two parts. The experiments start off with the commonly occurring phenomena of combustion, and lead up to the laws of chemical combination, the determination of chemical equivalents, vapour densities, &c.

Part II. consists of qualitative and quantitative analysis taken together, no attempt being made to separate the two. The results of the experiments are here carefully withheld from the student, and are given in the Key. A useful table for the detection of the positive radicles is published separately, and may be used in connection with this part.

The book can be recommended as a trustworthy one, and, apart from the novelty of the system adopted, as a storehouse of knowledge useful to the chemist, it will be appreciated by many a teacher.

The problems are actual examples met with in the laboratory, and appear to be free from the artificial exercises so common in text-books. It is also noteworthy that they, as well as the lectures, are concerned to a considerable extent with the energy changes as well as with the material changes which constitute chemical phenomena.

In glancing at the tables of physical constants to be found as answers in the Key, it is frequently noticeable that these magnitudes are given to an accuracy which is altogether fictitious. For example, to express heats of vaporization or absorption coefficients to one part in thousands of millions, or to give a boiling point such as that of bromine to one thousandth of a degree Fahrenheit, tends to create an erroneous idea of the accuracy with which such determinations can be made. In one or two instances the information is not quite up to date. Hydrofluoric acid, for instance, is still formulated H_2F_2, and Bunsen's values for the absorption coefficients of hydrogen and oxygen are still given, although they have been superseded by the observations of Winkler and Timoféef. Van der Waals's work might have been included in the otherwise serviceable account of the kinetic theory of gases, and it is somewhat unfortunate that the author insists upon the narrow view that specific gravity has no other meaning than that which is perhaps more correctly attributed to relative density.

The printing and the woodcuts are hardly up to the standard usually attained in books of this kind.

J. W. R.

OUR BOOK SHELF.

Die Pflanze in ihren Beziehungen zum Eisen. Von Dr. Hans Molisch. Iron in its Relations to Plant-life. 8vo, 119 pages, with one coloured plate. (Jena: Gustav Fischer, 1892.)

AN interesting essay on the presence, function, and form of iron in plants, embodying the results of previous investigators and of the author's experiments and researches extending over several years. Though the outcome of much labour, Dr. Molisch regards it as preliminary to more extended inquiries, and the whole subject as being yet in its infancy. He discusses the determination of the presence in the vegetable cell of iron in loose combinations and in dense combinations, or what he terms the masked condition. He then describes the occurrence and distribution of iron in plants in loose and dense combinations, and enters somewhat fully into the description of a new method he claims to have discovered for proving the existence of iron in the masked condition, even when it is present only in infinitesimally small quantities. This is done by soaking the objects one or more days or weeks in saturated aqueous liquor potassæ, and then, after quickly washing them in pure water, subjecting them to the usual reagents. He further claims to have proved that iron is not one of the constituents of chlorophyll. There is also a short chapter on healing vegetable chlorosis by the use of chloride of iron, sulphate of iron, and other salts of iron. W. B. H.

Up the Niger. By Captain A. F. Mockler-Ferryman (London: George Philip and Son, 1892.)

SEVERAL years ago complaints were made about the conduct of various British subjects in the territories placed under the Royal Niger Company. The British Government accordingly sent Major Claude Macdonald to inquire into the matter. He was accompanied by Captain Mockler-Ferryman, who in the present volume gives a full account of the proceedings of the Mission. During the entire journey, which extended over more than 3000 miles, nothing "of a blood-curdling nature" occurred, so that any one who is attracted to books of travel mainly by the chance of finding them full of sensational narratives, need not trouble himself with Captain Mockler-Ferryman's pages. On the other hand, those who like to read about remote regions and their native inhabitants, will find in this book much to interest them. The author is an accurate observer, and notes in a clear and unpretending style the facts by which his attention has been most strongly attracted. His descriptions of the native tribes of the Niger country, so far as he himself observed them, are particularly good, and will not only please the general reader, but be of service to ethnologists and anthropologists. A capital chapter on music and musical instruments, prepared from materials collected by the members of the mission, is contributed by Captain C. R. Day, and the value of the volume as a whole is much increased by a map and illustrations.

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.*]

Density of Nitrogen.

I AM much puzzled by some recent results as to the density of *nitrogen*, and shall be obliged if any of your chemical readers can offer suggestions as to the cause. According to two methods of preparation I obtain quite distinct values. The relative difference, amounting to about $\frac{1}{1000}$ part, is small in itself; but it lies entirely outside the errors of experiment, and can only be attributed to a variation in the character of the gas.

In the first method the oxygen of atmospheric air is removed in the ordinary way by metallic copper, itself reduced by hydrogen from the oxide. The air, freed from CO_2 by potash, gives up its oxygen to copper heated in hard glass over a large Bunsen, and *then* passes over about a foot of red-hot copper in a furnace. This tube was used merely as an indicator, and the copper in it remained bright throughout. The gas then passed through a wash-bottle containing sulphuric acid, thence again through the furnace over *copper oxide*, and finally over sulphuric acid, potash, and phosphoric anhydride.

In the second method of preparation, suggested to me by Prof. Ramsay, everything remained unchanged, except that the *first* tube of hot copper was replaced by a wash-bottle containing liquid *ammonia*, through which the air was allowed to bubble. The ammonia method is very convenient, but the nitrogen obtained by means of it was $\frac{1}{1000}$ part *lighter* than the nitrogen of the first method. The question is, to what is the discrepancy due?