

# REVIEW OF REVIEWS<sup>1</sup>

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A few years ago I gave a short report on the questionable progress and present problems of primary journals (*J. Chem. Doc.* 10:27-29, 1970). My purpose was to propose a study of ways to get rid of the burden of primary journals by developing current technology on an international scale by the recording, storage, and retrieval of bit-by-bit scientific information, quite as is done so well in airline reservations. Further, my purpose was to promote the use of reviews, either periodically or in monographs. I advocated the specific training of library scientists for the writing of reviews on items of current interest.

Eugene Garfield, the keen documentalist who founded the very successful Institute for Scientific Information (ISI), has long been interested in these matters. The services offered by ISI are indicative of what can be done. The financial success of ISI testifies to satisfaction with its services. Reviewing has now become such an important part of the science enterprise that ISI is offering an annual index of scientific reviews. It is a huge compilation!

In the nearly half a century of *Annual Reviews*, scientists generally have become fully aware of the significance of reviews, both in orienting novices in a field, and in keeping scientific workers abreast of progress in their respective areas. *Annual Reviews* has set a high standard of reviewing excellence, and its various editorial boards deserve much praise for their achievement. Special thanks and honors are always due Murray Luck and his devoted staff for initiating *Annual Reviews* and for maintaining them so well for so long.

## GENERAL

In a recent survey of about 2000 acknowledged pharmacologists, 91% were found to have doctoral degrees; 92% are males; 7% are from various minorities; about half hold positions in medical schools; and about a fourth are in the drug industry. I would say that about 15% are in schools of pharmacy.

<sup>1</sup>This review was completed July 1, 1975, for material available at that time. References are cited by author, without numbering. Names are arranged alphabetically for convenience.

Drug-transport processes were reviewed in 23 contributions to a London conference edited by Callingham. The role of nutrition in drug-metabolizing enzyme systems was surveyed by Campbell & Hayes in regard both to macro and micro nutrient deficiencies. Some 27 reviews on endocrine aspects of malnutrition were edited by Gardner & Amacher.

A useful review of bibliography on foreign drug identification was given by Closson. Dancis & Hwang edited 18 discussions on problems and priorities in perinatal pharmacology. A more comprehensive survey of basic and therapeutic aspects of perinatal pharmacology was edited by Morselli, Garattini & Sereni. Farnsworth and associates reviewed the potential value of plants as sources of new antifertility agents. With 43 references, Silverman surveyed fetal and newborn adverse drug reactions. Susman edited many case reports dealing with various aspects of drug use and social policy.

A series of 19 discussions on insolubilized enzymes was edited by Salmona, Saronio & Garattini. These dealt with fiber entrapment, artificial membranes, and drug-release devices. Schmitt, Schneider & Crothers edited 16 discussions on functional linkage in biomolecular systems, with much on transductive coupling.

Popular is sophisticated methodology for approaching pharmacological problems. Frigerio & Castagnoli edit 34 descriptions of mass spectrometric methods involving many types of drugs, and usually including gas chromatography. Industrial aspects of enzymes and drug actions are discussed at length in 48 reports edited by Spencer.

## PHARMACOKINETICS AND DRUG INTERACTIONS

In discussing drug interactions, Cohen & Armstrong advise adjusting dosage and mode of administration to reduce interactive potential. They offer much tabular data and consider mechanisms. Morselli, Garattini & Cohen edit 37 essays on drug interactions, from absorption to microsomal enzymes and protein binding. With 72 references, Suffness & Rose discuss adverse effects related to aspirin, from ulcerogenic to ion imbalance.

Csaky edits 20 reviews on intestinal absorption and malabsorption, ranging from membrane-bound enzymes to the "brush border" and the influence enterotoxins. Lauterbach reviews absorption and secretion of drugs by mucosal epithelium of the gastroenteric tract. Saunders offers an outline review of the absorption and distribution of drugs, with special reference to anionic drugs and to uncharged drugs.

Metabolism of tobacco alkaloids is reviewed by Gorrod & Jenner. Age and exposure factors in drug metabolism are surveyed by Hanninen. With 109 references, Jerina & Daly reveal that many aromatic organic compounds metabolize to potentially carcinogenic arene oxides. With appropriate dedication to the memory of Wallace O. Fenn (1893-1971), Nahas & Schaefer edit 31 essays on carbon dioxide in relation to metabolic regulation. Using 95 references, O'Brien gives tabulated data on excretion of drugs in milk. The rectal administration of drugs is reviewed by Senior.

## CHEMOTHERAPY

Chemotherapeutic interest seems to be centering on cancer control. Clark introduces a Houston symposium on the pharmacological basis of cancer chemotherapy. This includes discussions on drug design by Ariens, with 73 references, and by Cheng with 261 references. Toxicity aspects are well covered by Sieber & Adamson with 297 references. Mechanisms of action of antimicrobial and antitumor agents are analyzed by Corcoran & Hahn in regard to interference with nucleic acid, protein, and enzyme biosynthesis. A series of 33 contributions on differentiation and control of malignancy of tumor cells is well edited by Nakahara, Sugimura, Ono & Sugano. With much on alkylating agents and cell kinetics, Sartorelli & Johns edit discussions on antineoplastic and immunosuppressive agents. A series of 31 full reports on adenine arabinoside as an antiviral agent is edited by Pavon-Langston, Buchanan & Alford.

## AUTONOMIC NERVOUS SYSTEM

Ablad and associates edit a comprehensive symposium on "metoprolol," another new adrenergic  $\beta$ -1-receptor antagonist. Magnani edits 15 reports on  $\beta$ -adrenergic blocking agents in the management of hypertension and angina pectoris, with much on "timolol maleate," another new one. With 423 references, Paul, Miller & Trendelenberg review molecular geometry in relation to adrenergic drug activity, emphasizing stereo selectivity at receptors, as well as enzyme selectivity. They conclude that for  $\beta$ -adreno-receptor antagonists, the stereochemical explanation still holds.

Brimblecombe reviews drug actions on cholinergic systems for both peripheral and central muscarinic and nicotinic sites, and with much on anticholinesterase agents. A comprehensive survey, with 51 reviews on cholinergic mechanisms is well edited by Waser. This included morphology of cholinergic synapses, estimation of cholines, their pharmacokinetics, enzymes in synthesis and degradation, transmitter action on receptors, anticholinesterase poisoning, and pharmacological and behavioral aspects.

## CENTRAL NERVOUS SYSTEM

Social aspects of the medical use of psychotropic drugs were reviewed in a volume edited by Cooperstock. A full survey of benzodiazepines was edited by Garattini, Mussini & Randall. Dealing mostly with chlordiazepoxide and diazepam, it includes biochemorphology, pharmacokinetics, antianxiety actions, muscle-relaxing effects, sleep, and antiaggressive action. Triazolo derivatives are described in relation to central nervous system depression, and interactions with other drugs are discussed. With 128 references (1974), Hartshorn reviews drug interactions with monamine oxidase, and with 78 references (1975) he surveys anti-anxiety drug interactions. Tolerance among these drugs seems to be induced by microsomal enzyme reactions. With 34 essays, Usdin edits an important volume on the neuropsychopharmacology of monoamines and their regulatory enzymes. This includes much on dopamine.

Mandell edits 16 important surveys of neurobiological mechanisms of adaptation and behavior in relation to psychotropic drugs.

Gibbins and colleagues at the Toronto Addiction Research Foundation begin a series of volumes on research advances in alcohol and drug problems. The first includes reviews of methods, of marihuana, of narcotic addiction, and survey data on alcohol use. Gross edits proceedings of 30th congress on alcoholism, dealing with alcohol intoxication and withdrawal, with mechanisms of tolerance, and with human experimentation.

With 394 references, Kostrzewa & Jacobowitz review pharmacological actions of 6-hydroxydopamine, finding that in high doses it induces peroxides and destroys neurons. In an unusual volume of 39 essays, Sandler & Gessa edit much material on the pharmacology of sexual behavior, especially with humoral, endocrine, serotonin, and aminergic mechanisms. Zimmermann & George edit 18 surveys regarding narcotics and the hypothalamus, including mechanisms of action of narcotics on the diencephalon, effects of morphine on neuroendocrine regulation, and effects of blood-brain barriers on narcotic action. Munkvad surveys mechanisms of action of psychopharmacological agents on behavior.

Siva Sankar edits a comprehensive review on LSD. With 84 references, Hoskins reviews the current status of anti-epilepsy drugs. In surveying the use of lithium salts in psychiatry, Shopsin & Gershon advise. Vernadakis & Weiner edit 28 contributions to our knowledge of the action of drugs on developing brains.

## ANESTHESIA

A new serial publication, *Progress in Anesthesiology*, is inaugurated by a volume of 46 contributions on molecular mechanisms of anesthesia edited by Fink. These are grouped by neuronal systems, physicochemical models, high pressure, biochemical studies, cellular systems, and cardiac muscle studies. With 78 references, Aviado reviews the regulation of bronchomotor tone during anesthesia. Brunner, Cheng & Berman review the effects of anesthesia on intermediate metabolism. Gyermek & Soyka, in surveying steroid anesthetics, using 92 references, conclude that dione steroids have advantages in low toxicity with little cardiac or respiratory depression. Ketamine anesthesia is reviewed by Lanning & Harmel. Larson and associates survey anesthetic effects on cerebral, renal, and splanchnic circulations. With 185 references, Rowe analyzes the response of the coronary circulation to various drugs used in anesthesia, finding increases with ketamine, barbitals, atropine, epinephrine, dopamine, guanethidine, and papaverine. Ueda, Shieh & Eyring note that anesthetics expand membrane areas. In reviewing local anesthetic effects on vascular smooth muscle, using 180 references, the Alturas find that local anesthetics stabilize cell membranes.

## CARDIOVASCULAR-RENAL

Anderson & Kepler, with 96 references, review thiazide diuretics. With 472 references, Bennett, Singer & Coggins offer a guide to drug therapy in renal failure.

Davies & Wilson survey mechanisms of action and clinical applications of various diuretics. Murray & Goldberg warn about renal disease from analgesic abuse.

Doherty & Kane survey the clinical pharmacology of digitalis glycosides. Donoso edits a two-part review of the many drugs used in cardiology. Øye reviews the status of cyclic AMP in cardiovascular pharmacology. With 86 references, Porter reports on digitalis toxicity.

Appropriately, Page & Bumpus edit a comprehensive survey on angiotensin. Regoli, Park & Rioux use 354 references in reviewing the pharmacology of angiotensin, with comments on the biochemorphology of three-dimensional structures in receptor theory. With 729 references, Schwartz, Lindenmayer & Allen review the pharmacological aspects of  $\text{Na}^+ - \text{K}^+$  adenosine triphosphatase, raising the question as to whether or not it may be a receptor for digitalis, and showing the wide range of drugs modifying its action from mercurial diuretics to dimethylsulfoxide (DMSO). The Meisels question whether or not adenosine may be a mediator for coronary circulation regulation and for efficiency of coronary dilators.

## TOXICOLOGY

An important comprehensive account of uranium, plutonium, and transplutonic elements has been carefully edited by Hodge, Stannard & Hursh. This gives full details on toxicity, protective criteria, monitoring, body burdens, excretion, biomedical properties, and assays. The toxicology of nonradioactive heavy metals and their salts is described by Venugopal & Luckey.

Toxicological analysis of drugs in biological specimens is reviewed by Goldbaum & Dominguez, while Koles surveys microcrystal tests for drugs. Bastos & Mule describe uses of fluorescence in toxicological analysis while Feldstein does likewise for polarography.

Ciegler reviews occurrence, chemistry, and activity of mycotoxins. Wolfe & Devries survey oxygen toxicity.

## CLINICAL

With 134 references, Duhme, Greenblatt & Miller review the pharmacology of essential hypertension, while Fozard reviews the pharmacology of drugs used in treating migraine. Glenn edits 24 reviews on the use of steroids in shock, including discussions on cardiovascular actions of corticosteroids and their use in circulatory shock. Lithium therapy is reviewed by Greene. With 126 references, Holloway considers drug problems in geriatric patients. Parratt reviews pharmacological approaches to angina therapy. Pories, Strain, Hsu & Woosley edit reports on clinical applications of zinc metabolism, with much on zinc sulfate therapy.

## MISCELLANEOUS

Gastric antisecretory and anti-ulcer drugs are reviewed by Bass, and Bennett reviews prostaglandin antagonists. Robinson & Vane edit 28 reviews on prostaglandin

synthetase inhibitors, especially aspirin, antipyretics, and indomethacin. Bennett & Aberg edit a symposium on hormonal and antifertility action of silicon derivatives, such as 2,6,*cis*-diphenylhexamethyl-cyclotetra siloxane. The effect is antigonadotrophic.

Carter edits discussions on inhibitors of viral functions, with much on interferon and amantadine, while Parkes gives a full review of amantadine which blocks entry of virus into cells. With 212 references, Coburn, Hartenbower & Norman review the metabolism and calcium homeostatic action of hormone vitamin D. Hellon surveys monoamines, pyrogens, and cations with regard to their effects on the central control of body temperature. Lomax, temperature regulation and drug action, covering 46 reports.

Scherrer & Whitehouse edit 11 reports on anti-inflammatory agents, including aryl-carboxylic, alkanolic and enolic acids, sulfonamides, gold compounds, steroids, colchicine, and allopurinol. They then edited 10 surveys on the evaluation, kinetic metabolism, and toxicity of such agents.

Howe reviews hypolipodaemic agents. Jacob & Herschler edit an important symposium on the biological actions of DMSO. This includes reports on its mechanisms of action, toxicity, metabolism, effects on tumor systems, use in agriculture and in radiation and cold protection, effects on the central nervous system, and its clinical potential. Rando, with 34 references, reviews the enzymology of " $k_{cat}$ " inhibitors. This is a catalytic constant reflecting the probability that substrate molecules once bound may be converted into a product. He notes that an acetylene moiety, as in pargyline and its derivatives, irreversibly inhibits monamine oxidases. Vogt reviews the activation of pharmacologically active products of complement. With 38 references, he notes 9 components acting sequentially in a properdin system activating lipopolysaccharides.

## LOOKING AHEAD

Reviews of pharmacological information will continue to increase in number and importance. Fortunately, the annual *Index to Scientific Reviews* issued by the Institute for Scientific Information in Philadelphia will help greatly in locating and using them.

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