

of about 3 inches long and 5 inches wide—having been previously dried in the dark it is also requisite, to keep it dry and free from light. When required, one of these slips is placed 5 feet from the ground and shaded from the sun and rain;—another of these slips, of ozone paper, is elevated and exposed at an altitude of 80 feet, for the purpose of comparison. It is also well to place slips of this prepared paper in the vicinity of any vegetables, which may be affected with disease; for instance, during the prevalence of the potatoe rot.

A *Microscope* and apparatus for the examination of snow crystals and also obtaining copies by the chromotype process, is also provided.

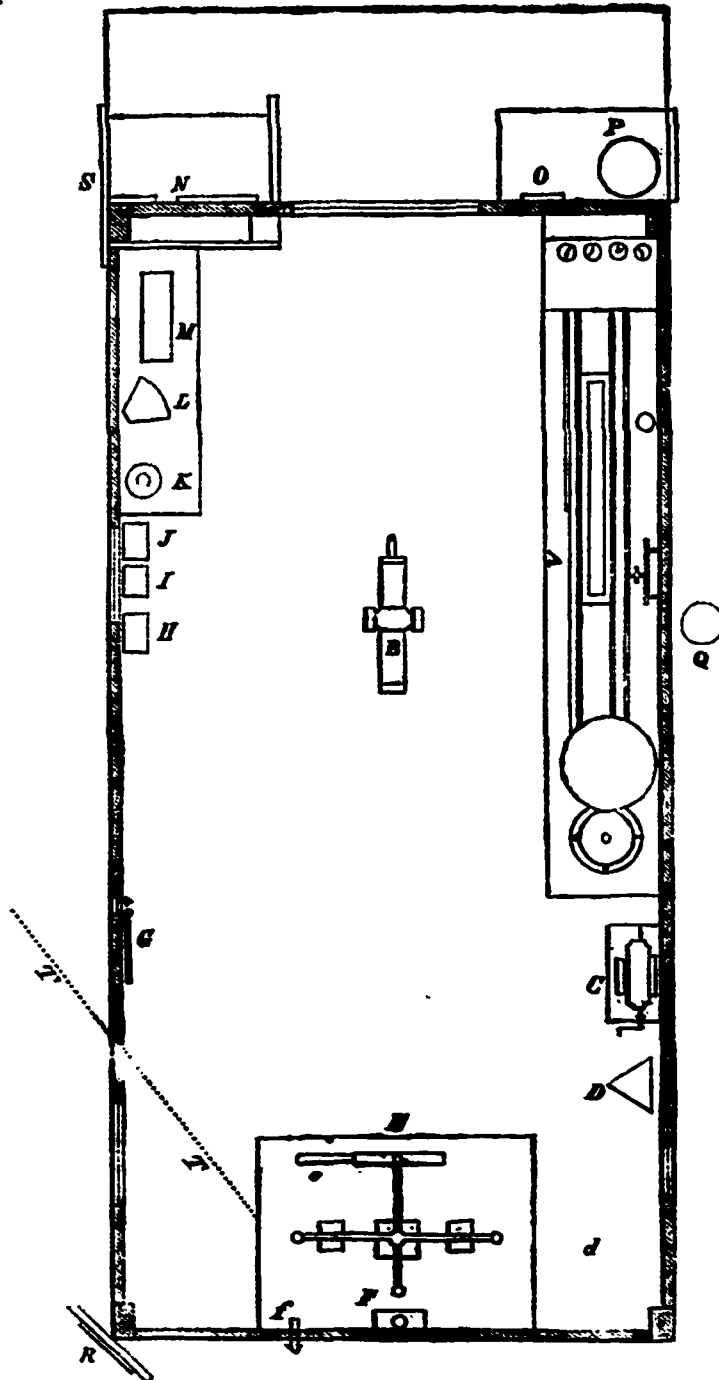
The Electrical Apparatus.—This consists of three parts: a hoisting, a collecting and a receiving apparatus.

The hoisting apparatus consists of a pole or mast 80 feet. It is in two pieces, but is spliced and bound with iron hoops, and squared or dressed on one face for about six inches. It is dressed in a straight line to receive cross pieces of a two-inch plank, 8 inches wide and 12 inches long, which are firmly nailed to the mast or pole about three feet apart; this serves as a ladder to climb the pole in case of necessity. Each of these cross pieces is *rebated* to receive pieces of inch board 4 inches wide, and placed edgewise in the *rebate*, extending from the top to the bottom of the pole, and forms a sort of vertical railway: these pieces are also grooved or rebated to receive a slide, which runs in these grooves and carries the receiving apparatus. From the top of the sliding piece passes a rope over a pulley fixed at the top of the mast, and from it to a roller and windlass, by which means the collecting lantern is raised or lowered for trimming the lamps. It has also been used for the purpose of placing the ozonometer at that height (80 feet). The lower part of the mast or pole is fixed into a cross piece of heavy timber, and is supported by four stays. These cross timbers are loaded with stones, and are thus rendered sufficiently firm.

The collecting apparatus consists of a copper lantern 3 inches in diameter, 5 inches high. (See top of mast G, fig. 1.) The bottom is moveable and the lamp is placed in it by the means of

a small copper pin passing in a slit, which is a very easy method of fixing it. This lantern is placed on top of a copper rod $\frac{3}{4}$ inch thick and 4 feet long: the bottom of the lantern having a piece of copper tube fixed to it, a very little larger than the rod, and is thus easily removed and replaced. To the lower end of the copper rod is soldered an inverted copper funnel, a *parapluie*, for protecting the glass insulating pillar upon which it is fixed by means of a short tube firmly soldered to the underside of the *parapluie*. This glass pillar passes into and is fixed firmly in a wooden box, and is freely

exposed to the heat of a second lamp, which is placed in that box. It is trimmed at the same time as that in the collecting lantern, and keeps warm and dry the glass pillar, by that means securing a more perfect insulation. From this upright rod and collecting apparatus descends a thick copper wire, which serves to convey the accumulated electricity to the receiver, which is placed in the observatory.



The receiver consists of a cross of brass tube (gas tubes), each about 2 feet long, and is screwed into a large tube fitting upon a glass cone, which is hollow, forming a system of hollow pipes for the passage of the heat internally, and keeping up a certain amount of dryness and consequent insulation. The glass cone is fixed upon a table over an opening made in it, fitting to the hollow part of the cone. Immediately under this table is placed a small stove of sheet-iron, about 8 inches in diameter, made double, the space of about 1 inch being left between the two chambers; and this plan has been found to effect a good insulation by keeping the whole of the apparatus warm and dry. Charcoal is used as fuel, and is, I think, preferable to a lamp. A coating of suet or tallow is applied to the glass cones or pillars. Care must be taken not to rub or polish the collecting apparatus, as it seems to deteriorate its power of collecting and retaining atmospheric electricity; and I have found that its collecting powers increase with its age. Suspended from these cross-arms hang the *electrometers*.

1. *Bennet's electrometer* of gold leaves; this scarcely needs a description. 2. *Volta's electrometers*, No. 1, consisting of two straws, two French inches long: a very fine copper wire passes through these straws, which are suspended from the cross-arms. This electrometer is furnished with an ivory scale, the old French inch being divided into twenty-four parts, each being 10; this forms the standard scale for the amount of tension. 3. *Volta's electrometer*, No. 2 is similar to the No. 1, but the straws are five times the weight of No. 1, so that one degree of Volta's No. 2 is equal to five of No. 1. *Henly's electrometer* is a straw suspended and furnished with a small pith ball: each

of the degrees of Henly's is equal to 100th of No. 1 of Volta's. These electrometers are all suspended from the cross-arms. A *discharging apparatus*, furnished with a long glass handle, measures the length of the spark, and serves also as a conductor to carry the electricity collected to the earth, and is also connected by a chain and iron rod passing outside of the observatory for about twenty yards, and buried under ground.

Various forms of *Distinguishers* are used to distinguish the kinds of electricity. The Volta's electrometers may be rendered self-