Book Reviews

Chemistry of the Solid State. W. E. Garner, Ed. Academic, New York; Butterworths, London, 1955. vii + 417 pp. Illus. + plates. $8.

This book interprets its title broadly, in 15 separately contributed chapters. Most of its authors are or have been at the University of Bristol, and its topics reflect the interests of the vigorous schools of physical chemistry and the physics of solids that W. E. Garner and N. F. Mott long headed there. Seven chapters summarize "the knowledge gained regarding dislocations, lattice defects, energy levels in the solid state, and nucleation phenomena," and eight chapters apply those principles. Surely it will fulfill Garner's prefatory hope of aiding "in the more rapid development of the study of catalysis, solid reactions, oxidation of metals, photographic processes, and other related subjects."

Referring to existing reviews for prior theory and experiment, the contributors write of more recent work (and provide helpful bibliographies), some more successfully than others. F. C. Frank's witty succinctness ornaments his "Chemistry of crystal dislocations." A. J. E. Welch gives in 13 pages a wise discussion of "Solid-solid reactions" from the viewpoint of structural inorganic chemistry. Careless exposition and questionable emphases mar the chapter on semiconductivity and magnetochemistry. "Acceptor levels located slightly above the conduction band" should have been caught in proof, and the description of those levels as "discrete surface energy states associated with the impurities" will confuse. Readers may regret that "magnetochemistry" does not here include the chemical aspects of electronic and nuclear paramagnetic resonance spectroscopy. But these are busy people; we must thank them all for taking time to help us approach the frontiers of their fields.

The printer and binder, busy also, could not (p. 390) always retain the running head, and in one copy left pages 306, 307, 318, and 319 blank. But beautifully printed photographs of silver in silver bromide assist J. W. Mitchell's account of the "Photographic process."

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Advances in Cancer Research. vol. III. Jesse P. Greenstein and Alexander Haddow, Eds. Academic Press, New York, 1955. viii + 369 pp. Illus. $8.50.

This well-indexed volume with contributions from four countries contains such a wealth of variegated information that those who are interested in any aspect of cancer work will have to study the book and its references.

Richard Doll's chapter on the etiology of lung cancer begins with mention of the international symposium at Louvain in 1952; the corresponding chapter in the next volume may well start with the 1954 conference of the International Society of Geographical Pathology at Washington. The reality of the increase in frequency, which was accepted at Louvain, is supported by much new evidence, and further increase may be expected (Mackenzie). The fact that in different countries the preponderance of male deaths over females has increased with the rise of total mortality from lung cancer speaks for the actuality of the increase (Clemmesen, Doll, Kreyberg). The changes in age distribution when studied with Korteweg's "cohort analysis" show that men born in successive decades have a higher death rate in all age groups than the corresponding age groups of the "cohort" born in a previous decade. This has been confirmed in different countries. It is interpreted as indicating increasing exposure to an environmental carcinogen.

Kreyberg and others divide lung cancers into endogenous and exogenous ones, the latter comprising the squamous cell carcinomas and the undifferentiated tumors. Only these show the marked increase and the preponderance in men, probably as the result of a newly introduced carcinogen to which men have been more exposed than women. The much-debated and emotionally weighted question of cigarette smoking is discussed in detail, and its etiologic importance is accepted on statistical grounds for the exogenous cancers. In the absence of smoking, the death rate may be equal for the sexes (Doll and Hill). The experimental work with tobacco, however, is not yet convincing, notably on account of the high temperatures reached in the smoking machines. The higher rate in towns is not explained, and an effect of radioactivity is not proved. The possible role of previous infections is mentioned briefly. In my opinion the findings of "scar cancer" [*Virchow's Arch. pathol. Anat. u. Physiol.* **304**, 230 (1939); **325**, 499 (1954)] deserve attention. The whole chapter is fascinating.

Equally fascinating is Shimkin's review of pulmonary tumors in experimental animals. The history of pulmonary tumors in mice—for which the cautious name *primary adenomatous pulmonary tumor* is proposed—is traced back to 1926 (Lynch) and followed through the establishment of quantitative methods (Shimkin), the clarification of histogenesis (Grady and Stewart), and the induction in the rat (Jaffe) and the guinea pig (Heston and Deringer). The use of animals larger than the mouse may facilitate physiological and biochemical studies. The tumors appear alike in different species but so far only the mouse tumors have been studied extensively. The rarity of lung tumors in other species should be verified by studying more old animals. One species of mice (*Peromyscus leucopus*) did not develop lung tumors when injected with urethane.

The constancy of occurrence in specific strains, which is greater than for breast tumors or liver tumors, indicates a small influence of exogenous factors. The genetic character of this susceptibility is attested to by the fact that its segregation during breeding was not premeditated. The tendency to develop lung tumors is obviously inherent, and the carcinogens act as accelerators. Transplanted lung tissue from susceptible and nonsusceptible strains retains its character (Shapiro and Kirschbaum). Since the mechanism of this susceptibility is not fully known, it may or may not be true somatic mutation (Heston and Schneidermann). In spite of bearing the earmarks of malignancy, the lung adenomas rarely metastasize and seldom kill. The problem of their histogenesis is bound up with the eternal dispute about the nature of alveolar lining cells.

Numerous, partly contradictory experiments indicate that direct contact of the carcinogen and the lung tissue is the essential factor. Dispersions with larger particles give a higher yield. Shimkin, like Doll, accepts the actual increase in human lung cancer and the role of tobacco. He urges public education directed toward reduction of cigarette smoking and control of atmospheric pollution. The last pages reveal a refreshingly broad-minded attitude in defining neoplasia.

Rondoni, in his chapter on some aspects of carcinogenesis, stresses the antientropic nature of normal anabolic processes and the return to the second law in carcinogenesis (Mirsky and Pauling), which probably corresponds to an *in*