number of really challenging results for the reader to come to grips with, and to mull over later. If this is accepted as a valid criterion, then Wang's book will leave a lot of people unsatisfied.

In matters of presentation, this book leaves a great deal to be desired. It may seem harsh to criticise numerous misuses of language in a book by an author for whom English is a second language. However, it is not only the author who should bear the brunt of such criticism; it is also the persons responsible for the production of his book. When one finds sentence after sentence that does not, by any stretch of the imagination, read decently, and a confusion of similar-sounding but different words (e.g. "conversion" instead of "converse") then the conclusion has to be that the editorial staff neglected their job. On the other side, neither is it unreasonable to express the regret that the author did not trouble to have his typescript read over by a native-speaking colleague.

This book is about a nice circle of ideas with some interesting, still-unsolved problems. The subject does not currently occupy the centre stage of research in harmonic analysis; however, it has some good things to offer, and it is a pity that the present treatment of it was not just that much better.

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Hausdorff compactifications, edited by Richard E. Chandler, Marcel Dekker, Inc., New York and Basel, 1976, vii + 146 pp., $16.50.

Work on compactifications began in 1924 with Tietze, Alexandroff and Urysohn. In 1930, Tychonoff characterized completely regular (Hausdorff) spaces as those which can be embedded in a compact Hausdorff space. Using Tychonoff's method, Čech constructed βX, the largest Hausdorff compactification of a completely regular space X. Independently, using algebraic techniques, Stone also produced the compactification βX.

In 1938, Wallman extracted the set-theoretic portion of Stone's work to construct the Wallman compactification which agrees with βX when X is normal. (For nonnormal X, the Wallman compactification is not Hausdorff.) Stone's work was also modified by Gelfand-Shilov in 1941 and elaborated and generalized by Hewitt in 1948.

Once one Hausdorff compactification of a space has been constructed, other Hausdorff compactifications can be obtained as suitable quotient spaces.

Tychonoff's original embedding was into a product of closed intervals indexed by $C^*(X, R)$, the set of bounded, continuous real-valued functions on X. Proceeding in an analogous manner and using appropriate subsets of this indexing set, any given Hausdorff compactification of X can be obtained. This procedure provides the underlying unity for Chandler's book, although other methods for obtaining Hausdorff compactifications are discussed and contrasted with the Tychonoff procedure.

Chandler's book is written so as to bring a student to the forefront of research in the area of Hausdorff compactifications. The only prerequisite is an introductory course in general topology; otherwise the book is self-contained. The first four chapters provide the necessary background material for the last four chapters, each of which is devoted to a specific area of research.

Much of the material in the first half of Chandler's book may be found in Gillman and Jerison **[GJ]**, but here it has been reorganized and modified. Additional topics include a discussion of the upper semilattice $K(X)$ of equivalence classes of Hausdorff compactifications and the result of Sierpiński that to each point of $\beta N \setminus N$ there corresponds a non-Lebesgue measurable function. To further indicate the complexity of βN, the Stone-Čech compactification of the integers, Chandler gives two proofs of the nonhomogeneity of $\beta N \setminus N$. The first, due to Rudin, involves the existence of P-points; the second, due to Frolík, uses the concept of the type of a point in $\beta N \setminus N$ relative to a countable discrete subset of $\beta N \setminus N$.

All constructions of βX require some form of the Axiom of Choice. Using the concept of compact* defined by Comfort, Chandler presents a construction of βX and shows that it is compact* without using the Axiom of Choice. With the Axiom, compact* implies compact.

The research areas discussed in the last half of the book represent the author's own interests, and he has concluded each of these discussions with an unsolved problem. The material presented here has been taken directly from the research literature and has not been previously compiled in book form.

Topic 1. The upper semilattice $K(X)$ of Hausdorff compactifications of X has a largest element, βX, and, if X is locally compact, has a smallest element. Thus, if X is locally compact, $K(X)$ is a complete lattice, and moreover it is determined by $\beta X \setminus X$. (That is, if X and Y are locally compact, then $K(X)$ and $K(Y)$ are isomorphic if and only if $\beta X \setminus X$ and $BY \setminus Y$ are homeomorphic.) Moreover, if $K(X)$ is a complete lattice then X is locally compact. For nonlocally compact X, the situation is much more complicated. If $\beta X \setminus X$ is discrete and C^*-embedded in βX, then $K(X)$ is a lattice. If X satisfies the first axiom of countability but is not locally compact, $K(X)$ is not a lattice. Thus the first problem is to give intrinsic conditions on X which are necessary and/or sufficient for $K(X)$ to be a lattice.

Topic 2. If $\alpha X \in K(X)$ then $\alpha X \setminus X$ is called a remainder of X. For finite n, the spaces X with $|\beta X \setminus X| = n$ are completely characterized as are those for which $|\alpha X \setminus X| = n$ for some $\alpha X \in K(X)$. A characterization of spaces having $|\beta X \setminus X| \leqslant \aleph_0$ is also known. If $|\beta X \setminus X| < 2^c$ then X is pseudocompact (all continuous real-valued functions on X are bounded), but in general, remainders with cardinality between $\aleph_0$ and 2^c have not been studied. Thus the second problem is to obtain necessary and/or sufficient conditions on X to guarantee that X has remainders with specific cardinality between $\aleph_0$ and 2^c.

Topic 3. Remainders are again considered, but now from a topological rather than a cardinality viewpoint. Almost all topological results on remainders are for locally compact spaces. A locally compact, nonpseudocompact space X has both connected and totally disconnected remainders. In fact, any weak Peano space can be a remainder for such an X. If $\beta X \setminus X = \prod_{n=1}^{\infty} N_n^*$, where N_n^* is the one-point compactification of the integers for each n, then the remainders of X are precisely the compact metric spaces. For nonlocally compact spaces, the little that is known is in terms of the closure of the remainder in the compactification, rather than in terms of the remainder itself. The third and fourth problems are in this area and are of a general nature.

Topic 4. Modifying Wallman's procedure for obtaining the Wallman compactification, Frink obtained a family of Hausdorff compactifications of completely regular spaces and posed the question as to whether each compactification in $K(X)$ could be obtained in this way. Such a compactification is called a Wallman-Frink compactification. (Actually, Banaschewski considered this approach prior to Frink, but has not received proper credit in the literature.) Frink's original question has been reduced to showing that every Hausdorff compactification of every discrete space is a Wallman-Frink compactification. The last problem is whether or not the latter is true.

Although there is probably more literature on this last topic than any other, Chandler gives it the least coverage. As things have turned out, however, this omission is not too serious. Within the last few months this last problem has been solved by V. I. Ul'janov in Moscow, who has shown the existence of a compactification of N which is not of the Wallman-Frink type. Thus, except for those who wish to classify those spaces all of whose compactifications are Wallman-Frink, this area will have lost considerable interest.

Chandler has written a well-organized and very readable book. It has a symbol index, an author index, and a subject index. An extensive bibliography contains papers not referred to in the book itself, but which relate closely to the topics covered and which should provide impetus for further research.

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Parallelisms of complete designs, by Peter J. Cameron, Cambridge Univ. Press, New York, 1976, 144 pp., $ 9.95.

Combinatorics is primarily concerned with two general types of questions concerning arrangements of objects: enumeration, when there are many different arrangements; and the study of structural properties, when the desired arrangements are harder to come by. Of course, there is a large overlap of these two types, and they have some common origins.

There are many relationships between combinatorics and other parts of mathematics. Of special importance for Cameron's book are the relationships with groups, the design of experiments, and coding theory. The relationships with finite groups are fairly obvious and go back to the last century: finiteness implies the use of counting; interesting combinatorial objects will frequently have interesting automorphism groups; and most of the known finite simple groups are intimately related with combinatorial objects on which they act. Cameron's book is primarily concerned with structural properties, just as is much of present-day finite group theory. The structural side of combinatorics also arose in the work on the design of statistical experiments of R. A. Fisher and his successors. More recently, algebraic coding theory has produced new insights into standard combinatorial questions of a structural sort. Many of the best designs and codes have tight structures (and frequently have large automorphism groups), suggesting some sort of classification. This is the point of view espoused in much of this book.

Structure is studied by building up global properties from local information (that is, from configuration "theorems"). Classical examples are the coordinatization theorems for projective spaces of dimension at least 3, and of projective planes in which Desargues' "theorem" is assumed. However, even if a complete classification is unreasonable, it may be possible to associate algebraic objects with suitably restricted combinatorial ones, and then apply standard algebraic techniques.

There are three ways an area of mathematics can be surveyed: by a vast, comprehensive treatise; by a monograph on a small corner of the field; or by a monograph on a cross section. Cameron has chosen the latter method for structural combinatorics. After starting with the seemingly specialized notion of a parallelism of a complete design, he is led into questions concerning finite groups, algebras related to important combinatorial objects, coding theory, and a surprising number of familiar topics in combinatorics and finite