

It must be true – I read it in the paper!

Tooth whitening kits can
be bad for your health

Echinacea
'halves the risk of
catching colds'

Low-energy light bulbs
'can trigger epilepsy'

'Mile-wide UFO' spotted
by British airline pilot

How having a twin brother
can leave a girl single

A couch potato's dream...
thought-activated television

The insulin pill that could mean
no more injections for diabetics

Right: a selection
of headlines which
appeared in the **Daily
Mail** during just one
week in June 2007

*Our newspapers, magazines and TV programmes are full of stories based on science and technology. But can we trust what the papers say? This article looks at the way in which scientists try to ensure that their own publications are reliable. It makes use of a system called **peer review**.*

How can you read articles like these and assess whether the report is to be trusted? What should you look for?

Start by scanning the article to find the source of the journalist's information. It might say, for example:

'Work by Cambridge University biologists published in this week's issue of *Nature*...'

This gives you an idea of who did the work and where it is to be published (*Nature* is a prestigious scientific journal). In principle, you could search out a copy of *Nature* and read the original article for yourself.

On the other hand, an article might say:

'Scientists working for a Japanese electronics firm predict that they will soon ...'

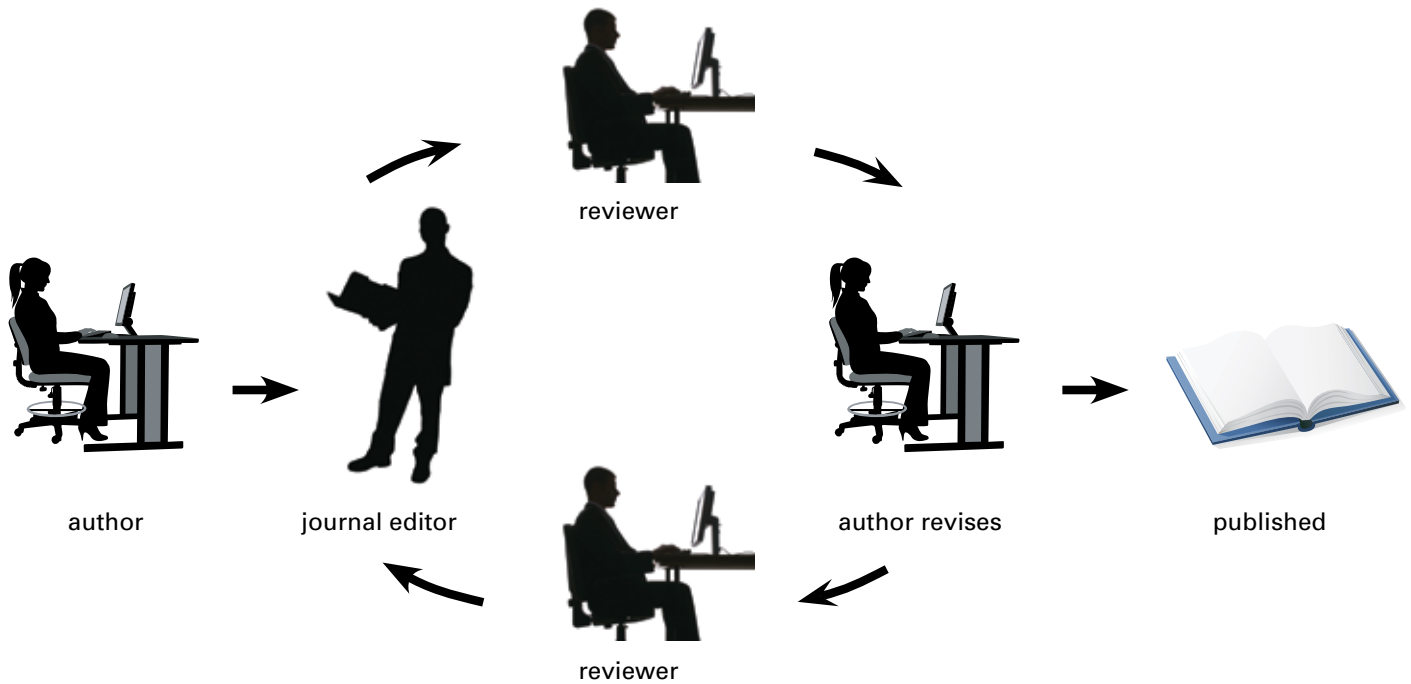
There is not enough information here to track down a specific group of scientists or to find their published work. It is more likely that the article is based on a press-release from a commercial firm, eager to suggest that they will soon have new products to sell.

Box 1 Scientific journals

There are thousands of peer-reviewed journals, not all of them scientific. About one million scientific papers are published each year worldwide. Some journals never appear in print; they are only available electronically, on the internet.



Nature is one of the leading scientific journals.



Quality control

A **scientific paper**, published in a scientific journal, is the standard way in which scientists communicate their findings. Without a published paper, a piece of research is almost worthless because it is not available to the rest of the scientific community.

When a piece of work is finished, members of the team draft a paper describing what they have done and what they have found out. They then submit their draft to the editor of a journal. Now the process of **peer review** can begin.

The editor is likely to know many scientists working in the field. These people are the peers (or equals) of the paper's authors. The editor selects two or three with relevant experience and sends them the draft paper for review. The reviewers are unpaid, and they remain anonymous. They judge the paper, and send back suggestions to the editor.

- Is the paper **valid**? (Are the conclusions based on good methods and is the data reliable?)
- Is the paper **significant**? (The paper must make a useful addition to the existing body of scientific knowledge.)
- Is the paper **original**? (Or has someone else already done the same work?)

It is rare for a draft paper to be accepted exactly as it was submitted. Usually, reviewers suggest alterations, or even some extra work, to be done before the paper can be accepted for publication. Occasionally, a paper is flatly rejected.

It may seem alarming to have to go through the process of peer review each time a paper is to be published, but most scientists value it because it confirms the value of their work. For scientists reading the published paper, it gives confidence that the work has been properly scrutinised.

Box 2 Go-it-alone scientists

Occasionally, scientists prefer to present their findings in a different way. In 1989, two scientists, Stanley Pons and Martin Fleischmann, announced that they had discovered a new technique for releasing energy from hydrogen. They called it 'cold fusion', and suggested that it might become a cheap, clean way of generating electricity. However, they didn't publish their results in a refereed journal; instead, they held a press conference in front of TV cameras.

Most scientists working in the field reject Pons and Fleischmann's work. However, there are still people developing the work, and cold fusion may yet turn out to be a genuine phenomenon, accepted by the rest of the scientific community.



Pons (right) and Fleischmann, at work in their lab in 1993.

www.scirus.com

This specialist science search engine allows scientists to search existing published journals on-line. Go to the site and put in search words related to the article on wave power (pages 1-3): *Joao Cruz wave power* – you will find a link to one of Joao Cruz's published papers.