

rated to dryness *in vacuo* to yield 540 mg. (58.3% yield)⁷ of oily free amine. The neutral ether extract was washed with 15 ml. of saturated salt solution, dried (MgSO₄), and taken to dryness *in vacuo* to yield 280 mg. of a neutral yellow oil.

The free amine in 10 ml. of ether was treated with 4 ml. of ether saturated with HCl, and the mixture was taken to dryness.

(7) The yield of Grignard reagent estimated by titration was ca. 65-70%. Therefore, reaction with isobutoxymethylenedimethylamine must have occurred in good (80-90%) yield.

The gummy residue was dissolved in ethanol, treated with charcoal, and filtered through Celite. The filtrate, when boiled down to a small volume, diluted with ether to the point of cloudiness, and scratched, yielded 460 mg. (43.8%) of amitriptyline (II, X = CH₂N(CH₃)₂·HCl), m.p. 180-185°.

The 280 mg. of neutral oil on chromatography over 25 g. of basic alumina yielded on elution with hexane 127.4 mg. of crystalline coupled hydrocarbon II [X = ()], m.p. 121-124°, λ_{max}^{acet} 207 mμ (ε 86,500) and 239 (23,400).

Anal. Calcd. for C₃₁H₃₀: C, 93.11; H, 6.89; mol. wt., 439. Found: C, 92.81; H, 6.73; mol. wt., 443.⁵

Book Review

Psychopharmacological Agents. Volume I. Edited by MAXWELL GORDON (Volume IV in the series, Medicinal Chemistry, G. de Stevens, Ed.). Academic Press Inc., New York, N. Y. 1964. xvi + 678 pp. 23.5 × 16.5 cm. \$23.50.

In the last decade the pace of expansion of medicinal chemistry has been stepped up so rapidly that a reasonably thorough coverage of any one of its many areas is no longer feasible except in specialized monographs. The present volume is the first of two devoted to the drugs which influence the state of the mind, and which have brought about revolutionary changes in the treatment of mental diseases.

The book has been written by and for medicinal chemists and pharmacologists who are interested in psychopharmacological agents. Each chapter starts with the background of the discovery of the type of drug under discussion. In some cases a follow-up on ancient folklore has been operative, in others the observation of certain types of psychopharmacological side effects of established drugs with unrelated activities. More often, however, there has been a lack of causative mind processes which opened a new field to investigation. These stories are being told by the very men to whom these discoveries are credited, and thus they form an authentic documentation of those early researches. An excellent account of the chemical derivations of the drugs, their syntheses, steric considerations, and structure-activity relationships is presented in each chapter. These sections are followed by carefully compiled and restrained sections on the general and psychopharmacology of each major drug, and often, many of its congeners. The fine shades of symptomatic differences in the animal experiments are considered together with basic actions which might explain the observed symptoms. Side effects are listed detachedly, and these particular sections attest to the highmindedness of the many investigators in an extremely competitive industry.

The *in vivo* fate of the major drugs has given much insight into the mechanism of action of the various agents, and in some cases, has led to the discovery of activation by metabolic alteration.

Some of these studies are among the best contributions of biochemistry to modern medicinal science.

Although, or perhaps because, the book represents a close-to-ideal cooperative effort of chemists and experimental biologists, sections on the clinical applications of the drugs described have been held at a minimum. They survey the clinical utility, advantages, and disadvantages of the major drugs for mental diseases, but do not give the psychiatrist or the general practitioner quite enough information for the use of these drugs on his patients. However, excellent lists of clinical references make up for this intended deficiency.

The first volume presents all types of psychopharmacological agents except the phenothiazines which will fill Volume II as a monograph on this topic. Among the subjects in Volume I are the Rauwolfia drugs, the dibenzazepines, meprobamate, chloro-diazepoxide and related compounds, the lead compounds and congeners of the methylphenidate and pipradol group, piperazine derivatives, thioxanthenes, benzimidazoles and related systems, and all types of inhibitors of monoamine oxidases. Chapters on benactyzine and on psychotomimetic compounds make strange bed-fellows in this sound assembly, but seem to have been included as fringe benefits for the reader. The list of authors reads like a Who's Who in psychopharmacological science; the editor has done an unusually conscientious job to unify the thirteen chapters into a continuous and homogeneous whole. A complete author index and a subject index add to the utility of the book.

This review was written on the sand of Waikiki Beach on an April Sunday, while the reviewer tried to relax from a full week's laboratory work on the biochemistry of some of the very drugs described in this volume. It must be reported that reading about these drugs, without sampling some of them, did not facilitate mental concentration in the presence of the many vital and absorbing distractions in the natural environment.

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