academician." With this I agree, but I wonder if this is the whole story. There seem to be some gaps; for example: What about Banach as a family man? Mrs Banach apparently provided the original book in which the deliberations in the *Scottish Café* were recorded – before then they were written in pencil on the marble tabletops and were usually lost when the janitor cleaned up – but we learn very little more about her; Banach's son Stefan, who became a neurosurgeon in Warsaw, is only mentioned in connection with later ownership of the *Scottish Book*. Nevertheless, I found the book totally absorbing and can recommend it to anyone with an interest in modern mathematics. The author and editor-translators have produced a very readable text, which has been well presented by the publisher.

I. TWEDDLE

SACHKOV, V. N. *Combinatorial methods in discrete mathematics* (Encyclopedia of Mathematics and its Applications, Vol. 55, Cambridge University Press, Cambridge, 1996), xiii + 306 pp., 0 521 45513 8 (hardback), £45 (US$69.95).

This is a translation of an extended version of a book which first appeared in Russian in 1977. It is one of two books by Sachkov which have recently been added to the series, the other volume being entitled *Probabilistic methods in discrete mathematics*. Its aim is to present enumerative methods in a unified way, concentrating on generating functions and emphasising asymptotic results.

In enumeration theory generating functions play an important role. They can be considered either as formal power series or as analytic functions. From the latter point of view contour integration and the saddle point method can be used to obtain asymptotic estimates for the coefficients. A number of examples are given; for example, asymptotic formulae for Stirling numbers of the second kind and the Hardy–Ramanujan asymptotic formula for the number of partitions of an integer are presented.

A chapter on graphs and mappings counts various types of graph and then proceeds to a discussion of the cycle structure of permutations.

The key chapter, which precedes an account of Polya's theory, is entitled "The general combinatorial scheme". Enumeration problems are viewed as concerning mappings from a set X to a set Y with permutation groups G and H on X and Y which give equivalence classes of elements, equivalent elements being regarded as indistinguishable. The problem is then to construct the generating function for enumerating distinguishable elements with respect to some "weight". In Polya's theory the required generating function Φ is represented in terms of the basic generating function F as a cumbersome polynomial of several variables which depend on G and H. "Therefore it is natural to separate several simple cases in terms of G and H, and to present the method of finding generating functions for the enumeration of objects possessing certain characteristics (the so-called primary and secondary specifications of the corresponding mappings) that are common in combinatorial problems . . . . Let each of G and H be either the identity group or the symmetric group. Using the primary and secondary specifications as the characteristics, we can give a method for constructing the generating function for the enumeration of non-equivalent mappings in each of the four possible cases under various restrictions on these specifications. The described formalization of certain classes of problems, together with the method for finding the corresponding generating functions, is called the general combinatorial scheme."

It is not an easy book to read. The subject matter is quite technical and is in the style of Riordan's classic *An introduction to combinatorial analysis* (Wiley, 1958; Princeton U. P., 1980). Further, some of the terminology is old-fashioned; there are invariant subgroups and substitutions. But for the serious student of generating functions and asymptotic techniques it provides an account of work of Kolchin (who did the translation), the author and others which is not otherwise readily available in English.

I. ANDERSON