

Water Resources Research: Past, Present, and Future

Editor's Note. This is the second in a series of guest editorials planned for the volume marking the end of the first 25 years of *Water Resources Research*. Stephen Burges is Professor of Civil Engineering at the University of Washington and was Editor of *Water Resources Research* from 1981 to 1984.

Water Resources Research was established as a multidisciplinary journal largely to satisfy needs perceived by a committee headed by the late Walter Langbein in 1962. The papers in volume 1, number 1, set the tone and high standard of scholarship for all subsequent issues; we are all in debt to the founding co-editors, Allen Kneese and Walter Langbein, for their leadership and vision. Most research workers consider this journal to be a highly desirable forum to share their ideas and findings with colleagues. What has served the community well for twenty-five years may or may not be the most appropriate medium as we enter the era of multimedia and multisensorial display of the information from which we distill our knowledge.

I have chosen to write briefly about eight issues related to the content of a modern journal and what it might become. I have not expanded upon any of these topics; I seek to stimulate thinking and hope that all readers will think carefully about them. With many thoughtful colleagues focusing on these and related issues, improvements in our science and means of communication are likely.

G. K. Batchelor (*Journal of Fluid Mechanics*, 109, 1-25, 1981) in his editorial "Preoccupations of a Journal Editor" reflected on the first twenty-five years of his journal. He raised many of the questions that all editors, journal contributors, and readers must try to answer continuously: Journal proliferation, apparent scope of a journal, the balance between theory and application, the imbalance of subject matter at different times, and the perceived need for a new journal as some new field develops. The unit known as the scientific paper is still an effective communication mechanism. Batchelor comments, "A paper which describes some useful development, in a way which enables a reader to understand it and see its implications and be pleased he has done so, does more than contribute significantly to the progress of science. . . . An author desperately wants his papers to be read and used and admired." WRR's editors are flexible, and the bulk of the papers are written in the spirit described by Batchelor.

I have some deeper concern that may be a little parochial and reflect developments in North America. Much of what is published reflects what is in vogue and is supported by limited research budgets. Long-term model development and associated data collection for a range of problems and fundamental areas of inquiry must also be nurtured. There is always a different set of questions to be posed and answered about processes that we thought were understood well. I do not know of any area that would not benefit from closer inquiry. The models and data of yesterday may be completely inappropriate for questions we face in the near future. The journal can and must be a focal point for

nurturing essential and often painstakingly slow fundamental inquiry.

Scholars who publish in WRR may hope to influence others. Policy makers who influence what research is to be funded are unlikely to read the journal. The journal will remain primarily a communications means for scientists and engineers. We must write as clearly and economically as possible. It is better to take the time needed to make many potential papers into few that are integrative and informative. The journal should remain largely an educational device as well as a long-term repository of the thinking of the day. The archival quality of the journal must be appreciated by contributors. There is little place for small increments that are largely progress reports. The professional artist displays only the best work; the amateur feels obligated to display almost everything that he or she has done.

How is the journal used? A small fraction of readers read each issue widely as soon or relatively soon after receiving it or seeing a copy in a library. A larger number read it topically and fail to benefit from its interdisciplinary nature. Some of those readers favor specialized journals, which I believe is the antithesis of progress. The bulk of the readers use it as an archival source and read it topically when starting a new area of inquiry.

In North America there is a distinction between engineers and scientists. There is much less of a distinction in older societies. Engineers tend to wait and write as completely about a particular problem as is possible because they have needed to develop and implement a solution to that problem. The pure scientist is less problem driven and can explore a major field of inquiry in varying levels of detail. The journal will need to continue to provide outlets for the best of both types of work. It is crucial, however, that the reader not confuse one for the other. This confusion has been one of the greatest shackles for inquiry in the broad field of hydrology, the most extensive of the Earth sciences.

Authors must have a clear idea of with whom they are communicating. Fortunately, few authors write to impress; those who do are often unsuccessful. Authors attempting to reach highly skilled professionals involved in high-level hydrological practice or colleagues in the related geosciences face a difficult challenge. The most useful material for these readers is the most demanding of all papers to write: the integrative review paper. There is a continuing need for review papers to unify research findings and direct the state of science and practice and to educate students at all levels as well as practicing professionals.

Is the journal suitably international? More than one quarter of the members of the current editorial board were not born in the United States, and four Associate Editors do not reside in North America. Developments in electronic data and information transmission have made it possible for the editors to draw directly on the talents of these scholars to broaden the international base of the journal. I applaud these developments and am grateful for the generous contributions of all who strive to maintain WRR as a premier journal.

I believe that magnificent opportunities to use new ways to record and display information are not far in the future. It is

Copyright 1990 by the American Geophysical Union.

Paper number 90WR00768.
0043-1397/90/90WR-00768\$02.00

in relatively recent years that journal images have been extended from two to three dimensions by printing stereo pair photographs routinely when three-dimensional structure needs to be displayed. Color images have been extremely costly to print but are necessary to display certain detailed information. These relatively primitive displays will give way eventually to three-dimensional and multimedia dynamic displays that are essential for scientific development and enhanced observational opportunities. An obvious candidate is inclusion of "moving film" in all its possible forms ranging from planar to three dimensional in space. We have in place already the printed page and microfiche media. It is

not a large technological leap to include a "moving film" version to augment our familiar printed form.

The foundations of the water sciences, policy, physical, chemical, and biological, have been strengthened by the existence of *Water Resources Research*. It is up to all of us to keep building on those foundations and maintain the quality and diversity of the journal. We all must work with AGU publications staff and editorial board members to ensure that the journal is the appropriate vehicle for communicating progress in water science and technology as many exciting multimedia and technological developments unfold.

STEPHEN J. BURGES