The author's exposition matches the elegance of his subject. This part of the book invites obvious comparison with the well-known work by Professor H. S. M. Coxeter, which has clearly, in part, been its inspiration; however there are enough differences in approach and emphasis to make this account welcome in its own right. There are interesting historical notes at the end of each chapter; but surely, in the last line but two on p. 97, the reference should be to Legendre and not to Lagrange.

The second part of the book, which the author calls "Genetics of the Regular Figures," is of quite a different nature. Here, as it seems to the reviewer, we have no well-rounded theory, but rather a number of special problems, the solution of some of which is by no means complete. The subject matter consists of various extremal problems in which regular figures play a part. This is a subject to which the author has made notable contributions, and this seems to be the first time that current knowledge on the subject has been put together as a whole. Chapter VI deals with some relatively simple problems of packings and coverings of circles in a plane, and Chapter VII with tessellations on a sphere. We quote one theorem, out of many, as an example of the sort of thing the reader will find. Suppose that we have a tessellation of the unit sphere by convex faces of equal area, with e edges, and suppose that p and q denote, respectively, the average number of edges in a face, and the average number of edges meeting in a vertex. Then the total length of the edges in the tessellation is not less than

$$2e \text{ arc cos } \left[\cos \frac{\pi}{p} \text{ cosec } \frac{\pi}{q}\right],$$

and this lower bound is attained if, and only if, the tessellation is regular. The remaining chapters deal with problems in the hyperbolic plane, and in Euclidean space of three or more dimensions. It is clear that this is a subject in which there is still much scope for research, and one which calls for considerable ingenuity in approaching its problems.

The book is copiously illustrated, with some anaglyphs in a folder at the end, and contains an extensive bibliography.

The excellence of the text is unfortunately not matched by a corresponding elegance of production, which falls a long way short of the standard one is now accustomed to expect in mathematical printing. There are numerous cases in which mathematical expressions or sentences are broken by the end of a line instead of being displayed and the number of obvious misprints in passages of plain text, not to mention weak letters, suggests that the press reader has not been sufficiently careful. The current standard of " higher mathematical printing " in this country is high, and it is a pity that it is not attained in this book which, both by its contents and its price, claims to be judged by the highest standards.

J. A. TODD

MIKHLIN, S. G., *Integral Equations and their Applications to Certain Problems in Mechanics, Mathematical Physics and Technology*. Translated from the Russian By A. H. Armstrong (Pergamon Press, 1964), xiv+341 pp., 80s.

Ever since the appearance of the first English translation in 1957, Mikhlin's book on integral equations enjoyed a well-deserved popularity, especially among applied mathematicians. According to the author's preface, no substantial changes have been made in the present second edition of the translation. Some slips have been corrected, and some improvements (and minor additions) have been made. Nevertheless, it seems appropriate to describe briefly the contents of the book since it has not been previously reviewed in these Proceedings.

Part I, which occupies about two-fifths of the book, is devoted to the mathematical theory of integral equations under three headings: the Fredholm theory, the Hilbert-Schmidt theory, and singular integral equations (i.e., equations involving principal value integrals). The presentation will appeal especially to applied mathematicians as being both sound and comparatively elementary. Approximate and numerical methods are touched upon, and the inclusion of singular integral equations is an especially useful feature. The chapter on the latter may serve as an excellent introduction to the more ambitious books on this important subject.

Part II occupies the remainder of the book and is devoted to a variety of applications. Flow problems, vibration and stability problems, various problems of elasticity theory, heat conduction problems, and diffraction problems receive attention. Here again the inclusion of applications of singular integral equations is especially valuable.

The presentation is lucid, and statements of theorems are usually precise without being cumbersome. The purist will note certain lapses from precision, for instance, when in the definition of completeness (p. 81 f) " whatever the function " means any quadratically integrable function, or when in the statement of the Riesz-Fischer theorem the author fails to point out that quadratic integrability in this context does not necessarily mean quadratic Riemann-integrability (while in most places the theory of Riemann integrals can be used); but such omissions will not mislead an applied mathematician (and the pure mathematician should be able to put an appropriate construction on the ambiguous phrases). The translation is good, indeed better than in many other similar books, although some awkward phrases (e.g., " Then the equation has a meaning to consider in this interval." on p. 5) and unusual terminology (" permutation " in the footnote on p. 14 for interchanging the order of integration and summation) remain. Some misprints have presumably been corrected in this reprinting, but a few remain (for instance, a misprint in a displayed formula on p. 76, or a misspelling of Sobolev's name on p. 61). However, no serious or misleading misprints have been noticed.

At the end of the book there is a list of books on integral equations to which two items have been added for this reprinting (but neither Smithies's Cambridge Tract, nor the presentation in Functional Analysis by Riesz and Nagy are referred to). There is also a considerably longer list of books dealing with applications of integral equations and of original papers, which has also been extended; and an index.

The book has already proved valuable both for independent study and as a text book for courses, and the present revised reprint will be found equally useful.

A. ERDÉLYI