

in a hollow and on a mound, selective grazing by snails gives an advantage to cyanogenic plants. Clearly the situation is not as simple as it once seemed.

The traditional idea of a battle between insects and plants is also too simple according to H. F. van Emden (University of Reading). Drawing on his experience with aphids, he presented an alternative viewpoint. Insects such as aphids, which are restricted in their selection of host plants, might gain an advantage if the secondary compounds in the plants are primarily a defence against vertebrate predators. One benefit would be that both the insects and their food would be protected. □

Materials science and engineering

from Robert W. Cahn

"A GENERAL survey or reconsideration" is one of the meanings attached by the Shorter Oxford English Dictionary to the word *Review*. That usage dates from 1604, when modern science was in its birth throes. The natural philosophers of that time knew and corresponded with each other, and that curse and blessing of our day, the scientific journal, was as yet unknown and unnecessary. Today, the general survey or reconsideration is as essential to the working scientist as the Good Food Guide to the serious gourmet.

A review, of course, tells a scientist in a nutshell what the current state of knowledge is in a field, with extra emphasis on recent facts and insights. Who ever heard of a survey of ignorance? Yet that is what the editor-in-chief of the journal *Materials Science and Engineering*, together with his Advisory Board, set out to provide to mark the tenth anniversary of the journal's publication. The 264 pages of volume 25, dated September 1976, are made up of 35 short essays devoted to "what we do not know about" a range of subjects which fall within the scope of the journal. The tacit objective seems to be to guide the research worker who is contemplating a change of field, or of emphasis within a field, into fruitful problems. The editor invited a number of specialists all over the world to map the gaps and chasms in their knowledge. The result is unconventional, variable and useful.

One contributor complains: "Throughout my professional life I

tried to teach my students, when they were writing their first paper, not to elaborate too much what they didn't know. Of that, I told them, the future readers know enough themselves." However, the wise choice of expert contributors renders this review of ignorance acceptable and indeed useful. It is necessary to know a great deal before the gaps in that knowledge can be a source of wisdom. Nobody attempted to restrict himself to a survey of gaps: all, with greater or lesser terseness, first surveyed what is known. As another contributor expressed it—"I take it that we are asking: What principles governing . . . are generally agreed by the scientific community? What principles are controversial? What areas are unknown to the extent that no principles have been formulated?" This contributor achieved something very rare and indeed paradoxical in a scientific review: he included not a single reference to published work, but filled his own prescription in a discursive way, emphasizing the important points without documentation. The essay—L. M. Brown's on the Deformation of 2-phase Alloys—is a thorough going success. This approach can be followed successfully only with a widely familiar topic; one which is less familiar may need plenty of documentation, and yet effectively pinpoint the crucial areas of ignorance; D. A. Vermilyea's essay on Corrosion is a case in point.

Some reviews are highly theoretical and can only be followed by a reader who is already highly expert (for instance, H. E. Cook on Continuous Transformations; M. Wuttig and T. Suzuki on the Martensite Transformation); others are severely practical, addressed to specific industrial objectives (A. G. Chynoweth on Fiber Lightguides for Optical Communications; M. C. Flemings and others on Rheocasting; J. A. Manson on Modification of Concretes with Polymers). Most cover their subjects in breadth, some (N. Brown on The Effects of Gaseous Environments on Polymers; Flemings on Rheocasting) describe only their own work and the problems uncovered thereby, justifiably since they opened up new fields. One particularly illuminating survey, V. F. Zackay's on Thermomechanical Processing, is not so much concerned with gaps in scientific understanding as with the problems of finding a development strategy which will increase the industrial acceptability of the complex form of processing with which it deals. Altogether, the volume is an intriguing study in styles. In general, the broader the author's range of vision, the clearer his presentation. One might have expected that when subject to such severe constraints on the number

of words, the narrow specialist would have fared better, but indeed the general principle remains true that one sees the wood better from a helicopter than from the jungle trail.

The Editor does disclaim any attempt to cover the whole spectrum of materials science and engineering, but it is nevertheless true that coverage is lopsided. Nearly 80% of the reviews deal with metals and alloys, and within that category, there is heavy emphasis on the admittedly crucial topic of phase transformations.

It is nevertheless disappointing that only two essays deal with polymers (and one of these only does so tangentially), one with ceramics, and one with oxide glasses (again tangentially). There is no attempt to shirk topics in which understanding is unsatisfactory (E. Rabinowicz has plenty of ignorance to report on Wear, and does so without obfuscation), but no broad topic such as Materials in Biomedical Engineering is included.

In spite of the inevitable limitations and the uneven quality of the reviews, this volume deserves to be widely purchased by junior research workers particularly (the price is set low to enable them to do so). They should use it in conjunction with another compendium of useful short reviews, *Annual Reviews of Materials Science*, to gain a first-class overview of the direction in which the discipline is currently heading. □

A hundred years ago

A VERY extensive Etruscan necropolis has been discovered at Montelparo, near Ascoli-Piceno (Umbria). An enormous quantity of bronze, iron, and terra-cotta objects have been and are being found in the grounds, chiefly consisting of helmets, armillas, collars, buckles, nails, spurs, bows, rings, lances, spears, swords, and thousands of perforated bronze grains and beads, besides numerous objects of amber, glass, shells, and pottery, all of which are likely to be secured by the Italian Government for the Florentine Museums.

Two Prussian officers have arrived in Paris for the purpose of determining telegraphically the longitude of Berlin. Two French officers have been despatched to Berlin in order to carry out similar operations. The apparatus to be used in Paris have been located at Montsouris under the superintendence of M. Mouchez and the Bureau des Longitudes. The ultimate aim of the operation is to connect the French trigonometrical triangulation with the system of the Geodesical International Association which is covering almost the whole of Europe.
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