have order $p^a q$) and the orders of those nonsupersolvable groups with all proper divisors the orders of only supersolvable groups. The latter proof is not selfcontained, since results of Pazderski are assumed.

Chapter 4, *Miscellaneous classes*, 27 pages by John F. Humphreys and David Johnson, first states but does not prove Suprunenko's description of primitive solvable linear groups. Then there are brief discussions of groups whose homomorphic images are all CLT-groups (QCLT-groups), groups which are the products of normal supersolvable subgroups, groups whose lattice of subgroups is lower semimodular (LM-groups), and seminilpotent groups (those whose nonnormal nilpotent subgroups have nilpotent normalizers). Incidentally, the third G in the statement of Theorem 6.1, p. 137, should be a $\mathfrak{D}$; that was the most annoying of the several misprints I noticed in the book.

The title of Chapter 5, *Classes of finite solvable groups*, by Gary L. Walls, could title the entire book. This 44-page chapter actually is a well-written presentation of the standard results on formations and $\mathfrak{F}$-normalizers due to Gaschütz, Lubeseder, Carter, and Hawkes, and the dual notion of Fitting class as developed by B. Fischer, Blessenohl, and Gaschütz. The last section, on the homomorph, a localized concept of formation developed by Wielandt, presents some results by J. A. Troccolo.

The last chapter, 19 pages by the editor, neatly summarizes much of the book by briefly stating or restating and proving known characterizations of certain classes of groups, as well as whether the classes are closed under the taking of subgroups, homomorphic images, or direct products. The classes are: CLT-groups, QCLT-groups, nilpotent-by-abelian groups, groups with the Sylow tower property, supersolvable groups, $\mathfrak{Y}$-groups ($G \in \mathfrak{Y}$ iff for all proper subgroups H, if prime p divides the index of H in G then there is a subgroup W in which H has index p), $\mathbb{S}\mathfrak{Y}$-groups ($G \in \mathbb{S}\mathfrak{Y}$ iff all subgroups of G are in $\mathfrak{Y}$), and LM-groups. The omnibus Theorem 5.1 presents 23 equivalent conditions for supersolvability.

I would like to caution the reader that the list of References does not attempt to include all recent research papers on the topics of this book; it does, of course, include the results actually stated or referred to in this book. The index is also briefer than I would like. Since there does not seem to exist any other recent English language survey of special classes of solvable groups, this book should be a valuable addition to the libraries of those interested in the subject.

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Coding the universe, by A. Beller, R. B. Jensen, and P. Welch, London Mathematical Society Lecture Note Series, vol. 47, Cambridge Univ. Press, Cambridge, London, New York, New Rochelle, Melbourne, and Sydney, 1982, 353 pp., $34.50.