

F. H. POLLARD (Inorganic chromatography), J. W. H. LUGG (Chromatography of organic acids), P. N. CAMPBELL AND T. S. WORK (Chromatography of peptides), F. A. ISHERWOOD (Separation of carbohydrates and phosphoric esters), J. E. FALK (Porphyrins), R. MARKHAM (Chromatography of nucleotides and related substances), J. GROSS (Thyroid hormones), T. S. G. JONES (Antibiotics and Vitamins), I. E. BUSH (Chromatography of steroids and sterols), R. R. PORTER (Chromatography of proteins), S. M. PARTRIDGE (Separation of amino acids and peptides), C. E. DENT AND J. M. WALSHE (Amino-acid metabolism). These papers also contain a wealth of useful technical information, including the use of ion exchange resins.

Paper electrophoresis and counter current distribution are not included in this collection, but that will not detract from its value for the medical specialist, for the former technique has already found its way into the clinical research laboratory and the latter is rather too elaborate to be practised there.

The publishers of the British Medical Bulletin are to be congratulated in producing this most useful review, that will undoubtedly become a frequently consulted item on the bookshelves of many a laboratory.

E. P. STEYN-PARVÉ (Utrecht)

*Symposium on effects of radiation and other deleterious agents on embryonic developments*, sponsored by The Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, April 20, 21, 1953. *Journal of Cellular and Comparative Physiology*, Vol. 43, Supplement 1, 1954.

This symposium contains papers and reports of discussions on the development of amphibian, chicken and mammalian embryos. Papers, dealing mainly with empirical features, include reports on the effect of:

(a) X-irradiation, by J. G. WILSON, by R. RUGH, by L. BRAUCH RUSSELL AND W. L. RUSSELL and by S. P. HICKS.

(b) "radiomimetic" substances, (especially nitrogen mustard), by S. P. HICKS and by D. BODENSTEIN.

(c) vitamin deficiency, by J. WARKANY.

(d) hormones by D. BODENSTEIN (sex hormones), by F. C. FRASER, H. KALTER, B. E. WALKER AND F. D. FAINSTADT (cortisone) and by W. LANDAUER (insulin).

(e) various chemicals, by W. LANDAUER (sulfanilamide, boric acid, eserine, pilocarpine and thallium).

Furthermore, some effects of the atomic bomb blast in Nagasaki are reported by J. N. YAMAZAKI, S. W. WRIGHT AND PHYLLIS M. WRIGHT. They found, among the fetuses, neonati and children of 30 exposed, pregnant women, a total number of 13 deaths. Another important practical feature is RUGH's warning, given to clinical radiologists against exposing women to X-rays for diagnostic purposes, since the developing central nervous system is highly sensitive (HICKS) and damage may be caused in the first weeks of pregnancy; a similar warning may be given against the use of drugs like sulfanilamide.

Apart from these empirical and morphological aspects of the problem, much attention is given to the causal mechanism of the developmental aberration. The specific period, during which the embryo is exposed to deleterious agents, may be of primary importance for the occurrence and the nature of the abnormalities. This experience is expressed by the concept of specific, sensitive, "critical periods" of development, which concept is critically discussed in this symposium. B. H. WILLIER, in an important and clear survey, defines 5 main phases of development, divided again in a series of steps, each of which might be a "critical period", but he emphasizes that all changes, either structural or functional (and physicochemical), occur continuously, so that critical periods cannot be sharply demarcated. His statement that "the causal analysis of the underlying events has not yet been explored on a scale commensurate with its great importance" summarizes also the opinion of several other participants. PAUL WEISS pointed to the many variables complicating the problem and emphasized that not only the mitotic period is sensitive. A review on radiotracer work in embryology is given by J. N. DENT AND E. L. HUNT.

The report of this symposium, where such widely different specialists as biochemists, radiologists, pathologists, embryologists and geneticists were present, is very valuable for all who are interested in this particular problem, especially since discussions are included.

G. TEN CATE (Amsterdam)