"Uncle Sam Doesn't Want You!", is one of the book's funniest.)

My favourite anecdote, however — it's vintage Feynman — concerns a joke his friends once tried to play on him. In Japan Feynman had learned some Japanese, and in Portugal he gave lectures in Portuguese. At a party someone thought it would be amusing to see how this "man of a thousand tongues" would react if a Caucasian lady, who grew up in China, greeted him in Chinese. "Ai, choong, ngong jia!" she said with a bow. Taken aback, Feynman swiftly decided the best thing to do was imitate the sounds she made. "Ah, ching, jong jien!" he replied, returning the bow. "Oh, my God!" the lady exclaimed. "I knew this would happen. I speak Mandarin and he speaks Cantonese!"

From childhood on, anything mysterious or puzzling instantly aroused Feynman's curiosity. Growing up in Long Island, New York, he taught himself how radios work and he became the neighbourhood's youngest radio repair man. He invented ingenious experiments with ants to work out how their brains were programmed. Intrigued by hypnotism, he allowed himself to be hypnotized. To experience out-of-body hallucinations, he floated in a sensory deprivation tank. Always, wherever he was or whatever he did, the wheels in Feynman's brain never stopped whirring. Every experience posed new challenging questions. What goes on here? Why does this work? Can it be done better? The best example echoes Newton and the apple (no, that story isn't a myth). Feynman once watched someone toss a plate in the air and noticed that its wobble went around faster than the plate. It started a train of thought that eventually led to the Feynman diagrams for particle interactions and to the work that won the Nobel award.

The book swarms with delightful glimpses of the famous: Einstein, Bohr, Wheeler, Wigner, Oppenheimer, Teller, Pauli, Compton, Fermi, Gell-Mann and many others. (It is said that the California Institute of Technology, where Feynman has taught since 1950, hired Murray Gell-Mann so Feynman would have someone to talk to.) And it was, apparently, a casual remark of one of them, John von Neumann, that gave Feynman a sense of political detachment that he claims has kept him happy ever since. You don't have to feel responsible, the great mathematician told him, for the state of the world. Not for its social and political insanities, perhaps, but trying to understand how nature works on her deepest level is a responsibility — perhaps pleasure is a better word for what Feynman feels — that he surely has not taken lightly. □

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Global matters

David R. Rosseinsky

The Cambridge Guide to the Material World.

By Rodney Cotterill.

Cambridge University Press: 1985.

Pp.352. £17.50, \$34.50.

"We are living in a material world" is the burden of a current popular song, and this inviting tome comprehensively portrays its component materials. While — despite the title — not exactly instruction against excessive monasticism (nor yet a coffee-table book, despite the large and colourful jacket) it possibly does have a message underlying its non-mathematical account of materials. Some are materials as in materials science, that is to say mainly solids (metals, polymers, ceramics and the like, together with the new organic superconductors and kindred exotica) but also included are nucleic acids, cells, living systems and their operation. More than a third of the book is devoted to biological materials, metabolism, nerve and brain operation and so on. Perhaps the philosophical drift of this mechanistic outline lies in the concluding sentence — "The nature of the mind remains a mystery". And thereby may the title be nicely justified.

The level of exposition is a mature one, even though for example the concept of potential energy itself has to be established in terms of uphill and downhill travel. Description of nuclear and atomic structures leads on to the complexity of, for instance,

the superconductivity mechanism. Experiment is included insofar as it aids the continuity of description. Lively historical exposition is often followed, and individuals are named at a pleasing narrative pace. And there are many fine illustrations, often in colour.

All is not quite perfect, however: we could do without the entropy death of the Universe (yet again), and on the atomic scale some aspects are just wrong rather than oversimplified. Thus p orbitals are not appropriately represented, the hydrogen bond and electron affinity suffer in verbal compression, the invention of the T-jump rate measurement is wrongly ascribed and so on. It is a measure of the book's overall strength, however, that the description of materials, which is the author's *métier*, survives such shortfalls in the physics and chemistry at the beginning.

What will be the readership of such a book? Certainly established physical scientists will benefit (and perhaps feel smart at spotting the occasional slip). But *all* enquiring amateur or professional scientists and technologists of whatever origin or age should enjoy it, and possibly the eye-catching jacket will fulfil the role of the Venus fly-trap depicted there. The price is such as to encourage private investment, and who knows, even as a coffee-table book it could do good by stealth. In Britain the invaluable campaign for "Women into Science and Engineering" goes under the acronym WISE, and for a WISE education, no Material Girl (of the pop song) should be without a copy. □

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Visual distraction — Maurits Escher's "Prentententoonstelling", reproduced from the chapter on crystal defects in *The Cambridge Guide to the Material World*.