

quite separate from planning authorities, and, as likely as not, they will rest on regulatory principles dissimilar to those contained in planning laws.

The book is the distillation of a three year research study undertaken by the Pollution Research Unit of the University of Manchester. Essentially, the authors make a plea that, notwithstanding the existence of more specialized pollution laws, local authorities can, and should, use their planning powers to ensure that industrial developments take place with least environmental damage. As such, the book probably adds little more conceptually than was said on the subject in the 5th Report of the Royal Commission on Environmental Pollution in 1975. But where it gains is in the presentation of a number of recent case histories that illustrate the joint application of planning and pollution controls. In the main, they make for disturbing reading.

It is all too easy to criticize with the benefit of hindsight, but it is difficult not to feel concern at some of the examples given in the book. The planning decisions which permitted the juxtaposition of a housing estate and a waste disposal site, taken almost concurrently and with no apparent reference to each other; planning regulations which allowed a rug manufacturer to convert his premises for the manufacture of herbicides without the need for planning permission; the long history of conflict between a local planning authority and the Central Government Inspectorate responsible for air pollution control concerning a new sulphuric acid works, where the Inspectorate reported that, "We deprecate the insertion into planning consents of conditions which impinge on our statutory duties".

The authors conclude the study with a number of pertinent suggestions for improving the relationship and compatibility of the planning and pollution control systems. The current political climate, though, does not favour major legal or institutional changes in this field, as evidenced in the Government's belated and low-key response at the end of 1982 to the Royal Commission's 5th Report.

In the long run, the need to comply with the growing body of EEC policies concerning environmental protection, emphasizing prevention, may be seen to have wrought cohesive linkages between land-use planning and pollution control in the United Kingdom. For the present, greater appreciation of the difficulties that can occur through lack of coordination and misunderstanding between enforcement authorities may at least help avoid repetition of some of the worst instances recorded in *Planning and Pollution*. In this respect, the book is a study of value and importance. □

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Photon reading

P. Mathis

Light Reaction Path of Photosynthesis.

Edited by Francis K. Fong.
Springer-Verlag: 1982. Pp.342.
DM138, \$55.20.

WHEN a photon encounters a photosynthetic system it is likely to be absorbed by the so-called molecular 'antenna'; its energy then migrates to a reaction centre where charge separation takes place. When the reader approaches this book, like a photon, he immediately faces the complexity of a part of the antenna system, the phycobiliproteins. Fortunately, they are very nicely presented by H. Scheer who describes enough but not too much of the variability of these blue or red proteins found in lower oxygen-producing organisms. The photon-reader may then get a little lost in light-harvesting protein complexes covered by Cogdell and Beddard; the chapter is good overall, but the balance between details and generalities is uneven.

Before the reader reaches the reaction centre and is trapped by the primary electron donor he is prepared for the event by the good introduction to photosynthesis provided by A. Hoff. This chapter is an authoritative presentation of the primary partners in charge separation and of the spectroscopic tools used in their study. Hoff concludes by a more personal, and interesting, view on the bacterial reaction centre but leaves the reader a little confused (the photon has now irremediably disappeared): it would be interesting to know how the charges migrate away from the reaction centre, but this aspect is not covered in the book.

The chapters by Norris and Levanon on "Triplet state and chlorophylls" and by Clarke on "The chlorophyll triplet state and the structure of the chlorophyll aggregates" are both of the highest quality but they overlap considerably with each other and also with Hoff's chapter which results in a great deal of emphasis on triplet states.

A fascinating chapter, expertly written by M. Wasielewski, is devoted to synthetic models. This is an important and rapidly developing field: modelling the reaction centre helps our understanding of the biological reactions and brings closer the possibility of practical artificial photosynthesis. It is therefore unfortunate that the book has taken so long to be published: most of the references are to work published before 1979. The many printing mistakes in the text are also to be regretted.

The first and last chapters, both written by the editor F. Fong, express very personal views and it is perhaps unfair to insert the other chapters, which are extremely good and honest, between Fong's theories, implicitly presented as the state of the art in photosynthesis research. However, these

problems should not detract from the interest of the book which should be a useful addition to most research libraries. □

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Particle flows

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Electric Plasmas: Their Nature and Uses.

By A. von Engel.
Taylor and Francis: 1983. Pp.242.
£16, \$36.

THERE are comparatively few books which deal with both the properties and applications of gaseous plasmas and this one, by Dr von Engel, with many original contributions and comments is a welcome addition. The plasmas considered range from microdischarges to those in the earth's and sun's atmospheres, and in lightning and thermonuclear reactions.

References are appended to each chapter, and at the end to subjects axed — together with numerical examples — to keep the book of reasonable length. Even without what is left out of the main text, the field covered is extensive but the presentation is continuous and coherent.

The approach may be illustrated by Chapter 4, on the motion of charged particles in electric and magnetic fields. Except in very straightforward cases the theoretical and numerical analyses are approximations, but these do however usually yield results which come close to exact solutions. They are given first for pure fields, then under pre-plasma conditions, and finally for plasmas, and are discussed in detail. The corresponding subject sequence is; (no gas), boundary field refraction, electric and magnetic lenses, and oscillating fields; (pre-plasma), low and high field ion mobility, charge exchange, clusters, electron-drift, free and ambipolar diffusion, and self-repulsion; and (plasma), the Debye length, micro-fields, ranges of interaction, and the electrical and thermal conductivities of fully ionized gases.

On the applied side, there is again a wide range of topics, including amongst others triggering of gas explosions; shock tubes; lightning protection; arcs; corona discharges for spraying, copying and particle sorting; laser isotope separation; chemical changes; and flame radiation detection.

Altogether, Dr von Engel has given us an authoritative book, which is on the one hand an excellent introduction to the subject, and on the other, can be read by experts in the field with both enjoyment and profit. □

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