European Communities, with the aim of evaluating screening tests in chemical carcinogenesis.

The first section contains papers dealing with general strategy and appraisal of current programmes for carcinogenesis screening in U.S.A. and Japan and the methods being used to evaluate short term tests. A word of warning is rightly sounded in this section by Saffiotti, who points out that the validation of short term tests is largely based on their comparison with animal bioassay results. The latter, however, are in many cases not particularly reliable. Although efforts are being made in the carcinogenesis programme at the NCI to develop a standard animal bioassay procedure.

This session was followed by much general discussion which was well and usefully reported, particular emphasis being put on ways of effectively disseminating information about the large numbers of compounds under test in different programmes in different parts of the world.

The second session consisted of a number of papers dealing with metabolic activation of pre- or procarcinogens and with the development of tests aimed at quantifying the ability of different individuals to metabolically activate chemicals to ultimate carcinogens. Several possible approaches were discussed, and the general feeling was that continued development of such tests may in the future allow more accurate assessment of risks of carcinogen exposure in individuals and populations.

In vitro transformation as a model system was discussed at length, together with its possible relationships to somatic cell mutation, cell selection, virus activation and epigenetic events. In general the high frequencies of in vitro transformation in fibroblasts relative to the low rates of spontaneous mutation in mammalian cells would argue against a random mutation being the basis for chemical carcinogenesis. The other main point which emerged from papers and discussion in this section are that fibroblast and epithelial cell cultures differ significantly in their transformability, the latter requiring a long period of in vitro culture before expression of the transformed state as measured by many of the now relatively well defined criteria.

The group of papers on mutagenicity assays included data from both procaryotic and eucaryotic cell systems. A clear correlation between compounds which are mutagenic and those which are carcinogenic obviously exists, supporting the theory that most carcinogens cause cancer through somatic mutation. The predictive value of such tests is now accepted. The general conclusion was that although no direct causal relationship had been established between mutagenesis and carcinogenesis, both are induced by the same classes of compounds. Therefore, any compound which is mutagenic should be treated with great caution. The ways in which unknown chemicals should be tested before release into the environment was also discussed at length.

Since mutations are generally considered to be the result of errors in repair or replication, a section was included on DNA repair processes in both procaryotic and eucaryotic cell systems. The most interesting topic discussed in this field was the evidence in favour of the "SOS" repair hypothesis as applied to E. coli, and possible future extensions of the hypothesis to mammalian cell systems. A point brought out in discussion was that if evidence for inducible repair enzymes were obtained in mammalian cells this could lead to a complete re-interpretation of the phenomenon of recovery from sublethal damage, which could have important ramifications in radiotherapy.

In general, the volume is well presented. It is clearly divided into sections, making it relatively easy to find papers on a specific topic, and an alphabetical list of participants is included. The discussion, which is reported after each individual paper, has been well edited and its inclusion is very useful, as it is here that some of the most interesting ideas are presented. The collecting together of the many papers on the related topics of mutagenesis and carcinogenesis should be particularly useful for all workers in the field. The volume also has a wider appeal to all scientists who are interested in the control of man's chemical environment.

M. Fox

Biology of Radiation Carcinogenesis.
Ed. J. M. Yuhas, R. W. Tennant and J. D. Regan (1976) New York: Raven Press. 347 pp. Price $30.00.

This book is the proceedings of a Conference in Gatlinburg, USA, April 1975.
The field under review is divided into 4 major sections: population, molecular, viral and cellular. Each section contains several short informative reviews. In general they are concise, easily read, and not overloaded by bibliography, as references are given to other more detailed reviews and papers. Discussions, an important part of any conference, are unfortunately not included. Comments on the individual sections, in order of the reviewers, are as follows.

Population studies cover a broad range, from dose distributions at the subcellular level, through tumour production in rodents, to persons of high risk to leukaemia. Radiation microdosimetry considerations are described clearly and non-mathematically. The dual theory of radiation action is discussed in terms of a linear-quadratic dependence of energy deposition on absorbed dose. Single-hit lethal events predominate at low doses, even for sparsely ionizing radiation. This implies a linear extrapolation (and no dose-rate effect) for responses at low dose. Therefore, this does not account for the observed greater efficiency of dose fractionation for transformation (but not, in general, for tumour production), which is considered to lie in the changing state of the target cells after a first dose. Neoplasia in skin, bone marrow, thyroid, mammary tissue and lung are discussed with reference to dose-rate, high LET radiation, dose-modifying agents, and other carcinogens.

The section on molecular studies presents a large amount of data relating to our current knowledge of the interaction of ionizing radiation and chemical carcinogens with DNA. The differences and similarities of such interactions are well illustrated, as is our knowledge of the way in which mammalian cells (in particular human cells) recognize and repair such damage. The biological significance of such DNA repair processes is indicated by studies on fibroblasts from patients with diseases which are associated with DNA repair defects and with increased tumour incidence, i.e. xeroderma pigmentosum defective in u.v.-excision repair and the lesser known Fanconis's anaemia, which appears to be associated with reduced y-ray excision capacity, a process only recently demonstrated and less well understood. It now seems clear that mammalian cells possess a number of enzymes which are capable of recognizing a wide range of chemical and physical damage in DNA, that much of this damage can be repaired in a variety of ways and may in some cases lead to mutations. The relationship between mutations, DNA damage and cytotoxicity can now be directly studied in cultured mammalian cells, and most carcinogens can be shown to be mutagens. Whether such mutations are directly related to the conversion of normal to malignant cells is still not clear, but this section provides a useful review of our current knowledge.

The section on viral studies is confined almost exclusively to murine oncornaviruses. Genetic localization of MuLV, the regulation of viral expression, and factors restricting transmission of N and B tropic viruses are discussed in detail. Against this background, is described the role of radiation in stimulating radiogenic thymic lymphoma in mice. The question, whether radiation stimulates oncogenesis by immunosuppression or by stimulation of cell division or modification of the target cell population, is clearly stated, and current experiments are described that suggest that immunosuppression may be less important than previously believed, at least in the case of exogenous viral infection.

The first chapter in the section on cellular studies deals with the mechanism of viral (SV40) transformation. Using temperature sensitive mutants, the continued expression of SV40 A function has been shown to be necessary for the maintenance of transformation. A mechanism for SV40 transformation, where cells engaged in DNA synthesis become susceptible to death, has been postulated. The last 4 chapters deal with radiation-induced transformation in vitro, using different types of cultured cells. Reviewing the work in this field, Klein stressed the importance of the experimental conditions (especially those which increase cell death) and concluded that many cell-lines cannot be transformed by radiation. Borek, on the other hand, showed that both X-rays (as low as 1 rad) and neutrons can transform cells, and that splitting the dose increases the transformation frequency. Terzaghi and Little also showed oncogenic transformation and discussed the possible role of repair in this process. DiPaolo found no transformation by X-rays alone, but post-treatment of such cells with chemicals increased transformation frequency. The discrepancies seen in these studies emphasize
the need for further work under standardized experimental conditions.

J. H. Hendry
M. Fox
J. M. Boyle
P. T. Tyte

New Concepts in Surgical Pathology of the Skin. R. J. Reed (1976) New York: John Wiley & Sons. 159 pp. Price £10.90; $18.45.

This rather strange book is the first of a projected series on surgical pathology. The aim of the series is to expound (to quote the series preface) “the why’s and how’s of specimen handling”, rather than to portray the diagnostic skills of the hospital pathologist.

Surgical pathology has long been, according to the author, the neglected poor relation of academic pathology in the U.S.A.; worse, “the hospital-based pathologist has favoured the monetarily fruitful specialty of clinical pathology.” The state of dermatopathology is even more desperate—as a subspeciality of clinical dermatology, it is seldom accepted as a responsibility of pathologists, nor is it included in pathology training programmes. (This, of course, is all too true of some schools of pathology in Britain, too.)

After drawing such a dark picture in his first chapter, it is not surprising that the author entitles Chapter 2: “Ethics and Deportment”. He describes a battlefield on which clinicians and pathologists struggle for prestige, power, and above all, the patients’ dollars. The author gives sound advice on dealing with unscrupulous clinicians, and one might recommend this chapter to British pathologists contemplating flight from the N.H.S.

Later chapters offer sensible, but unnecessarily detailed, advice on such elementary topics as the labelling, fixation, and gross description of specimens, the selection of tissue for sectioning and so on.

The last 2 chapters are quite different. One deals with stromal reaction to neoplasia. The other, entitled “Controversies in Dermatopathology” is a rather confused discussion of a variety of topics, including atypical fibroxanthomas, melanomas, and what the author unhappily calls “lymphohistiocytic reticulosis of the skin”. The author suddenly concludes this chapter by telling us that “clinicians want to be pathologists and pathologists want to be financiers... it appears that the discipline of pathology is being fragmented and dismantled.” Can American pathology really be in such a moribund state?

It is hard to know for whom this book has been written. The junior trainees and technicians who might find Chapters 1–4 useful would find Chapters 5–6 very hard going. Practising pathologists would find the earlier chapters banal.

The book is not likely to appeal to pathologists in this country, at least; and at £10.90 for 159 pages the price is prohibitive. One hopes that later volumes in this series will be more clearly directed towards a specific readership.

O. G. Dodge

Cancer, Vol. 3. Biology of Tumours: Cellular Biology and Growth. Ed. F. Becker (1975) New York and London: Plenum Press. 473 pp. Price $44.00.

This is the third volume of a series aimed at providing a comprehensive treatise on cancer. The first volume dealt with chemical and physical carcinogenesis and the second with viral carcinogenesis. Volume 3 is concerned with the cell biology of tumours. The underlying theme is to define, and to attempt to explain, the characteristics which make a cell malignant. Topics covered include: potentialities for differentiation in tumour cells; expression of foetal and embryonic genes in tumour cells; the genetics of tumour cells; tumour progression; the physiopathology of solid tumours; energetics; enzyme and metabolic regulation in tumours; control of transcription and translation; protein synthesis in tumour cells; ectopic hormone production; endocrine factors and tumour growth; chalones, and tumour angiogenesis.

Though minor criticisms might be made, on the whole the aim of producing a comprehensive account of tumour biology is successfully achieved. The main themes are treated with clarity and balance, and there are abundant references up to 1975. This alone would make the book a good investment for research workers in 1976, but in addition to presenting well-ordered and interesting facts, at least some of the contributions give us