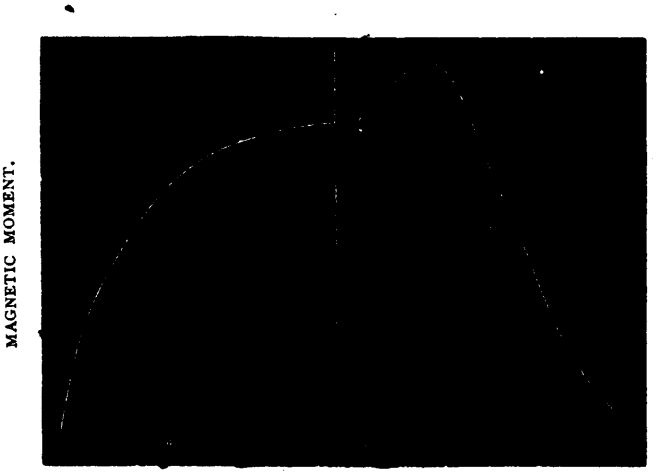

FIG. 1.—DISCHARGES. FIG. 2.—DECREASING WEIGHTS.

the Leyden jar through a circuit, the self-induction of which was chiefly due to the magnetising helix of 20 turns of wire insulated with gutta-percha. The inner portion or core of the magnet was always found to be free from magnetism. Occasionally a slight reversal was found at the inner boundary of the magnetised portion of the rod.

In all cases the magnetic moment increases with successive discharges up to about ten. Beyond that the increase, if any, is very small. Fig. 1 shows the relation of magnetic moment to successive discharges through the magnetising spiral. The two figures refer to the same magnet.

An oscillatory discharge is then capable of magnetising steel, and lightning may still be oscillatory, and produce magnetic effects. There are perhaps two explanations—at least two suggestions—which may explain the magnetic effects produced by electric oscillations.

In the first place the mathematical theory, based on self-induction, shows that the maximum values of the intensity of the discharge decrease in geometrical progression, while the alternating currents employed to effect demagnetisation decrease in something like arithmetical progression. It is not difficult to see that while the latter annul magnetism the former may not.

Again Kirchoff has shown that under certain conditions the time of one of the electric oscillations is much greater than the others. It is not unreasonable to suppose that the electromagnetic effect of this oscillation of long period may be far greater than the others. It is known that time is required to magnetise iron and steel, and fig. 1 shows that the repetition of electro-magnetic impulses increases the total permanent magnetism.

We conclude, then, that oscillatory discharges do magnetise steel, generally, though not always, in opposite directions at different depths; and that the known differences between such discharges and alternating currents are sufficient to account for the difference in effect.

ELECTRIC ROAD WAGON.

Messrs. Immisch & Co., electrical apparatus manufacturers of London, have recently constructed an electric dog-cart for the Sultan of Turkey, which is excellently displayed in the accompanying illustration.

In the last issue to hand of the *Electrical Engineer* of London, the following description and account of the trial trip are given :—

"In appearance it is similar to an ordinary four-wheeled dog-cart, but without the shafts. In use the running is very easy and perfectly under control, but it must be said the absence of shafts and a horse gives it at first to the mind of the onlooker a curious, imperfect appearance, comparable to seeing a fowl running about without its head; this effect, no doubt, wears off, but it will be probable, if electric dog-carts come much into use, that a special form of carriage adapted to the needs of accumulators instead of horses will evolve, as the Pullman car has superseded the early railway imitation of the stage coach.

The dog-cart is constructed with a walnut body and white wood spokes, brightly varnished, and the cushions and hangings are of a harmonious brown color, and are embroidered with the Turkish Imperial crest—the star and crescent; it is beautifully finished, but, although destined for an Oriental Court, has not been designed to have any specially luxurious appearance.

The motive power is supplied by a set of 24 small E.P.S. accumulators, placed in the body of the cart, of sufficient storage capacity to drive the dog-cart for five hours at the speed of 10 miles an hour. The weight of the accumulators is 7 cwt., and that of the carriage, all complete, is 11½ cwt.

The motor is Messrs. Immisch & Co.'s 1 h.p. type, using in this case a current of 20 to 25 ampères, with an E.M.F. of 48 volts. When the vehicle is running at a speed of 10 miles an hour, the motor makes 1,440 revolutions per minute, and