observers are admitted on the platform, their equivalent weight must first be removed before observations begin. This swinging platform may be compared to the glass crystal of a ship's chronometer, being mounted in the same way, always maintaining a horizontal position, no matter in what direction the axis of the telescope is pointed.

From this platform, and extending through an opening in the sphere, is an electrical cable controlling an exterior automatic apparatus, by means of which the telescope may be pointed in the necessary direction for altitude, azimuth, in declination or right ascension. These specified motions may be obtained by means of a series of rubber-faced wheels, mounted on oscillating forks or levers, three wheels being necessary for each co-ordinate, and the required speed being controlled by electric motors. The cable connection inside the platform enables the observer to use any set of co-ordinates he may need, it being possible, of course, only to use one set at a time.

Following the design of the antique armilary sphere, a series of automatic-setting devices for the horizon and equinoctial system of co-ordinates is advisable, these setting-systems being gimbal-mounted and controlled by means of a pendulum. In order that the eye-piece of the finder of the telescope may be as close to the eye-piece of the great tube as possible, Prof. Todd considers a finder with a duplex Coudé tube essential.

With regard to the clockwork required for controlling the moving parts of the telescope, such as the dome and observing platform, exceptional power is needed. Prof. Todd suggests that the mechanism should consist of electric motors controlled by the observer from his chair, thus making a change of level in the floor or the observer's chair unnecessary. In the present style of mounting, the dome is separate from the rest of the structure, and means must be provided for rotating it in the required direction, while Prof. Todd's suggested form of mounting a telescope, either refractor or reflector, is one in which the telescope, observing-floor and dome, are all combined in one.

When not in use the exterior tube of the telescope is lowered nearly level with the ground, and the objective is sheltered beneath a movable roof, like that of a transit-room. In this way, the objective is accessible at any time for the purpose of adjustment or repairs. If such a telescope were placed on a high mountain, it would be possible to keep the interior of the sphere at a comfortable temperature by means of electric heaters, and within a compartment of the sphere, a barometric pressure might be maintained by artificial means.

Prof. Todd estimates the price of such a telescope, as follows:

Sphere	$175,000
Five-foot objective	75,000
Masonry and cement basin	5,000
Clock work and motion	10,000
Tubes and eye-piece accessories	10,000
Total	$275,000

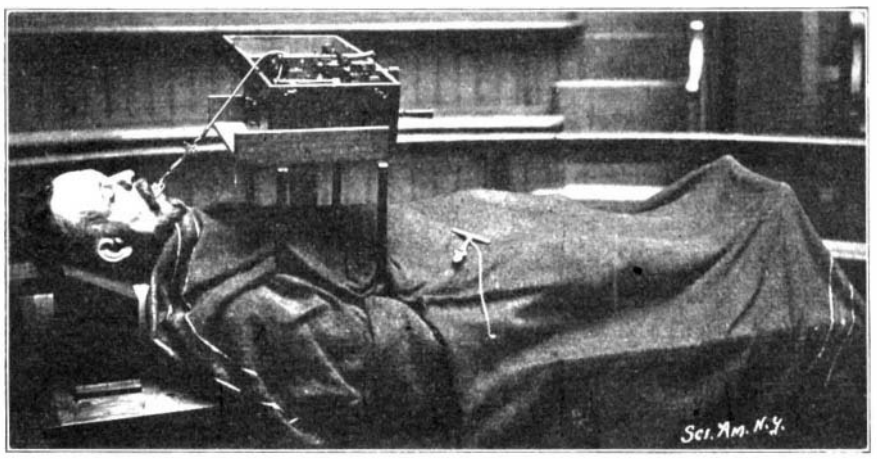
Prof. Todd is well known for his mechanical ingenuity, and has worked out the detail of his scheme very thoroughly, having had it in mind for the past twenty-five years. He had received much encouragement from expert engineers and telescope builders with regard to the efficiency of his plan.

Great telescopes have helped astronomers to make important discoveries, such as that of the planet Uranus, first seen in Herschel's reflector; the satellites of Mars, discovered by Asaph Hall in 1877, with the Washington 26-inch refractor; and the fifth satellite of Jupiter, first glimpsed with the 36-inch Lick Observatory telescope. At the time of these discoveries, these great telescopes made such celestial finds possible. What may not be the result awaiting such a telescope as Prof. Todd has planned?

TONGUE-TRACTION FOR RESUSCITATION OF THE ASPHYXIATED.

It has long been known that rhythmical traction of the tongue is one of the most efficient means for the resuscitation of persons who have been drowned. Dr. Laborde, of Paris, who has carried on extensive investigations on the effect of tongue traction as a means of resuscitation, maintains that often, although the organism has apparently ceased to live externally, it still lives internally. That is to say, life is still latent; and as long as there is latent life, there is still hope of saving an asphyxiated or drowned person. The function which it is most necessary to revive is the respiratory. Experimenting upon dogs, Dr. Laborde found that two or three hours after apparent death had set in, it was sometimes possible to secure resuscitation. A vigorous half bull dog weighing 35 pounds was chloroformed to such an extent that respiration had entirely ceased; after a quarter of an hour's traction of the tongue, the animal came to. The experiment was tried again until complete asphyxiation occurred, and traction was not resorted to until five minutes after. The dog, who bears the appropriate name of Lazarus, this time appeared to be really dead. One hour and two hours of traction were followed by no result. But after another one-half hour, a respiratory cough showed that life was still present. The dog soon revived. It occurred to Dr. Laborde that it would be a good idea to substitute an automatic apparatus for the cloth-covered hand. The first apparatus made was driven by clockwork. The more improved apparatus now used is operated by means of an electric motor, the current being supplied by a secondary battery. By means of this improved instrument it is possible to subject the tongue to continuous traction for three hours.

TONGUE-TRACTION BY HAND.



TONGUE-TRACTION BY THE LABORDE ELECTRIC APPARATUS.

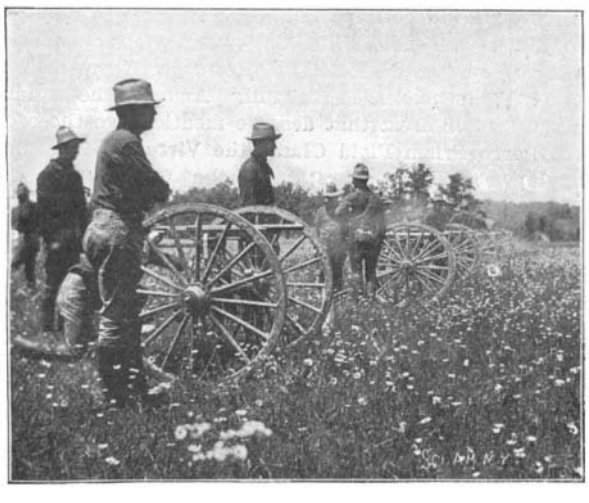
THE MILITIA AND THE COLT AUTOMATIC GUN.

BY C. E. STONEBRIDGE.

After a practice march of seven days over the roads of Long Island, the 3d Battery of the New York National Guard arrived on the eighth day at the rifle grounds at Creedmoor, and used their guns with results that left no doubt as to what would happen if the fire were directed toward an advancing enemy. This battery was formerly armed with Gatling guns, but has now been supplied with the Colt automatic rifle, one of the most deadly machines in existence. The gun weighs only 40 pounds, and the battery is provided with mounts of three kinds, so that it is only the work of a few seconds to transfer a gun from a disabled mount to a good one. One mount is on the carriage, one on the limber, and a tripod, that can be spread and set up in a few moments in any desired location, composes the third. The battery has six carriages and caissons, and six extra guns and tripods, making twelve guns in all with eighteen mounts.

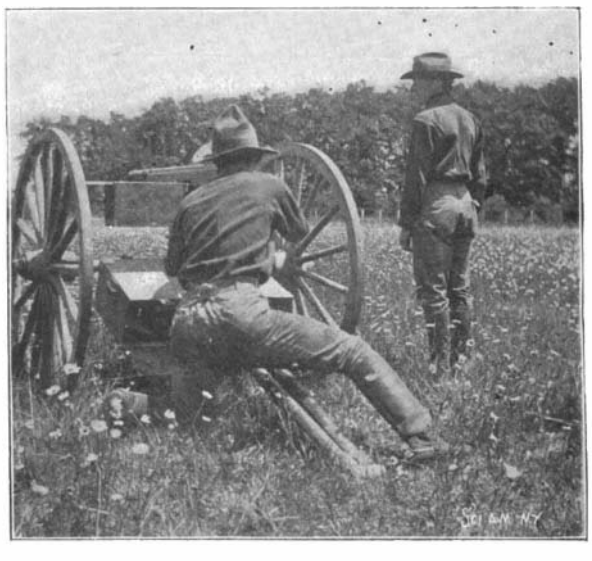
On the range at Creedmoor the battery first went into position at 200 yards and moved back by easy stages until the limit of the range was reached at 1200 yards. The cartridges, on a canvas belt, pass into the gun on the left side, and the empty belt emerges on the right side, while the shells are drawn back and ejected through an aperture near the top. On the under side of the barrel, about six inches from the muzzle, is the gas check, the automaton that does all the work. At each shot the explosion throws this lever downward, swinging it back against the gun. It is this motion that works the interior mechanism which loads, fires and ejects the shell. Eight shots per second, or nearly 500 per minute, is the usual performance of this gun. When a battery of these destroyers is viciously pouring out its rain of destruction, no living thing can stay in its arc of fire. The 3d Battery uses a .30 caliber gun, and smokeless powder. While the stream of bullets is pouring from the muzzle a faint vapor can be seen, but it vanishes the moment firing ceases, and the location of the gun cannot be detected by smoke.

The weapon is made ready for firing by throwing down the gas lever, this action bringing the first cartridge into position. The first shot is then fired by pulling the trigger. The firing then continues until the ammunition is exhausted. The belts of cartridges are folded in layers in a small box, which is hung on the side of the gun, and which feeds unceasingly until no more remain. The empty belts, when rolled up, look like a common lamp wick and can be placed in a coat pocket. The loading tool is quite as ingenious as the gun and resembles a hand sewing-machine. One man feeds the machine with cartridges, a second turns a crank, while a third guides the loaded belt into the boxes. This little machine sews the loaded shells into the belts as fast



Five Hundred Shots per Minute with Smokeless Powder.

Charging the Belts.



A Gun in Action, Using Smokeless Powder.

THE MILITIA AND THE COLT AUTOMATIC GUN.