

not touch other aspects of intellectual life. They correlate with each other, therefore, because they all measure the same limited thing.

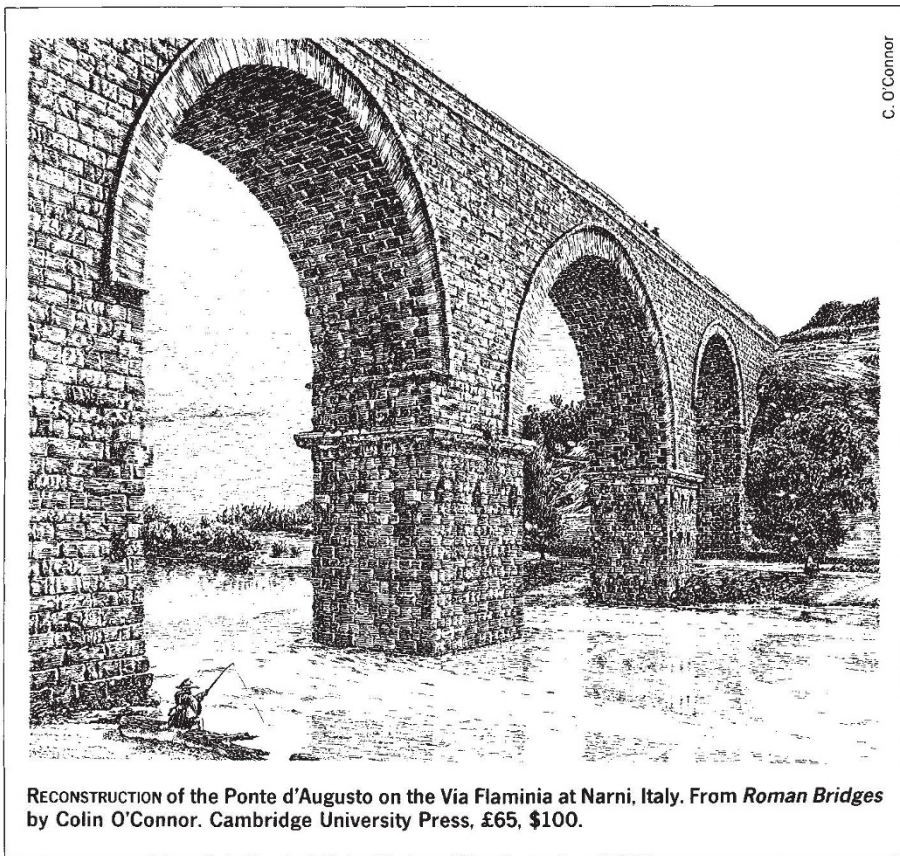
He then gives an account of some more wide-ranging tests that he has developed to measure the seven intelligences. He reports that preliminary data suggest that these measures are indeed independent in that for the most part they do not correlate with each other. But the data, only sketchily described in this book, are indeed very preliminary. They come from no more than a handful of children, far too few for proper research on any psychological measuring instrument. As Gardner himself says: "Because of the small sample that received the Spectrum battery, the study should be regarded as generating hypotheses rather than as conclusive in any sense" (p.105).

Another problem is that we do not yet know whether these tests are genuinely measures of intelligence, because Gardner's research team has not so far shown how well the tests predict children's achievements outside the testing situation. "We do not know yet whether a Spectrum assessment can predict scholastic success with the reliability of standard forms of assessment" (p.106).

The other main theme of this new book is the relevance of the theory of multiple intelligences to education. The claim that Gardner makes is a simple one: "To the extent that there are electives, it is pertinent for students to know their own proclivities" (p.73). If children are to specialize at school, he argues, they need the help of professionals: they need an "assessment specialist" who will talk to a "curriculum broker" and together they will decide the most appropriate set of lessons for each child. But the strength of Gardner's arguments about the management of specialization in schools depends in the end on the success or failure of his ambitious and still unproved theory about multiple intelligences. We need many more data before we can accept these new ideas.

In the meantime some of the observations in this new book are particularly acute and make it worth reading. I liked Gardner's account of children's conceptions of a different school subjects. "In science," one child told him, "you learn about nature: in English they are teaching about how to talk properly, like 'I learned about frogs today: ain't that nice?' — that's not good English, but it's okay to say in science" (p.126). Here at any rate is a youngster who, like Howard Gardner, believes in the independence of different intellectual activities. □

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C. O'Connor

RECONSTRUCTION of the Ponte d'Augusto on the Via Flaminia at Narni, Italy. From *Roman Bridges* by Colin O'Connor. Cambridge University Press, £65, \$100.

## Fossils through time

Bob Savage

**The Fossil Record 2.** Edited by M. J. Benton. *Chapman & Hall*: 1993. Pp. 845. £95.00. \$149.95.

WHEN Linnaeus published *Systema Naturae* (1758), wherein all known species of plant, animal and mineral are given binomial Latin names, he included Petrifications. He named some 40 fossils, most of them molluscs; in contrast, he named more than 12,000 living species. Today, about 100,000 palaeospecies are known over a span exceeding three billion years, yet many gaps remain. So many data have accumulated that in 1965 a committee of the Geological Society of London decided to review the fossil record, with particular reference to the ranges of taxa. It is that work which is now superseded by *The Fossil Record 2*.

The taxonomic unit chosen to record fossils by first and last appearances is the family. Its status may not equate across all phyla, but it is a sound choice because genera are too numerous and orders are too long-ranging. Over 7,000 families are listed, more than double the number in the first edition. This is due partly to new research, but also to fine tuning (many orders were undivided in the first edition). The ranges are mostly resolved to strati-

graphic stages (stage durations average 5 million years). Only marine stages are listed and no equivalents are given for terrestrial taxa. Each chapter has a bibliography, and the index lists taxa only under vernacular names, which do not appear elsewhere. Charts plot the time ranges of each family and, wisely, no attempt is made to interpret phylogenetic relationships. Fossils in all phyla are recorded, together with Monera, Fungi, 'Algae', Problematica and Miscellanea.

The editor and authors of this massive database are to be congratulated on a very substantial achievement. Its strong points are the comprehensive coverage, the up-to-date accurately recorded data and consistency in use of family units and stratigraphic stages. The first edition concluded with histograms of turnover rates. Modern computer programs can generate highly sophisticated analyses, and it is for such ends that the immense labour of producing the tome is convincingly justified. Research on rates of evolution and extinction can now be fuelled by this great compilation. The authors' labours will not have been in vain. □

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