

OBSERVATION EQUATIONS 119 GROOMBRIDGE

	Weight	x	y	z	u	v	$=n$
1	9	1.000	- 1.061	- .980	- .091	+ .079	+ 0.1-0
2	6	1.000	- .922	- .415	+ .492	- .563	- 4.2
3	7	1.000	- .423	+ .938	+ .910	- .936	- 2.7
4	8	1.000	+ .087	+ .771	+ .964	- .922	+ 0.9
5	6	1.000	+ .544	- .405	+ .770	- .703	+ 1.5
6	1.4	1.000	+ .904	- .985	+ .231	- .221	1.4
7	6	1.000	+ .825	- .829	- .478	+ .411	+ 3.7
8	5	1.000	+ .471	+ .702	- .867	+ .818	+ 3.6
9	3	1.000	+ .075	+ 1.022	- 1.011	+ 1.020	+ 0.8
10	5	1.000	- .313	+ .652	- .985	+ 1.041	- 6.9
11	9	1.000	- .825	- .468	- .675	+ .738	+ 5.4

From these were obtained the normal equations:

$$\begin{aligned}
 7.500x - .582y - .433z + .214u - .177v + 1.490 &= 0 \\
 3.919y + .048z + .302u - .308v + 2.577 &= 0 \\
 4.056z + .374u - .375v - 3.454 &= 0 \\
 3.604u - 3.602v - 4.420 &= 0 \\
 3.618v + 4.587 &= 0
 \end{aligned}$$

which resulted in the corrections,

$$\begin{aligned}
 \delta\gamma &= -0.21 \text{ km.} \\
 \delta K &= -0.84 \text{ km.} \\
 \delta e &= +.011 \\
 \delta\omega &= -7^{\circ}.14 \\
 \delta T &= 0.224 \text{ day}
 \end{aligned}$$

It was feared that owing to the small value of e and consequent similarity of columns for u and v in the observation equations that either ω or T would have to be taken as fixed, but such was not the case and one solution was sufficient, as the difference between the residuals obtained by computing directly and by substituting in the observation equations were all less than 0.2 km. The value of Σprr for the normal places was reduced from 81.0 to 67.8.