tion in which it is placed, and is independent of the earth's magnetism.

Any galvanometer will not do to measure the small currents, which are, for the most part, used in Medical work, for the simple reason that the coils employed have to be wound in accordance with the quantity of Cs it is desired to measure. A galvanometer, for instance, constructed to measure the strong currents used in electric light and power work would not deflect at all with the few milliampères which are required in Medical work, and a delicate galvanometer suited to the measuring of small currents would be seriously injured if a current from a light-circuit were to pass through it.

Galvanometers for Medical work should be graduated in milliampéres (the milliampère being the one-thousandth part of an ampére, which is *the unit of current strength* as shown in Lesson III.), and it is very necessary that attention be paid to this. Most galvanometers sent out by Medical instrument makers are simply current indicators and not current measurers. The divisions of the scale marked on the face of the instrument are often equal throughout, and, therefore, do not mark proportional increments of the current which passes through the instrument, while the value of each division is altogether an unknown quantity.

Unless a galvanometer be graduated in *m.a.*, or has been "calibrated" so that the value of its deflections be known in terms of *m.a.*, it is of very little service in Medical work and should never be employed by those who value accuracy.

It is not difficult, however, to obtain at a reasonable cost galvanometers graduated in *m.a.*; nor is it difficult to calibrate one not so graduated so that the value of its deflections may be known. All that is required is the loan of a milliampère-meter for a few minutes, the galvanometer to

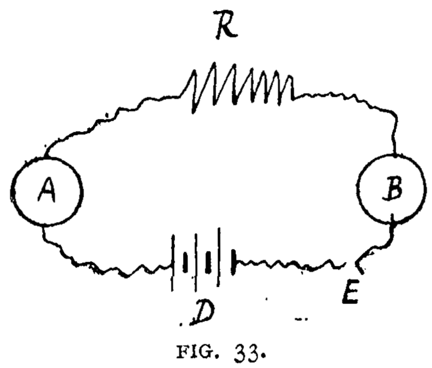

FIG. 33.

be calibrated, a small battery, an adjustable resistance (such as a few coils of wire or a water heostat), and a sheet of squared paper.

Fig. 33 shows how the instruments should be arranged for the purpose. A is the standard milliampère-meter, B is the galvanometer to be calibrated, R is the adjustable resistance, D is the battery, and E the switch.

Having arranged the connections as shown above, make the resistance R sufficiently high to allow such a Cs to pass when the circuit is completed as will indicate 1 *m.a.* on the standard A, then with the same Cs passing read the deflection of B. Reduce R till A records say 4 *m.a.*, and simultaneously read the deflection of B. Repeat observations with increasing Cs at reasonable intervals till the maximum deflection of one or both instruments is obtained. These observations should be recorded carefully, and then plotted upon the squared paper in the manner shown in Fig. 34. Let us suppose that we have obtained the following readings:—

A.			B.	
Milliampères	1	...	Divisions	1·5
"	4	...	"	4·5
"	10	...	"	10·0
"	15	...	"	13·5
"	20	...	"	17·0
"	25	...	"	19·5

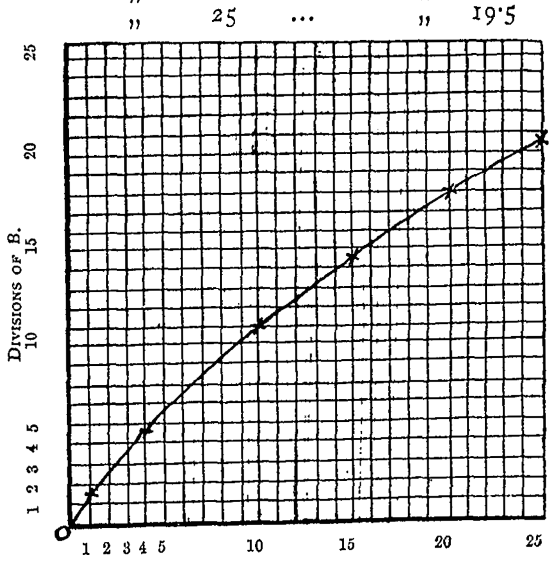

FIG. 34.

Taking the values of A (in *m.a.*) and of B (in divisions), we then plot the curve, and by its use are able to see the value in *m.a.* of any deflection upon the galvanometer B.

For instance, 7 divisions = 6·5 *m.a.*, 12 divisions = nearly 13 *m.a.*, 18 divisions = 22 *m.a.*, and so on.

As long as we have this curve to refer to, B is practically as useful to us as A would be, because though its scale is not marked off in