Trypanosoma cruzi in the Treatment of Cancer

Biotherapy of Malignant Tumors. N. G. Klyuyeva and G. I. Roskin. Translated from the Russian edition (Moscow, 1957) by J. J. Oliver. W. J. P. Neish, Ed. Pergamon, London; Macmillan, New York, 1963. x + 315 pp. Illus. $12.

This translation is published 6 years after the Russian edition. The book has not been revised or brought up to date in translation, with the exception of a short section (with four references) which summarizes the work of French clinicians using a preparation of *Trypanosoma cruzi*. None of the remaining 344 references in the bibliography refer to work reported after 1957.

This book is a poorly prepared tract, whose purpose is to create interest in the use of *Trypanosoma cruzi* (the trypanosome causing Chagas' disease) in the treatment of cancer. Poorly controlled and presented observations and uncritical statements together with wordiness, irrelevant detail, and repetitious arguments make it difficult to avoid an early categorical judgment—but a reviewer must read on.

The authors believe that it "is possible to isolate from *T. cruzi* a substance which is harmless to normal tissue but selectively active against human malignant tumors." In describing their approach to cancer therapy, they superficially review attempts to treat cancer by biotherapy: studies with Coley's toxins, bacterial polysaccharides, diphtheria toxin, tuberculin, bacteriophages, viruses, bacteria and fungi, and various antibiotics. Pages 55 to 217 are devoted to a review of their clinical results with preparations of *T. cruzi*, including details of histological and histochemical change in the cancer cells produced by the treatment. During the period 1948 to 1951, 24 patients with lip cancer and 73 women with breast cancer were treated with these preparations; several miscellaneous types of cancer were treated prior to this period. Many patients had early and localized disease, and the case reports are redundant, inconsistent with respect to the type of detail presented, and often lack information that, by American standards, is essential. The authors state that their patients, apparently free of disease for 5 years, were examined by a special committee of the Presidium of the Scientific Council of the Ministry of Health of the U.S.S.R. in 1955. This would seem to be an unusual procedure, and although the committee's statement about an individual case is included in the report of that case, the overall report of the special committee is not mentioned.

The book concludes with a disjointed account of animal experiments, the attempts to standardize the preparations, and the results of a number of random experiments. The authors appear to be critical of the deficiencies in their work, and they have a section entitled "Defects in observation."

The reporting of their clinical results is poor. The cases are not summarized in an orderly manner. The use of the *T. cruzi* preparation is discussed as a prophylactic procedure, although there is no convincing evidence that it has inherent activity against cancer in man. It is stated, for example, that in treating breast cancer ". . . relatively prolonged effects were obtained from the use of the preparation only after the clinicians started to resort to the excision of the primary tumor nodule to the extent of the macroscopically affected tissue, carrying out this doubly palliative interference during an uninterrupted course of intramuscular injections of the trypanosome preparation." How can one separate the therapeutic results of the surgery alone from any additive benefit from *T. cruzi* injections, without the use of control patients? In another case, patient Z had difficulty swallowing, and although a biopsy was not taken, the patient was started on the *T. cruzi* treatment. Within 5 days the x-ray appearance of the esophagus by barium swallow was restored from a slow passage before treatment to a normal flow, and 3 years later the patient was well. The authors conclude that this observation "established the positive effect of the preparation on a condition of the esophagus clinically interpreted as cancer. . . ." In analyzing their animal as well as their clinical work, the authors appear to have no conception of the need for statistically interpretable data and sound clinical experience as the basis for valid conclusions.

The bibliography is carelessly prepared; in some of the references the year of publication is omitted, in others the name of the journal or the pagination of the article; perhaps worse than this, an author, referred to in the text, is not in the bibliography. If research on the biotherapy of cancer, as defined by the authors, is to contribute to the care of the cancer patient, the quality of work will have to be conducted on a level much higher than that reported in this book. A book translated and published in an elaborate format such as this one, demands attention. But after reading this book, I can only feel a little bitterness at having wasted my time; there is, however, some consolation—perhaps my review will help save others from a similar experience.

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Organic Chemistry

Technique of Organic Chemistry. A. Weissberger, Ed. vol. 11, pts. 1 and 2, *Elucidation of Structures by Physical and Chemical Methods.* K. W. Bentley, Ed. Interscience (Wiley), New York, 1963. pt. 1, x + 665 pp. $19.50; pt. 2, x + pp. 643–1181. $16.50.

"Organic chemistry, from its very beginning, has used specific tools and techniques for the synthesis, isolation, and purification of compounds, and physical methods for the determination of their properties. Much of the success of the organic chemist depends on a wise selection and a skillful application of these methods, tools and techniques. . . ." This statement is from the general editor's introduction to the series "Techniques of Organic Chemistry." The two books that constitute volume 11 of the series will play no small part in helping the organic chemist to make the wise selection and the skillful application of the experimental techniques necessary for his success.

The material in the two parts of volume 11 can be divided into four categories. Chapter 1 deals with the isolation and purification of organic compounds. Chapters 2, 3, and 4 treat the main physical methods for obtaining structural information. Chapter 7 discusses the use of biogenetic theory to make intelligent guesses about the structure of natural products. The remaining 13 chapters are devoted to chemical methods of structural analysis.

The main emphasis is on the determination of the structure of natural products, and the authors of each chap-

ter have done an excellent job of reviewing the use of the various techniques available for making such determinations. In my opinion, this book is also one of the best compilations of methods for determining the structure of organic compounds in general that is presently available. Chapters 2 through 5 (on ultraviolet, infrared, nuclear magnetic resonance, and mass spectroscopy, respectively) form a compact introduction to the applications of these tools in organic chemistry, which could be read with profit by every student in this field. Another example of the general utility of this volume is the excellent treatment (in Chapter 6) of the interplay of inductive, resonance, and steric factors in determining the acidity and basicity of organic compounds.

The various topics treated in the chapters devoted to chemical methods will be of general usefulness to the organic chemists, even though the specific examples of their use are usually natural products. The chemical methods treated are detection and protection of simple functional groups, reduction and hydrogenation, dehydrogenation, zinc dust distillation, alkali fusion, carbon-oxygen and carbon-nitrogen bond fission, degradation of polypeptides and proteins, degradation of side chains, stereochemistry, and molecular rearrangements.

This volume certainly belongs in every scientific library, and many practicing chemists will want to own their own copy.

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Undergraduate Textbook

University Mathematics. Robert C. James. Wadsworth, Belmont, Calif., 1963. xiv + 924 pp. Illus.

Despite a reasonable first conjecture that the reader may form on viewing the title, type-size, and bulk of this book, the volume is designed as a textbook for use in the first 2 years of undergraduate instruction in mathematics. It opens with a substantial chapter that introduces the basic ideas and techniques of the calculus and serves as a preview of the course without bothering overmuch about finer points; many science departments request that their students have these tools early in their first term, a request that this chapter meets. Following this, we start from fundamentals: sets, relations, functions, logic, probability, the finite cardinals, an outline of the development of the number system, and a discussion of the real number system.

The least upper bound axiom leads naturally to limits and continuity (chapter 5), and from this point on the subject matter could be described, fairly and briefly, as an unusually careful, complete, and detailed "calculus and analytic geometry—with vectors," except for chapter 12, which is a substantial introduction to linear spaces, transformations, and their associated matrices.

It seems clear that the book was written with a rather above average student in mind, that an average student would find it a rather stiff dose (although his instructor might profitably consult it), but that it deserves consideration if your primary concern is with students of fairly high ability.

The only lapse noted in the author's general carefulness is in section 7-4 where, without comment, we find ourselves considering partitions of the interval $[a, b]$ with $a > b$.

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Malnutrition

Mild-Moderate Forms of Protein-Calorie Malnutrition. Symposia of the Swedish Nutrition Foundation held at Båstad in August 1962. Gunnar Blix, Ed. Almquist and Wiksell, Stockholm, 1963. 159 pp. Illus. Kr. 35.

The Swedish Nutrition Foundation was created in 1961 to bring together scientific, industrial, and government organizations interested in nutrition. Among its activities is the holding of an annual symposium on a topical subject. The first meeting was held in Båstad, 29 to 31 August 1962, and the proceedings of that symposium have been published under the title *Mild-Moderate Forms of Protein-Calorie Malnutrition.*

It was judged appropriate to initiate the series with a study of the most widespread nutritional syndrome in the world today. The organizers probably wished to also emphasize that, in addition to the full-blown kwashiorkor and marasmus, there are a number of mild and intermediary conditions which, like the submerged part of an iceberg, comprise the great mass of this important threat to the welfare of the children of the world.

This slim, attractive book, well edited by Gunnar Blix, contains the following chapters: "Nutrition research and food production," "Clinical signs of mild-moderate protein-calorie malnutrition of early childhood," "Biochemical signs of mild-moderate forms of protein-calorie malnutrition," "Metabolic disturbances in protein-calorie malnutrition," "Production and control of oedema," "The Swedish project concerning a children's nutrition unit in Ethiopia," "The evaluation of the nutritive value of proteins," "Minimum requirements of calories and protein in different age groups," "Adaptation to suboptimal nutrition with respect to protein and calories," "The vicious-circle mechanism in production of protein-calorie malnutrition," "The influence of protein-calorie malnutrition on psychological test behavior," "Methods for the determination of physical capability," "The assessment of protein-calorie malnutrition of early childhood as a community problem," "The utilization of protein-rich foods in the prevention of protein-calorie deficiency diseases."

Particularly outstanding are the chapters by Jelliffe and Welbourne, Waterlow, Dean, Bigwood, and Cravioto and Robles. Jellife greatly clarifies the marasmus-kwashiorkor relationship and gives a workable classification of signs and symptoms. Waterlow gives a neat summary of metabolic and, more specifically, body composition changes in protein-calorie malnutrition; Dean, one of the edema picture in this syndrome. Bigwood, one of the great scholars in the field of nutrition, whose scientific life-span has embraced almost the entire period during which the field of modern nutrition was developed, brings his long experience to bear on the evaluation of the nutritive value of protein, and he presents a clear and cogent criticism of some of the short cuts to the appraisal of diets, which have recently appeared in the literature. Cravioto and Robles provide an interesting discussion of aspects of the often neglected psychological consequences of protein-calorie malnutrition. The excellent chapter by the Jellifes, on practical tests to appraise malnutrition in young