amples of each somatotype, at various ages, plus the age-weight-height data mentioned. If you are against the man or his system, then the college-weighted sample, the subjective though reproducible ratings, the attempt to provide norms with inadequate material, and the tasteless zoo approach may elicit a dangerous cardiac response.

Either way, you will not find a definition of the somatotype other than something between the phenotype or the genotype, nor direct information bearing on the permanence of the somatotype, nor proof that an endopene or an endomorph is not simply an individual habituated to markedly different patterns of food consumption and energy expenditure.

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Anatomy of Weeds. Emil Korsmo. Grondahl, Oslo, 1954. 413 pp. Illus. Kr. 100.

Emil Korsmo terminates his lifework in the field of weed biology by publishing this book containing anatomical descriptions of 95 weed species with 2050 original drawings. The anatomical structure of the stem, leaf, and underground parts is illustrated and described for each species. In addition, a short description is given of the external morphology of the plant, together with its means of multiplication and dispersal and its distribution.

Almost all the 95 species included are present as weeds in the agricultural areas of northeastern North America. Of those weeds classified as "primary noxious" under the Seeds Act of Canada or of the State of Indiana, at least two-thirds of them are treated in this volume. It illustrates and describes the anatomy of 25 of the 94 species contained in *Some Important Michigan Weeds* [Special Bull. 304, Michigan State College (1951)], and of 26 of the 165 species contained in *South Dakota Weeds* [South Dakota State Weed Board Pub. 5 (1950)].

Folio in size, the book is printed in English on coated paper stock. The text is well-written and the plates are very well reproduced. Korsmo is to be congratulated for compiling this information on plant anatomy, and it will be of real value to all workers dealing with weeds.

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The Compleat Strategyst. Being a primer on the theory of games of strategy. J. D. Williams. McGraw-Hill, New York–London, 1954. xiii + 234 pp. Illus. $4.75.

In this book the theory of games of strategy, applied to two-person games, has found an unsurpassed popular exposition. The author is chief of the mathematics division of the Rand Corp., which has done a formidable amount of research on most branches of game theory and its applications, primarily to military problems. He is therefore writing from the basis of unique experience; but in addition he brings unusual abilities to bear on his task, which is to give a simple, accurate account of a difficult theory.

The two-person situation, characterized by a conflict in the interests of the two parties (not necessarily individuals), is basic for the understanding of game theory. In this book it is explained in its many facets with great clarity. The fundamental concepts of the theory, such as saddlepoints, pure and mixed strategies, payoffs, value of a game, and so forth, are all presented in such fasion that a reader willing to do a moderate amount of thinking and to use elementary arithmetic (not more!) can get a good grasp of these notions. This is accomplished by means of interesting illustrations that are aptly used, often in a very humerous manner; they are further enlivened by the excellent cartoons of Charles Satterfield. The author shows the wide diversity of situations to which game theory applies, be in the Russian duel, the dissolution of a firm, the question of when to present flowers to your wife, or the deployment of troops on several mountain passes when the enemy's dispositions are unknown. References to linear programming and to nonzero-sum games (that is, where both sides may win or lose) conclude the work.

The reader, having followed the author on a not-very-thorny path, should be able to go beyond the illustrations offered and to apply the theory to problems of his own experience. If there are prizes awarded for successful popularization of scientific theories, this book should be a serious candidate.

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Linear Analysis. Measure and integral, Banach and Hilbert space, linear integral equations. Adriaan Cornelis Zaanen. North-Holland, Amsterdam; Interscience, New York, 1953. 600 pp. $11.

This book does two things and does them very well indeed. It gives a comprehensive account, from first principles, of the basic theory of both Banach and Hilbert spaces. It also presents, as illustration and application, a thorough treatment of linear integral transformations having a compact iterate.

In order to have significant examples at all stages of the argument, the author begins (part I, 5 chaps., 87 pp.) with a discussion of measure and integration suited to his purposes. Familiar definitions of exterior measure and measurable set are given and specialized to yield Lebesgue measure if $X = R_m$ (Euclidean m-space) and, in a different way, Stieltjes measure if $X = R_1$. Measurable functions, product-measures, and an integral (via ordinate sets) are discussed, the development is carried through Fubini's theorem. A brief treatment of additive set functions culminates in the Radon-Nikodym theorem. The final chapter develops the basic theory of the Lebesgue spaces $L_p(1 \leqq p \leqq \infty)$ and the Orliez spaces L_Φ. Although there are no references, the material being largely classical, the preface acknowledges the influence of De Bruijn's lecture notes and the books of Halmos and Saks.

Part II (7 chaps., 364 pp.), the meat of the book, is devoted to "Bounded transformations and compact transformations in Banach space and Hilbert space." Except for the terse survey of Banach spaces in the early part of Hille's *Colloquium Lectures,* there has been no detailed treatment of either Banach or Hilbert space since the treatises of Banach and Stone in 1932. The attractive development given here will be valuable as a textbook for students and as a standard reference for the expert. The reader is referred to the monographs of Nagy and Halmos for detailed discussion of more general transformations in Hilbert space.

To begin with, the rudimentary properties of Banach and Hilbert spaces are proved and illustrated. Separability is usually not assumed, and there are several results in which completeness of the space is not assumed.

In the treatment (chap. 7) of bounded linear transformations, the theorem (Ext.) on extension of bounded linear functionals is basic. This theorem can be proved in a separable Banach space or in a Hilbert space without appealing to the Axiom of Choice. Here the author renounces the Axiom of Choice entirely, and assumes Ext., when needed, as a further postulate. The discussion includes results on the first and second adjoint spaces, weak convergence, closed transformations, the adjoint transformation, and projections.

A concise algebraic account of finite-dimensional spaces is carried through the Hamilton-Cayley theorem and the (Jordan) canonical form.

Chapter 9 is devoted principally to bounded self-adjoint transformations in Hilbert space. One also finds here a substantial introductory discussion of linear integral transformations. The latter part of the chapter discusses symmetrizable and normal transformations and closes with a presentation, following F. Smithies, of the Fredholm theory for a linear transformation T of a separable Hilbert space into itself such that $\Sigma_{ij} | (T\varphi_i, \varphi_j) |^2 < \infty$, where φ_j is a complete orthonormal system.

Next the author studies the range, nullspace, and spectral properties of bounded linear transformations on one Banach space into another, extending the results on these topics given in earlier chapters.

The long Chapter 11 treats compact transformations on one Banach space into another. A transformation is compact (formerly "completely continuous") if the map of bounded set has a compact closure. One misses here at least some mention of approximating a compact transformation by a transformation with finite-dimensional range. The Riesz-Schauder theory is given for a transformation T with a compact iterate. Further results in Hilbert space are presented, and the chapter closes with two mean ergodic theorems.

The final chapter of part II is devoted to compact symmetrizable, self-adjoint, and normal transformations in Hilbert space. The emphasis is on spectral properties, and the minimax relations and expansion theorems are developed in detail.

Part III (5 chaps., 136 pp.), entitled "Nonsingular linear integral equations," will be of particular interest to specialists in that branch of analysis. Roughly half the space is devoted to general theory (spectral properties, resolvent, expansion theorems, and so forth), with numerous applications of the material developed in part II. Remaining chapters treat normal kernels, symmetrizable kernels, and kernels of Marty, Garbe, and Pell. Although the original contributions of the author in part II are substantial, in part III they are very conspicuous, and his treatment clearly indicates the progress that has been made since the initial work on these particular questions.

The general theory of linear topologic spaces is omitted, along with non-linear and unbounded linear transformations.

By concentrating on his chosen objectives, however, Zaanen has been able to dispose of them in an unusually thorough way. The book is enriched with numerous examples and much illuminating comment. Many chapters are followed by long lists of valuable exercises with generous hints. The few typographic errors noted are trivial. This book is meticulously written, at a very high level of explicitness, and the prerequisites are so modest that an intermediate graduate student should be able to use it with little assistance. The author has met in a very satisfying way an urgent need in the expository literature.

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The Statistical Approach to X-ray Structure Analysis. Vladimir Vand and Ray Pepinsky. Pennsylvania State Univ., State College, Pa., 1953. xvi + 98 pp. Illus. Paper, $1.50.

A proper solution to the phase problem of x-ray crystal structure analysis—that is, the problem of somehow supplying the phases of the Fourier coefficients of a crystal structure to accompany the experimentally measurable magnitudes—would be an achievement of the highest importance, for it would make the complete and precise structure determination of every crystallizable substance a routine matter. Only a few months ago a monograph appeared [*The Solution of the Phase Problem,* pt. I, *The Centrosymmetric Crystal.* H. Hauptmann and J. Karle, American Crystallographic Assoc. Monogr. No. 3. The Letter Shop, Wilmington, Del. (1953)] that seemed to provide this long-sought solution. Hauptmann and Karle's method is a statistical one; they take advantage of the fact that there are more magnitudes known than are strictly necessary to characterize the structure to obtain the most probable value for each of the phases.

Almost immediately objections were raised, and they have found their strongest statement in the pres-