On the Action of Röntgen Rays and Ultra-violet Light on Electric Sparks.

IN NATURE of April 30, the writer of "Recent Work with Röntgen Rays" has not exactly described the results of our experiments, published in the *Rendiconti dell' Accademia dei Lincei*.

We had formerly found that the sparking distance between two electrodes, in a shunt-circuit on the discharge of an induction coil, which illuminates a Crookes' tube, is strongly diminished if the Röntgen rays sent from the tube fall upon the positive electrode. The phenomenon is very interesting, as it is the reverse of the phenomenon discovered by Hertz, in which the ultra-violet light acts on the sparking distance in lengthening it, when falling on the negative pole.

On subsequent experiments, we found that when the sparking distance was the same as that used with Röntgen rays, the ultra-violet light acted exactly in the same way, and the passive pole —so to say—was then the positive one.

So far we had succeeded in reversing the phenomenon discovered by Hertz, and further investigated by Wiedemann, Ebert, Elster and Geitel, and had shown the parallelism of the two radiations as to their impeditive action on the spark.

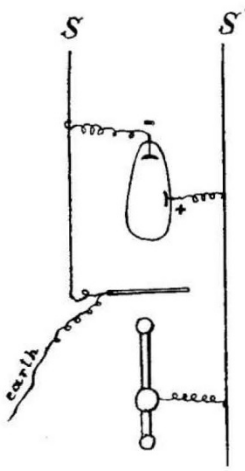
But on diminishing the sparking distance, when the ultra-violet light has a facilitating action, we have shown that the Röntgen rays would provoke the passing of the spark. In the last case the passive pole—*i.e.* on which the radiation must fall —is in both cases the negative.

So taking as electrodes two spheres of amalgamated brass, 52 mm. in diameter, when the sparking distance was below 30 mm., the Röntgen rays and the ultra-violet light provoke the passing of the spark when falling on the negative electrode. When, on the contrary, the distance was more than 30 mm., both radiations act in an impeditive way when falling on the positive pole.

This result is quite different to that referred to in the cited article, in which it is said that the simultaneous actions of the Röntgen rays and the ultra-violet light could be made to neutralise each other. From our experiments it follows, on the contrary, that the action of the two radiations is in every respect identical.

We will describe a method by which the action of the Röntgen rays on the spark is very clearly demonstrated.

S, S' are the terminals of the secondary of an induction coil. In front of the portion of the tube on which the kathode rays fall



is a thin aluminium plate 20 cm. square, in connection with the negative electrode of the Crookes' tube; whilst the positive is connected with a sphere so that the sparks between the plate and the sphere take place in the direction of propagation of the Röntgen rays, to which the aluminium plate is transparent. The plate is connected to the earth. With this apparatus the length of the spark can be made *four* times greater when the Röntgen rays are screened before falling on the aluminium plate. On diminishing the intensity of the current in the primary so as to conveniently shorten the sparking distance, the inverse phenomenon can be obtained, so that the spark does not pass when the Röntgen rays are screened.

Our present researches aim at the study of the alteration of the nature of the discharge when the spark is under the action of the Röntgen rays.

A. SELLA.
Q. MAJORANA.

Istituto o della Università di Roma, May 3.

Röntgen Ray Phenomena.

AT one of my demonstrations last week two tubes failed to act. They were both of the kind which depend for their action on a piece of platinum placed within, and from which after bombardment by kathode rays the Röntgen rays take origin. A glance at the tubes showed that owing to the unusual strength of spark the platinums within them were red-hot at the point of impact. Before the demonstration the tubes had been in good working order. I considered they had broken down, but, on returning home, tried them with the spark from my own apparatus, with which they had before answered well. I was somewhat astonished to find them giving off Röntgen rays rather more freely than when first tried. This tends to show that Röntgen rays are not given off by platinum heated above a certain temperature. I think this has already been suggested, but I have not seen it corroborated.

Following up the idea of reinforcing the effect of the Röntgen rays by placing a fluorescent screen under a sensitive film on celluloid, the celluloid side being next the screen to prevent "grain," and having tried screens of barium platino-cyanide, potassium platino-cyanide, calcium tungstate, natural scheelite, artificial scheelite (Edison's), fluor-spar and calcium fluoride, I find that potassium platino-cyanide and artificial scheelite alone produce any effect through celluloid. Barium platino-cyanide, placed underneath, gave no effect either in contact with the sensitive film itself or through celluloid, but the films were not sensitive to yellow, and this salt gives yellow fluorescence. The effect with potassium platino-cyanide was decidedly the best.

Chard, May 3. J. WILLIAM GIFFORD.

Alpenglühen.

AFTER the shadows of the lower mountains have swept up past the tops of the higher snow peaks, *i.e.* after the sun has set upon these last, and as the general light of the sky fades, the contrast between the illumination of the snow and of the sky usually increases. The westerly-facing snow peaks stand out against the darkened sky, and gradually change in tint. Very often the most noticeable change is to a clear greenish-white. But sometimes there is a period during which they have a faint rose or crimson glow. This is the true Alpenglühen; often confused by tourists with the ordinary rose-coloured illumination preceding the setting of the sun.

I see (NATURE, vol. liii. p. 588) that it has been suggested that this afterglow is due to what practically amounts to a second rising of the sun upon the high snow, owing to a peculiar arrangement of layers of hot and cold air in the atmosphere. This may be so; but it is rather a startling theory, and should be tested by observations from, say, the higher or lower observatories of Mont Blanc, simultaneously with observations of the Alpenglühen made from below anywhere to the west. A reappearance of the sun would be an interesting sight for the higher observer. In the meantime, my own observations of some twelve or thirteen summers would lead me to suggest the following explanation. In the first place, I do not think that the afterglow is nearly as vivid as an observer believes. To the eye, the stars "come out," and the moon becomes almost dazzling, as the general light of the sky fades; and both "fade" as day breaks.

Next, I noticed the following during five months of uninterrupted observations of sunsets in the plains of Argentina. On some fine evenings, there was left, as daylight faded, a vivid line or band (of uneven thickness) of intense crimson colour in the west. This was so strong and so well defined that it lit up the westerly face of the estancia with crimson, and actually threw a fairly sharp shadow of the horizontal gutter. Vertical poles, &c., had of course no shadow; the source was too long in a horizontal direction. This crimson streak did not appear always, by any means. The westerly sky itself often passed through various tints of a clear greenish-blue.

It seems to me that, considering the snow heights facing the