cause the line of a rival to test 'engaged' at important times of the day. Luckily these defects have been completely remedied.

To scientific men the use that telephonists make of 'phantom circuits' to increase the number of conversations that can take place simultaneously between two stations always seems wonderful. The authoritative account of trans-Atlantic telephony given in this book will prove helpful to many. The saving of costs of trunk lines by means of thermionic valve repeaters is shown by the fact that in place of aerial lines weighing from 100 lb. to 800 lb. per mile, there are now underground cables working between London and Glasgow and between London and Berlin weighing only about 20 lb. per mile.

Linienspektren und periodisches System der Elemente. Von Dr. Friedrich Hund. (Struktur der Materie in Einzeldarstellungen, herausgegeben von M. Born und J. Franck, Band 4.) Pp. vi + 221. (Berlin: Julius Springer, 1927.) 15 gold marks.

SINCE the work of Bohr, followed by that of Sommerfeld, Catalán, Heisenberg, and others, gave a theoretical foundation to spectroscopy, the analysis of the spectra of the elements on the basis of quantum mechanics has proceeded apace. The results are scattered through many journals, in many tongues. This material the author has collected and welded into a coherent account. The appropriate results of quantum analysis are quoted and their significance explained without the burden of mathematical proof. The application of these results to the line spectra of the elements of the different columns of the Periodic Table is then fully discussed. Practical spectroscopists, chemists, and (may we whisper it) students of physics who wish to learn something of the methods and results of the new spectrum analysis, without first undertaking the formidable task of learning quantum mechanics, will welcome this well-written and informative account. For those who may wish to pursue the subject further, either on its more theoretical or on its experimental side, the author supplies a full and well-arranged bibliography of the literature of the subject, to the end of the year 1926.

Thermodynamics and Chemistry. By Prof. F. H. Macdougall. Second edition. Pp. vii + 414. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1926.) 27*s.* 6*d.* net.

THE first edition of Prof. Macdougall's book was well received, and in the new edition the author has incorporated a considerable amount of new matter and has revised the old so that the work is considerably improved. The treatment is straightforward, with a free use of the calculus. The rather long section on phase rule diagrams is out of place, since there are separate text-books giving a better and more detailed treatment of this branch of the subject, which is more a matter for the drawing office than for the student of thermodynamics. The properties of electrolytes are dealt with from the point of view of activity, and the Debye equation is used, although its detailed deduction is omitted. A good feature is the inclusion of problems, but these are omitted in the last chapter on the quantum theory and Nernst's heat theorem. The number of books on chemical thermodynamics is not large, and Prof. Macdougall's is a useful member of the group. The only unsatisfactory feature of the book is its price, which is excessive, although that of the first edition was even higher.

South America: an Economic and Regional Geography; with an Historical Chapter. By Dr. E. W. Shanahan. (Methuen's Geographical Series.) Pp. xiv + 318. (London: Methuen and Co., Ltd., 1927.) 14*s.* net.

DR. SHANAHAN has succeeded in producing a book on South America that was much needed. After some preliminary chapters on the continent as a whole, including a most interesting one on historical geography, he treats South America by natural regions, thus avoiding much repetition which a treatment by States would entail.

The book bears evidence of wide and discriminating reading, but it gives the impression of a compilation and lacks signs of personal acquaintance with South America. Many of the broader human interests receive little notice, such as the immigration problems, the racial problems, and the character and peculiarities of the great cities and seaports. Cities are not merely market places; they have individualistics that are worthy of portrayal even in a geographical work, if geography is to escape the charge of being merely the background of commerce. But in spite of these criticisms we welcome the book, especially for its freedom from bias towards any particular interest or State, a defect which mars too many works on South America.

An Introduction to Building Science. By F. L. Brady. Pp. viii + 280. (London: Edward Arnold and Co., 1927.) 7*s.* 6*d.* net.

IN a series of twenty-five chapters the author discusses his subject under the headings of physics and chemistry. His method is perspicuous and the diagrams deserve appreciative notice, as also the series of experiments and the lists of questions at the end of the successive chapters. They serve the useful purpose of testing the degree of knowledge acquired from the previous pages.

The use of constants for conversion from one thermometric scale to another is most unnecessarily condemned by Mr. Brady. He is, of course, not responsible for the double significance of the word calorie (distinguishable only by the employment of upper or lower case initial), but such duplication is unfortunate. If it be granted that "alloys are mixtures of metals," why call steel an alloy? It is no more an alloy than is wrought or cast iron, all three being dependent upon the proportion of contained carbon. Fig. 37 would be better were the comparative diagrams drawn to one scale. The book is, however, one to be accorded a hearty welcome.