after the death of the former, whose soul is transported to Mars, they get into communication with each other.

The posthumous papers consist of the record left by the son, who describes all their experiments, hopes, failures, successes, and, lastly, the extra-planetary wireless messages he received.

Those interested in this class of fiction can spend a pleasant hour or two over these pages.

On the Lakes of South-eastern Wisconsin. By Prof. N. M. Fenneman. *Bulletin* viii. of Wisconsin Geol. and Nat. History Survey. Pp. xv+178. (Madison, Wisconsin: Published by the State, 1902.)

THE preface and the introduction announce the object of this work. It is intended as a guide to the teacher of geology, and shows how the shores of these lakes may form beautiful illustrations of the principles of wave, current, and ice action. The first chapter gives a general account of the origin of such lakes, and the second is devoted to a general and more or less theoretical discussion of the geological agents at work. After this the lakes are taken up one by one, and it is shown how the various features of the shore have arisen. There are many very good and aptly chosen photographs, which bring out clearly the points mentioned in the text, and make the book interesting even to those who cannot see the lakes for themselves.

Most of the book is devoted to the features of the shores, but it is also shown how the hydrographic maps may be used to decipher the origin of the basins, and in the case of Lake Mendota there is an interesting discussion of the results obtained by dredging, which are said to indicate currents below the wave-base. The unpublished work of the director of the Survey, Dr. Birge, on the temperature of these lakes is also said to confirm these conclusions. We shall look forward to the publication of these temperature observations. E. R. W.

Malessere Agrario ed Alimentare in Italia. By Italo Giglioli, Direttore della R. Stazione Agraria di Roma, &c. Pp. lxxxii+797. (Portici, 1903.)

IN this work Prof. Giglioli has attempted a detailed survey of the agricultural state of Italy in comparison with other nations. He considers one by one the various branches of the industry, the production of wheat, maize, rice and other cereals, wine, fruit, olives and silk, eggs, butter, cheese and the many minor branches of rural activity which are possible in the climate of Italy. In each case a comparison is drawn between the conditions of the past and those which prevail to-day both in Italy and the chief competing countries. Both as an ardent patriot and a man of science, Prof. Giglioli is troubled by the increasing poverty of the rural districts as compared with the towns, especially when one travels out of the favoured northern provinces of Lombardy and Tuscany into middle and southern Italy. He indicates how the actual production of the land is declining, so that Italy with all its traditional farming skill and with the vast possibilities of its climate is coming to be more and more dependent upon other nations for food which could be grown within its own borders if only more intensive methods of cultivation were resorted to. Aggravated as the case is in parts of Italy by the poverty of the people and their entire dependence upon agriculture, the problem is one which all the west European States are being called upon to face; how can agriculture, which is a primitive industry, live in a highly civilised State against the competition of the great areas of virgin soil like Argentina or the North-West? To English economists who want an enlightened and temperate review of the situation in a nation not unlike our own we commend Prof. Giglioli's book.

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.*]

Does the Radio-activity of Radium depend upon its Concentration?

SOME experiments have recently been made to test whether the radio-activity of radium is influenced by the continuous bombardment to which it is subjected by its own radiations. In an article in this Journal on radium (April 30, 1903) Prof. J. J. Thomson suggested that the radio-activity of radium may possibly depend upon its degree of concentration, and that a given quantity of radium, diffused throughout a mass of pitchblende, may be less than when concentrated in a small mass. In order to test this point, measurements of the radio-activity of radium bromide were made when in the solid state and when diffused throughout the mass of a solution more than a thousand times the volume occupied by the radium compound.

Two tubes, closed at one end, were taken, in one of which was placed about a milligram of pure solid radium bromide and in the other a solution of radium chloride. The tubes were connected near the top by a cross tube, and the open ends were then sealed by a blowpipe.

Measurements of the radio-activity of the radium were made by means of an electroscope. The tubes, fixed on a stand, were placed in a definite position near an electroscope and the rate of discharge observed. This was due to the β and γ rays emitted by the radium, since the α rays were completely absorbed in the walls of the tube. By placing a lead screen 6 mm. thick between the tubes and the electroscope the rate of discharge was due to the γ rays alone.

After measurements of the activity had been made, the glass apparatus was tilted so as to allow the radium chloride to flow into the arm containing the radium bromide. This dissolved the radium, and part of the emanation was released and distributed itself throughout the tubes.

No appreciable change of the radio-activity of radium was observed over a month's interval. If the rate of production of the emanation, or the excited activity caused by it, had varied during the interval, a corresponding change would have been observed in the rate of discharge due to the γ rays, for other experiments have shown that the amount of γ rays is proportional to the amount of emanation present, provided measurements are made several hours after the introduction of the emanation into a vessel, in order to allow the excited activity to reach a maximum value. The rate of discharge due to the γ rays was somewhat diminished, but this was due to an increased absorption of the β rays by the solution, and not to a change in the rate of emission of these rays. On account of the great penetrating power of the γ rays, the increased absorption due to the presence of the solution was negligible.

Since, after solution, the radium bromide was diffused through a mass of solution at least 1000 times the bulk of the solid radium bromide, we may conclude that a distribution of the radiating matter over a thousand times its original volume has no appreciable influence on its radio-activity.

This experiment shows that, over the range investigated, the radio-activity of radium is not influenced by its own intense radiations. This result is in agreement with previous observations, for neither the radio-activity of any active product nor the rate of loss of its activity has been found to be affected by its degree of concentration.

It is thus improbable that the energy given out by radium is due to an absorption of an unknown external radiation which is similar in character to the radiations which are emitted. Experiments are in progress to test whether still further dilution of the radium solution produces any alteration in its radio-activity. E. RUTHERFORD.

McGill University, Montreal, December 18, 1903.

Relative Motion and Conservation of Energy.

I HAVE received a letter from a correspondent which has led me to think that certain points connected with elementary dynamics are very obscurely put forward in text-books and in elementary class teaching generally. Of these the following may be taken as examples:—