He would commence, for instance, at the northeast corner of section 34, and pace-traverse a diagonal course to the northeast corner of section 24, passing through the centre of the block at the northeast corner of section 26; at the northeast corner of section 24, he would check on a telemeter-level elevation, and then take a similar traverse course across the next block of 4 sections, checking always on levelled meridians.

In some cases however, of level prairie townships, the main features, such as valleys and ridges, would be traversed quite independently of the sections or levelled meridians.

The source of Serviceberry creek was located by this method, in addition to several important ridges and valleys. The topographer used a prismatic compass, an aneroid barometer, and an Abney hand level; the distances were paced either on foot or on horseback.

A stationary aneroid barometer was kept at the camp and readings were taken hourly, as far as possible. I have not found the barometer work very reliable or helpful, however, in plotting the season's contour work.

The outlined district north of the Bow river, embracing an area of 510 square miles, was commenced on June the 16th, and completed by August the 29th. The outlined district south of the Bow river, was commenced on September 1st, but work was stopped by your instructions on October 7th, 266 square miles having been completed up to that date. Therefore, the total area contoured during the season (June 16th to October 7th) was 776 square miles. The line mileage levelled over and measured by the telemeter was about 440 miles.

The rodman kept field notes of the topography on each side of levelled lines, in a book specially designed for the purpose; each page was divided up into a block of 4 sections intersected by 2 miles of meridian; each section was divided up into squares with sides of 10 chains, and these were subdivided into smaller squares with sides of 2 chains.

The topographer's field book was similar, except that the points of the compass were laid down on each page, and the book was larger in size.

The advantage of this style of book is twofold: the bearing of any object can be sketched in without using a protractor, and a scale is unnecessary.

The rodman's book was used to supplement the topographer's work; it also contained pages for plotting the profile of levels run—thus one page contained the topography on either side of levelled line, and the opposite page the profile to correspond.

The rodman carried a hand level, which he used in connection with his field notes.

The gradient-telemeter levels were quite satisfactory, the difference in checking being as a rule from 0·0 to 2 feet.

The gradient-telemeter measurements were checked when practicable every half mile, at the $\frac{1}{4}$ section, and section corners. The distance usually checked within a few feet of the theoretic.

The accuracy of an ordinary level over a gradient-telemeter level is undoubtedly superior, because, in the case of a level, the elevations are taken from direct horizontal readings; whereas, with a gradient-telemeter level the elevations are obtained indirectly, and depend upon the accuracy of the distance measured by the instrument, from itself to the rod.

As the gradient-telemeter level is the first instrument of its kind to be used on the Canadian irrigation surveys, a brief description is herewith appended:—

The main features are:—the measurement of distance without the use of a chain, the computation of elevation by means of vertical angles and the automatic method of obtaining gradients on slopes.

Distance is obtained by taking two readings at different vertical angles on the rod, which is an ordinary engineer's levelling rod divided to hundredths of a foot.

The horizontal circle of the telemeter is graduated from $10\frac{1}{2}$ up to 1,200. Certain stated numbers on the circle are designated as pairs, and must always be used in conjunction with one another for the double readings necessary in this work. The entire upper surface of the horizontal circle is shaped to form a curve, so that when the telescope is revolved it is mechanically tilted either up or down, as desired. If the telescope tilts upwards when revolved, the leveller need only reverse it end for end in the Y's to obtain the opposite result, viz., a downward tilt; in fact one end of the lower bar bears