a comparison with issues of a year before and found that the major change in *Science* was an increase in the number of research reports.

The feeling that the AAAS should somehow make good on the promises made at the time of the merger persisted. In October of the same year, the publications committee discussed the possibility of the AAAS publishing a "popular science" magazine and recommended to the AAAS board that a feasibility study be made. That proposal was allowed to die but the idea that the AAAS was neglecting its responsibilities to a nonspecialist audience that had been served by the *Monthly* became a recurrent theme at board meetings, with a variety of proposals being put forward on how the association could meet what it saw as an obligation and an opportunity. For the rest of DuShane's tenure as editor, which lasted until 1962, the focus of attention so far as publications were concerned was on the continued improvement of *Science*. One direct legacy of the *Scientific Monthly* was the adoption of its picture cover which became, under Grayce Finger's skillful handling, a distinctive and popular feature of *Science*.

Organizationally, the most important change of the late 1950's was professionalization of the staff. With the growth in revenues it was possible to relieve the overload on the staff and turn successively to development of different sections of the magazine. Three people moved into key jobs they would occupy as *Science* expanded in the 1960's. Robert V. Ormes succeeded Charlotte V. Meeting as assistant editor and assumed the duties and later the title of managing editor. Ellen E. Murphy anchored production of the magazine. And John E. Ringle supervised the processing of man-

uscripts. Refereeing of papers at *Science* had been the province of the Editorial Board and the source of its power. Board members were expected to judge manuscripts in their own specialities and refer others to colleagues in the appropriate fields. A system relying on a corps of carefully selected referees was initiated and steadily expanded in later years under Philip H. Abelson's editorship with the aid of advancing technology. Throughout this whole period, Hans Nussbaum served as business manager for *Science* and the AAAS and successfully carried a growing burden of business, personnel, and circulation responsibilities.

Improvement of *Science* news coverage had been espoused by every editor since Valentine. In the period following the war *Science* provided scanty coverage of controversial issues affecting science. The exceptions were instances where the essential interests of the scientific community were seen to be involved, as in the case of the campaign for establishment of a National Science Foundation immediately after World War II. Otherwise, news in *Science* consisted primarily of the recording of promotions, honors and grants, descriptions of new programs, announcements of meetings, and obituaries of scientists, distinguished and otherwise. News of a political cast tended to be handled by printing letters or texts of statements or resolutions on topical subjects, but virtually no attempt was made at providing background or analysis.

From the middle 1950's on, through a trial and error process, *Science* evolved a more systematic coverage of news. One difficulty was that no ready model existed in the scientific or general press at the time. Just as science policy studies had only begun to take shape in academia, reporting on the politics and economics of science was in a rudimentary state. Wolfle and DuShane, in the immemorial way of editors, felt they would recognize what they were looking for when they saw it and hired a series of writers in the cause of the experiment. Finally, in 1960, Howard Margolis, who had worked on a Washington newsletter aimed at the drug industry before coming to *Science*, pioneered the formula. In 1961, with the arrival of Daniel S. Greenberg, recently a Washington *Post* reporter, a style of news coverage for *Science* was established. To indicate the infusion of interpretative reporting into the magazine, which pained some readers and board members, the name of the section was changed from News of Science to News and Comment.

Clearly, by the early 1960's *Science* had become a much more substantial product in size and quality than it had been in the early 1950's. The upswing in advertising revenues that had begun with the conversion to the standard page size and the appointment of Scherago continued. In 1960, gross revenue from advertising for the first time exceeded the cost of printing the magazine. A rule of thumb in commercial publishing is that in a successful periodical advertising pays the printing bill.

In the early 1960's, however, circulation was not meeting hopes and expectations (Table 2). *Science* circulation in 1958, the first year of the merger, was 61,245 and had advanced only to 64,819 in 1960. In 1961 circulation did jump by 8,104, the largest gain in *Science*'s history, except for the increase forced by the merger. From this point, a pattern of substantial increase was maintained through the 1960's and circulation had roughly doubled to 150,000 at the end of the decade.

### Appeal to Academic Scientists

The appeal of *Science* continued to be to academic scientists, with the largest bloc of readers drawn from the life sciences and medicine. Except for expansion of the news and book review sections *Science* did not appear to be bidding seriously for the attention of readers with a nonprofessional interest in the sciences, the group thought to have been served by *Scientific Monthly*. In fact, it seems to have been the content of *Science* and the sharply defined audience it attracted that made the magazine a desirable advertising medium to manufacturers of scientific instruments and supplies. *Science* offered advertisers a crack at a prime market for their wares at an acceptable cost per thousand at a time when a rise in government support of research was creating a booming market in scientific hardware. And it can be argued that the policies that kept *Science* a magazine with a specialized audience both guaranteed the viability of *Science* and limited its growth.

From the time AAAS took over publication of *Science*, the AAAS board had insisted that the magazine retain its character as a AAAS publication. In the early postwar years there was certainly a possibility that *Science* would develop into a AAAS house organ featuring news of the association or into a kind of trade journal chronicling uncritically the events affecting science.

On this point, AAAS leaders displayed some ambivalence. Elected officers and staff members owed their primary loyalty to the association, and their own professional interests led them to stress the importance of AAAS as a scientific organization. AAAS leaders were sensitive to any suggestion that, so to speak, the *Science* tail was wagging the AAAS dog. In the late 1950's, for example, the board responded to a recommendation that a circulation manager for *Science* be appointed by pointedly noting that the job title should be "membership and circulation manager." At the same time the AAAS hierarchy recognized that *Science* had a history and tradition separate from AAAS, although the relationship for many years had been a symbiotic one, and they saw the potential value to the scientific community of a strengthened *Science*.

In these formative years, it can be said that the AAAS followed a middle way. The board seems to have accepted and, indeed, encouraged change in *Science* up to the point where they saw a danger to its remaining essentially a magazine by and for scientists. They appear to have shared Weaver's misgivings about scientists delegating power over basic policy to journalists. They insisted that the editor of *Science* be chosen primarily for credentials as a scientist rather than a journalist. They resisted proposals for major changes in *Science*, such as were proposed by Roller and Piel, aimed at broadening the magazine's appeal but which were viewed as popularizing measures. AAAS leaders did, however, endorse the development of the news section of *Science*, which, both in choice of subject and manner of treatment, often made them uneasy.

The central problem, of course, is that it is unusual for a nonprofit organization such as the AAAS to have a publication like *Science*, which in a modest way, at least, serves as the forum for a larger constituency, in this case the scientific community. In such a case it appears inevitable that there be a permanent tension reconciling the interests of the organization and the publication.

Editorial policy is, ultimately, the sum of daily decisions, and by the early 1960's the ascendant attitude was that held by Wolfle, the most influential figure in the development of *Science* during the period under discussion. Wolfle says he "took the position that *Science* was published for the readers. That it was not published to satisfy the advertisers, that it was not published to foster the welfare of AAAS or feed the ego of its leaders, that the only policy we could defend in the long run was that it was for the

people who subscribed to it and that we had to select material and handle things on that basis." By and large, this view prevailed.

For *Science*, the postwar decade was a period of muddling through. Under Cattell, *Science* had gained a prominent place in American science, but had suffered a decline in both quality and influence in the later years of the editor's life. When AAAS took control of the magazine after the war things were at low ebb. *Science* was fortunate when it was weak that it was not seriously challenged by competitors. That it weathered the period as well as it did is a tribute to a staff that was loyal and long-suffering under adverse conditions and to the voluntary efforts of countless scientists who acted as editors, contributors, and referees, and to the good will of the scientific community toward the AAAS and *Science*. The turning point came with the Wolfle initiatives in the middle 1950's. That AAAS was willing to give *Science* its head was confirmed when it appointed Abelson as editor and showed its confidence in him by granting him a virtually free hand with the magazine. By the early 1960's, therefore, *Science* was ready to participate in the second phase of the postwar expansion of American science that began after Sputnik.

# *Science*: A Memoir of the 1960's and 1970's

Dael Wolfle

Some future historian may describe *Science* since 1962, the end of the period reviewed by John Walsh, but this article is not such a history. The period is too recent, and I was too closely involved. Instead, this will be a personal account of how the editorial staff works, and some of the problems and satisfactions of securing, selecting, writing, and editing 4000 to 5000 pages of text a year that will go to essentially every major research institute and university in the world.

## A New Editor

The period starts in 1962 when Graham DuShane, who had been editor since the first of 1956, accepted appointment at Vanderbilt University as chairman of the Department of Biology and Dean of Graduate Sciences. The *Journal of Geophysical Research* was then prospering under the editorship of Philip Abelson, director of the Geophysical Laboratory, and subsequently president, of the Carnegie Institution of Washington. I had several talks with Abelson; liked the way he thought about editorial problems; and recommended to the board of directors that we invite him to become editor of *Science*. They agreed; he accepted; and in August started what has become the longest editorship in the history of *Science* except for the never to be repeated half-century of James McKeen Cattell.

Abelson stepped into a going enterprise. Ellen Murphy, production editor, and Robert Ormes, managing editor, had come in 1954 during Duane Roller's brief period as editor; and John Ringle, assistant managing editor, had come during the DuShane period. They had the help of experienced manuscript editors, proofreaders, and other aides. Circulation was increasing steadily. And Earl Scherago, the advertising representative, and his staff were expanding advertising sales. With an experienced and able staff in place, the new editor could concentrate on broadening the content of the magazine and on the never completed task of improving the quality of the material published.

To help choose the topics and authors who should be in *Science*, editors have long had the help of an editorial board. In addition, Abelson considered it his personal responsibility to keep broadly informed about new ideas and major developments across the forefront of science. He uses the telephone extensively; seeks the advice of a wide range of scientific acquaintances; and makes frequent exploratory visits to universities, industrial laboratories, and research institutes. The result has been a broadening of the content with less of the concentration on biology that had developed for quite understandable reasons but that was nevertheless worrisome to the AAAS officers and staff. The most notable broadening of content was in geophysics and space and planetary science. Unmanned space probes, the Apollo Program, plate tectonics, and new instruments for geophysical research have led to new findings of wide interest. *Science* has given much attention to these developments.

## Selection and Quality Control

When there are only enough pages to print 20 to 25 percent of the papers that authors would like to have published in the magazine, selecting those of highest quality and widest interest is always a responsibility that calls for the most careful attention. To help make the selection a panel of willing, well-informed, and critical referees is essential. A quarter of a century ago, when manuscripts were fewer, they were parceled out to members of the editorial board who read and decided, or sought the advice of knowledgeable colleagues. As the volume of work increased, a card file of referees became necessary. When John Ringle joined the staff in 1961 the improvement and use of an expanding panel of referees became his primary responsibility. The number has now grown to 10,000 and the old card file has been replaced by magnetic tape.

When Abelson came, he quickly introduced the practice of telephoning prospective referees instead of writing them. The telephone bill jumped, but the average lag between receipt and publication of accepted articles was cut by a month, for no longer were manuscripts sent to referees who were off to Europe for a conference or for some other reason were unable to respond promptly.

In the past few years the continuing effort to improve the reviewing process

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