of the introduction of such a course of work as is herein described. It encourages thought, creates interest in chemistry, and furnishes the kind of knowledge most likely to prove of advantage in after years. Not only in organised science schools, but in every school where chemistry is taught, the course described in this book could be profitably introduced.

Observaciones de precision con el Sextante. Por el Conde de Cañete del Pinar, Cápitan de Fragata Retirado. Pp. 180. (Madrid: Ricardo Alvarez, 1895.)

A DESCRIPTION of the sextant and the uses to which it can be applied is here given in seven chapters, of which the first describes the instrument, and shows how it may be corrected. Following, we have four chapters on different means of the determination of latitude by means of stars, showing the methods trigonometrically, and also giving examples. The accuracy of observations taken by the sextant is graphically shown by two tables, giving the latitude obtained on several successive days. Lastly, we have a description of the means by which time is determined, and also how the longitude is obtained by means of the moon and stars. Throughout the book there are numerous examples, and no pains have been spared to make it useful.

First Stage Mechanics. By F. Rosenberg, M.A. Pp. 296. (London: W. B. Clive, 1895.)

THIS book has been made to fit the requirements of the elementary stage of theoretical mechanics of solids, as laid down in the syllabus of the Department of Science and Art. It is the first volume of a new series of Departmental text-books, and it possesses all the characteristics of the literature of the University Correspondence College Press; by which remark we mean that the text is concise, the examples numerous, and the comparative importance of the sections is indicated by the thickness of the type in which they are printed. What more does a student require, who is learning theoretical mechanics for examinational purposes?

The Story of the Solar System. By George F. Chambers, F.R.A.S. Pp. 202. (London: George Newnes, Limited, 1895.)

WE are glad to be able to state that the twenty-eight illustrations in this book are better than those in the companion volume on the "Stars," by the same author. Mr. Chambers has contrived to compress an immense amount of information within a small compass, and his descriptions possess the double quality of simplicity and attractiveness. We do not know of a book in which so much is told about the solar system within such narrow limits.

British Guiana and its Resources. By the author of "Sardinia and its Resources." Pp. 104. (London: George Philip and Son, 1895.)

THE question of frontier between British Guiana and Venezuela is now so much to the front, that a large public will be interested in this description of the history, features, and resources of the region in which the debatable land lies. The book will be found valuable not only on this account, but because it is full of information useful to visitors to British Guiana. Travellers of all tastes and inclinations will find that the country offers many attractions, and is as wide a field for observation and collection as could be desired.

Mammals of Land and Sea. By Mrs. Arthur Bell (N. D'Anvers). Pp. xii + 191. (London: George Philip and Son, 1896.)

ALTHOUGH this volume will assist its readers to know the general characteristics of members of the mammalian family, it possesses no novel features, and the illustrations belong to a past age. Some readers may find the book interesting, but few will pronounce it attractive.

LETTERS TO THE EDITOR.

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A New Method of Measuring Temperature.

THE recent publication of papers dealing principally with thermometry, by Mr. Griffiths, and by the Kew Standardising Bureau, has suggested to me that the publication of a new thermometric method which I have used for some years may be of use.

Briefly, in this method two thermo-junctions are used; one is placed, protected or not, as circumstances dictate, in the substance of which the temperature is to be measured, the other in the bulb of an air or nitrogen thermometer. This junction is blackened, and may or may not be protected, but should be in the same state as the other. The bulb of the air thermometer may or may not be silvered or platinised. Within the bulb of the air thermometer is placed a coil of platinum wire, in series with this being a carbon resistance and a storage battery. The bulb of the thermometer is protected by a layer of slag-wool, or, if this cannot be obtained, of asbestos; or a sheath of polished metal may be used. In the thermo-electric circuit a low resistance galvanometer is placed. I prefer to use a d'Arsonval.

The *modus operandi* is as follows. The free thermo-junction is placed in the substance whose temperature is to be measured. The galvanometer is immediately deflected. The circuit of the platinum heating coil is then closed, and the carbon resistance screwed down till the galvanometer needle comes back to zero, or until making and breaking the thermo-electric circuit produced no movement of the needle. When this is the case the temperature of the air or nitrogen in the bulb will evidently be the same as that of the substance to be measured, and can be directly read off in any of the usual ways on the thermometer. I prefer myself to use the constant volume method.

It is necessary, of course, that the thermo-junctions be both in the same physical state. This is generally secured with sufficient accuracy by cutting the wire from the middle of a much larger piece which has been well annealed. In connection with other work I have found that two samples of metal, chemically identical but having different rigidities and thermo-electric powers, may always be brought to identical states by heating for a time at white heat in vacuo, first introducing, if necessary, oxygen or hydrogen to decompose any hydride or oxide combined with the metal. I have never found it necessary to do this in making thermo-junctions, but its use is recommended to experimenters who are studying the physical properties of metals.

The advantages of this method are as follows:

(1) No assumption is made in regard to any law of variation of thermo-electric effect with temperature.

(2) No assumption is made with respect to variation of voltage of standard cell in relation to temperature. The error due to the fact that the saturation of the sulphate solution of the standard cell always lags behind the temperature, and that due to the fact that the temperature is never known exactly, are thus done away with.

(3) No assumption in regard to temperature or temperature coefficient of wires is made.

(4) Both junctions being maintained at the same temperature for approximately the same length of time, and under the same conditions, the likelihood of changes in physical state, produced by one wire being annealed more than the other, is reduced to a minimum.

(5) The temperature is read directly by a nitrogen thermometer, and no intermediate standards need be used.

(6) No complicated apparatus is needed, the only instrument used being the galvanometer, and that only as an indicator. The only standard used is the kathetometer for measuring the height of the mercury column.

The only assumption made is that the air in the bulb is at a uniform temperature throughout. This assumption is justified, however, by experiment. In 1890 Mr. A. E. Kennlly and the writer made a number of experiments to determine the temperature coefficient of the electrical resistance of copper wire. In these experiments the wire was wound in two coaxial coils in the bulb of an air thermometer, the idea being that there would