

With this word it is easier to state the theorems, "two line-directions determine one plane-direction," and its reciprocal, than with the other. "Two directions determine one aspect," is hard.

If this discussion has not gone on too long perhaps some of your correspondents will criticise this suggestion and compare it with "aspect." It is desirable that the best word possible should be chosen.

J. M. W.

Science and Art Examinations

THE subject of Science and Art Examinations by the Department of Science and Art is one which really requires looking up, and I wish to make one or two suggestions and remarks as to the mode of examination.

In the first place, take the examination itself. The candidates make their appearance at the appointed time and place. Their forms are given them, and their places assigned to them. Now the candidate is told to write on both sides of the form, thus leaving no back pages on which to do his rough calculation. Blotting-paper in 1870 was not allowed; but in 1871 the Department fixed a sheet to the bottom of each form in such a position that it was very difficult to make use of it; much time—time that was of the utmost consequence to the candidate—being lost in doing so. This, of course, stopped him from doing so much work, and so lessened his chance of success. This may be all very well for the Department so far as it affects grants on results; but what about the unfortunate student who is made the victim of this very arbitrary custom?

Then again for the questions set. In all the papers the questions set were very difficult. "The Department" having, without any notice, raised the standard of examination, the subjects of questions set in the first stage of mathematics were placed in the syllabus a stage higher, viz, the second stage. Then in chemistry (inorganic) the standard was considerably raised. The questions in this subject are very unfair in the opinion of many persons who have seen them. Take the following:—

"HONOURS 1871

"Describe the process of manufacturing sulphuric acid, as carried on in an alkali works, illustrating the various chemical changes by equations, and, as far as possible, the constitution of the compounds formed by graphic formulæ."

Now about the sulphuric acid part, or about the equations, I have nothing to say; but when the question requires a knowledge of graphic formulæ I protest against it. Graphic formulæ are not in sufficient use to warrant their introduction into an examination—thus enforcing their general adoption whether right or wrong; and I do not think the examiner should be allowed to enforce his peculiar views—the views taken by himself and a few other chemists—into the great system of Science examination in the country, thus compelling it to be learnt by any person wishing to compete.

Now for the results. The results of the examinations for 1871 are very unsatisfactory, and a very high ratio is shown of failures, and second classes to first classes obtained. This, of course, must lessen the amount of money to be paid on results by the Department, and a report was circulating a short time ago, to the effect that "The examiners, after having made their reports, had the papers returned to them, with an instruction to reduce the number of successful candidates, as an intimation had been given by a right hon. gentleman that the amount of grant due upon those papers must be reduced 20,000*l.* The examiners were thus obliged to eliminate half the names from their lists." The question was asked by Mr. Dixon, M.P., in the House of Commons, whether this was or was not true, and Mr. Forster, M.P., denied it. But, previous to that, a provincial local secretary, hearing the rumour, wrote to ask the Department if it were true, and received a reply saying it was true, and that instead of the amount being 20,000*l.* it was 40,000*l.* (The Department's letter can be produced.) Now I would suggest that the Department reform these matters referring to the forms, blotting-paper, questions, and results, and that if they do not do so that the House of Commons take the matter up and do justice to Science teachers and students.

HENRY UHLGREN

New Zealand Forest Trees

In the last number of NATURE is a paragraph relating to some New Zealand woods, which the writer observes are "deserving of

a better fate than to be cut down wholesale and used as firewood." Five timber trees are mentioned, of which the native names only are given.

Knowing that it is the province of NATURE to give accurate information as possible on all points with which it deals, I send you the botanical names of four of these New Zealand trees. The Rimu or red pine is probably *Dacrydium cupressinum* Soland, a tree 80 or more feet high, the fleshy cup of the fruit of which is eatable. *D. laxifolium* Hk. fil., a small creeping bush, is also known occasionally as Rimu. The Mataii or black pine is *Podocarpus spicata* Br., likewise a large tree, and having an eatable fruit. The Totara is *Podocarpus totara* A. Cunn., a tree about 60 feet high, producing a durable and close-grained wood much valued in the islands, and, like the others, having an eatable drupe. These trees are all more or less abundant in the Northern and Middle islands, and all belong to the natural order Coniferae, though we are told in the paragraph referred to that "none of them are Coniferae."

The Rata, "that wonderful vegetable production forming itself out of numberless vines," &c., is referable to some species of *Metrosideros*. *M. robusta* A. Cunn. and *M. florida* Sm., are both known as Rata, but the hard and very dense wood usually known under that name is mostly derived from *M. robusta*. This, however, is not a climbing plant, but an erect tree 50 or 60 feet high; therefore the plant referred to in the paragraph before us is probably *M. florida*. The Makia I do not know, but its extreme hardness would seem to indicate it as belonging to the same order as the last, namely the Myrtaceae.

JOHN R. JACKSON

Kew, Nov. 7

The Glacial Drift at Finchley

A FURTHER examination of the railway cutting at the Finchley and Hendon Station shows that the glacial beds now revealed there have a greater thickness and range than I at first imagined. On Saturday last I visited the place in company with Dr. Hicks, of Hendon, a gentleman well-known for his researches in the Cambrian formation. Above the blue clay, and right up within a few inches of the vegetable soil, we found drift fossils. With an interruption here and there from the underlying London clay, these chalky glacial beds, consisting of blue (Oxford?) clay, bluish clay with flints, marl, sand, and gravel (in no regular descending order), have an average thickness of 30 feet. They are open for about 500 yards, and they might perhaps be traced farther north-west, towards the Dollis Brook Viaduct. Dr. Hicks and I afterwards visited Mr. Plowman's Manor brickfields, a little south-east of the railway station; here too we found fossils in the brick-earth.

From what has transpired during the last few weeks, it would seem that the Muswell Hill deposit need no longer figure in geological literature as an outlier, at a long distance from the general deposit; and Londoners may in future find glacial drift without much difficulty about Highgate, Finchley, Whetstone, and Barnet. I am indebted to Professor Morris for the information that the Great Northern Cemetery at Barnet lies almost wholly in the glacial clay. The forthcoming Survey memoir upon the drift in this district is looked for by London geologists with much interest.

HENRY WALKER

100, Fleet Street, E.C., Nov. 7

ON THE ORIGIN OF INSECTS*

THE metamorphoses of this group have always seemed to me one of the greatest difficulties of the Darwinian theory. In most cases the development of the individual reproduces to a certain extent that of the race, but the motionless, imbecile, pupa cannot represent a mature form. Fritz Müller considers that the wingless Blattidæ probably most closely represent the original insect stock; Haeckel is inclined rather to the Pseudo-Neuroptera. I feel great difficulty in conceiving by what natural process an insect with a suctorial mouth like that

* Abstract of a paper read before the Linnean Society, Nov. 2, 1871, by Sir John Lubbock, Bart., M.P., F.R.S.