

advantageously have been a trifle larger, about 8 x 8 feet. A few alterations had to be made, such as the substitution of all the iron parts by copper, brass or wood. For the iron frame spreading out the tent at the base of the pyramid on top, I substituted two light pieces of wood fastened together in the centre by a brass screw, about which the two pieces could turn and be spread out in the form of an X. They were held in place by small brass hooks in each corner of the base of the pyramid. The pine rod (2 inches in diameter) was somewhat over 8 feet long and consisted of two pieces which, when joined together, were held in place by a piece of brass tubing. The rod terminated in a copper tip which passed through the brass ring of the tent on top. About the copper tip could be passed guy ropes to hold the tent in time of strong winds or for the purpose of allowing the centre pole to be placed at an angle from the vertical and thus to be shifted away from the centre of the tent. With the aid of these guy ropes the whole tent could be easily tilted back far enough to allow making azimuth observations on the sun. The tent was held down by seven light pegs (2 x $\frac{1}{2}$ x 8 inches). Very often four—one at each corner—were sufficient.

The conditions under which the magnetic survey had to be commenced were such that it was highly essential that the observer should be as independent and as free in his movements as possible. As stated, the funds had to be carefully managed, it was not known how long the Coast and Geodetic Survey could spare its instruments, and the time which the observer could devote to the survey was restricted. As a first step, the amount of baggage to be transported from place to place was reduced as much as possible and disposed in such a way that no package would weigh over 30 pounds, and hence could be easily handled. After a few trials, the instruments and personal effects were put up in three packages, each weighing 25 to 30 pounds. The chronometer was always in the special care of the observer. It fitted snugly in a leather case to which was attached a handle for holding or carrying it. In traveling on the railroad the packages could generally be safely entrusted to the baggage-master when specially cautioned.

The special Theodolite No. 163 the observer did not carry along