24[X].—L. FEJES TÓTH, *Regular Figures*, The Macmillan Company, New York, 1964, xi + 339 p., 22 cm. Price $12.00.

The discrete groups of isometries in the plane are the basis fo.· ornamental patterns. The simplest geometrical representations for them are displayed, as well as ten beautifully colored classic designs based on them.

Their extension to three-space is seen in spherical arrangements and the classical geometrical crystal classes. Since these do not exhaust the permutations of the group parameters, it is necessary to go to hyperbolic space to complete the utilization of all the possible values of the parameters. Their groups are derived, and tesselation examples are displayed.

The regular and semi-regular polyhedra are derived and exhibited in photographs and well-drawn figures. They include the Platonic and Archimedean solids, the Kepler-Poinsot star-polyhedra, and the regular honeycombs. The convex regular polytopes and Euclidean tesselations in all higher dimensions are derived from purely combinatorial considerations.

Problems concerning the most efficient packing of congruent figures in the plane are considered, as well as the most economical covering of the plane by congruent figures. These have technical applications as well as artistic applications. The problems are generalized to the use of sets of non-congruent figures. Also, multiple coverage and corresponding problems on a sphere are considered. The results are compared with biological patterns such as those occurring in pollen grains. The problems in this field are very difficult and many are still unsolved.

Problems in three-space, which involve the properties of polyhedra, include the isoperimetric problems, covering with clouds of spheres, sphere packing, and honeycombs. Extensions to higher spaces are made. Many beautiful results are derived, but there are many promising avenues to be explored.

A six-page bibliography and a good index make the book an excellent reference work.

The excellent three-dimensional anaglyphs in the book-pocket are not mentioned in the table of contents or the index. Their proper use is not explained in the text. For best viewing, these plates should be horizontal with the near edge about a foot from the eyes. They should be viewed through the colored spectacles with the green lens before the right eye and the red lens before the left eye. The line of sight should be depressed about 45°.

A few typographical errors were noted, which the reviewer has communicated to the author. On p. 119, it is stated that Gauss proved that the only regular p-gons that can be made by Euclidean constructions are for those values of p whose odd prime factors are distinct Fermat primes. Gauss did not quite prove this. (See Archibald's note on p. 84 of his translation of *Famous Problems* by Felix Klein.)

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25[Z].—R. BAUMANN, M. FELICIANO, F. L. BAUER & K. SAMELSON, *Introduction to ALGOL*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1964, x + 142 p., 24 cm. Price $8.00.

The ALCOR group is a cooperative association of about 25 institutions in Europe and the USA, primarily interested in the construction of ALGOL compilers and the establishment of common hardware representations. In order to promote program exchangeability the group began the development of an ALGOL manual based on courses and lectures conducted by some of the member institutions, and also on the practical experience of using and compiling ALGOL. While this book is the result of several revisions and extensions of this manual, it is no longer a manual as such. As stated in the Preface, "This book is intended to give a needed introduction to ALGOL, which should enable the nonspecialist, for whose benefit ALGOL was primarily conceived, to write clear and readable ALGOL programs from which a reasonable translator would produce efficient machine codes. . . . Emphasis is on the normal use of the language rather than on artificial examples exploiting tricky possibilities . . . ."

Without question, the book is indeed a well written, tutorial introduction to ALGOL, very well suited for self-study by readers not previously familiar with ALGOL or other algorithmic languages. This is underscored by the arrangement of the text in three distinct parts with an increasing level of sophistication.

Following a general introduction to some of the basic ideas of computer programming, Part I provides an introduction to the elements of ALGOL: The definition of the basic ALGOL symbols is followed first by a discussion of arithmetic expressions, statements and the general construction of ALGOL programs, and then of subscripted variables, loops, conditional and jump statements. At this point the reader should be familiar enough with the language to write simple, but complete, ALGOL programs.

Part II introduces the block structure of ALGOL, Boolean statements, designational expressions and, finally, procedures. Both Parts I and II present a subset of the full language corresponding to the forthcoming IFIP Subset ALGOL 60. This subset is certainly sufficient for the majority of applications, especially for the beginner. Part III covers some additional advanced concepts—namely, the use of expressions called by name and, in a brief section, the idea of recursive procedures. The defining report of full ALGOL 60 is included as an appendix, together with the officially approved IFIP corrections and amendments of the April 1962 meeting in Rome.

There are many examples supplementing the text and showing good programming techniques. In addition, a full section of exercises at the end of the book provides a source of further information about typical programming mistakes and features of the languages. The examples in the text are all taken from numerical mathematics, and all of them are excellent illustrations for good numerical algorithms. As a whole, however, one readily observes that for many readers the examples are probably on a much higher plane than the introduction to the language itself.

The book certainly provides a good introduction to ALGOL and as such it fills a need. For the users of the ALCOR compilers some appendix on hardware representations and related questions might have been desirable—but this is at the same time a questionable suggestion since the book is of course not a manual for certain ALGOL compilers but a tutorial introduction to ALGOL itself. Unfor-

tunately, the fairly high price of this book may well preclude the desirable, wide-spread distribution which it deserves.

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26[Z].—L. BOLLIET, N. GASTINEL & P. J. LAURENT, *Algol*, Hermann, Paris, 1964, 196 p., 23 cm. Paperbound. Price 36 Fr.

This is a tutorial discussion of the programming language ALGOL 60, of a type which was badly needed a year or two ago. In contrast to the formal style of the ALGOL 60 report [1], it presents both informal explanations of the various features of the language, and illustrations of the ways in which they may be applied. The discussion of the potentialities of the *for* statement is particularly illuminating. The informal description of the syntax is supplemented by extensive use of syntactic charts, both for individual syntactic elements, and for the entire language.

In addition, the volume contains appendices on: 1. Hardware representations; 2. Examples of Input-Out procedures; 3. Compilation processes; 4. The ALGOL 60 Report [1], as revised at the 1962 Rome meeting; 5. A chart of ALGOL basic symbols. In addition, it includes a listing of Algorithms published in Communications of the Association for Computing Machinery through August 1963, and a bibliography of 137 items on ALGOL 60 and its implementation.

Unfortunately, there are many typographical errors, some of which might confuse the novice. The printing of digits in bold face, while letters are in normal type is also distracting. The paper binding appears unusually flimsy for a volume which will have extensive use.

The present availability of a variety of tutorial presentations of ALGOL 60 in English will restrict the value of this work outside of French-speaking regions. This is particularly so because of the decision to transcribe the ALGOL basic symbols into French, so that the language is incompatible with most translators. It is of interest, however, for the information which it contains on French implementation of ALGOL, and the convenient reference material in the appendices.

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1. P. NAUR (Ed.), "Revised report on the algorithmic language ALGOL 60," *Comm. ACM*, v. 6, 1963, p. 1-17.

27[Z].—D. G. BURNETT-HALL, L. A. G. DRESEL & P. A. SAMET, *Computer Programming and Autocodes*, Van Nostrand Company, Inc., Princeton, New Jersey, 1964, viii + 106 p., 24 cm. Price $4.50.

The preface states that "this book is intended to serve as an introduction to the programming of automatic computers." The first 24 pages present such an introduction, apparently assuming that this is the reader's first contact with a stored-program digital computer.