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THEME SECTION

Quality in science publishing

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Introduction

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The purpose of this Theme Section (TS) is to discuss various aspects of quality, and quality assurance, in science publishing. While we will each have our own views about exactly what this means, the editorial policy statement of the Council of Science Editors uses the following adjectives in reference to the quality of a scientific journal's content: accurate, valid, reliable, credible, authoritative, relevant to the journal's scope and mission, readable, and comprehensible. A standard dictionary definition of quality control is: '…a method of establishing and maintaining a high level of quality in a product or process through careful organizing, constant checking and painstaking corrections.' In this context, most of us would probably agree that the publisher, the editorial board, the reviewers and (not least) the authors are all involved in creating, defining, measuring and maintaining quality. Thus, we asked a cross-section of people with experience of one or more aspects of science publishing to present their views on the theme. The main points of consensus that emerge from the essays follow.

Most contributors identified the importance of good scientific writing. When a manuscript has not been well written by the author(s), thorough and professionally astute editing is a necessity. This requires great care to preserve the exactness of the text despite possibly significant revisions, restructuring, and/or deletion of what is unsuitable, superfluous and/or badly written. This task is shared by the reviewers of the manuscript's scientific content, and by copy editors. The former focus on what is, or is not, essential to the scientific story being told, and the latter on the clarity of the prose and the correctness of the grammar and syntax. This process takes time, but it is worth waiting for if the result is something that will be more easily read. This is the essence of *production quality*.

The fundamental importance of good scientific judgement in deciding a manuscript's fate was mentioned by all contributors. This crucial decision must be taken by a hands-on Editor who is an acknowledged authority in the subject area of any particular article, and who is a respected scientist capable and courageous enough to arbitrate openly and fairly when confronted with divergent views among authors and reviewers. The sheer number of manuscripts received by our discipline's most successful scholarly journals (over 700 per year at MEPS alone), and the wondrous breadth of their subject matter, makes this an extremely challenging task. The views expressed here suggest that the 'Subject Editors plus Editor-in-Chief' model is probably the best way of assuring *scientific quality*, as well as being more transparent and accountable than alternative models of editorial decision making. Authors themselves are best positioned to decide upon the most appropriate Subject Editor to handle the evaluation process. There should be a sufficient number of Subject Editors to cover the journal's scope: no more, lest they become idle and their title meaningless, and no less, to ensure that the workload is reasonably distributed and that they are only responsible for papers that fall within their own field of expertise. Subject Editors must be actively engaged in the review process, able to dissect the arguments of authors and reviewers alike and to provide guidance and leadership, and thus arrive at decisions that are transparent and well founded. Their decisions should still be open to appeal to an Editor-in-Chief, a person of recognised eminence and broad experience, and that decision would be final. The Editor-in-Chief, presumably in consultation with the rest of the Editorial Board, and the Publisher, would set a common Editorial policy and ensure that it is consistently applied. This system is not yet widely applied in marine science publishing, but it is the most common decision-making framework

*Contributors are presented in alphabetical order

for biomedical journals. MEPS itself operates under a model that has many of these elements.

While views on future prospects in electronic and 'open access' publishing differ, there is consensus on the continuing need for an effective peer review system, to control and enhance the quality of the published product and to help scientists identify articles that are worth reading. Electronic publishing has made it simple for scientists to instantaneously disseminate their work across the globe, but readers must be wary of work that has not been peer-reviewed prior to publication. Paradoxically, if scientists choose to publish their work on the internet, without submission to a recognized journal, they may never reach their intended audience if that audience prefers to scan tables of journal contents each month rather than sift through the results of internet searches that produce irreproducible (over time) results. Unquestionably, as a distribution medium, the internet is unrivalled. What we see in the essays that follow is that the process of quality enhancement through peer review, and the collection of related papers into journal form (whether in print or online), is still respected; any new technological development(s) in science publishing should serve rather than subvert this process.

We hope that readers find these essays thought provoking, and that this TS will increase our profession's resolve towards producing and maintaining the highest standard of quality in science publishing, at all definitional levels. We have thoroughly enjoyed putting it together and are grateful to the contributors for their thoughtful and eloquent essays. The content of these essays should also result in a broader and deeper recognition of the immense contribution made by the staff of Inter-Research, who all work conscientiously in tireless devotion to this journal. Finally, we thank 'The Professor', Otto Kinne, Editor and Publisher of *Marine Ecology Progress Series*, for encouraging us to develop this TS and for his unparalleled role in modern marine science.

Between the Scylla of hidebound conservatism and the Charybdis of mindless speculation

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The 'quality' of a scientific publication is not an absolute but must be assessed in relation to a journal's mission. It should be judged primarily by its disciplined intellectual rigor, bearing in mind what course the publication aims to take, as between the Scylla of hidebound conservatism and the Charybdis of mindless speculation.

One commonly applied measure of the 'quality' of a periodical, perhaps most overtly in the social sciences, is its rejection rate: the higher that rate, the higher the presumed quality. In the natural sciences, a somewhat similar criterion is invoked, perhaps less overtly and certainly less quantitatively, when kudos comes for being published in journals 'hard to get into', such as *Nature* or *Science* or the *Journal of the American Chemical Society*. But consider the professed, or implicitly taken-for-granted, aim of these 'top' journals. Actually, there are 2 aims: that what gets published should be ground breaking; and that what gets published should not be in error. But it seems not to be commonly understood that these aims are incompatible. The first implies a willingness to be often wrong, at least to some degree, because it is always difficult to judge the validity of something that is without precedent. On the other hand, the second places high barriers in the way of anything so novel as to call into question ideas that have hitherto been widely accepted. Between these 2 incompatible aims, no journal can avoid making its own choice, at least implicitly, in which direction to lean. The judgment of a journal's quality should then be based upon how well it performs its chosen task, not according to whether one agrees or differs with the journal's aim of emphasizing novelty over reliability or vice versa.

The history of science offers ample illustrations that the time needs to be ripe for any given advance to be accepted by the conventional wisdom of the mainstream community. Truly novel scientific claims are at first typically resisted, even though some of them later turn out to be genuine advances. Some such claims have been highly premature, that is to say decades ahead of their contemporary *Zeitgeist*, for instance Wegener's continental drift or Mendel's laws of heredity (Barber 1961, Bauer 2001, Hook 2002). Novel claims may have to do with data or facts; or with new means for obtaining data; or with some new way of looking at the data. Normal progress in science involves the accumulation of information in the absence of startlingly novel claims: most scientific work adds detail without upsetting the existing body of data, methods, and theories (Kuhn 1970). Scientific revolutions involve something strikingly contrarian in at least one of those 3 aspects (Bauer 2001).

History teaches that much of what we publish will turn out to be flawed in some way. Given that we cannot always be right, the journal I edit is deliberately open to far-ranging claims, willing to be often wrong in order to grant a hearing to topics of which only a few are likely to