covered thermometer rose rapidly till it nearly touched 94°, while the naked one remained stationary.

The conclusions to which these experiments point are too obvious to require demonstration. C. J. McNALLY

Madras, December 9, 1880

Selenium

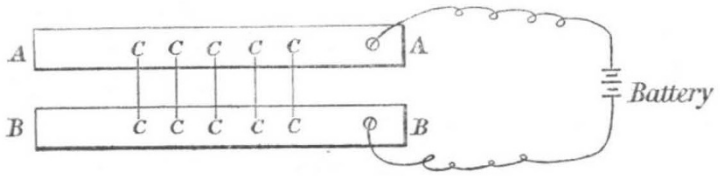
THE use of selenium in the photophone has suggested to me the possibility of using it in two ways, which I shall now describe, thinking you may perhaps consider them of sufficient general interest to publish in NATURE.

Firstly, it seems probable that selenium might be used to obtain the automatic registration in a chronograph of such phenomena as star transits. It possesses the property of being drawn into fine wire at a low temperature, but whether it can be drawn fine enough to represent transit wires in a telescope I do dot know.

The arrangement would be as shown in the diagram, where A A B B are parallel metal plates crossing the field of the telescope, and insulated from each other except by the selenium wires C C C C in one direction, and by a wire circuit passing through a battery, and a relay, R, in the other. The relay should be so adjusted that the increased force of the current passing through the circuit caused by the light of a star falling on each wire C C in succession, shall cause its armature to act, and pass on a signal to the chronograph.

The delicacy of the adjustment required for this purpose might be a greater difficulty than I am aware of; but it should be borne in mind that the length of selenium in the circuit may be very small, as the plates A A B B need not be farther apart than sufficient to insure the star's falling between them without excessive accuracy of setting, say one-twentieth to one-tenth of an inch in a telescope of moderate size. If necessary, it would be simple enough to give each wire C C its own distinct circuit. Should the brittleness of the wires prove a difficulty, they may be supported between the plates A A B B in any convenient way which does not interfere with the insulation of these plates.

The second purpose would perhaps be of more practical use than the above, viz. to secure an automatic daily time-signal.



Let a thin plate of [illegible] be placed between, and in [illegible] contact with, two parallel plates of metal, which are connected with each other by a wire passing through a battery and a relay as above, so that the selenium alone interrupts the circuit. Then if this plate be placed with its length in the meridian, and a lens adjusted above it, so as to throw the image of a star, or the sun, as it crosses the meridian exactly on the selenium, a signal will be obtained from the relay as before, which in this case may be the stroke of a bell or any other convenient sound.

An ordinary lens would require constant changes of adjustment if used for the sun, moon, or any body of varying declination; but if the lens were the central slice cut out of a sphere by two small circles parallel to each other and equidistant from the centre, placed with its flat sides parallel to the meridian, [illegible] concentric with that of the lens, at the proper distance from its surface, and of sufficient length—of course being accurately in the meridian—then any heavenly body of whatever declination—between certain wide limits—would throw its image on the selenium and afford a signal, if of sufficient brightness. The arrangement of a warning-signal would be easy.

If this method proved practicable the objection would remain of having to apply a correction to obtain mean time, which would probably prevent its being used for public purposes, such as dropping time-balls or firing time-guns. It seems to me however that it might nevertheless prove very useful to many private individuals who require an accurate knowledge of time.

Poona, December 3, 1880 W. M. C.

Experiments with Vacuum Tubes

AT a meeting of the Philosophical Society of Glasgow on December 22, 1880, I gave a ver[illegible] brief preliminary account of some experiments that I have been making, along with Sir William Thomson, with vacuum tubes. We have sealed up English and German glass tubes with very high vacuums, but without any electrodes; and have obtained very remarkable luminous effects both with the Ruhmkorf coil and also working by means of electrostatic induction. Using an ordinary frictional electric machine, and applying one end of a long vacuum tube to the prime conductor, while the other end of the tube is held in the hand, the tube becomes charged as a double Leyden jar in the following way:—one end of the tube, next to the prime conductor,—outside positive, inside negative; the other end—inside positive, outside negative. This can be shown by the gold leaf electroscope. The charges seem to be very high and the glass is very frequently perforated. Indeed it is difficult to work with the electric machine in tolerably good order without perforating the glass. While this double Leyden jar is slowly discharged, by removing, part by part, the charges from the outside of the tube, beautiful luminous effects are observed very different from those seen in the ordinary vacuum tubes. We have also obtained curious effects by heating the middle region of the tube so highly that it becomes a semi-conductor. J. T. BOTTOMLEY

Physical Laboratory, University, Glasgow, December 29

Modern Use of Ancient Stone Implements

PERHAPS the following statement will interest some of your readers:—In an old volume, "Thomae Bartolini Acta hafniensia," Ann. 1674, 1675, 1676, I find a paragraph signed by Olaus Borrichius, which clearly indicates that in the seventeenth century ancient stone implements, and probably many of them, were converted into flints for the use of the contemporaneous musquetry. The text runs thus:—"Silices Anholdini triangulares. Insula haec [Anholt in the Kattegat] porrigitur in sinu codano, minuta illa quidem et naufragiis multorum infamis, uno hîc laudanda quod si quis arenas littoris eiusdem scrutetur, infinitos reperiat silices nigros, albos, varios, in sabulo hinc inde sepultos, ad sex transversos digitos in longitudinem protensos, latos digitum unum, omnes triquetros ac si manu artificis fuissent acuminati, et lateribus plerumque in illam aciem excitatis, ut Iosuae servire potuerint cultris saxeis filiorum Israel circumcisionem imperanti. Nunc ferreo hic seculo in alios vocantur usus: malleo enim in frusta convenientia divisi sclopetorum rotulis ignem prompte ministrant et fomitis incendiarii loco fulmineis bellatorum tubis ancillantur." D. BUDDE

Rome, December 26, 1880

Pile Dwellings

IF the connection between pile dwellings in the Swiss lakes, the Swiss châlet, and the Malayan modern pile dwellings is demonstrated, a decided advance has been or will be made in prehistoric anthropology.

Pile dwellings are a very distinct characteristic of all the Hill races north-east of Bengal, except those on the Kasia Hill ranges, and so far as I can see is a conspicuous distinction between the Aryan and non-Aryan races here.

The persistence with which this custom is retained among tribes who have migrated to new sites, where the need is not obvious, seems to offer a safe means of tracing to some extent racial descent or relationships.

The "Miris" of Asam offer a case where part of the tribe is still in its hills, while the rest are more or less scattered along the Brahmaputra in the level land of Asam, and build houses alike. The Ahoms, a Shan race who invaded and settled in Asam in A.D. 1228, built pile dwellings, and the "Deodhaings," who are lineally descended from them, do so now. The Butias