So far as the nomenclature of latency was concerned, agreement was finally reached on a number of definitions. The term 'inapparent infection' was suggested to cover the whole field of virus infections which give no overt sign of their presence. The expression 'latent virus' is no more, and its place is taken by 'latent infection', which is 'inapparent infection' in a chronic condition where a certain host – virus equilibrium has been established. The use of the word 'masked' is discontinued and 'occult virus' is substituted to describe the cases where virus particles cannot be detected and in which the actual state of the virus cannot as yet be ascertained. 'Occult' viruses do not appear to fulfil Lwoff's precept: "in order that an infection, whether apparent or not, should be recognized as viral, infectious particles have to be detected and identified as a virus".

For viruses which have been shown to have developmental stages, the terms 'provirus', 'vegetative virus' and 'infective virus' are suggested.

As regards latency at the virus – cell level, a 'moderate' virus is one growing in a cell while still permitting its continued survival, a 'cytocidal' one kills the cell, and 'sub-moderate' covers intermediate cases.

While these definitions may not be acceptable to all virologists, the conference has served a most useful purpose in paving the way to a more stable nomenclature of the subject. The discussions on the underlying causes of latency are stimulating and may help to throw some light on this fascinating partnership between virus and cell.

Kenneth M. Smith

THE TECHNOLOGY OF TRANSISTORS

Transistor Technology

(Bell Telephone Laboratories Series.) By Members of the Technical Staff of Bell Telephone Laboratories. Vol. 1. Edited by H. E. Bridgers, J. H. Scaff, and J. N. Shive. Pp. xxxvii+661. 131*s*. 6*d*. Vol. 2. Edited by F. J. Biondi. Pp. xiii+701. 131*s*. 6*d*. (Princeton, N.J.: D. Van Nostrand Company, Inc.; London: D. Van Nostrand Company, Ltd., 1958.)

THE ten years of intensive research which have followed the discovery of transistor action have been very fruitful. The two key materials, germanium and silicon, are now widely prepared with a purity and crystalline perfection unsurpassed for any substance; their bulk and surface properties have been exhaustively examined and the results have enabled theoretical advances to be substantiated. The properties of transistors have been explained very fully in physical terms and suitably expressed for use by electrical engineers. Metallurgical, physical and electrolytic methods of preparing transistors—with their key dimension, base-width, controlled to a micron or so—have led to production-lines the combined output of which now exceeds a million transistors a week. The impact on electronic equipment is beginning to be felt. But while the scientific, technical and review publications have devoted increasing space to all sides of the subject, the more advanced text-books have concentrated much more on analysing and applying the electrical properties of transistors than they have on describing methods of preparing the semiconductors and the many practical junction structures.

The Bell Telephone Laboratories played a major part throughout these ten years, for they followed up their original discovery with the first junction transistor, the first measurements of drift mobility and lifetime of minority carriers, zone refining and zone levelling, grown and diffused structures, the solar battery and other advances. There was much to look forward to, therefore, when it was announced that three volumes in the Bell Telephone Laboratories series of text-books were to be entitled "Transistor Technology". But 'technology' has no precise meaning; the Concise Oxford English Dictionary gives "the science of the industrial arts", a definition which, it might be argued, includes only those parts of a subject which have been based on empiricism. A wider meaning is applied here, however, particularly to Vol. 2, much of which is devoted to the analysis or prediction of the behaviour of the conventional three-terminal, three-layer transistor, of tetrodes and unipolar transistors, and of two- and four-layer diodes.

Vol. 1 is primarily a history of the developments made before April 1952, until when the Laboratories had had almost a monopoly of the main advances; in that month they disclosed their processes and design procedures to prospective licensees. What was then prepared is now published, with a little, but scarcely enough, revision in the light of later developments. The many comparative newcomers to the subject should read it, at least once. It does not demand much concentration, but it does convey something of the early atmosphere, when the subject was spreading so rapidly into several different fields of science. Some parts retain much of their importance, for example the preparation of germanium and the measurement of its key properties, while others, for example the fabrication of point transistors, have lost theirs.

Vol. 2 deals with some of the progress since 1952; it is essentially the reprinting of many papers, mostly by authors from the Laboratories. The introductory remarks to the different headings, under which the papers are grouped, are generally too short to weld the collection together and are uncritical. The opening chapter, a fairly recent review of the technology of silicon, with 156 references, moves at such a high speed that few points receive detailed description; but it is followed by good accounts of floating-zone refinement and zone levelling. The lengthy chapters which come next, on the design of diodes and triodes, contain many analyses of behaviour and include well-known papers by Ebers and Moll, Kingston, Moll and Ross, Pritchard, and Webster. Descriptions of a field-effect transistor and the solar battery follow; and the book concludes with a group of papers on those surface effects which have assumed importance in their own right and on which may well depend the reliability of transistors and hence the practicability of some large equipments now under development, each incorporating 10,000–30,000 transistors.

Only an interim assessment can be made of this large venture pending consideration of Vol. 3. But two points can be made already. The disjointed structure of Vol. 2 comes as a disappointment; and the undue length of some sections of Vol. 1, and the availability of almost all of Vol. 2 in well-known periodicals, promotes a sense of redundancy. The gap in text-book coverage may not be closed, despite the resources mustered.

J. R. Tillman