PROCEEDINGS
OF THE
AMERICAN PHYSICAL SOCIETY.

THE ADJUSTMENT OF THE D'ARSONVAL GALVANOMETER FOR
BALLISTIC WORK.¹

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DURING the past year I have used D'Arsonval galvanometers with a particular adjustment for ballistic work, and this adjustment has some very important advantages.

The coil is stripped of its dampers, so that its motion is but little damped when on open circuit. The relation between the coil constant, the suspension constant, the strength of the field, the moment of inertia of the coil and the resistance of the coil is so adjusted that the coil comes to the zero position in the least time without swinging past it. It is also desirable to have the period of the coil as large as 15 or 20 seconds. To make the period as large as this often requires the use of a small suspension or an increase in the moment of inertia of the coil. Unless the coil has a very large moment of inertia in proportion to the copper in it or swings in a very weak field the adjustment may be completed by putting the proper resistance in series with the coil. This resistance may be determined by using different values and observing the swing of the coil past the zero when released from a certain deflection. If resistances are plotted as ordinates and the swings past the zero as abscissa, the point where the curve meets the "y" axis gives the resistance.

With this adjustment the ballistic constant is e (base of Napierian log.) times as large with the coil on closed circuit as when on open circuit. The constant may be determined by the solenoid method, a condenser and standard cell or from its figure of merit and the free period of the coil. The galvanometer may be used either on closed or open circuit work with the same constant except the factor e . When used on condenser work the coil may be quickly brought to the zero by closing the coil circuit. When used on closed circuit work, such as iron testing and induction experiments, the coil returns to the zero position without attention about as fast as readings can be taken and recorded.

Other advantages which D'Arsonval galvanometers show for general work are also noticeable here.

¹ Abstract of a paper presented at the New York meeting of the Physical Society, Dec. 29-30, 1905.