owing to the decomposition taking place in such a solution, still the green colour from the modified chlorophyll will long remain. A single drop of hydrochloric acid added to the green extract, although it at once changes the bright green to a darker and browner green, enables the solution to resist this action of light to a much greater extent than it could have done if no acid had been added.

In the one-banded modification of chlorophyll we appear to have a body on which light has no action; solutions of this body have been, for the last three months, exposed continuously to all the light and sunshine we could get, and they are unchanged in colour and constitution; another proof of the really wonderful stability of this substance. Again, as a confirmation of the properties and formation of this form of chlorophyll, a single drop of sulphate of copper added to an ordinary chlorophyll extract renders the green colour of the solution permanent.

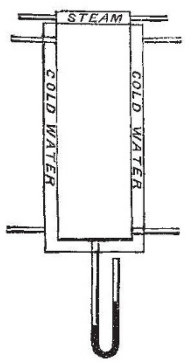
The very striking change of tint which occurs when a strong chlorophyll solution is very considerably diluted, whereupon it changes from a dark to a light yellowish-green, forcibly suggests to us the probability that the difference in shade of old leaves as compared with young ones, is due to the same cause, namely, the greater or smaller amount of chlorophyll in a given area.

ON A METHOD OF INVESTIGATING EXPERIMENTALLY THE ABSORPTION OF RADIANT HEAT BY GASES[1]

THERE are grave objections, which have been only partially overcome, to almost all the processes hitherto employed for testing the diathermancy of vapours. These arise chiefly from condensation on some part of the apparatus. Thus when rock-salt is used, an absorbent surface-layer may be formed; and, when the pile is used without a plate of salt, the effect of radiant heat may be to cool it (the pile) by the evaporation of such a surface film. The use of intermittent radiation is liable to the same objection.

Some time ago it occurred to me that *this* part of the difficulty might be got rid of by dispensing with the pile, and measuring the amount of absorption by its continued effects on the volume and pressure of the gas or vapour itself.

Only preliminary trials have, as yet, been made. They were carried out for me by Prof. Mac-Gregor and Mr. Lindsay.



Their object was *first* to find whether the method would work well, *second* (when this was satisfactorily proved) to find the best form and dimensions for the apparatus.

The rough apparatus is merely a double cylinder, placed vertically. Cold water circulates in the jacket, and steam can be blown into the double top. The changes in the pressure of the gas are shown by a manometer U tube at the bottom, which contains a liquid which will not absorb the contents. This apparatus was 4 feet long, with 2 inches internal radius. The results of a number of experiments show that it should be shorter and much wider. The former idea I was not quite prepared for, the latter is obvious.

The effects on the manometer are due to five chief causes:—

1. Heating of the upper layer of gas by contact with lid.
2. Cooling ,, ,, ,, ,, sides.
3. Heating of more or less of the column by absorption.
4. Cooling of do. by radiation.
5. ,, ,, contact.

(1) and (2) only are present in a perfectly diathermanous gas, and in a perfectly adiathermanous gas or vapour.

All five are present in a partially diathermanous gas or vapour.

The preliminary experiments show that the manometer effect is only *very slightly less* for dry olefiant gas than for dry air, while moist air shows a markedly smaller effect than either of the others.

This is conclusive as to the absorption of low radiant heat by aqueous vapour, but it shows also that the absorption is so small as to take place throughout the whole column.

Even with the present rude apparatus I hope soon to get a very accurate determination of the absorbing power of aqueous vapour, by finding in what proportions olefiant gas must be mixed with air to form an absorbing medium equivalent to saturated air at different temperatures.

I have to acknowledge valuable hints from Prof. Stokes, who, before I told him the results I had obtained (thus knowing merely the *nature* of the experiments) made something much higher than a guess) though somewhat short of a prediction, of the truth.

In these preliminary trials no precaution was taken to exclude *dust*. The results, therefore, are still liable to a certain amount of doubt, as Mr. Aitken's beautiful experiments have shown.

The *point* of the method is that there can be no question of surface-layers.

[Since the above was written, Messrs. Mac-Gregor and Lindsay have made an extended series of experiments with dry and moist air, and with mixtures of dry air and olefiant gas in different proportions. The cylinder employed was 9 inches in radius. The results will soon be communicated to the Royal Society of Edinburgh.—P. G. T.]

[1] Letter from Prof. Tait, read by Sir W. Thomson at the Southampton meeting of the British Association.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

OXFORD.—In addition to the courses in Natural Science described in last week's NATURE, the following will be given during the present Michaelmas term:—Prof. Pritchard will give a course of six lectures on the Theory of the Transit Instrument, Equatorial, and Sextant, to be followed by six lectures on the Lunar Theory. There will be eight lectures on Instrumental Practice, and eight "Evenings with the Telescope," the latter being of a popular and untechnical character

Prof. Lawson has announced the following courses of lectures for the ensuing year at the Botanical Gardens:—

Course I. Vegetable Histology; Michaelmas Term, 1882.

Course II. Special Morphology; Lent Term, 1883, and Trinity Term, 1883 (continued).

Course III. Descriptive Botany; every Saturday in Lent and Trinity Terms, 1882.

Prof. Prestwich gives a course on Theoretical Geology at the University Museum, and Prof. Westwood on Certain Groups of Anthropoda.

The Regius Professor of Medicine gives notice that an examination for certificates in Preventive Medicine and Public Health will be held this term, and secondly that Bachelors of Medicine may proceed to the degree of Doctor in any term, on due notice being given.

Natural Science Scholarships are offered this term at Balliol and at Christ Church.

The notice issued by Balliol College states there will be an election to a sholarship on the foundation of Miss Hannah Brackenbury, "for the encouragement of the study of Natural Science," worth 80*l.* a year (55*l.* and tuition free), tenable during residence for four years: open to all such candidates as shall not have exceeded eight terms from Matriculation. This examination will begin on Thursday, November 16, at ten o'clock. Papers will be set in the following subjects:—(1) Mechanical Philosophy and Physics; (2) Chemistry; (3) Biology. But candidates will not be expected to offer themselves in more than two of these. There will be a practical examination in one or more of the above subjects, if the examiners think it expedient. There will also be an optional paper in Mathematics; and the literary qualifications of the candidates will be tested by an English essay, or by a paper of general questions.

At Christ Church *at least* one scholar will be elected in Natural Science. Papers will be set in Biology, Chemistry, and Physics, but no candidate will be allowed to offer more than two of these subjects. An optional paper will be set in Elementary