LETTERS TO THE EDITOR.

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Radio-activity and London Clay.

I VENTURE to think your readers may be interested in the following results.

The recent tube operations in London have brought to the surface specimens of the London Clay from different districts. Samples of this clay taken from such different points as Hyde Park Corner, Brompton Road, and Haverstock Hill have been tested in the physical laboratory of the South-western Polytechnic for the presence of a radio-active gas by Mr. H. Cottam, and he has been unable to detect with his apparatus any marked quantity of active gas from the clays.

With the same apparatus he has detected quite easily the radio-active gas from the water of a deep well, belonging to Messrs. Eastman, Latimer Road, W., which goes below the clay to the greensand. We have come to the conclusion that the London Clay forms a floor through which the radio-active gas does not penetrate; or it may be said that the radio-active substance only travels when the water with which it is associated can travel. This is an argument in support of Prof. J. J. Thomson's view, that the radio-active gas, which he found in deep well waters, arises from the splitting up of a trace of soluble radium salt which comes up with the water. S. SKINNER.

South-western Polytechnic, Chelsea.

Cecil's Gas Engine.

THE earliest practical gas engine appears to be unknown to the leading writers on internal combustion engines. I think that it may be a matter of interest to those who are antiquarians in their subject—as Maxwell used to say—to know that a working gas engine was shown in Cambridge in the year 1820. It was the invention of the Rev. W. Cecil, fellow of Magdalen College, Cambridge. A full account of his engine is given in vol. i., p. 217, of the *Proceedings* of the Philosophical Society of Cambridge (paper read November 27, 1820). The paper is long, and contains excellent matter; a new form of parallel motion is described, and what the author calls "ardent spirit" and turpentine, and vapour of oil, are suggested as possible substitutes for the gas employed by the inventor of the engine. F. J. JERVIS-SMITH.

Trinity College, Oxford, September 29.

The Iris and the Colour Sense.

MR. VINCENT NAPIER'S communication in your issue of September 1 on "Adaptive Colours of Eyes" moves me to record an observation which I have never seen formulated. It is that persons who exhibit a fondness, in dress, for striking colours, or display exceptional taste in colour combination, have eyes of a pronounced and positive colour. One naturally notices this chiefly in women, but I believe it holds good for men also. In the matter of harmonious costuming, perhaps it would not be too much to say that many women dress conformably to the tint of the iris.

New York, September 17. W. P. G.

Electrolytic Oxidation.

I NOTICE with interest that in your issue of September 22 (p. 511) a brief account is given of a memoir published by Paterno and Pannain in the *Gazzetta* on the electrolysis of alkaline aqueous solutions of potassium cyanide. The chief result of their work appears to be the production of potassium cyanate. In the summer of 1899 a friend and I were working in the same direction. From the commencement of our experiments, on both aqueous and semi-alcoholic solutions of potassium cyanide, we were struck by the almost entire absence of oxygen in the electrolytic gases. The aqueous solutions became strongly alkaline and ammoniacal. The semi-alcoholic solutions became strongly alkaline, but not ammoniacal. Acetamide was, however, detected in a distillate, the presence of which may explain the absence of free ammonia. The alcoholic solutions also yielded, on evaporation, white crystals, which proved to be potassium carbonate.

We therefore assumed, without direct proof, that oxygen had been absorbed by the potassium cyanide to form potassium cyanate. This assumption, which now receives confirmation, was based on the detection of its hydrolytic products, which we considered to have been formed according to the following equation:—

$$KCNO + 2H_2O = KHCO_3 + NH_3.$$

It is possible that continued electrolysis would have led to the production of potassium formate from the bicarbonate (*Berichte*, xxxvii., 2836), if this change had not, to some extent, already occurred.

We obtained evidence of the formation of more complex bodies, but have been unable, up to the present, to prosecute further experiments. HERBERT A. KITTLE.

Leatherhead, Surrey, September 26.

DEVELOPMENTS OF THREE-COLOUR PHOTOGRAPHIC PROCESSES.[1]

I.

IN reviewing the recent progress of the various processes, direct and indirect, of the reproduction of colours by photography, it is obvious that there is no very remarkable advancement to report. The ultimate aim of those who do fundamental work at this subject is to formulate a method that shall automatically reproduce the colours of the original, just as by means of a camera and lens the form of the original is automatically drawn in true perspective. The realisation of this desideratum does not seem at hand. There is no method of producing colour prints known that does not need so much control in the working of it or alteration of its results, that it would be incorrect to regard the final products as simple photographs. The skill and sometimes the taste of the operator, and the nature of the appliances that he makes use of, have an important effect upon the work. This fact may lead to the idea that photographic methods of colour reproduction are of little use. But by the aid of photography results may be obtained that were impossible before, either in their character or in the economy of their production. Photography in portraiture is not considered useless because the negative goes through the hands of the retoucher.

Of the direct methods of heliochromy, the interference method that was practically worked out by Lippmann remains nothing more than an interesting illustration of certain physical phenomena. The many restrictions that limit its applications and the difficulties that beset its practice are such that it can never be expected to develop into a practical process. After a dozen years or so, Lippmann photographs are still regarded as curiosities, and are interesting only as examples of the method. None appear to have been made for the sake of the subject. The restrictions as to size and the angle under which they must be viewed, the need for getting rid of reflections from the surface of the film, the slowness of their production, and, above all, the uncertainty of the colours produced and the fact that they change with any alteration in the condition of the film, render the process useful to the physicist rather than the photographer.

The only other method of direct colour photography that appears at all likely to develop into a practically

1 "The Water-Colour Drawings of J. M. W. Turner, R.A., in the National Gallery." By T. A. Cook. Pp. vi+86 and 58 plates. (London: Cassell and Co., Ltd., 1904.) Price 3 guineas net.

"Three-Colour Photography." By A. F. von Hubl. Translated by H. O. Klein. Pp. 148. (London: A. W. Penrose, Ltd., 1904.)

"Photography in Colours." By R. C. Bayley. 2nd edition. Pp. 151. (London: Iliffe, Ltd., 1904.) Price 1s. net.