interact with its receptors in a chelated state (Schwyzer, 1963). The fact that the chelation complex is formed in a 1 to 1 ratio would indicate that the hydroxyl group of the tyrosine residue would be involved. This hydroxyl group has also been found essential for the biological activity of the polypeptide (Bumpus, Khairallah, Arakawa, Page & Smeby, 1961) and also could be involved in the formation of the drug-receptor complex (Walaszek & Dyer, 1966).

The flavonoid compounds have the ability to chelate bivalent metals and it could be possible that osajin irreversibly antagonises the action of valyl[5] angiotensinamide II by complexing a metal which is an integral part of the angiotensin receptor since, like the polypeptide, osajin also contains in its molecular structure a free hydroxyl group.

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March 24, 1966

References

Bumpus, F. M., Khairallah, P. A., Arakawa, K., Page, I. H. & Smeby, R. R. (1961). *Biochim. biophys. Acta*, **46**, 38–44.
Geissman, T. A. & Hinreiner, E. (1952). *Bot. Rev.*, **18**, 77–164.
Schwyzer, R. (1963). *Pure appl. Chem.*, **6**, 265–295.
Walaszek, E. J. & Dyer, D. C. (1966). Polypeptide Receptor Mechanisms: Influence of pH, in *Hypotensive Peptides*, New York: Springer Verlag.

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Book Review

REMINGTON'S PHARMACEUTICAL SCIENCES, 13th Edition. (RPS XIII.) Pp. xii + 1954 (including Index and over 1000 illustrations). Mack Publishing Company, Easton, Pa., U.S.A., 1965. In Great Britain: John Wiley & Sons, Ltd., London. 212s.

In this new edition of *Remington's Pharmaceutical Sciences* there are 100 chapters, written mostly by separate authors, covering the economic, professional and scientific aspects of pharmacy. The volume is intended both as a text book and as a reference book but as these two functions are clearly separate one wonders what advantage is to be gained by retaining a single mammoth volume. The physical bulk of Remington demands a substantial space on a firm table and this restricts its use as a convenient reference book.

The book is divided into nine parts: Orientation, Physical Pharmacy, Pharmaceutical Manufacturing, Pharmaceutical Chemistry, Pharmaceutical Products, Biological Products, Radiopharmacy, Testing and Analysis, Professional Practice. The layout of material follows the previous editions.

One cannot fail to be impressed by the coverage achieved and the enormous effort involved in the preparation of this book. It is unfortunate however that there is some unnecessary duplication of material particularly in the Physical Pharmacy section. Three different authors have contributed chapters on Surface Activity, Colloidal Dispersion and Emulsification respectively and the same concepts of surface tension are discussed on pages 254 and 284. Gibb's Adsorption theory appears in three different places, pages 257, 273 and 284. On page 286 neither the definition of zeta potential nor Fig. 257 is clear.

The chapter on Rheology (pp. 305–316) would give a student an elementary introduction to the interpretation of flow curves of non-Newtonian materials and emphasises the limitations of "one-point" methods such as the use of the Ostwald viscometer. The latter part of the chapter would have been improved if line diagrams had replaced reproductions from manufacturers' catalogues. It is implied on p. 308 that kinetic energy corrections are required only for kinematic viscosity measurements but not for dynamic viscosity measurements.

In the following chapter on Separation Methods, much of the material in earlier editions is retained, for instance under Filtration one is informed pictorially of the difference between a plain funnel, a ribbed funnel and a hard rubber funnel. This type of catalogue information could well be deleted.

The term "biopharmaceutics" has been coined in the United States for the study of the relationship between chemical and physical properties of a drug and the biological effects observed following administration of the drug in its various dosage forms. In the chapter under this heading, Doluisio and Swintosky discuss the general theory of penetration of drugs through biological membranes based on the lipid solubility of un-ionised drug moieties. The metabolic, storage and transport phenomena which may occur after a drug is administered are briefly discussed together with the factors influencing the route of administration. The factors involved in the design, preparation and evaluation of prolonged action pharmaceuticals are intelligently discussed by Ballard and Nelson although much of the basic information on the nature of membrane permeability duplicates material in the biopharmaceutics section. There are 264 references and tables of proprietary slow release products.

An interesting chapter on the formulation of new drugs in suitable dosage forms is contributed by T. J. Macek. Problems of particle size, crystal form and interaction with excipients are discussed and should alert the student to the kinds of problems he may meet in practice. The section entitled Pharmaceutical Manufacturing (Part III), describes the small scale manufacture of solutions, extracts, powders and tablets. The chapter on ophthalmic solutions includes a discussion on the anatomy and physiology of the eye so that formulation of eye preparations is related to the biological aspects. Details of buffers, viscosity adjustment, preservation and contact lens solutions are given.

Part V has nearly 500 pages and is devoted to Pharmaceutical Products, grouped in relation to their main pharmacological properties and therapeutic uses. Products in the U.S.P., N.F., B.P. and Ph.I. are included, together with explanatory information which is complementary to the official monographs. The comprehensive compilation of pharmaceutical products in this section and in the section on Biological Products make Remington an essential reference book for those engaged in formulation.

Pharmacy students in this country will find certain sections particularly useful as there is no equivalent treatment in British textbooks, e.g. colouring and flavouring agents, tablet coatings, sustained release products, quality control in production and pesticides.

On the title page Remington is described as "A treatise on the manufacturing, standardising, dispensing of pharmaceutical products with biological and chemical properties and tests, assays uses, and doses; also a guide to the legal obligations of the pharmacist and the professional services rendered in helping to maintain community health. . . . A textbook and reference guide for pharmacists, physicians and other medical scientists". This is a fair description.

J. E. CARLESS