The Camera as a Detective.

Practical reformers, who have been trying to abolish low concert saloons and other vicious resorts in New York city, have met with opposition from the very people who are presumably their helpers. About some of these places there is sufficient of the ward politician's influence to make even the policeman a consenting party; and consequently he is sometimes quite oblivious to violations of the law which are plain enough to everybody else. This state of affairs has led the reformers to turn to the more reliable testimony offered by a good photograph. The saloons are brilliantly lighted by electricity as a rule, and the reformer, armed with a pocket camera and instantaneous photographic plates, has succeeded in taking over a hundred views of the saloons and streets in front of them after one o'clock in the morning, when the law provides that they shall be closed. A number of the photographs contain clock dials, which thus offer their testimony as to the hour.

Loss of Imported Soles.

Among the freight on board the steamship Gallia, during a recent westward passage, was a consignment of 500 live soles sent over by the National Fish Culture Association of Great Britain. On reaching New York, however, not one of the fish was alive, for the shippers had neglected to place any sand in the bottom of the tank, into which the fish could have burrowed and had a comparatively tranquil passage. As it was, they were pitched from side to side in the bare tank, and were literally beaten to death during a severe storm encountered on the second day out. The agent of the American Fish Commission had arranged for the transfer of the soles to the piscicultural establishment at Wood's Holl, and was greatly disappointed to be obliged to consign them to New York Harbor. The next consignment will probably be sanded.

Transplanting Trees and Shrubs.

My experience of many years, says William Smythe in the *Gardeners' Chronicle*, of transplanting work with evergreen shrubs proves the advantage of early autumn planting. The soil at this season has a higher temperature during the next two months, and there is more humidity in the atmosphere than in the spring or during the winter. I have always thought trees and shrubs of all kinds succeed best when transplanted in the months of September and October. The roots are then quickly developed, and the injury and check caused by transplanting are soon rectified, the plants becoming re-established before winter sets in. Where alterations and new plantations are contemplated, every available means should be used to complete the work as early as possible. Where large specimen trees or shrubs have to be removed, they should have been prepared twelve months previously by cutting a trench completely round and partially underneath them, so as to sever all the roots at a proportionate distance from the stem, according to the size and nature of the tree.

Many trees which furnish fibrous roots plentifully will succeed with a comparatively small ball of earth, but others, especially the Coniferæ and many tender kinds of evergreens, require a larger ball and greater care to insure success. Great care and attention should be given by refilling the trench with rich, light soil, so that the trees may more easily form a mass of fresh roots, which can be much easier removed without injury in transplanting. Having prepared the trees, the site to which it is intended to remove them should next be considered. One thing important is to provide thorough drainage, as without this few trees or shrubs will succeed where the subsoil is not sufficiently porous. To prevent water stagnating at the roots, drains of rubble or stones should be used for the purpose, about a foot below the bottom of each hole, and it is advisable to get out good, large holes, and as deep as requisite for the subjects to be operated on. The soil that I find suitable for most kinds of trees and shrubs is a good, light, turfy loam; the more turf, the better.

Having made all preparations beforehand, and having the proper mechanical arrangements in readiness for conveying the tree to its intended position, care should be taken not to injure the roots in transit, and in placing it again in position; the roots should be laid out straight at various levels, and afterward covered with fine soil, which should be well washed down with an abundance of water, and then the soil should be filled in and well rammed, and made quite firm all round the tree; a good mulching of long manure, 5 inches thick, should be spread over the surface; the tree should be staked and tied firmly. The operation will be complete if the above instructions are carefully carried out, and early autumn planting, and greater care in the operations of transplanting trees and shrubs, will succeed, and be sure to give satisfaction.

MICROSCOPIC EXAMINATION OF CILIATED ORGANISMS BY INTERMITTENT LIGHT.

BY GEORGE M. HOPKINS.

Every observing person has noticed that moving objects appear stationary when viewed by a flash of light; examples of this are seen during every thunder storm occurring in the night. The wheels of a carriage, a moving animal, or any moving thing, seen by the light of the lightning, appears perfectly stationary, the duration of the light being so brief as to admit of only an inappreciable movement of the body while illumination lasts.

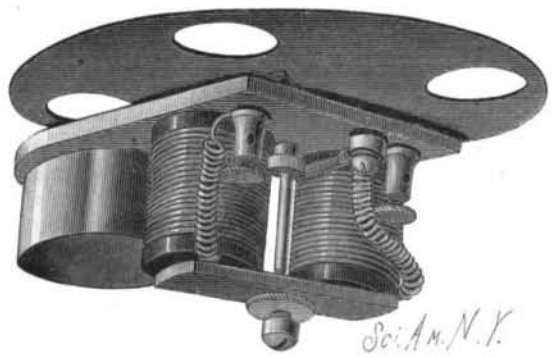

Fig. 1.—LIGHT INTERRUPTER FOR THE MICROSCOPE.

If by any means a regular succession of light flashes be produced, the moving body will be seen in as many different positions as there are flashes of light. If a body rotating rapidly on a fixed axis be viewed by light flashes occurring once during each revolution of the body, only one image will be observed, and this will result from a succession of impressions upon the retina, which by the persistence of vision become blended into one continuous image. In this case no movement of the body will be apparent; but if the flashes of light succeed each other ever so little slower than the rotatory period of the revolving body, the body will appear to move slowly forward, while in reality it is moving rapidly; and should the light flashes succeed each other more rapidly than the revolutions of the revolving body, the body will appear to move slowly backward, or in a direction opposite to that in which it is really turning. These curious effects are also produced when the number of the light flashes is a multiple of the number of revolutions, or *vice versa*.

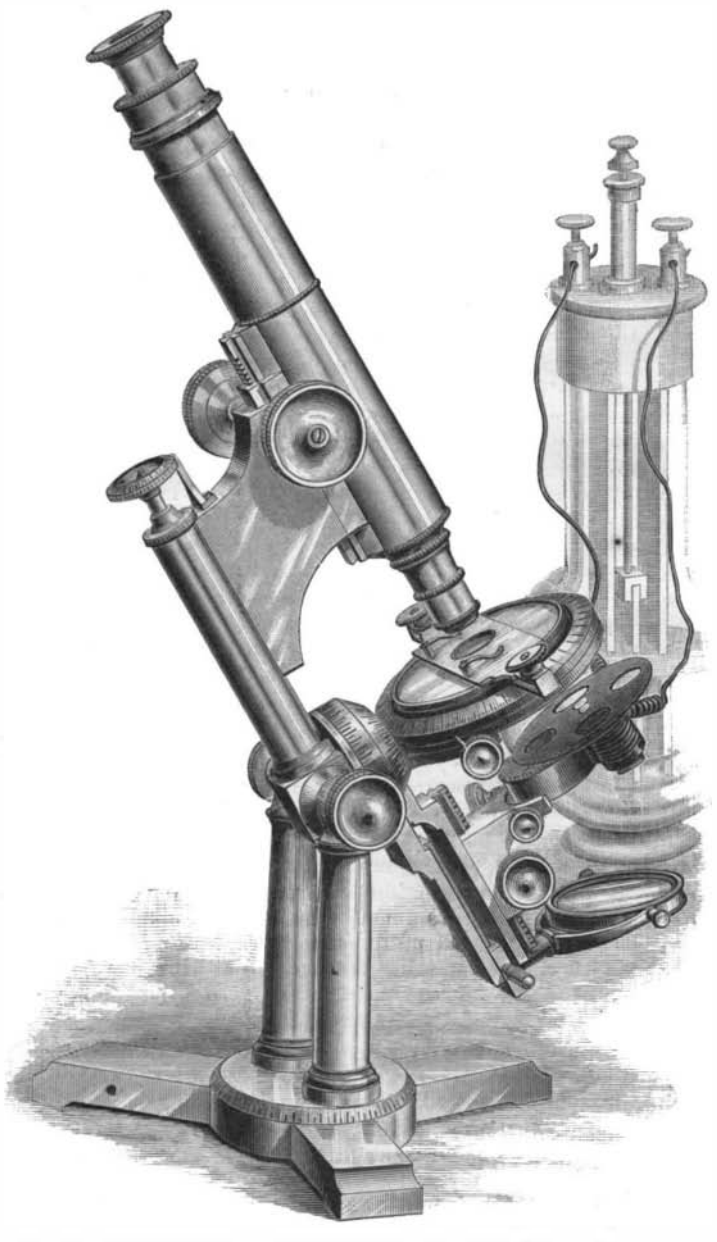

Fig. 2.—MICROSCOPIC EXAMINATION OF CILIATED ORGANISMS BY INTERMITTENT LIGHT.

The combined effect of interrupted illumination and persistence of vision may be practically utilized for examining objects under motion which could not otherwise be satisfactorily studied. To apply intermittent light to the microscopical examination of ciliated organisms, the writer has devised the electrically rotated apertured disk shown in Fig. 1, which is arranged to interrupt the beam of light employed in illuminating the object to be examined.

The instrument consists of an electric motor of the simplest kind mounted on a plate having a collar fitted to the substage of the microscope, as shown in Fig. 2. The shaft, which carries a simple bar armature before the poles of the magnet, also carries upon its upper extremity a disk having two or four apertures, which coincide with the apertures of the stage and substage two or four times during the revolutions of the disk.

The shaft carries a commutator, and the course of the current from the battery through the instrument is through the spring touching the commutator, through the shaft and frame of the instrument to the magnet, thence out and back to the battery. There are two methods by which the speed of rotation of the apertured disk may be varied; one is by plunging the elements of the battery more or less, and the other is by applying the finger to the shaft of the motor as a brake, the motor in the latter case being started at its maximum speed, and then slowed down to the required degree by the friction of the finger. Experiment shows that the period of darkness should be to the period of illumination about as three to one for the best effects. Closing two diametrically opposite holes in the disk represented in the cut secures about the correct proportion.

Various rotifers examined by intermittent light showed the cilia perfectly stationary. The ciliary filaments of some of the infusoria, Vorticella and the Stentor, for example, when viewed by intermittent light, appeared to stand still, and their length seemed much greater than when examined by continuous light. The interrupted light brings out not only the cilia around the oral aperture, but shows to good advantage the cilia disposed along the margin of the body. What interrupted light may reveal in the examination of flagellate or ciliated plants the writer is unable to say, as no objects of this character have been available. It is presumable, however, that something interesting will result from the examination of Volvox and other motile plants, by means of this kind of illumination. Although it is necessary to interrupt the beam of light regularly, for continuous observation, the effect of intermittent light may be exhibited to some extent by an apertured disk like that above described, twirled by the thumb and finger or revolved like a top by means of a string; or by using a larger apertured disk fitted to a rotator, and placed between the source of light and the mirror of the microscope.

The Flood Rock Explosion.

Professor W. A. Rogers, of the Harvard Observatory, has reported to the American Academy of Arts and Sciences, in Boston, the results of his observations on the transmission of shock from the Flood Rock explosion.

The air line distance between the observatory in Cambridge and Flood Rock is 190 miles, and the observations were timed as follows: Disturbance first seen, 11:17:14; instant of maximum disturbance, 11:18:03; disturbance ceased, 11:20. The figures are all in seventy-fifth meridian or "Eastern" time. The method used to develop the existence of vibration was the placing of a saucer of mercury on the solid cellar floor. In this mercury was a speck or flaw. Upon this point was brought to bear a microscope of 750 magnifying power, the spider line being in exact coincidence with the flaw.

The first vibration perceived was about a thousandth of an inch, and recurred at intervals for nearly two minutes, the greatest swaying of the mercury being over a space of one five-hundredth of an inch.

In this connection it is interesting to note that General Abbot reported that the shock from 50,000 pounds of dynamite, exploded in 1876 at Hallet's Point, was transmitted through the drift formation of Long Island, at the rate of 5,300 feet per second for 13½ miles. Assuming the figures of the Cambridge report as correct, and that the mine at Flood Rock was exploded at 11:14, seventy-fifth meridian time, it took the wave just 194 seconds to travel 190 miles, or at the rate of 5,120 feet per second. This is very near the rate of transmission observed by General Abbot, when the greatly increased distance is taken into account.—*Engineering News.*

THE Genesta arrived at Portsmouth, England, on the 28th of October, having made the trip across the Atlantic from New York in 20 days and 10 hours.