

## A SIMPLE FORM OF THE CAREY FOSTER BRIDGE.

---

J. P. NAYLOR.

---

Probably there is no better method than the Carey Foster method for comparing nearly equal resistances or for measuring small changes in resistances such, for instance, as those due to change of temperature. While many arrangements have been devised for interchanging the resistances, as is necessary in this method, the following arrangement is believed to be sufficiently novel to make it worth while to present it to the Academy and it is also thought to possess some advantages over other forms of the apparatus.

Its advantages are that it is readily adapted to any width of resistance terminals; the arrangement of connections and relative position of the resistances is such that they can be seen at a glance: and the apparatus is so simple in construction that it can easily be made by anyone who can solder a little and can drill a few screw-holes in the straight copper strips of which it is made up. The whole apparatus can be built up on well varnished hardwood as a base, the copper strips being fastened to the wood base with wood screws. To help the insulation, it has been found to be a good plan, after the screws have been screwed home, to remove them, one at a time, put a drop or two of thick shellac in the hole, and then put the screws back again.

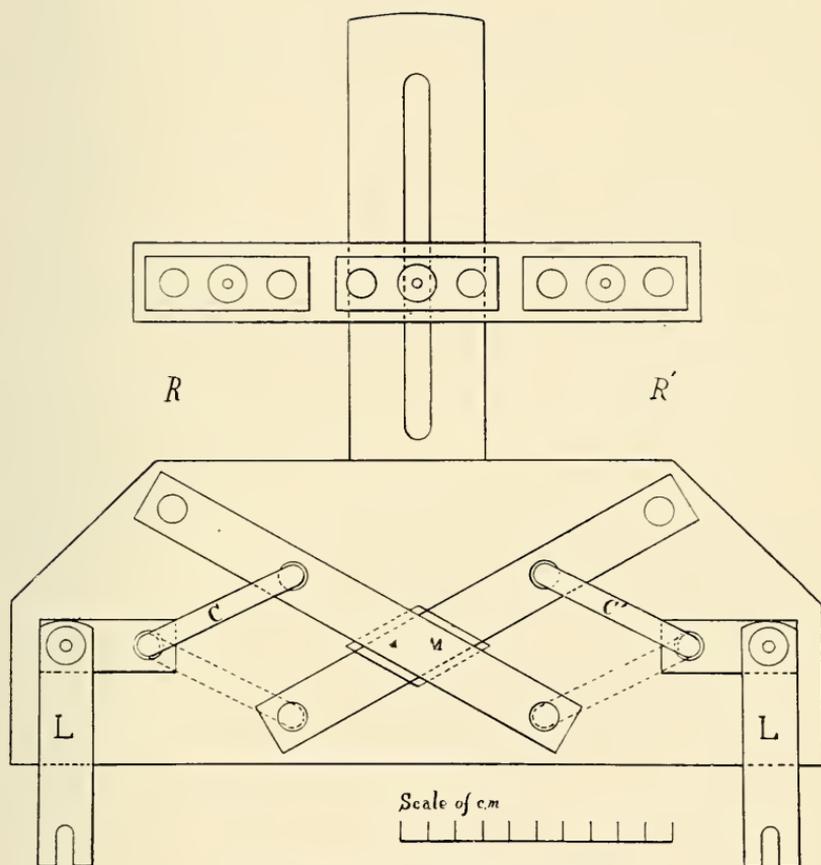
No. 10 or 12 gauge copper strip, two centimeters wide, can be used for the conductors. In the figure, the double, concentric circles represent binding posts and the single circles mercury cups. The latter are made from .41 copper rim-fire cartridge shells.

It may not be generally known that these shells, although quite thin, make very satisfactory mercury cups if soldered directly on top of such copper strips as here mentioned. If blank shells cannot be obtained, the charges may be drawn from the loaded shells. The charges should not be shot out, for the firing pin will nick the shells and cause them to leak. In order to prevent any mercury from coming in contact with the solder and loosening the shells, they and the strips, after soldering is done,

should be thickly coated with shellac varnish which, after drying, should be baked on by heating until it begins to smoke. Mercury cups made in this way have been in use in our laboratory for twenty years and are still doing good service.

The figure practically explains itself. By means of the links, L and L prime, the apparatus can be connected with any calibrated bridge wire, thus adapting it to the Carey Foster method. By changing the thick connectors, C and C prime, to the dotted positions it will be seen, by tracing the connections, that the resistance in the gaps, R and R prime, are interchanged to opposite ends of the bridge wire. These gaps can be adjusted to any width by means of the slotted support shown in the figure. A piece of mica, M, is used to separate the strips at the point of crossing.

As the conductors are so arranged that the arms of the bridge are at all times symmetrical, the dimensions of the apparatus are immaterial. However, a scale of centimeters is added as a suggestion of size for those who may care to construct apparatus of the size figured. It might be added, that apparatus similar to the above has been used at the DePauw physics laboratory for a number of years and has proved very satisfactory for student work.



A Simple Form of the Carey Foster Bridge.

