Mr. W. F. King, Chief Astronomer, to whose office the record sheets have been transmitted, suggests an improved system in the following remarks :—

REMARKS ON THE RECORDING APPARATUS AT THE CALGARY RATING STATION.

The difficulty of getting proper marking of the chronograph sheet is probably due—

(1.) To defect in the contact apparatus on the car.

(2.) To the use of too strong a current on the chronograph.

I would recommend the trial of a more delicate mechanism for the car contacts. In the first place the using of the rails as a part of the circuit seems to be a bad principle.

The resistance must vary very considerably, so that the current at times is much stronger than at other times, and it is impossible to keep the magnet, by which the signals are transmitted to the chronograph, in delicate adjustment. The lateral oscillation of the car must also give contacts of unequal length. Possibly the following system would answer,—

Lay a wire A. B. C. D. as in figure I, diagram No. 5, along the track, midway between the rails. At the points (A. B. C., suppose) where signals are to be recorded, insert break-circuit contrivances, as shown figure II. The uprights F, f, f′ and G, g′, g″ &c., are springs, and the uprights G, g′, g″, are normally in contact with the small projecting points of F. f, f′, so that, when the car is not passing, the current flows unbroken through the wire A. B. C. D..... Now let a projection on the other side of the car be arranged so that as the car is moved (from left to right in the figure) this projection will successively touch G, g, g′, &c. and slightly moving the springs, break the contacts with F, f, f′, &c. The projection should be made of such form as readily to free itself from contact with the springs as soon as it has touched them. Of course the car can be worked only one way, and it will be necessary to remove the projecting piece when the car is returning. The contact springs may be set in plugs, to fit into proper sockets at A. B. C. D. . . . so that they may be removed when the apparatus is not in use. The wire A. B. C. D. ..... should be a stout one.

The advantages of this arrangement would be—

(1.) The resistance not varying, the relay by which the signals are transmitted to the chronograph can be kept in fine adjustment, so as to act promptly.

(2.) A weak current can be used. One gravity cell should be sufficient to work this circuit. A relay acts sluggishly when the current is so strong as nearly to approach the limit of capacity of the magnet.

(3.) The relay will respond more promptly to a break than to a make. Hence the mark on the chronograph sheet is more definite.

For the other connections I would recommend a local circuit for the chronograph alone, and another for the clock. The arrangement wouid be as in figure III.

G, G′, G″, are the batteries.

R, relay on the other circuit, A. B. C. D.. .....

S, relay on the clock circuit.

Ch, chronograph.

Cl, clock.

K, key on the chronograph circuit, which may be used for recording observations taken for rating the clock.

The chronograph circuit passes through the magnet of the chronograph, through the points of the relays R and S, and through the key K. This key must be a break-circuit key. The battery of the chronograph circuit, G, should not be too powerful. One large gravity cell in good order will work well with the above arrangement of the circuits.

As to the battery on the clock circuit, I am not in a position to advise, not having a detailed description of electrical control mechanism of the clock. In the arrangement suggested, however, I assume that the clock breaks the circuit. If I am wrong in this, and the clock makes the circuit, the make may be changed into a break so far as the relay S is concerned, in the manner shown by figure IV.

Connect the battery G″ directly to the relay S, by the wires w, w′. Connect w, w′, by the wires v, v′, with the clock. Then the current from G″ normally passes through the magnet S, and holds the armature tight to it. At the instant, however,