

Setting permanent monuments was found to be of little use at the outset of the work, so a plan was devised by which the changes in the position of the tubes could be noted. A monument was built of concrete holding brass scales, one horizontal and one perpendicular. The readings taken on these scales are recorded every time a check is made. The next problem that has confronted the alignment corps is taking the line through the air locks. The instrument is set up in the lock, back sight is taken and then the outer door closed and pressure raised, the inner door opened and line prolonged. It is easy to explain, but when the instrument man has to wait ten minutes between his back and fore sights under a changing pressure and a change in temperature of 30° due to expansion of the air, it is a bit tedious and work, especially when all points must be double centered. In the East River Tunnel a device has been devised which saves a great deal of this trouble. A section of 8" pipe is passed through the bulkheads at a convenient point for the alignment work. This is fitted with doors and valves just as the large locks. A plummet bob is suspended in each end with a contrivance for accurate setting. These bobs are lined in by a transit outside. The outside door is then closed and a transit on the inside can take the line up without delay. A general line check was made every month including plummeting the shaft. Weekly checks made from the shaft to shield, while the position of the shield is checked every