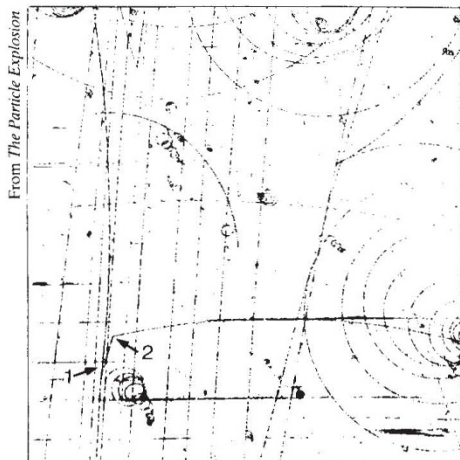


divided into easily digestible chapters, almost complete in themselves, which deal, alternately, with the physics of the particles and with the increasingly large and complex tools, particle accelerators and detector assemblies, necessary to study them.

Good though the writing is, the pictures make the book. Where did the almost surrealist photograph of a direction-sign for a fall-out shelter, standing desolate in the Utah desert, come from? Blips on an oscilloscope trace signalled the first detection of the 'undetectable' neutrino by Reines and Cowan; kinks in cloud-chamber tracks revealed to Rochester and Butler the existence of new out-of-the-ordinary,



From *The Particle Explosion*

Historic track — the first picture to show the production (1) and decay (2) of an omega-minus particle, taken at the Brookhaven National Laboratory in the early 1960s. Discovery of the omega-minus led quickly to the quark theory of matter.

hence 'strange', forms of matter. The prize pictures, justifying the adjective 'explosive', must however be those of the most violent man-made collisions — recreating conditions which have not existed since the Universe was 10^{-9} s old — in which W and Z bosons were transiently observed, so confirming the union of the electromagnetic and weak forces. Missing, however, is the lone electron straggling through the dark vault of the Gargamelle bubble-chamber at CERN which was the first direct sign of this major synthesis. The surprise of its absence measures the completeness of this pictorial feast.

Many people will enjoy this attractive, reasonably priced volume and its story of the technical achievements which have brought the denizens of the sub-atomic world into view. Novel concepts such as quarks, leptons and gauge bosons will eventually become, like the atom is today, part of the commonly accepted picture of the natural world. Books such as this will help to speed the process. □

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Policing the paper chase

Stephen Lock

An Insider's Guide for Medical Authors & Editors. By Peter Morgan. *ISI Press, Philadelphia/STM Distribution, Ashford, Middlesex: 1986. Pp. 111. Hbk \$23.95, £20.50; pbk \$14.95, £13.*

LIKE it or not, the scientific editor's role has changed. Once concerned mostly with house style and peer review, and balancing the competing elements in his journal, he has now had other preoccupations thrust upon him: duplicate publication; piracy, plagiarism and forgery; and hidden commercial interests. Examples of transgressions occur in many issues of *Nature* or *Science*, but let me cite two recent problems encountered personally.

In the first, one author was found to be submitting over 20 articles a year to the *British Medical Journal* alone; a literature search showed that he and his team were publishing double that number altogether. (Solution: a tactful check that the data weren't invented, followed by a letter pointing to the heavy costs of manuscript processing — about £50 in our case — and suggesting that weightier papers rather than those based on the least publishable units might be more successful.)

Secondly, a couple of junior investigators asked for advice when a professor in another department added his name to three articles reporting work which he had had nothing to do with. (Solution: follow the American practice of involving the dean and the overall head of the division.)

Clearly we need a guide to the new "journalology", a term some editors in the United States are now using with only just a hint of tongues in their cheeks, and Peter Morgan, editor of the *Canadian Medical Association Journal*, has set out to give us the first of its kind. His *Insider's Guide* does not neglect the traditional advice and detailed methods for better scientific writing: to base original articles on the IMRAD structure (introduction, methods, results and discussion) while making them readable by following the style books, such as Fowler or Strunk, and cutting out abbreviations and jargon. But, with his epidemiological background, Morgan stresses that, whereas in the early twentieth century William Osler could make his name with over 1,400 articles, most of them single-case reports, today's emphasis has shifted to the testing of hypotheses. Inevitably many of these articles are flawed, and no amount of stylistic tinkering can repair them because the studies they report were misconceived from the start. They have committed the seven deadly sins — insufficient informa-

tion, biased or inadequate samples, confounding factors, vague endpoints, straying from the hypotheses and poor control of numbers.

Hence much of the thrust of Morgan's book is on numeracy — the presentation in tables and figures of data that examine the hypotheses and analysis of the data for statistical significance. Scientists in other disciplines may be surprised at the need for such emphasis in medicine, but in a subject that still contains as much art as science many teachers still do not accept this need and journals abound with examples of poorly conducted trials. If, then, in the 1960s and 1970s one of the main preoccupations of medical editors was with the ethics of human and animal experimentation, that in the 1980s and 1990s is likely to be with statistical rigour. For this, they will find Morgan a trusty guide, though I remain unconvinced that his use of folksy anecdotes, such as Drs Relso, Nojarg and Terse discussing randomized clinical trials in a court house, is any better for explaining the type II ("false-negative") error than a straight account.

Medicine, however, can claim one success: it is the first discipline in which journal editors have collaborated to formulate proposals for uniform style. Widely accepted, these Vancouver guidelines must have saved authors (and their secretaries) hundreds of hours. The International Committee has produced guidelines on reference style, duplicate publication and criteria for authorship, while it is discussing proposals for retraction of fraud or erroneous comment. Would that others would copy. For without being snide, it has to be said that our two principal general science journals do their readers a disservice by failing to give the full bibliographical details in the references. On average, only six or so more lines are needed per article and the gain in rigour, accuracy and usefulness is immense.

It is no accident that many of the scandals about shady work (whether forged or plagiarized) have occurred in medicine. The stakes are high — a single article in the *New England Journal of Medicine* can have immediate repercussions on the New York Stock Exchange, for there are fortunes to be made with a better drug for hypertension or rheumatoid arthritis. And, while appointments committees continue to assign merit on the weight of articles in a curriculum vitae, rather than to read a selected few for quality, the publish or perish syndrome is unlikely to go away. Perhaps the often-ridiculed proposal of allowing any scientist to publish only five articles a year (or even 50 in a lifetime) was not such a bad one after all. □

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