it be not exposed for more than ten minutes or so at a time, it will recover itself in the dark; one of the cells which has been used only in the latter manner has been so employed by Professor Minchin for four years.

According to the dynamic hypothesis of the invisible photographic image, the phenomena just stated may be explained on the principle that the shorter exposures do not result in the decomposition of the molecule, which decomposition the longer exposures effect.

Some of these cells are found to be "impulsion cells," that is to say, that they do not act until the support of the apparatus is tapped; a slight touch with a lucifer match is enough. The working of small frictional electrical machines will give an impulsion from a distance. If the alcohol in the cell be changed four or five times, the necessity for impulsion disappears.

More recently Professor Minchin has been working with selenium sensitive films. The plates are sealed in very thin little glass tubes, one-eighth of an inch in diameter, and about four inches long. At the lower end is a plate of pure aluminium cleaned by scraping. The plate above it, but not touching it, is of pure aluminium coated with a thin layer of selenium. Platinum leading wires pass through the sealed ends of the tube to the plates. The liquid used in this cell is pure acetone.

To prepare the sensitive plate, the zig-zag porcelain arm already mentioned has the aluminium plate held by a forceps upon its horizontal projecting end, and the arm and plate are heated from below by means of a Bunsen flame. A melted blob of aluminium is placed upon a hot glass rod, and while one hand holds one end of the plate by means of the forceps, the other hand, by means of the rod, smears the selenium over the plate in one uniform, black, viscous layer; at the same instant the gas flame is removed, and the aluminium plate taken rapidly off the porcelain arm, and waved rapidly three or four times in the air; then it is placed upon a comparatively cool part of the flat porcelain arm to anneal it, and any tendency to remelt is checked by blowing over the plate.

Next, the gas flame is worked uniformly under the porcelain arm bearing the plate. The selenium surface will then exhibit a series of changes: first of all, the black surface becomes slatey white, and, as the heating and blowing are continued, the slatey white will turn to a grey, which may be of several shades. Should it be a light grey marked by any glossy streaks or spots, the plate is to be rejected as not one of maximum sensitiveness; the melting and smearing process then has to be repeated all through until the surface finally obtained is uniform, and half way between a grey and a brown in colour, but decidedly brownish. Hitherto it has not been supposed that this is the colour for the most sensitive selenium.

The cell made with the two plates just described acts with great rapidity when exposed to light, and the E.M.F. disappears almost instantly when the cell is screened, but this quickness of action does not characterise the cell some days after it has been formed, although its sensitiveness is unimpaired. These selenium cells do not permanently deteriorate by any amount of continuous exposure to daylight, so far as is yet known; they have been made only about six months; they recover their powers always during the night.

Their maximum sensitiveness is in the yellow, but the whole of the rays of the spectrum give results not much inferior. The E.M.F. they yield under the action of good diffused daylight is from one-half to two-thirds of a volt. They will stand any amount of exposure to light while in open circuit, as when their E.M.F. is tested by means of the quadrant electrometer; but if the two wires from the cell be joined up so as to complete the circuit, the cell will then somewhat slowly deteriorate under the continuous action of daylight. Professor Minchin has joined up a battery of fifty of these cells, and with ordinary diffused daylight it gives an E.M.F. of twenty-five volts. One end of a strong local battery may be connected with the movable part of the electrometer, so the circuit shall be completed when the part is deflected. By means of this relay, the strong current resulting from the effects of the weak one may be made to do practical work, such as the ringing of electrical bells, or the automatic turning up of the gas when the daylight grows weak.

A favourite remark of Professor Tyndall is, that discoveries in one branch of science often throw light upon problems connected with another branch of science. These discoveries in photo-electricity, and the discoveries of Mr. Croft in relation to breath images, seem to give the power of attacking the mystery of the nature of the invisible photographic image from fresh standpoints.

ABOUT INSTANTANEOUS SHUTTERS.

ONE of the most curious results of the introduction of rapid dry plates has been the amount of ingenuity and inventive ability which has been expended in designing and constructing shutters for instantaneous exposures. If the shade of Daguerre should haply have the opportunity of revisiting the earth, he would marvel that such things could be necessary, seeing that the time of exposure under his system entailed minutes rather than seconds, and although after Goddard's introduction of bromide in aid of the iodide of silver this exposure was very much lessened in duration, yet it was far too long to need the employment of any mechanical appliance to uncover the lens. But some form of instantaneous shutter soon became necessary when the collodion method superseded the Daguerreotype.

It is the fashion for modern photographers, and especially those who are recent aspirants for fame, to talk glibly of the shortcomings of collodion in the way of rapidity, and to imagine that it was as slow as the old Daguerreotype process. The truth is that they take very little pains to make themselves acquainted with the history of the art, and, after reading in a very cursory manner of the labours of Daguerre, Fox