those in which he wishes to retain membership. Concentration, rather than diffusion, of interest and support has its advantages.

The maintenance of stocks of back issues extending far into the past does not seem to be warranted in these times. Once they were necessary to insure that scientific publications would be available indefinitely to users anywhere. Acceptable substitute mechanisms are now in use to discharge this obligation—through microfilming, microcarding, and offset-reprinting. The cost of printing, storing and inventorying of large stocks in excess of the subscription list is considerable. The demand for back issues falls off sharply after from 2 to 5 years. It is questionable that the investment and servicing for stocks larger than needed for this short-time demand are warranted.

Reprints of published papers are often sold at practically the cost of the press work, paper, binding, and shipping. Realistically, their pricing should include a portion of the composition cost of the paper and of the editorial office overhead.

Many societies seem to feel either that their journal has something unique to offer as an advertising medium, or that industry as a gesture of good will should buy advertising space. This is an extremely naive point of view. The sales and promotion department of any industry is not interested in charity, and the mixing of charity and business is resented. In general, small-circulation journals can look for little support through advertising. In any event, they are not equipped to properly handle and service advertising contracts.

The picture as regards advertising is not wholly black, however. Certain specialized journals may be ideal media for the advertising promotion of some specialized items of industry. The problem of proper servicing of advertising contracts, usually far beyond the capability of the volunteer editor or business manager, still remains, but the possibility exists of a group of journals in a broad field—botany, zoology, physics—sharing cooperatively the services of professional advertising representatives who can do the work of servicing and distributing advertising in a group of journals in a thoroughly competent manner.

Some journals are now making a practice of charging a page rate for publication, or of charging for the cost of tables, illustrations, and formula material above a certain free allowance. This is based on the following premises: (i) communication through publication represents the final step in almost any nonclassified research; (ii) the research project has probably cost from several to many thousands of dollars; (iii) it is false economy to stint on publication—the final and essential stage of the research (actually 1 or 2 percent of the funds used for almost any research would cover the costs of publishing its results; (iv) it is essentially fair that the original publication of the results of research be, to some extent, at the expense of the funds that supported the research.

This practice is a rather unpopular mechanism at the present time for meeting financial problems of scientific journals. The experience of those groups that have employed it, however, has been that author acceptance can be achieved, that it provides a necessary relief of the burden on subscribers and therefore leads to wider use, and that it need not result in authors having to meet such charges personally. Before the practice is widely accepted it will be necessary for those who plan and prepare budgets for research projects to include an item for publication.

The desirability has frequently been stated for mergers of already existing journals, for the expansion of some to include subsidiary fields that are pressing for the initiation of new journals, and for the sectionalizing of large journals in order to avoid separate new ones. In many cases, considerable advantage would result, both economically and in effectiveness of science communication. It is obviously true that, in certain areas of science where journal development has proceeded along these lines, the whole matter of communication is more effectively handled than in other areas where unrestrained competition and division of effort has been the rule.

Our scientific journals, containing as they do, the permanent records of research, must certainly continue their existence, but they have the responsibility of discharging their function in an effective and economical manner.

Problems of the Editor of a Small Journal

George S. Tulloch

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The editor of a small journal usually has duties far beyond those of selecting and preparing articles for publication. Extra and related duties seem to rub off on him. He may find himself acting as subscription manager, advertising agent, head of the complaint department, and last, but not least, the custodian of all back issues of his journal. After a bit of history, I shall restrict my remarks to the problems that are of an editing nature.

The Brooklyn Entomological Society was founded in 1872 by a small group of men who were drawn together by a common interest in insects. Most of these men were born in Germany, where natural science was an important part of the curriculum, even of the elementary schools. During the early years, the meetings were conducted in German and were held in the backroom of a local beergarden. Within a few years, this group increased in size, and many native Americans were brought into the society. By 1879, the meetings were conducted mostly in English, and the meeting place was moved to the backroom of a store that specialized in the sale of insect specimens and entomological supplies.

In 1879, the society started publication of a monthly journal devoted to the topics of general entomological interest and to the insects of the area around New York. Although very few of the members were pro-

fessional entomologists, the journal was and still is devoted to papers of scientific value, thus precluding the inclusion of articles of popular interest. Owing to a variety of circumstances, publication of this journal was discontinued in 1885. It was reactivated in 1912 and has continued during the last 41 years. The 1953 volume is the 48th in the series.

Our society, through its monthly meetings, is dedicated to serve the people in our community who are interested in learning more about insects. Through our publications, the *Bulletin,* which is devoted to short articles, and *Entomologica Americana,* which is devoted to monographic works, we serve entomology as a whole. The subscribers to our *Bulletin,* which is my specific responsibility, are for the most part the educational, governmental, and research institutions, located all over the world, that include entomology in their sphere of interest.

For the most part, our *Bulletin* reaches the reader not at the retail or individual level but at the wholesale or institutional level, and this latter fact is reflected in our small subscriber list. We estimate that we reach about 2500 readers on a regular basis, which indeed is a very small constituency. However, based on bibliographic references to articles that have appeared in our *Bulletin,* we estimate that our occasional reader audience numbers into many thousands.

I am certain that the problems discussed here are not peculiar to editors of small journals, but I am not competent to judge which of my problems are characteristic of the larger journals. The following items appear to be the most important insofar as I am concerned.

1) *Maintaining reader appeal.* The problem of maintaining reader appeal is tremendously acute to editors of small technical publications. Our readers are limited to those whose interests are directed to the splinters of a subject rather than to the subject as a whole. The subject matter of entomology is enormous and, over the years, has been fractured into thousands of splinters. Those with taxonomic interests may restrict their endeavors to a single family of insects or even to a smaller category, such as a subfamily or tribe. The entomological histologist may restrict his interest to a single type of gland or to a single tissue. To these investigators, as well as to a large number of other specialists, the editor must provide a publication that is sufficiently rewarding to maintain reader interest and, at the same time, adhere to the editorial policy of the journal.

A mixture of articles of general interest combined with topics of a specialized and highly technical nature is a simple solution. Usually, however, the more specialized articles outnumber those of a nonspecialized nature, so that there is difficulty in maintaining a proper balance. Possibly, I should not admit that I solicit articles on general topics but this is the truth. At the moment, I have an author preparing a review on the respiratory enzymes of insects, a topic of great interest because of the new understanding of the control of insects by chemical means.

2) *Budgets and costs.* It is desirable to operate within the income of a publication. At the present, each of our yearly volumes runs about 140 pages spread over five issues, and the cost is $3.50. The 1929 volume had 382 pages and cost $2. During the past 6 years, our printing costs have increased about each 2 years, the period of a union contract in the publishing field.

In an attempt to adjust to these new conditions, we have had to reduce the size of our *Bulletin.* We have not, however, cut our *Bulletin* to fit our income; that is to say, we have adopted the unbusiness-like policy of operating at a loss, which for the last 6 years has averaged about 20 percent. I must hasten to explain that, as a side effort, we publish the *Glossary of Entomology,* and part of the profits from this venture are used to subsidize the *Bulletin* deficit.

In former days, we gave 25 free reprints to each author, and we assumed part or all of the costs of special reproductions as well as special composition. These gratuities now are a thing of the past, and there seems to be no hope that they will be reintroduced.

3) *Overabundance of manuscripts.* It is strange, perhaps, to complain of an overabundance of manuscripts, but at times this seemingly healthy situation is a problem. It is discouraging to an author, particularly a young one, to be told that his paper cannot be scheduled for publication until some vague date about 18 months away. As a general policy, I have, in the past, discouraged authors from leaving their papers with me if I could not foresee likely publication within a year. This seems to be a humane act but one that an editor may regret at some later date.

4) *Scarcity of manuscripts.* Having too few manuscripts is really a serious matter for an editor. A year ago I was turning manuscripts away. In October, I suffered the greatest manuscript depression in my 6 years as editor and wondered whether I would have enough material for the second next *Bulletin.* In December, there was an overabundance of manuscripts.

Entomologists, although of divergent interests, are a closely knit group, and word that a journal is loaded with manuscripts or is rejecting manuscripts because of an oversupply soon gets around, then the famine sets in. Because of these experiences, I am lifting my sights a little and plan to work on a 2-years ahead basis.

5) *Selection of manuscripts.* Most of our contributors are professional entomologists or other workers who have attained stature in the field and are recognized as competent authors and present no problem in selection. A second group of contributors is made up of younger workers who are introduced to us by older workers who indicate that they consider the manuscripts being forwarded as worthy of publication. These usually present no problems, although exceptions crop up occasionally.

A third group of contributors is made up of individuals who appear out of the blue. Their offerings

are examined very critically, usually by authorities who serve as anonymous advisers to the editor. Approximately 10 percent of these are rejected. There still is another type of contributor to whom I shall refer to as the "eccentric," the individual who attacks the motives or character of another investigator. Manuscripts from this source present no serious problem, since they are rejected as being inconsistent with our editorial policy, but they are a nuisance, because time must be devoted to processing them.

6) *Technical editing problems.* Some manuscripts received are perfectly typed, punctuated, and arranged in the style of our journal and require a minimum of routine attention (20 percent). The remaining 80 percent range from nearly satisfactory documents to those that require complete overhauling and in rare cases retyping. In one instance, I received a manuscript that contained 25 compositional inconsistencies. I asked the author for permission to mark the copy so that corrections could be made by him. This permission was received and I returned the manuscript; in a few days, I received the following letter:

> On receiving your letter with the corrected copy of my manuscript, I was filled with mixed emotions. In the first place, in the sixty papers I have published, I never had one more marked. At first I was tempted to call back the plate and publish it elsewhere. However, on reading through the manuscript my opinion changed. Now my sympathies are with you. However, the entire situation has been a little embarassing. My son is in the process of taking a typing course, so he offered to type the article from my notes. He thought I would proof read it and I understood that he had proof read the material. Neither of us did proof read it.
>
> I am having the article retyped and I hope it will not require further editing. Thank you for your patience.

Illustrations for Scientific Publications

Ruth C. Christman

Interscience Publishers, New York

The author who is faced with the problem of illustrating his scientific or technical writings has a dual responsibility: he must select his material carefully so that illustrations and text complement each other, and he must prepare his illustrations in a form acceptable for reproduction. The first part of the task is important to both author and publisher, since in these days of mounting costs each illustration must be evaluated for its importance to the text. The other responsibility, that of preparing acceptable illustrative copy, may sometimes be passed to the publisher, but for the purposes of this discussion it is assumed that the author must submit copy ready for reproduction.

Before selecting or preparing illustrations, the author of either a paper in a journal or a book should familiarize himself with the requirements of the publisher, so that knowledge of such details as page size and the kind of paper to be used may be helpful in considering reductions and the quality of reproduction that is desired.

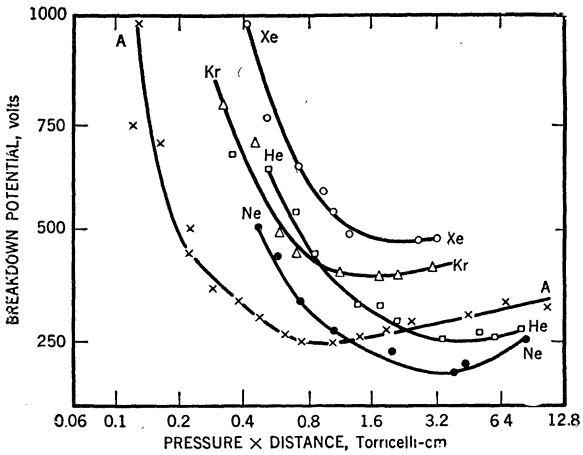

FIG. 1. A graph in which grid lines have been reduced to ticks to avoid confusion with curves. Symbols are well chosen and lettering is in proper proportion to the block. [Courtesy Interscience Publishers]

Of the two general groups of illustrations, halftones and line cuts, halftones are required when the material cannot be reproduced from lines but requires gradations of tone. Photographs form a large part of this group. Since halftones are more expensive than line cuts and require a better grade of paper in the printing process, the number of them is usually reduced to a minimum. Some authors are misled into believing that halftones that are acceptable photographically should be used to enhance the paper or book, even though they add little to the value of the text.

The value of a photograph to an understanding of the text should be considered carefully. Usually photographs are larger than the reproduction, and important details may be lost in reduction. Frequently illustrations of instruments or machines are so reduced in reproduction that the reader would be better served by a schematic or a flow diagram. When the required reproduction will result in a meaningless figure, it is sometimes possible to crop—that is, cut superfluous bordering portions from the photograph—so that the remaining featured part may be reduced less drastically.

If photomicrographs or electron micrographs are to be used, reduction problems must be considered carefully. Reduction in size may decrease magnification to a point that makes the illustration valueless. In addition, a finer screen and paper of better quality may be needed to produce satisfactory results. For these special problems, the advice of the publisher should be sought.

Halftone material submitted for reproduction should be handled carefully and be adequately protected against damage. Bending or cracking the surface will mar the reproduction. Pressure marks from pins,