

its symbiotic character in later ages. The particular kind of symbiosis occurring in Merlia was apparently extremely common and vigorous in the Palæozoic era, for encrusting, massive, laminate, and branching "Monticuliporas" abound, while Merlia is only a thin spreading crust.

I shall shortly publish a paper giving the evidence for the truth of the above statements.

R. KIRKPATRICK.

British Museum (Natural History).

#### Curie's Constant in the Ferromagnetic State.

IN a former letter to NATURE (August 25, 1910) I remarked upon the analogy which exists between the passage of a fluid from the liquid to the gaseous state, and the passage of a magnetic substance from the ferro- to the para-magnetic state, and that the equation of van der Waals which applies to the former represents the salient features of the latter.

In magnetism it is possible to suppress more or less completely the term representing the mutual attraction of the magnetic molecules by running an alternating current through the magnetic substance. The equation thus simplified represents very well the curves of magnetisation under these conditions at different temperatures, and allows the constant which corresponds to R in the fluid equation to be calculated. Observations on such magnetic isothermals when reduced by the method of least squares yield for this constant the mean value  $4.35 \times 10^{-6}$  for iron between air temperature and  $700^{\circ}$  C., and  $21.1 \times 10^{-6}$  for nickel between air temperature and  $300^{\circ}$  C. The reciprocal of this constant, according to this theory, is Curie's constant, and these numbers are in good agreement with determinations of the same constant by Curie, Weiss, and Bloch, from experiments made above the critical temperature.

This constant is therefore independent of the temperature, and may now be applied not only to the paramagnetic state above the critical temperature, but also to the ferromagnetic state below that temperature, and is of fundamental importance in the theory of magnetism.

J. R. ASHWORTH.

July 9.

#### The International Congress of Applied Chemistry.

I AM told that many chemists are hesitating about attending the eighth International Congress of Applied Chemistry (New York, September, 1912) because of the supposed enormous expense. I ask the hospitality of your columns for the purpose of correcting so utterly false an impression. The minimum expense for comfortable accommodation may be estimated as follows:—

(1) From Liverpool, August 21, by American Line ss. *Dominion* (only one class of cabin passengers), to Philadelphia, thence rail to New York; inclusive fares, single 10*l.*, return 20*l.*

(2) From Glasgow, August 23, Allan Line ss. *Numidian* (only one class of cabin passengers), to Boston, thence rail to New York; inclusive fares, single 9*l.*, return 18*l.*

(3) From Glasgow, August 24, Anchor Line ss. *California*, to New York; first cabin fares, single 14*l.*, return 28*l.*

The first two of these routes afford an opportunity to see Philadelphia and Boston, without additional expense.

Columbia University has offered to members and their families the free use of rooms in the residence halls, which will be available from August 31 to September 13. Until the end of July, rooms will be assigned, in order of application, to guests from

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abroad exclusively. Application should be made to the Secretary of the Congress, Dr. B. C. Hesse, 25 Broad Street, New York. The expenses in New York are limited, therefore, to the membership fee (1*l.*), the cost of excursions and entertainment (2*l.*), meals, which will be furnished at very low rates, and incidental expenses (say 5*l.*). The necessary expenses per person, including gratuities, &c., in the steamship (2*l.*), are therefore 28*l.* to 38*l.*, according to the ship selected.

The inaugural meeting of the congress in Washington, for those who desire to see the magnificent scientific institutions in that city, will involve additional expense of 5*l.*

Following the meetings of the congress, there will be two excursions. The "short trip," lasting eleven days, includes Philadelphia, Pittsburg, Niagara Falls, Detroit, Chicago, Cleveland, and Boston (2513 miles). The total expense of this trip will probably be less than 20*l.* Members desiring to join this excursion should notify Dr. Geo. D. Rosengarten, P.O. Box 1625, Philadelphia, Pa., immediately.

I shall be very glad to reply to inquiries, which may be sent to me at the address below.

ALEXANDER SMITH,

Professor of Chemistry in Columbia University, and member of the Executive Committee of the Congress.

34 St. Albans Road, Edinburgh, July 10.

#### CRYSTALLO-CHEMICAL ANALYSIS, A NEW METHOD OF CHEMICAL ANALYSIS.

AN important and possibly epoch-making memoir by Prof. E. von Fedorow, of St. Petersburg, is published in the last issue of the *Zeitschrift für Krystallographie*, entitled, "Die Praxis in der krystallochemischen Analyse und die Abfassung der Tabellen für dieselbe." It used frequently to be demanded by chemists of crystallographers, "Of what practical use is crystallography to us?" But the results of recent work have been so striking, and have gone so directly to the root of chemical constitution, that their cumulative effect has for ever rendered it perfectly obvious that crystallography is of fundamental importance to chemistry.

As a natural result of his well-known geometrical work on the possible structures possessing the property of homogeneity, the essential property of a crystal, Prof. von Fedorow turned his attention to descriptive crystallography, and in a series of brilliant papers has shown how the correct mode of setting up a crystal for descriptive purposes may be arrived at and distinguished from among the several possible modes; he has also shown us how to convert the crystallographic elements for any other "setting" or incorrect arrangement into those of the correct one, the latter being the arrangement which brings the directions chosen as the crystal axes into close and concordant relationship with the true internal structural arrangement, that of the nodes or points of the space-lattice or point-system, according to which the molecules of the substance and their constituent atoms are built up. This correct setting is arrived at quite independently of the fortuitous and variable property of external "habit," and is based upon calculations of the "reticular density" (close-