To trig. Brooklyn the mean bearing is 360° 00′ 07·3″. Looking up the table we see that 0′ 07·3″ comes between 0 and 0′ 16·8″, so the run-correction is — 0·7″, giving final mean as 360° 00′ 07·0″. Similarly, to Somes the mean is 251° 44′ 31·4″. Looking up the table we see that 4′ 31·4″ comes between 4′ 22·7″ and 4′ 43·2″, and the run-correction is + ·6, giving final mean as 251° 44′ 32·0″.

The run-corrections can thus be made for any position of the zero-line of the micrometer.

Vertical Angles with the 8 in. Transit.

The vertical circle of the 8 in. micrometer theodolite which is being used on the secondary-triangulation work is somewhat different from the usual pattern, and consequently requires different rules for obtaining vertical angles and applying the level-corrections. The circle is graduated continuously from 0° to 360°, in the reverse direction to that in which the hands of a clock move. It is not rigidly attached to the telescopic axis, but can be moved round and clamped in any position, similarly to the horizontal plate. The level is attached to the micrometers, and is divided continuously from left to right, from 0 to 35 divisions. Both level and micrometers are fixed to one of the standards of the instrument, and there are no clip-screws.

To obtain a vertical angle the following method is adopted, no matter in what position the circle is clamped: Level the instrument and take face-left and then face-right readings to the object, booking both C and D micrometers. Add 180° to the mean of the face-right readings, and take the difference between this and the mean of the face-left readings. The result will be double the vertical angle to the object. If the face-left figures are the greater, then the angle will be an elevation; and if less, then it will be a depression.

Example I.—Vertical Observations at Kaukau.

Face.	Mic.	Somes Island Apex.	E.	O.	Centre $\frac{E+O}{2}$	Correction.	Belmont Apex.	E.	O.	Centre $\frac{E+O}{2}$	Correction.
L	C	0° 03′ 07″	29·5	6·0	*17·75*	*— 1·4*	2° 43′ 35″	30·0	6·0	*18·0*	*— 2·9*
	D	03 02					43 30				
R	C	185 20 21	6·5	30·5	*18·5*	*— 5·7*	182 39 55	6·0	30·0	*18·0*	*— 2·9*
	D	19 31					39 07				
		Dep. 2 38 25·75				*— 2·15*	*Elev. 0 02 00·75*				*0*

In working out the vertical angle I adopt the following method:—

Example II.

	Somes.	Belmont.	
1. Mean of face left	0° 03′ 04·5″	2° 43′ 32·5″	
2. Mean of face right plus 180° ..	5 19 56·0	2 39 31·0	
3. Difference	5 16 51·5	0 04 01·5	
4. Half difference	2 38 25·75	0 02 00·75	= Vertical angle.
5. Sum of half difference and lesser of face left or right ..	2 41 30·25	2 41 31·75	= True level reading.
6. Sum of lines 4 and 5.. ..	5 19 56·0	2 43 32·5	= Checks with lines 1 or 2 above.

Line 4 gives the vertical angle, and as the face-left readings are less than the face-right readings to Somes, the angle is a depression. To Belmont the face-left readings are greater, so the angle is an elevation.

Line 5 gives the true-level reading, and these figures should come out approximately the same for all objects observed to, right through one set. Should it be desired to set the telescope to point true level, all that is necessary is to set the mean of the C and D micrometers to this reading if face left, or to reading + 180° if face right.

Line 6 checks the working in a similar manner to taking out the half-angles when side-pegging a road.

To take another set, unclamp the circle, leaving the telescope clamped on Somes Island signal, and turn the circle by hand until the reading is 45° 03′. Reclamp the circle, and proceed as before.

Example III.

Face.	Mic.	Somes Island Apex.	E.	O.	Centre $\frac{E+O}{2}$	Correction.	Belmont Apex.	E.	O.	Centre $\frac{E+O}{2}$	Correction.
L	C	45° 03′ 21″	29·5	5·5	*17·5*	*0*	47° 43′ 41″	29	5	*17·0*	*+ 2·9*
	D	03 10					43 30				
R	C	230 20 25	5·0	29	*17·0*	*+2·9*	227 40 03	5·5	29·5	*17·5*	*0*
	D	19 33					39 11				
		Dep. 2 38 21·7				*+1·4*	*Elev. 0 01 59·2*				*+ 1·4*