national symposium on arthropod phylogeny held in London in 1996. It covers a wide spectrum of issues: from comparative morphology and palaeontology to molecular comparisons and a range of technical approaches, from 'total evidence' to puristic cladism. Most authors put their contributions in a broader context, and the book contains many well-argued and thoughtful passages.

Although the symposium was meant to work towards a consensus, *Arthropod Relationships* is more a display of the disparity of thought that still exists at all levels. Yet by bringing these opinions together, one can see common ground emerging, or at least identify the problems that have led to the debates.

For example, the chapter by Geoffrey Fryer in defence of the polyphyly of arthropods may be the last written on this issue, since the credible arguments for polyphyly are quickly disappearing. Also, the strong disagreements among comparative morphologists often appear to be due to poor accessibility to the primary data, which should change with increasing use of the Internet. In fact, the editors have already taken a step in this direction and have prepared a website (now available via the Systematics Association at http://www.earthsci.gla.ac.uk/palaeo/systass/arthro.html) at which the data for some chapters are available. Finally, the almost unanimous opinion on the "… unreliability of molecular phylogenies …" that is voiced by most contributors seems already to be a thing of the past, because statistical problems are being identified and solved.

Although this book is part of a long series of treatises on arthropod phylogeny, it may mark a historical transition. It could be the last volume in which a disparity of opinions abounds and the first step towards a reunification of concepts. For practitioners in the field this will be an important book and should find its way onto their bookshelves, in spite of its daunting price. □

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Remembering Big Blue and his kin

A History Of Modern Computing
by Paul E. Ceruzzi
MIT Press: 1998. 338 pp. $53.95, £24.95

Rupert Goodwins

The computer as we know it is barely 50 years old, but it already has a rich and varied history. In writing *A History of Modern Computing*, Paul Ceruzzi, curator of the US National Air and Space Museum, is one of the first professional historians to look back past the feeding frenzy of the present decade and describe how we got here.

A better title would have been "A History of Big Old American Computers", and as a sourcebook of the years between 1945 and 1980 it is a useful collation of who did what, how much it cost and what happened in consequence.

In the beginning, as Ceruzzi states, the computer was a mathematical marvel and not much more. Its use in defence and research dominated the very early days, and continued to be important until the 1970s by stimulating research into semiconductors. Ceruzzi is strongest in his description of how the commercial world first came to computing. It's easy these days to forget how the omnipresence of IBM's Big Blue once had all the significance of ancient Rome's imperial purple, but this book charts the growth and the consequences of IBM's overweening inertia in some detail.

The coverage of the current state of computing is brief and not always accurate — to correct a few errors, it is worth stating that IBM did not integrate the display system into the motherboard of the original PC; Intel's processors were not particularly ill-suited to networking; and to say that the World Wide Web got off to a slow start is to completely miss the nature of the exponential graph that consistently describes so many aspects of modern computing. Also, there is no mention of the Intel 386 architecture (let alone the Pentium), a breathtaking oversight.

Perhaps these criticisms are not entirely fair: this is a history book and, as Ceruzzi himself says, it is still too early to write the history of the past ten years. He covers the complex interaction between software and hardware development — and, of course, Bill Gates's role in changing that balance for good. But those seeking technological insights will find the book best used as a gloss, a guide to where to look next.

For those whose life and work have involved computing before the microprocessor, *A History of Modern Computing* will be a readable and fascinating memento. It brings together much of importance, and much that would otherwise be forgotten. Yet it fails to demonstrate how the history of computing has set the context for our current experience, surely a prime curatorial concern. I am glad the book has been written, but much remains to be said. □

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More on computing
Introduction to Quantum Computers
by Gennady P. Berman, Gary D. Doolen, Ronnie Mannieri and Vladimir I. Tsifrinovich
World Scientific: 1998. $32, £23
The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places
by Byron Reeves and Clifford Nass
Cambridge University Press:1998. 323 pp. £10.95. Now available in paperback.

Them bones

La Sierra de Atapuerca is Europe's most important archaeological site for human prehistory, with almost a million years of life represented in the various remains found there (see above). One of the world's most complete and best-preserved hominid skulls was found in Atapuerca's 'Pit of Bones'. Other hominid fossils from the site date from over 780,000 years ago — pushing back the date of the earliest Europeans by 300,000 years. In addition, it is claimed that these remains provide the first evidence of human cannibalism. *Atapuerca: Un millón de años de historia* (Editorial Complutense, 3,990 ptas) by José Cervera, Juan Luis Arsuaga, José María Bermúdez de Castro and Eudald Carbonell, describes the site, its history and the methods used to discover its secrets.