short at the northern limits of New South Wales, and makes the coal-field of that colony Mesozoic, against the earnest protest of the Rev. W. B. Clarke, whose judgment on all matters concerning the geology of New South Wales is not to be lightly opposed. Cretaceous strata, first recognised from fossil evidence by Prof. M'Coy, are represented as covering a wide belt of country from the plains south of the Darling northwards to the Gulf of Carpentaria. The tertiary deposits are massed under one tint, which spreads over most of the interior, sweeping up to the base of the inland slopes of the Eastern Alps, and down to the coast-line for many leagues on the northern, western, and southern margins of the country.

No arrows to show prevalent inclinations of strata have been inserted on the map, and as no illustrative sections are given, the reader is left to infer the relations of the formations whose general area and boundaries are so clearly defined. The required information may be expected in the promised text to accompany the map. Another omission is the want of any sign for the gold and coal-fields. This might have been easily inserted without any diminution of the clearness and beauty of the map, and would have been of value to those who take interest in the mineral resources of the country. It is to be hoped that a new edition will soon be demanded, and that these small defects in a most useful and meritorious work will be supplied.

PHYSICAL SCIENCE IN SCHOOLS

WE have received the following additional letters on this subject :—

Your Rugby correspondents appear to me somewhat to misapprehend Dr. N. M. Watts's arguments on this important question. No satisfactory results, he maintains, can accrue from science teaching in schools until the subject is placed upon its true position of *educational equality*, both as regards range and time, with classics and mathematics, and no system of regulations or of examinations can be said to fulfil its object in which this position is ignored. I for my own part most cordially support Dr. Watts's views. The position at present accorded to science in English schools is, as Sir John Lubbock has clearly shown, anything but satisfactory, and this state of things seems likely to continue so long as the examinations for which the boys prepare persist in placing the science subjects in a distinctly inferior position to the older studies. Surely it is the part of examining bodies to lead and raise the education of the country. I think, however, that it has been fully proved that the "Oxford and Cambridge Schools Examination Board" has not done this, at any rate so far as science is concerned. The facts adduced by Mr. Cumming as to the small number of candidates presenting themselves for examination in science proves to my mind that the teaching of science is usually discouraged because it is usually not understood, and no efficient means of teaching science being as a rule provided, these subjects are not only neglected but their study becomes even despised by the boys. The truth is that it is the difficulty of obtaining such men as Mr. Wilson and Dr. Watts which renders the progress of science teaching in schools less rapid than some of us could wish. As soon as the supply of really competent and high class natural science masters becomes as large as that of equally distinguished teachers of classics or mathematics we may be sure that science will occupy no inferior position. Until that time arrives it behoves all those interested in the educational applications of science to take care that the teaching is really exact, methodical, and disciplinary, in short, scientific, so that if we do not progress rapidly we advance all the more surely, and we look with interest to the results of the education in those few schools such as Giggleswick and Newcastle-under-Lyne, in which science has already been placed on a footing of equality with the older studies.

Manchester, Feb. 26 HENRY E. ROSCOE

The remarks of Dr. Marshall Watts on physical science in schools in NATURE (vol. xiii., p. 311), seem to me to call for one or two observations in addition to those made by Mr. Wilson and Mr. Cumming in your columns last week (p. 329).

Dr. Watts selects a few questions from the examination papers that were set in heat, chemistry, and geology, by the Oxford and Cambridge Schools Examination Board in 1854, the first year of its existence, in order to show what he considers the very elementary nature of the knowledge required, and he adds that "with the exception of the last question [naming certain rocks and fossils] there is no test of a practical kind at all."

Now it is only fair to state that although it is quite true that there was no examination in practical chemistry in 1854, yet in the regulations for the next year "the elements of practical qualitative analysis" were added to "the elementary parts of inorganic chemistry," and last July those candidates who took in chemistry were examined for three hours in practical laboratory work, six substances being given to each boy for analysis.

Moreover, with regard to theoretical chemistry, the paper that was set last year was decidedly harder than that of the year before. I inclose a copy, and should be glad if you could find space to print it. As a matter of fact it is harder than the average chemistry papers of the London University Matriculation Examination, and quite as hard as an ordinary Oxford Pass Paper.

"*Natural Philosophy* (*Chemical Division.*) (*Time* 1½ *hours.*)

A.

"1. What happens when pure iron is dissolved in excess of dilute sulphuric acid? Give an account of the properties of the solution which is obtained, and the tests by which you would show what salt of iron is present. Suppose some of the solution were boiled with potassium nitrate, what changes would you expect to take place?

"2. Explain atom, molecule, acid, base. How can you show the composition by weight and volume of hydrogen with chlorine, bromine, and iodine? mention the best methods of obtaining these compounds in the state both of gas and in solution.

"3. How is analysis of air made with the eudiometer? Describe how to correct the observations for pressure, temperature, and aqueous vapour. Suppose 100 c.c. of oxygen to be mixed with 10 c.c. of marsh gas and exploded, find the amount of the residual gases.

"4. What is the percentage composition of nitrous and nitric oxides? How are these bodies prepared? Distinguish between the properties of nitrates and nitrites.

"5. Describe briefly the manufacture either of sulphuric acid or of bleaching powder.

"6. Account for the production of carbon mon-oxide in the blast furnace, and show what action it has in reducing the roasted iron-stone. What is the best method of preparing carbon mon-oxide: in what respects does it differ from the di-oxide?

"7. How is the metal aluminium prepared? Describe the manufacture of alum, and give a brief account of the properties of alumina.

"8. Describe the preparation and properties of the bodies $SnCl_4$, HgC_2N_2, PbO_2, $K_2Cr_2O_7$, HCN.

"*Practical Chemistry.* (*Time* 3 *hours.*)

"1. The substances marked 1, 2, 3, 4 are simple salts.

"2. The substances marked 5, 6 are elements.

"You are requested to find out what they are, and to write a full account of the methods you use."

Now at the risk of being accused of taking a low standard, I cannot help thinking that although some of these