

However, it is not true that “ancient throat-and-girth harnesses choked the animal”. This mistake was first made in the 1920s by Richard Lefebvre des Noëttes. His theory that slavery stemmed from the inability of the ancients to use animal power efficiently was very popular in his day. It lingers on in popular literature, although it has long been disproved: as Jean Spruytte showed in the 1970s, there were several ways of harnessing horses in antiquity, none of them choking the animals, and there is no connection between animal harnessing and slavery. (See, for example, Spruytte’s *Early Harness Systems*, J. A. Allen, London, 1982.) Lefebvre des Noëttes had two different harnessing techniques mixed together in his mind. So Smil is right that the horse-collar was an improvement, but only an improvement on an existing technique.

Second, as far as one can tell, ancient and medieval horses were very small, often barely the size of present-day ponies. There is no incontrovertible evidence of the breeding of “heavy war animals needed to carry armoured knights” that has so often been supposed. In medieval times, large horses were a rare luxury. We lack the data on horse size to know what happened before the eighteenth century, so we cannot know whether armoured knights did ride big horses.

My last point concerns ploughs. The replacement of wood by iron and steel obviously allowed many improvements in the general structure and design of ploughs. But the case of mould-boards is special. The idea that “iron mould-boards only crossed from China to Europe in the seventeenth century” is speculative. There is no evidence of metallic mould-boards coming from China to Europe in time to be used as models by European makers of ploughs. (Chinese mould-boards, incidentally, were made of an alloy, cast iron, rather than of plain iron.) In Europe, wooden mould-boards were simply covered by more and more iron sheets to protect against wear. In some regions, wooden mould-boards were made with a curve from late medieval times.

Finally, wooden mould-boards had their own advantages. In the Gâtinais, north of Orléans, for example, arable soils are quite clayey and stick to iron mould-boards, whereas wooden mould-boards get soaked on their surface, forming a lubricating film of water that prevents the earth from sticking to it. Hence wooden mould-boards were used in this area even when ploughs were made completely of iron, up until the era of the tractor.

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... so animals could pull their weight, and more

Sir — Vaclav Smil’s Millennium Essay “Horse power” presents a good overview of the important role of draught horses in agricultural production in North America during the last century¹. Some points worth adding are that mules were another key source of draught power on many farms², and that the larger draught-horse breeds are, during brief exertions, capable of developing even more than the three horsepower Smil mentions.

Records of draught-horse championship pulling trials in the United States show that a team of two animals could develop 30 horsepower when pulling loads over a set distance³. Similar performances have been recorded for teams in Europe and elsewhere. Average working performance for one horse is 0.75 to 1.0 horsepower⁴.

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2. Leaflet 225 “Quick Reference Map of Horses and Mules by States” (Horse and Mule Association of America, Chicago, 1936).
3. Collins, E. V. & Caine, A. B. *Testing Draft Horses* (Iowa Experiment Station Bulletin 240, Ames, 1926).
4. Goe, M. R. & McDowell, R. E. *Animal Traction: Guidelines for Utilization* (Cornell International Agriculture Mimeograph 81, Ithaca, NY, 1980).

Fraud: retracted articles are still being cited

Sir — Much heat continues to be generated by the topic of scientific fraud. In the United States, the Office for Research Integrity identifies papers in the biomedical sciences declared to be fraudulent after an official inquiry (<http://ori.dhhs.gov>) and publishes their bibliographic data.

In addition, papers are often retracted from journals after publication for other reasons. But are these data being generally disseminated?

There are some grounds for pessimism. Kochan and Budd¹, for example, showed that retracted papers by John Darsee continued to be positively cited even though a considerable amount of time had passed since retraction, and even though the case generated much publicity. Pfeifer and Snodgrass² recorded citations to 82 completely retracted articles and found that, although retraction reduces subsequent citation compared with a control group, retracted papers were often cited to support claims. Finally, Budd *et al.*³, using Medline to identify articles retracted between 1966 and 1997, found

that many retracted articles were still being cited as valid.

It seems, therefore, that in at least some cases, authors are not aware of retractions.

A systematic screening method is required to prevent the citation of fraudulent or retracted papers. This could be done for some disciplines via databases such as Medline (which can be searched for retracted publications), but would not cover all fields of research.

Another approach would be for an organization, for example a scientific publishers’ group, to run a web-based database of retracted and/or fraudulent papers covering all fields of research. Authors could then search this database before submitting their papers for publication. This search could be a requirement for submission of the paper to a journal.

Such a database could also help people to avoid doing new research based on useless claims in the literature.

How such a venture would be funded, and how it would work in practice, are the next questions to address.

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3. Budd, J. M., Sievert, M. E. & Schultz, T. R. *J. Am. Med. Assoc.* **280**, 296–297 (1998).

The Editor replies — *Nature* requires authors to have performed appropriate checks before submission to ensure the validity of references cited as far as is possible. *Nature* also has a policy of publishing retractions and corrections. These are linked to and from the relevant paper on the *Nature* website.

Award organizers should have noted the paper

Sir — In the News story “Ig Nobel glory for levitating frogs and collapsing toilets” (*Nature* **407**, 665; 2000), my name, listed as one of the co-winners of the Ig Nobel psychology prize for the paper “Unskilled and unaware of it: How difficulties in recognizing one’s own incompetence leads to inflated self-assessments”, was misspelt — as it is on the Ig Nobel website. It is Kruger, not Kreuger.

This accident is hardly surprising, however, in light of our topic. It can be very difficult to spot one’s own mistakes.

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