To obtain longitude, one can assume that the chronometer has kept the same rate during the same series of observations, so that computed results can be meaned, and this will give the value for chronometer error on L.S.T. or L.M.T. at the mean of the times of the various observations. Next find out the chronometer error on Greenwich time for this mean value, correcting it, of course, for rate. The sum or difference of these two values will give the longitude. This is a quicker method than correcting each computed value for chronometer error and obtaining the value for longitude for each observation, which then has to be meaned.

It is hoped that these notes may be of assistance to those who have to fix Astro-Radio points, and I hope that others too will contribute their experience, because saving of time is of vital importance to any survey work in the back blocks of the world.

WHITEWASH SIGNALS

by

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Along the northern coast of California the bluffs in many places consisted of crumbling dirt or rotten rock. Ordinarily, bluffs are ideal for whitewash signals, but on these the whitewash could not be brushed on due to the condition of the surface. Many wooden signals, requiring considerable time and material, were built in this area. . . . .

It was finally decided that if some method of spraying the whitewash could be used, the construction of many of these wooden signals could be eliminated and the time and labor of signal building reduced. A three-gallon brass garden spray was purchased locally. This spray consisted of a brass tank, the top opening of which is very little smaller than the diameter of the bank. Air pressure is maintained by means of a pump which fits into the center of the tank at the top. A piece of rubber hose about two feet long is attached to the side of the tank near the top, and attached to the other end of the hose is a piece of brass tubing with a nozzle which is used to control the size and quantity of the spray. In signal building it was found that this sprayer could be used more efficiently by replacing the short hose with a length of about 20 feet, and the nozzle was replaced by a lever nozzle which produced a fan-shaped spray or solid stream. A piece of copper window screening was used in the top of the tank when filling the container in order to prevent lumps of unslaked lime from getting into it. The whitewash used was made in the usual manner from pulverized unslaked lime. The spray gun was carried on a packboard which could be placed on the ground during operation, the 20 feet of hose allowing mobility to the operator. Ordinarily one man pumped to keep the pressure up, while another man sprayed. . . . .

Signals could be placed much higher on the bluff than usual due to the fact that the gun would spray approximately 20 feet into the air; one filling of the tank (approximately 2-1/2 gallons) sufficed for the average signal; rough and irregular surfaces were well coated with whitewash, and there was no waste or spilling of the whitewash. In places not easily accessible, the tank could be filled on the beach and pumped to the proper pressure, and then carried by means of the packboard to the desired location, leaving the operator's hands free for use in climbing. In some cases the tank could be left on the beach, the nozzle man climbing up 10 or 15 feet with the hose and then spraying a signal 10 or 15 feet above him. However, in this instance full pressure is necessary, requiring continuous pumping by the man remaining on the beach. The tank was cleaned at the end of each day's work, which kept the whitewash from clogging the hose and valve.

No doubt some may think that this method is impracticable, and that too many things may go wrong with the apparatus. The proof of the pudding is in the eating, however, in spite of the skepticism of various members of the party it did work and its use is recommended. After a season's experience the writer believes that a considerable saving in time, labor and material can be effected in the whitewashing of rock or earth signals, and that a much whiter signal is obtained due to more complete coverage of the ground by means of this method than by the ordinary brush method.

Where signals were whitewashed on dirt bluffs and it was believed that they would be needed the following season, they were marked by galvanized iron pipes driven into the bluffs. This method of marking them temporarily was considered satisfactory as the pipes could be easily found the following season.

It is recommended that each whitewash party, using the equipment described, carry several spare piston cup type washers, a screw-driver and a pair of pliers. The valve at the bottom of the pump should be examined from time to time. With these simple precautions, there should be no difficulty in keeping the spray gun in first-class working order at all times.

CALIBRATION OF TAUT-WIRE APPARATUS

by

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The accompanying illustration shows the method used in calibrating the registering sheave of the Ship *Hydrographer's* taut-wire apparatus in 1937 ; a method which is believed to be the most accurate and satisfactory of any heretofore used. The previous calibration of the sheave was made in 1935, over the one-mile speed course in the Gulf of Mexico near the Southwest Pass of the Mississippi River. Since that period, about 1,000 miles of wire had been used in measuring taut-wire traverses and the 1937 calibration was undertaken to ascertain if this extensive use of the registering sheave had changed the conversion factor.

The proximity of the *Hydrographer's* working grounds during the 1937 field season to the Houston Ship Channel was particularly fortunate in that a section of this Channel, marked by four pairs of firmly built beacons, provided a straight course of four miles and simulated the actual conditions of a taut-wire traverse between two or more survey buoys.

The four beacons Nos. 1, 3, 5 and 7, located on the east side of the channel, were used as reference points. Since their positions had been determined by second order triangulation in 1933, the distances between adjacent beacons, as well as the distance between the two end beacons, were obtained by inverse position computations. The latter distance was checked by solving the quadrilateral Grain-Moore-Beacon 1 — Beacon 7 from the adjusted triangles, as shown on the sketch.

In the operations for calibration, the wire, secured to a 75- pound weight, was lowered to the bottom about 3/4 mile from the first beacon, and the engines started. Speed was uniformly increased so that standard sounding speed was obtained prior to passing abeam of the first beacon. This speed was maintained throughout the test while a tension of 38 to 40 pounds, as indicated on the dynamometer of the apparatus, was kept on the wire and the ship conned carefully on a straight course.