nitrate), &c. To borrow the language of a sister science, there exists a slight doubt as to the veridical nature of these phenomena. However, an editorial footnote commends them to the reader's notice.

In an interesting article, H. Lunden gives a description (with sketch-plans) of Arrhenius' new Nobel Institute laboratory at Stockholm. Several other short articles deal with such varied topics as sun-spots and magnetic storms, precautions against coal-dust explosions in mines, &c. Enough has been said to indicate the catholicity of the editor's views concerning the scope of his new journal.

List of Documents in Spanish Archives relating to the History of the United States, which have been printed or of which Transcripts are preserved in American Libraries. By J. A. Robertson. Pp. xv+368. (Washington, D.C.: Carnegie Institution of Washington, 1910.)

THIS publication of the Carnegie Institution is the most recent of the "papers" of the Department of Historical Research of the Institution at Washington. The editor of the series points out in a preface that the volume may be regarded as an accompaniment to Prof. W. R. Shepherd's "Guide to the Materials for the History of the United States in Spanish Archives."

The two lists contained in the present book concern the history of the territory included within the boundaries of the continental United States of to-day. All matter touching that territory only indirectly or by inference as a part of the Indies has been rejected. The first list consists of published material, the original manuscripts of which exist in Spanish archives, or which, with good reason, are conjectured to exist in Spain; the second is much the longer, and is a list of transcripts in libraries and archives in the United States from originals in Spanish archives.

Lightning and the Churches. By Alfred Hands. Second edition. Pp. 92. (London: J. W. Gray and Son, 1910.) Price 1*s.* net.

THE first edition of this interesting pamphlet was dealt with in a note in our issue of April 22, 1909 (vol. lxxx., p. 228), and we welcome this second edition as indicating that increased attention is being directed to the important matter of protecting buildings from damage by lightning. Mr. Hands, who has expert knowledge of the subject, says that investigation shows that about twenty churches are struck and damaged in Great Britain every year. In some years the number is much greater; in 1907, for instance, thirty-nine suffered from this cause, and in 1908 there were thirty-one. Architects and others, whose business makes them responsible for the protection of buildings against lightning, would do well to study this little work.

The British Isles in Pictures. A Geographical Reading Book. By H. Clive Barnard. Pp. 64, containing 58 illustrations. (London: A. and C. Black, 1910.) Price 1*s.* 6*d.*

THERE are thirty-two beautiful coloured pictures in this volume, which will delight young pupils of geography, and serve also to explain graphically to them the characteristics of many kinds of scenery found in their native land. The black and white illustrations will also help to secure and maintain the interest of a class. The letterpress provides useful information; and, though it is hardly suitable for a text-book, it will serve admirably to supplement the geography lesson proper. The cheapness of the volume should ensure it a wide popularity.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

The Temperature Coefficients of the Ferromagnetic Metals.

EXPERIMENTS on the temperature coefficients of magnets published some years ago (Roy. Soc. Phil. Trans., vol. cciii., 1903) showed that the magnitude of the coefficient is largely dependent on the dimension ratio of the magnet, but that when the dimension ratio is sufficiently increased to make the self-demagnetising factor negligible, the coefficient is then characteristic of the ferromagnetic material. Observations made at that time, but not published, on iron, nickel, and cobalt magnets heated up to 100° C. showed that the coefficient was large in nickel, less in iron, and least in cobalt, the order being the inverse of the order of the magnetic critical temperatures of these metals.

I have recently repeated these experiments, carrying the temperature to 300°–400° C., and within this range it appears that when the magnetic intensity in the cyclic state is plotted against a scale, in which temperatures are calculated as percentages of the critical temperatures, then the points lie very nearly on one curve. In short, if corresponding temperatures are chosen, the temperature coefficient is the same for iron and nickel, and probably for cobalt. (The details of the experiments I omit here, but I should say that the cobalt employed was not pure, and behaved irregularly at 300° C.)

For example, the temperature coefficient of nickel between 15° and 115° C. is 0·0005, and it is the same for iron between 250° and 430° C., the corresponding temperatures; the temperature coefficient of iron between 7° and 107° C. is 0·0002, and it is nearly the same for cobalt between 90° and 220°, the corresponding temperatures.

Curie has shown that when iron is heated it passes continuously through the critical temperature from the ferromagnetic to the paramagnetic condition (in the latter state obeying the gas laws *mutatis mutandis*), and that the curves which trace the change from one state to the other are the counterpart of the curves which trace the passage of a liquid to a gas. An equation to the fluid curves may therefore be applied to the magnetic curves, and van der Waals's equation may be appropriately used, since it takes account of the facts that there is mutual attraction of the molecules and that there is a limit to fluid density, facts which have their counterpart in ferromagnetism in the mutual attraction of the molecular magnets and in the limit to magnetic intensity. One of the conclusions drawn from van der Waals's equation and the theory of corresponding states is that the coefficient of density, or expansion, of all liquids at corresponding temperatures is the same, and by similar reasoning this law is deducible for magnets. This is, in fact, the law to which the experiments cited above lead.

It is also worthy of notice that the temperature coefficient of density of liquids is of the same order as the temperature coefficient of intensity of ferromagnetics, just as the temperature coefficient of density of gases is of the same order as the temperature coefficient of intensity of paramagnetics.

Within the limits of this letter it is not possible to discuss these facts, but they show that certain magnetic problems may be treated by an application of van der Waals's equation with results consistent with experiment.

Manchester. J. R. ASHWORTH.

The Ratio between Uranium and Radium in Minerals.

DR. BOLTWOOD established the constancy of this ratio for all the minerals he examined (*Phil. Mag.*, April, 1905). He examined, however, no mineral in which uranium was present as phosphate, nor did he examine the then newly discovered mineral thorianite. Later, Mdlle. Gleditsch (*Comptes rendus*, cxlviii., 1451; cxlix., 267) found that the ratio radium to uranium was about