process has been at work, and that, therefore, no one mechanism or theory can hope to explain all the observed chemical and isotopic abundances.

Very broadly, one must think in terms of stars more massive than the Sun undergoing nuclear reactions throughout the history of the Galaxy and returning the products of those reactions to the interstellar medium. Successive generations of stars, including the Sun and its planetary system (whose composition is, by definition, normal and the standard with respect to which enhancements or deficiencies elsewhere are measured) will then be formed from the material thus enriched in elements heavier than hydrogen and helium.

Within our Solar System, abundances can be determined for meteorites of various types, the solar photosphere, the solar corona and wind, and particles ejected by solar flares, as well as for the Earth (which is, however, so chemically fractionated as to be almost useless as an indicator of general abundance). The carbonaceous chondrites (which are the type richest in volatile materials and therefore the closest to the primitive solar nebula in composition) have, to first order, compositions and structure which can be understood in terms of temperatures at which various compounds condense from a gaseous to a solid phase, with some later remelting and fractionation of their parent body, according to E. Anders (University of Chicago). But there are additional components, amounting to 1 or 2% of the masses of the meteorites concerned which, from their isotope ratios (in one case a deficiency of ^{20}Ne and ^{21}Ne relative to ^{22}Ne, and in the other an excess of ^{16}O relative to the other isotopes), seem to represent interstellar grain material incorporated into the meteorites without ever having been vaporised and recondensed in the solar nebula, according to R.N. Clayton (University of Chicago). The Earth on the basis of its oxygen isotope ratio may also contain about 1% of this unvaporised component.

High energy particles ejected from solar flares exhibit strong variations in composition with energy below a few MeV per nucleon, but above that converge to abundances which are not significantly different from those in the solar photosphere or corona. This suggests, according to P. B. Price (University of California, Berkeley) that, at sufficiently high energies, the composition of cosmic rays coming from outside the Solar System might also reflect that of the objects which are their sources (supernovae or supernova remnants in most theories). In fact, at those energies which have been studied, the cosmic ray composition shows unmistakable signs of spallation (which greatly enhances the amount of Li, Be, and B among other things) as a result of passage through the interstellar medium. After corrections for spallation, the apparent cosmic ray source composition, as determined by M. Shapiro (Naval Research Laboratory) and others, still has a great enhancement of heavy elements in general over hydrogen and helium and of the iron peak elements with respect to C, N and O. There may, in addition, be an excess of U and Th and other nuclei produced in the r process (in which neutrons are captured rapidly by iron peak nuclei and the resulting unstable products then beta decay back to stability). The cause of these anomalies must be apportioned between the processes which produce the nuclei that become cosmic rays and the processes that accelerate the nuclei to relativistic energies. It is not clear how this apportionment should be made.

A recently discovered, low energy component in the cosmic rays has a quite different set of anomalies (O and N enhanced with respect to C, and enhanced He which is pure ^{4}He). These have been attributed on the one hand to processes in the sources, assumed to be ordinary novae, by D. Clayton (Rice University) and F. Hoyle (University of Manchester) and, on the other hand, to preferential leakage into the heliosphere of atoms with high ionisation potential, by R. Ramaty and others at Goddard Space Flight Center, where the new component was discovered.

The most striking recent progress in measuring abundances has been made by a group at Princeton University as a result of Copernicus observations of ultraviolet interstellar absorption lines. They have obtained a relatively coherent picture, in which the elements that are most depleted from the general interstellar gas onto grains are those that condense at the lowest temperatures. This is reminiscent of the situation in meteorites.

Among the stars, the extraordinary enrichment of the surfaces of certain peculiar A stars in Eu and other rare earths seems, from the work of G. Michaud (University of Montreal), to be attributable to diffusion in the outer layers of stars with initially normal composition. A new class of CH subgiants, discovered by H. Bond (Louisiana State University) has, on the other hand, overabundances of C, Nd, Ce and La, combined with a deficiency of other metals, which seem to reflect mixing to the surface of material which has undergone nuclear reactions in the interior of the stars.

The theoretical models of element production tend to reflect the multiplicity of components in the observations. Several theorists, including I. Iben (University of Illinois) and S. Woosley (California Institute of Technology) have followed the assorted processes (hydrogen and helium burning; hydro-

B and *H*

from Peter J. Smith

As far as units are concerned, geomagneticians have traditionally had an easy life. Geomagnetic measurements are usually made in media having relative permeability $\mu_r \sim 1$; and in the c.g.s. e.m.u. system the permeability of free space $\mu_0 = 1$. Thus the induction B is related to the field intensity H by $B = \mu_r \mu_0 H = H$ for all practical purposes. As a result of this simple equation geophysicists have seldom had to think very carefully about the physical difference between B and H; few, if any, have really cared whether their magnetometers have measured B or H; the gauss, the c.g.s. unit of B, has by usage become totally interchangeable with the oersted, the c.g.s. unit of H; and as Lowes points out (*Geophys. J.*, **37**, 51; 1974), it is no longer even clear whether the gamma was introduced as 10^{-5} gauss or 10^{-5} oersted.

The recent recommendation by the International Association of Geomagnetism and Aeronomy (IAGA) that the geophysical community adopt the SI system has given cause for a little thought, although insofar as the conversions from c.g.s. may be made by simple numerical factors, life will probably go on much as before. Indeed the basic decision about whether to express results in terms of B or H (necessitated by the fact that in SI, $\mu_0 = 1$) was made by IAGA in favour of B in the "interest of achieving . . . the least possible disruption of existing numerical usage" and in spite of protestations that "matters of physical fact are involved" (Whitworth and Stopes-Roe, *Nature*, **234**, 31; 1971).

In any event, Lowes has now shown that, whatever it may say on the label, real magnetometers have calibrations which depend on the permeability of the medium in which the field is measured. Magnetometers thus actually measure neither B nor H exactly; and so from the instrumental point of view there is no reason for preferentially choosing either for expressing magnetic field data. Not that this will prevent controversy in the future, of course!