from isotropy continues vigorously at present, and one anticipates that such blemishes are inevitable in our observed Universe, given the degree of large-scale structure and galaxy formation activity. Nevertheless, the physicist's search for perfection can be indulged by retrodicting the observed Universe back to the first microseconds after the Big Bang. Then the energies reached rival those attainable in the largest particle accelerators, and we can begin to probe the fundamental nature of matter. At still earlier instants, we can study interactions that require vastly higher energies to be initiated. The ultimate symmetry between the fundamental forces is attainable when electromagnetic, weak and strong nuclear forces merge at similar strength at a temperature of roughly 10^{28} K.

The second part of *The Early Universe* provides a detailed exposition of the particle physics underlying the standard cosmological model. Börner delves into supersymmetry and grand unification schemes, affectionately labelled SUSY GUTS, and discusses exotic topics such as strings and superstrings. There are three principal legacies from these very early epochs. Relic particles provide a potential source of dark matter. The breaking of grand unification can lead to the observed baryon asymmetry of the Universe, as well as generation of an inflationary epoch of expansion. The inflationary period is characterized by an exponential expansion rate during the transition period of symmetry breaking, which provides an effective energy source, and helps account for the observed uniformity and spatial flatness of the Universe.

Inflation also provides a source of density fluctuations, through amplified quantum noise, that is responsible for the large-scale structures we observe. Galaxies and galaxy clusters form by the process of gravitational instability, which requires the presence of initial seed fluctuations of a specific amplitude. The third section of the book provides a topical account of the theory of large-scale structure formation. Linear theory is described, and the reader is initiated into the mysteries of cold and hot dark matter. Numerical simulations provide the final gloss to galaxy formation theory. One has to be constantly aware that the final outcome, no matter how closely it may resemble the observed Universe, is no more believable than the initial conditions that went into the initial value problem that we colourfully describe as the Big Bang. Until we find a theory of quantum cosmology that specifies the initial amplitude and spectrum of the primordial density fluctuations, we should remain reasonably sceptical about schemes for cosmic evolution. □

Joseph Silk is a Professor in the Department of Astronomy, University of California, Berkeley, California 94720, USA.

Time to turn to Marje?

R. N. Thompson

Igneous Petrogenesis. By M. Wilson. Unwin Hyman: 1989. Pp. 466. Hbk £50, \$100; pbk £24.95, \$39.95.

RESEARCH on the genesis of igneous rocks has produced a substantial flow of papers and a goodly crop of robust differences of opinion and interpretation. Both are hallmarks of active science. But for more than a decade nobody has settled down and made a really satisfactory attempt to distil the new material into a book, so that newcomers to the subject may find out what it is all about without drowning in a sea of undigested journal articles. Indeed, John Maddox was moved a while ago to make cross noises about part of the problem — the obscure private language of isotope geochemistry in *Nature*.

Marjorie Wilson has come to the rescue with a challenging book which looks at igneous petrogenesis from both physical and chemical viewpoints. Her own research field is predominantly geochemistry, and it is these aspects of her text which tend to be the more detailed and incisive. The first third of the book is a group of introductory chapters which set out the principles of the

subject clearly and include a satisfactory response to Maddox's complaint. The remainder deals with magmatism associated with the main terrestrial tectonic regimes, using the same format in each case: tectonic and geophysical setting, petrography, elemental and isotopic chemistry, petrogenesis. The result is extremely satisfactory because the reader can quickly flip from chapter to chapter in order to compare some specific aspect of magmas worldwide.

Nevertheless, it would be wrong to leave potential buyers thinking that they can throw away the rest of their libraries on this subject. Wilson has covered reams of controversial material within a book of reasonable length by simply ignoring all manner of hypotheses that are not to her taste. Her most spectacular omission is all mention of the predominant hypothesis (looking at the subject worldwide) for the genesis of granitic and associated rocks — the largest plutonic igneous rock group. This book should carry a health warning for any hypertensive geochemists who have spent their scientific lives considering that some, if not all, granites (*sensu lato*) originate by continental crustal melting during regional metamorphism. They will find that both their data and their ideas are absent. □

R. N. Thompson is a Professor in the Department of Geological Sciences, Science Laboratories, South Road, Durham DH1 3LE, UK.

JOINT LECTURE

(on the theme of the presentation of science through literature)

Translation or transformation?: the relations of literature and science

By Gillian Beer

(Reader in Literature and Narrative, and Professor Elect of English (1966) in the University of Cambridge)

Vigorous interchange of ideas and concerns between scientific and literary communities should not lead us to expect through-going and sustained congruity. Ideas rarely remain intact when they change generic context and their reception outside the immediate circle of co-workers may raise previously excluded questions. Changes of form as well as of semantics shape meaning. Scientific methods and ideas are often at their most powerful in literary works where it is possible to loosen the terminology and punningly transgress the terms provided. Tensions inhere in the very insistence on single signification in scientific discourse. Our analysis may founder if we seek a systematic representation of scientific theory within works of literature, or, indeed, a sufficient 'source' of scientific ideas within the common structure.

The lecture will examine, with examples, kinds of interchange between scientific and literary texts in the nineteenth-century and in our own time.

Tea will be served at 17.15.

Reproduced above is part of a document discovered on a university notice-board in London, England, circa April 1989. Analysis of the main text reveals the use of a hitherto unknown language, which some experts hold to be a daughter-tongue of English. Others differ. Readers are invited to decode the text, and provide a name for this curious language.