FLASH-LIGHT PHOTOGRAPHY.

BY MR. JOHN CARBUTT.

[*Being the Substance of Remarks made at the Stated Meeting of the INSTITUTE, held Wednesday, October 19, 1887.*]

JOS. M. WILSON, President, in the Chair.

MR. JOHN CARBUTT.—*Mr. President, Ladies and Gentlemen:* I take pleasure in bringing to your attention this evening the latest thing in instantaneous photography at night; although it is not instantaneous, for the duration of the flash is perceptible. It was but recently brought to the notice of the public at the meeting of the Photographic Society, in New York, on Tuesday last. Being a member of that society, I was so far interested in the subject as to go over to see its performance, and was very much struck by it.

While at first I thought the method would be useful only for social entertainment, I can now see where it might be of use in scientific investigations in photographing the interior of mines, geological strata, breasts of coal or in any place where it might be of advantage to have a photographic representation of objects, which could not be reached by daylight.

The invention is the outcome of investigations made by Dr. H. G. Giffard, of New York, who, on reading a description of a patented method of quickly igniting magnesium powder, the invention of a German and patented in England, saw that the material used was of what he considered a dangerous nature, and that it would deter those unacquainted with chemistry from using it. He thought first of using gunpowder to ignite the magnesium powder, but finally decided upon gun-cotton, using the kind which is least explosive in its nature, the variety called collodion, which is not so rapidly explosive as that used for projectiles. The results of his investigations were so satisfactory that, having a little party at my house last week on the occasion of my daughter's birthday, I thought that before they broke up, I would endeavor to secure a picture of them by the new method, it would be a most interesting memento of the occasion, and might be followed by others for a more useful purpose.

Before showing you this light, I will show you some instantaneous pictures, which I took at the University last week of the young athletes in the act of vaulting, and while the pictures are upon the screen I will endeavor to demonstrate the rapidity with which the exposures were made. The first shows the first step made by the champion high jumper, Mr. Page, as he makes his spring before taking the jump.

The second is the five-foot jump. You see him just over the bar. Those who saw this performance will recognize that he turns around and faces the goal from which he starts.

The third is the five-feet-six jump, in which you see that his body is on the turn.

The fourth is a representation of the extraordinary feat of Page breaking his own record by jumping six feet four inches.

The fifth represents Tom Ray vaulting with a pole and clearing the bar at eleven feet four inches. The sixth is the eleven-feet-six jump. In this jump, you will notice that after he rises to about the height of the pole, he climbs up it, hand-over-hand, about three hands, and elevates his feet over the pole and holds on with his left hand until he gets his feet clear, and then throws himself forward and the pole backward, using the momentum to pitch his body over the bar.

This last picture is the group of children, the little party at our house, which we called our "Donkey Party;" it was taken by the flash which will be presently illustrated to you.

It will be readily seen how portable the photographic apparatus is. The apparatus now provided is of such a portable nature that wherever anybody can go with his body he can take it along. I have in my hand six charges. If the President will kindly sit for a moment, I will photograph him.

I have here an extemporized arrangement upon which to burn the magnesium. Here in this paper are twenty grains of pyroxyline, commonly called gun-cotton, and here is a piece of asbestos underneath. I scatter fifteen grains of magnesium powder on the gun-cotton, and by touching the gun-cotton with a lighted taper it will explode with a puff and ignite the magnesium-powder. All now being in readiness, I will put out the lights.

A VOICE—Is your plate in?

MR. CARBUTT—I think you are right, Mr. Chambers. You have been where photographers have been at work before.—(Puts in the plate, fires the preparation, which ignites with a brilliant and diffused flash.)—The exposure is made, and the picture is taken. I will endeavor to show you the results at the next meeting; there are no facilities here for developing.

On motion of Dr. Wahl, the thanks of the INSTITUTE were tendered to Mr. Carbutt for his very interesting illustration.

THE REACTION OF A LIQUID JET;

Being a Review of § 522 and § 523 of Weisbach's „Ingenieur- und Maschinen-Mechanik, Erster Theil; Fünfte verbesserte und vervollständigte Ausgabe, Braunschweig, 1875;“

With some additional matter.

BY PROF. J. BURKITT WEBB, Stevens Institute, Hoboken, N. J.

(Continued from page 156.)

The effect of placing $F = G$ is best seen by means of eq. (24), which becomes

$$h' = \frac{c^2}{2g} = \frac{h}{1-1} = \infty \quad (24')$$

and shows that the velocity will be infinite if the water is to be furnished at A fast enough to keep the vessel or pipe full at F while gravity is free to act upon it in its passage from A to F . Eq. (49), which should read

$$V = 2 F h' \gamma (\sin a - 1), \quad (50)$$

gives, therefore, an infinite value for V , as it should. Another form of (24') is,

$$h' = \frac{c^2}{2g} = \frac{h=0}{1-1} = \text{any value}, \quad (24'')$$

according to which if A be on the same horizontal line with F (see Fig. 3) the pipe between may be of uniform section and remain full; or, taking friction into account, A may be at such a height above F that a column of water of the height $h = AF$, will just balance the friction between A and F . The difficulty in supposing $h > 0$ and $F = G$ when there is no friction is that the