lectures which over the years has been modified and polished until the author feels it represents the perfect approach to his subject. These methods help to ensure completeness and accuracy, but too often fail to produce a readable book. In this book Clinton Brown and George Webb have followed a different course. Dr. Brown is clearly a man with wide and extensive knowledge of his subject—both biologically and electronically—as well as a rare gift for putting across his ideas. It would almost be worth having this book for the first chapter alone, for there can be few biologists who would not find something of value in this discourse on the use—and misuse—of instrumentation in biology to-day and in the foreseeable future. The whole chapter is eminently quotable, but one short passage must suffice: "Reduced power, space and weight are obvious advantages of the transistorized instrument but their greatest importance has been in the invention of new devices. The descendants of the transistor; the four layer diode, semiconductor strain element, photosensitive device, controlled rectifier, Esaki diode are such radical departures from the original transistor as to resemble new species. Commercial applications are available to-day for functions formerly considered impossible or impractical". The quotation is significant: one suspects that Mr. Webb (the electronic collaborator) made it a point of honour to see that no new device of bioelectronic value was omitted, and as the book proceeds the distinctions between, for example, different types of four layer diodes is clearly explained with ample indication of typical circuit configurations.

One inevitable flaw in a book which has virtually been written by one man—and almost certainly over a short period—is that a number of inaccuracies and inconsistencies have slipped in. Misprints such as (p. 43) $X_L = 2\ pi fL$ are not misleading, but on this side of the Atlantic some readers may be caught out by the statement that the current in a hundred-watt lamp is about one amp (p. 35). (No voltage is stated.) More misleading is the implication that capacitors in series are additive (Colpitts oscillator, p. 157), while the statement that transformer coupling is unsatisfactory "at the low power and low frequencies encountered" (p. 121) surely requires further comment since no indication is given that two quite separate problems are involved. Again in one or two places the legends on the diagrams do not agree with the text, but in one place (p. 75) both diagram and text are wrong: "In (Fig. 5: 14*B*) the signal increases smoothly from zero to some value where it drops to zero. The differential of this signal is a square wave".

It is difficult to comment on some numerical data without knowing which devices the author has in mind, but he describes a CdS cell illuminated at 400 c/s by a neon lamp (p. 140) as a form of chopper for a d.c. amplifier. I feel that this could be misleading as, while high-speed CdSe cells are available, the vast majority of photosensitive resistors would not follow this frequency satisfactorily. On the other hand, to say (p. 102) that the reverse current in a diode is "less than 5 per cent" seems very cautious, even by germanium standards. A typical silicon leakage figure would be 0·1 μamp for a diode with a maximum forward current of 100 m.amp (Mullard *OA* 200) while a forward/reverse ratio of a thousand is now common even among germanium devices.

Although, rather surprisingly, abbreviations Ω, KΩ, MΩ, A, mA, μA, nA, etc., are not explained, their omission is the more conspicuous since the development of symbolism and ideas is elsewhere excellent: the chapter on signal conditioning systems and on digital logic being particularly good.

To sum up: this book is well written, amply and skilfully illustrated and, despite numerous minor lapses, should be of great value both to bioengineers and to biologists. It does not describe any complete apparatus—that is not its object—but it does describe clearly and in simple terms the working of virtually every semiconductor device available to-day and discusses ways in which apparatus built around such devices can be profitably used in a biological laboratory.

J. R. B. GREER

SOVIET CHEMISTRY

Chemistry in the Soviet Union

By Prof. John Turkevich. Pp. ix + 566. (Princeton, N.J.: D. Van Nostrand Company, Inc.; London: D. Van Nostrand Company, Ltd., 1965.) 93*s*.

AT a meeting of the Russian Chemical Society on March 6, 1869, the periodic law was first presented to the world by Menshutkin, acting for Mendeleev, who was ill. Mendeleev later became the 'best-known Russian chemist'. In conformity with Prof. Turkevich's treatment of other topics, he should have mentioned Newlands of London, who in all essential detail presented the same concept in 1864; and these few years were critical in the matter of atomic weights. Ignored is the letter in *Chemical News* of 1882 (p. 278) in which Newlands remarks on the reception of the Davy Medal by Mendeleev "for his discovery of the periodic relation", and draws attention to his own publications of 1864 and 1865. Ignored, too, is the letter by Mendeleev himself in *Chemical News* of 1881 (p. 15), in which he admits "it is possible that Newlands has prior to me enunciated something similar to the periodic law".

Those of us brought up in the classical days will recall the full-sounding names of Lomonosov (1711–1765), Tschitschibaban and Zelinski. Klaus contributed to the knowledge of the chemistry of osmium and iridium, and in 1844 discovered ruthenium, named after the Latin name for Russia. P. Walden worked mainly on non-aqueous electrolytic solutions; but is best known for his isolated discovery of the optical inversion.

This book is mainly about Russian chemists and educational (research) institutes. The history of chemistry in Russia from the fifteenth to the middle of the nineteenth centuries is outlined in six pages, and, in 12 pages, prominent chemists in the second half of the nineteenth century are mentioned. We read that Butlerov (1826–1886) is given credit by Western authorities for introducing the expression 'structure' into organic chemistry; but the Soviet chemists now claim a greater role for him as the one who formulated the structural theory of organic chemistry. "The solution of this problem could only be the lot of a scientist that is not only of outstanding talent but also free from the enumerated (p. 36) shortcomings which were inherent in the majority of important Western European chemists." "The honour of creating a new theory which exerted a revolutionary influence on further development of organic chemistry, fell to a Russian chemist, A. M. Butlerov." "The standard text-books in the West do not mention his eminence in this role." Markovnikov (1838–1904), a student of Butlerov, was a leader of the Russian scientific circles of his period.

In the next 29 pages, chemistry in Russia in the nineteenth and twentieth centuries is summarized under the usual headings, such as organic, colloid, analytical chemistry; and similar summaries on Soviet chemistry between the two World Wars are given in 91 pages.

For those who have maturity and time for quiet thoughtful reading at home, these 140 pages can provide intensive pleasure, and a grasp of the activities of Russian chemists not otherwise so readily achieved. There are 30 helpful pages on the activities of chemical research establishments in the U.S.S.R., but the remaining 393 pages could well have been relegated to a library handbook; for these show a list of names of authors, and the titles of dissertations in chemistry at the Soviet universities, as well as a similar list of recent publications of members of the U.S.S.R. Academy of Sciences.

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