

BOOK REVIEWS

Science and Humanity

Innovations: Scientific, Technological and Social. By Dennis Gabor. (Science and Engineering Policy Series.) Pp. vi+113. (Oxford University: London, November 1970.) £0.75.

Engineers and Engineering. By Lord Hinton of Bankside. (Science and Engineering Policy Series.) Pp. 75. (Oxford University: London, November 1970.)

"SCIENCE and technology have done more in the last ten decades to improve social conditions than the humanities have done in the last ten centuries," claims Lord Hinton as he concludes the first volume of this important new series. What the publisher hopes to achieve is to provoke those influential in shaping society into serious reflexion of the wide impact and consequences of the "science century". Future development may then, hopefully, be directed in the true sense, rather than lumbering onward, guided only by its own irresponsible momentum.

Lord Hinton launches the series on a somewhat disappointingly low key with a lamentation of the poor esteem in which the engineering profession is held by the intellectual community. This is no less than a tragedy, he asserts, because ultimately it is the engineer who actually fashions the fabric of society. Not only must engineering be an instinctively creative exercise ("engineering is not a science; it is an art"), but its practitioners must also be alive to the non-material needs of the society whose environment is being built. In a situation where the profession ranks as a mere second cousin to pure science, society has only itself to blame for self-inflicted injuries.

For the science and engineering community to be really effective, a partnership of respect needs to be created. Such a partnership exists in too few areas of technological endeavour, and Lord Hinton is clearly concerned by this. Much of the blame, he suggests, rests with the scientist, who too often keeps his eyes glued to the minutiae of academic problems rather than occasionally looking around to see just what is the context of his scientific labours.

In his much more stirring book, Dennis Gabor directs his venom at that

blindly materialistic system whose standard reads, "innovate or die". He contrasts the industrial society in its youth, when technological development without an explicit science base achieved important changes in man's material surroundings, with today when innovation has acquired a momentum in its own right, apparently unrelated to the real needs of society. Gabor lines himself up with the brave few who shout, "Stop, we are going the wrong way!" But he is no Luddite. "Growth addition," he says, "has harnessed inventive energies to blind material ends so that the scientist has become far removed from, and unaware of, the society which he is altering in dramatic ways." As the great innovative machine becomes increasingly efficient and remote, so man's ability to adapt to the fruits of his own efforts becomes dangerously stretched. The time lapse between discovery and commercial application seems steadily to be diminishing. One consequence is that significant changes in modes of living now occur well within man's natural time unit, a generation. Such a situation can only place increasing demands on man's finite ability to adapt.

It is time, Gabor argues, that we try to decide what is best for the quality of life rather than pursuing mindlessly what is best for the economics of growth. This is all good rousing stuff, closely argued with a controlled passion. Much of the book lists in cool, dispassionate detail, material, biological and social innovations possible in the next half century. These examples, fascinating in themselves, add force to an already persuasive argument.

ROGER LEWIN

Outlook of Relativity

Talking About Relativity. By J. L. Synge. Pp. 193. (North-Holland: Amsterdam and London; Elsevier: New York, March 1971.) \$5.75.

PROFESSOR SYNGE records that he chose the title before he wrote a word of the book. Clearly he chose it with deliberation, for he sees himself as meeting a challenge in communication. As nearly as is possible by means of the printed page, he does this by carry-

ing on a dialogue with his reader—hence "talking" in the title. Also, having a title at the start implies a well-defined aim, and Synge is here most certainly talking with a purpose. He is also talking with brilliance. He suggests, incidentally, that the inventor of zero should have got a Nobel prize in mathematics, had there been one; were there such a prize for expounding mathematics with a minimum use of mathematics it should undoubtedly go to Synge himself.

The book is addressed to anyone, layman or scientist, non-mathematician or mathematician, who wants to acquire the outlook of relativity in thinking about physics. While being diverted by Synge's sparkling presentation, he must be prepared to take trouble to grasp basic concepts. Synge offers him a succession of such concepts that are all essential to the purpose—the distinction between the R-world, the real world of experience, and M-worlds, the model or mathematical worlds of physical theory (Synge calls confusion between these the "Pygmalion syndrome"), concepts of algebra, geometry, function, operator, event, world-lines and the arrow of time, the concept of time itself, space-time and various associated concepts, including light-cones and curvature, the basic concepts of general relativity and its field equations (without writing them down except in symbolic form), the concept of gravitation, special relativity as a specialization of general relativity with some simple but fundamental applications.

Anyone who reads the book with attention—and anyone who reads it at all is certain to have his attention captured by it—no matter how little or how much he already knows, is bound to have his interest quickened and his ideas clarified and deepened. However, fully to appreciate the superb artistry of Synge's presentation, the reader should presumably know everything beforehand so that he can see what a wealth of thought has gone into the choice of every phrase (with apparently a curious solitary slip in describing a tensor transformation on page 143). Thus the book ought to prove equally invaluable to all who have to learn or to teach relativity.

W. H. MCCREA