THE TELESCOPE AT THE TROCADERO OBSERVATORY.

We represent herewith one of Mr. Leon Jaubert's telescopes arranged and constructed especially for the popular observatory of the Trocadero, and which has now been in daily use for nearly three years.

It is a short focus instrument, having only half the focal length of those formerly constructed by Mr. Leon Foucault. Its optical part consists of:

1. A silvered glass reflector, 16 centimeters in diameter, placed in the bottom of the tube. 2. A total reflection prism designed for sending the luminous fascicles, as in all Newtonian telescopes, to the lateral part of the instrument.

3. An ocular formed of several glasses arranged like the different lenses of a compound microscope, and giving an upright image.

It is through this ocular that the observer looks at the image given by the reflector.

The different pieces that go to make up the mechanical part produce, as a whole, a very beautiful effect. The instrument appears to be very light, while in reality it is very solid. The base rests upon a wooden frame mounted upon three rollers. The instrument is accurately leveled by means of three leveling screws. The base supports an open-work frame which carries a horizontal axle that may be called the axis of latitude. This serves for fixing, by means of a set screw, the horary axis on the latitude of the place where the observations are made. The horary axis is connected with the circle and horary wheels. The disk of the circle is likewise provided with a frame that carries the axis of declination, this latter being formed by the two trunnions belonging to the ring that surrounds the telescope tube. One of these trunnions carries a graduated circle accompanied by a vernier and called the circle of declination, and the other, a toothed wheel which is actuated by an endless screw.

The endless screw that actuates the horary wheel and the one that actuates the declination wheel are each mounted upon a hinged frame, which permits of engaging them instantly with the corresponding wheel, or of separating them in such a way that the instrument may revolve freely around the horary axis and that of declination.

In both its optical and mechanical parts this telescope presents some very interesting details.

Mr. Jaubert has placed in the opening of the instrument a cap which carries a circular glass whose surfaces are perfectly parallel and optically finished, and which is designed for protecting the silvering of the reflector from dust and atmospheric moisture. When it is desired to make an observation of the sun, this cap is replaced by a second one which carries a glass that is silvered upon one of its surfaces. The solar rays traverse the pellicle of silver, reach the parabolic reflector in small quantity, return in a condensed fascicle toward the prism, and, on reaching the eye of the observer, have but slight intensity. The rays thus weakened scarcely ever distort either the reflector, the prism, or the lenses of the eye piece. The mass of air inclosed within the telescope is also less superheated at the focus, and remains calm. Not only are the images better, but the reflector, prism, and eye piece are no longer liable to breakage, and the observer runs no risk of being blinded.

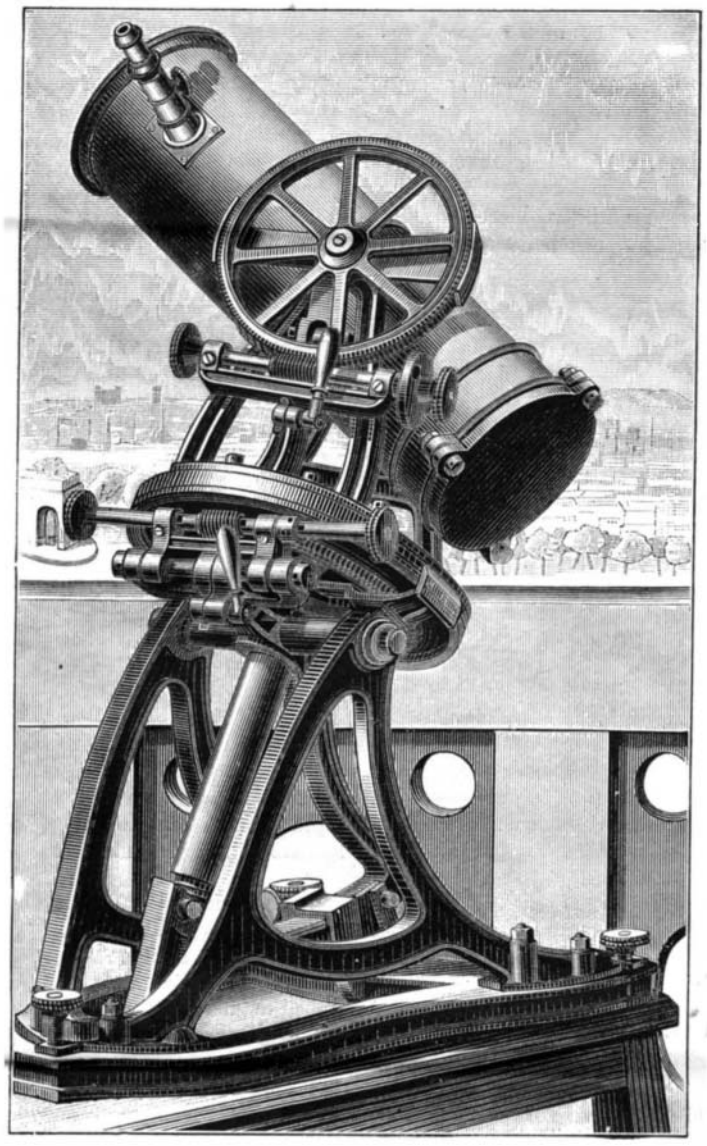
The reflector is mounted in a tube whose form merits notice. The external and lateral part of this tube, as well as the internal part of the telescope tube into which it is introduced, are both formed of two circular zones of the same diameter, one convex and the other concave. This simple arrangement has the advantage of permitting of the easy introduction of the reflector into the instrument, and of centering it instantly by tightening one or the other of the three bolts that connect the lugs of the tube with those of the breech piece. In order to remove it, it is only necessary to right the body of the instrument and take out the bolts, when the reflector tube will drop out of itself.

The telescope is provided with a revolving eye piece which carries four lenses, one of which is used as a finder, while the others give different magnifications. Mr. Jaubert has also devised for his telescopes, as well as for his microscopes, different styles of binocular eye pieces. He has also applied to the opening of his telescopes a special optical combination designed to bring within the field of the instrument stars that are very remote from one another, so as to compare the intensity or color of their light, or to compare the diameter of the sun and the moon, or the diameter of Venus, Jupiter, and Saturn when these different celestial bodies are no farther than 100, 120, or 130 degrees apart. The popular observatory makes use of telescopes of from 20 to 30 centimeters diameter, and these are employed by the amateurs who are attending the course of lectures on astronomy at the institution.—*La Nature.*

THE export of ostrich feathers from the Cape last year was unprecedentedly large. The prices obtained were enormous.

Zinc Blende at Niagara Falls.

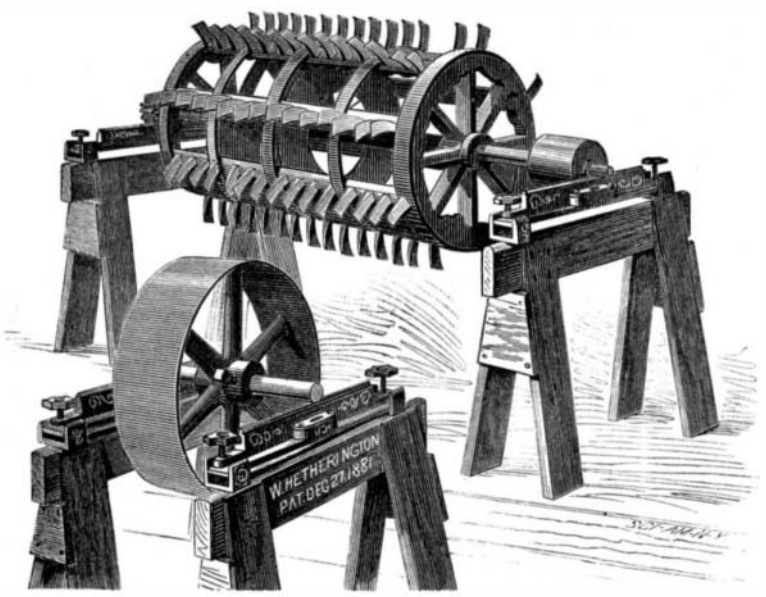
Prof. Osborn, of Miami University, Oxford, has discovered the beautiful amber colored mineral known to mineralogists as zinc blende or sulphide, in small quantities in the rocks at Niagara Falls. It may be found both above and below the inclined plane, but in the rocks which have recently been broken off, and sometimes in pieces several inches in length, especially in one immense block which has become detached from the American side, and lies near the water about 150 yards from the American Falls, in which one piece nearly five inches long was found. The specimens analyzed by Prof. Osborn all gave about 60 per cent zinc with traces of iron, but are only interesting as beautiful specimens of the mineral.



THE TELESCOPE AT THE TROCADERO OBSERVATORY.

PARALLELS FOR BALANCING PULLEYS, ETC.

We give an engraving of improved parallels for balancing pulleys, thrasher cylinders, and other rotating parts of machinery. Usually the parallels are blocked up by wedges of wood, pieces of pasteboard, or anything else at hand, the level is applied, and the parallels are leveled approximately after the expenditure of much valuable time. The improvement shown in the cut has been patented by Mr. W. Hetherington, and is designed to facilitate the operation of leveling the parallels. Each bar is provided with a level and with a leveling screw at each end, so that the adjustment may be very quickly and accurately made.



IMPROVED PARALLELS FOR BALANCING PULLEYS, ETC.

These parallels are very desirable for machine shops, planing mills, etc., for balancing pulleys, saw arbors, planer heads, spindles, and all kinds of high speed machinery. They will also find extensive use among thrashers for balancing separator cylinders in the field, thus saving a trip to the machine shop.

Further information may be obtained by addressing Messrs. Hetherington and Lukenheimer, St. Cloud, Minn.

English Torpedo Experiments.

An interesting series of torpedo experiments, carried out conjointly between the 28th Company of Royal Engineer Submarine Miners, under the command of Capt. Bucknill, R.E., and Capt. Markham and the officers of the Vernon Torpedo School, lately took place in Portchester Lake, Portsmouth.

The experiments illustrated the operations of torpedo attack and defense, and were also intended to determine certain debatable points with respect to formulæ, the resistance of various breadths of water cushions, the lateral effects of different charges of gun cotton, etc. For these purposes War Office tubular dynamometers and crusher gauges were extensively used, the reading of which will form the subject of subsequent consideration.

The first experiment was the most exciting and important of the series. It was for the purpose of practically ascertaining the effect of a ground mine, consisting of 250 lb. of gun cotton, upon a steam launch, moored broadside on at a distance of 50 feet horizontally from it, the submersion of the charge being 30 feet. The launch, which was moored fore and aft, was in complete steaming trim, the pressure in the boilers being regulated at 40 lb. to the square inch. The mine was fired from the Nettle at the slack of high water. The detonation was loud and startling, but the practical results were disappointing. The whole energy of the explosion seemed to be in a vertical direction, the upward rush throwing up a splendid dome of water, and the downward blow producing a considerable up heaval of mud.

The lateral extension of the force was comparatively insignificant, for not only were the machinery and boiler of the launch uninjured, but it was scarcely shaken. In future experiments the attack will be made at gradually reduced distances, until the target is disabled. The use of hand charges of gun cotton was next exhibited. While a boat steamed rapidly through the water, a grenade containing 9 oz. of gun cotton was thrown into a cask and fired by means of an instantaneous fuse and a pistol. The cask was shattered into a thousand fragments, the result showing the fatal efficacy of the weapon when directed against open boats. A run was next made with a Whitehead torpedo discharged from an impulse tube above water. The projectile went straight to the target, after passing which it got its nozzle into shallow water and stuck. Various charges of gun cotton lashed to floating spars were afterward simultaneously fired at a uniform depth of 3 feet, for the purpose of testing the accuracy of Abbot's formulæ.

The method of countermining mined channels was shown by means of blowing charges, the whole single line being simultaneously exploded. Two outrigger charges of gun cotton, each 35½ lb., were also fired from a steam pinnace, which maneuvered in going ahead and turning, lowering its spars, reversing, and firing without a man being seen. The explosive force of the explosions was so violent that no ship could have withstood it. While this experiment was taking place, some practice with small guns was going on from the Excellent close at hand, and it was impossible to overlook the chances in favor of an outrigger attack.

The practice was made from a permanent, and consequently steady, platform, at targets at well known and unvarying ranges; and when it is considered that the targets were never once hit, the difficulty of staving off the attack of a rapidly moving torpedo craft will be easily recognized. The last experiment was made to test the effect of a boat mine upon a whale boat containing a dummy crew. The mine consisted of 12 lb. of gun cotton confined in a circuit closer jacket, sunk 2 feet under the water and at the same distance from the target. When fired, the whale boat rose piecemeal into the air, and descended in a rain of fragments.—*London Times.*

Canine Intelligence.

A remarkable instance of the fidelity and sagacity of the dog lately happened at Milford Haven. Two men named Davies and Taylor were out in a boat, which was swamped. The former of these was the owner of a dog, and while the men were struggling in the water the animal caught hold of Taylor with the object of supporting him; finding, however, that it was not his master to whom he was rendering this assistance, he relinquished his grasp and went to the aid of Davies, his master, supporting him until he was rescued by a passing steamer, the other man being drowned.

There are fifty-six shops for the sale of horse-flesh as food in Paris.