might be said to be that adhesive technology has overtaken machine technology; for example, fibre cans for packaging motor oils, adhesives in orthopaedic practice, replacements of metal welding, and label adhering to cattle replacing the branding iron. The obvious omission is the Croid–Cooper method for bonding machinery to floors.

The omissions in the book are perhaps too numerous for comfort. The applications of adhesive to gummed paper or the applications to abrasive compositions are two such relevant topics not mentioned. It also seems incredible that a section on micro-capsules can be written without mention of the encapsulation medium. The testing of adhesives is dismissed in a chapter of eight pages to cover nine tests and can raise no word here for tack testing. It is a pity that a book of this size has to be so skimpy in the compilation of the subject index. The reference coverage, on the other hand, is adequate. The editors could have achieved much more on the same weight of paper by being more discriminating on the treatment of the subject matter. Some of the many good chapters in the book may, unfortunately, not reach the readers for whom they were intended. A. COURTS

OBITUARIES

Professor P. A. Roelofsen

WITH the sudden death on December 26, 1966, at the age of 58, of Professor P. A. Roelofsen, head of the Department of General and Technical Botany at the Delft Institute of Technology, Holland, the world of plant science has lost a leading exponent.

Roelofsen graduated in the School of Went and proceeded in 1935 to the degree of Ph.D. with honours at Utrecht, with a thesis on photosynthesis in purple bacteria based on his investigations at Delft under the direction of A. J. Kluyver. He had already signalled the field in which he was destined years later to find most acclaim by two papers with Oort on the significance of wall structure for growth in *Phycomyces* sporangiophores. In 1935 he left Holland for what was then the Dutch East Indies to work first at the Upland-culture Experiment Station and later at the Deli-Proefstation of which he was Director. His career at that time seemed set in its path.

The Second World War and his capture by the Japanese put an end to the plans which he must have had in following this path and called a halt to his career, but not to his persistence in biology; for among other things he proceeded to use his biological skills in the production of "tempeh" from soya beans. On his release, he returned to Holland to work for a short time in the Laboratory of Technical Botany at Delft under the direction of G. Van Iterson, jun., until, in 1947, he became Director of the Netherlands Organization for the Advancement of Pure Science. One year later Roelofsen began his real career on his appointment, as successor to Van Iterson, as professor of technical botany at Delft. He was to prove a worthy successor to this great botanist.

Roelofsen had many interests in common with Van Iterson and, like him, became through his work and through his writings an undisputed world authority. His interest in plant cell-wall structure and cell growth led him to propound the multi-net growth hypothesis which will forever bear his name and which has been accepted by all workers in this field. His book *The Plant Cell Wall* published in 1959 not only established him for all time as a scholar of great distinction but subtly revealed a major aspect of his character, namely, an integrity which led him in fairness to discuss in detail the work of investigators whose conclusions he nevertheless profoundly distrusted. Roelofsen had many other interests on which he published extensively: pectins, pectic enzymes and enzymes generally, vitamins, alcohol bacteria, the growth of coffee plants and the production of coffee, the fermentation and storage of cocoa beans; in all of these he was equally persuasive.

Roelofsen was a man of quiet charm, with a kindly wisdom and a strong aversion for any form of outward show. He had encyclopaedic knowledge and this, with his pronounced sense of justice, his energy, his quick grasp of a subject and his perceptiveness must have made him a good head of department just as it made him a respected scientist. R. D. PRESTON

Professor Flavio Resende

PROFESSOR FLAVIO RESENDE, Director of the Institute of Botany, University of Lisbon, died on January 1. His main contributions were in the field of chromosome research and in the study of the genetic mechanisms responsible for the flowering process.

Resende was born in Portugal on February 28, 1907. He obtained his M.Sc. in biology at Oporto University in 1928, and between 1931 and 1933 he carried out research under the direction of A. Quintanilha at the University of Coimbra. After that he studied with E. Heitz at the University of Hamburg until 1937, when he obtained his Ph.D. at the University of Hamburg. During the first years of the Second World War he worked at the Kaiser-Wilhelm-Institute, Berlin-Dahlem, and in 1942 became Professor of Botany at Oporto University. In the following year he was appointed professor at the University of Lisbon where he worked until his death.

One of the first problems which interested Resende was the study of nucleolar constrictions and the formation of nucleoli. Heitz in the preceding years had demonstrated a direct relation between the number of constrictions seen at metaphase of mitosis and the number of nucleoli present at interphase. Resende was instrumental in extending this finding to more than 300 species and varieties of plants. This led him to examine in detail the structure of the secondary constrictions associated with nucleoli and to compare their morphology and behaviour with other chromosome constrictions not involved in nucleolar formation.

His detailed work on the spiralization process of chromosomes at mitosis and meiosis resulted in the demonstration of the existence of two chromonemata at anaphase in a mitotic chromosome, a phenomenon of special relevance today in connexion with DNA synthesis in chromosomes.

He investigated the effect of high temperatures on chromosome contraction, which was known to occur after exposure to low temperatures, in *Trillium*, *Aloe* and *Vicia*, and he described the differential behaviour of different chromosome regions. He also became interested in the spontaneous chromosome stickiness which occurs in the roots of *Aloe*, and leads to the formation of chromosome bridges and as a consequence to spontaneous mutation.

In the later period of his life his interest shifted mainly to the study of genetic factors involved in plant development. The action of light on the formation of roots in *Bryophyllum* and its relation to hormonal processes, as well as the physiology of development of inflorescences in the *Aloinae* were studied from many aspects. He analysed the relation between photoperiodism and hereditary factors in *Kalanchoe* and *Bryophyllum* by means of crosses.

Resende was both an excellent naturalist and an experienced cytogeneticist. His work was characterized by a broad approach to the problems of chromosome structure and behaviour. Like many of his colleagues, he was a victim of the political regime in Portugal. He was dismissed temporarily from the chair of botany at Lisbon in 1947. His co-workers dispersed; some of them left the country. He had to work in conditions that hardly allowed any serious scientific research. Resende will be remembered not only as a devoted research worker but also as a man of integrity. A. LIMA-DE-FARIA