rigorous, and are liable to accidental errors of one or two seconds.

$C - O$.

Date, Greenwich mean time.	Observatory.	$\Delta\alpha \cos\delta$.	$\Delta\delta$.
Sept. 3.6	Harvard	[+ 21″	— 3″]
" 4.7	Harvard	+ 9	— 6
" 4.7	Harvard	[+ 23	— 3]
" 4.7	Harvard	[+ 22	— 2]
" 5.4	Kiel	— 10	+ 14
" 5.5	Albany	— 3	— 7
" 5.5	Harvard	[+ 12	+ 4]
" 5.5	Wien	— 4	+ 1
" 5.6	Albany	— 3	+ 11
" 5.6	Cincinnati	0	+ 12
" 5.6	Leiden	— 2	+ 10
" 6.4	Königsberg	[+ 12	— 26]
" 6.4	Dun Echt	— 2	+ 3
" 6.5	Harvard	[+ 12	+ 5]
" 6.6	Albany	— 3	+ 2
" 6.6	Albany	— 5	+ 10
" 6.6	Harvard	— 1	— 10
" 6.6	Cincinnati	+ 3	+ 3
" 6.8	Harvard	[+ 22	0]
" 7.3	Wien	+ 5	+ 4
" 7.4	Kiel	— 4	+ 1
" 7.5	Harvard	[+ 17	+ 10]
" 8.4	Leiden	— 3	— 3
" 8.4	Dun Echt	— 4	— 9
" 9.3	Pulkowa	+ 3	0
" 9.4	Kiel	— 2	+ 2
" 9.5	Strasburg	— 1	— 3
" 9.6	Albany	— .1	— 2
" 9.6	Harvard	+ 2	— 15
" 10.4	Pulkowa	+ 4	+ 2
" 10.5	Kiel	— 1	+ 6
" 10.5	Dun Echt	+ 1	+ 1
" 10.5	Strasburg	+ 2	0
" 10.8	Cincinnati	+ 7	+ 5
" 11.5	Kiel	— 9	+ 5
" 11.6	Dun Echt	— 5	+ 5
" 17.3	Pulkowa	+ 6	— 3
" 18.5	Albany	— 1	+ 7
" 19.3	Kiel	0	— 1
" 19.4	Strasburg	— 3	— 4
" 21.4	Strasburg	— 1	— 5
" 21.6	Albany	— 3	+ 1
" 21.6	Albany	0	— 7
" 22.3	Königsberg	— 1	+ 6
" 23.3	Wien	— 5	— 2
" 23.3	Kiel	— 6	— 2
" 25.4	Leiden	— 3	+ 6
" 25.6	Albany	+ 11	— 6
" 25.6	Albany	+ 7	+ 5
" 26.6	Albany	— 1	— 7
" 26.6	Cincinnati	— 9	+ 9
" 26.7	Albany	+ 3	+ 3
Oct. 3.6	Albany	+ 5	— 2
" 4.6	Albany	+ 3	+ 3
" 4.6	Albany	+ 6	0
" 4.6	Albany	+ 3	— 2
" 5.5	Albany	+ 1	+ 4
" 7.6	Albany	+ 6	+ 2
" 7.6	Albany	+ 3	— 2
" 9.5	Albany	+ 8	+ 5
" 16.5	Albany	0	— 9
" 17.5	Albany	+ 2	0
" 18.5	Albany	+ 6	+ 1
" 21.5	Albany	— 5	0
" 24.6	Albany	— 4	+ 5
" 25.5	Albany	— 3	— 5

The observations enclosed in brackets were not used as exhibiting large systematic or accidental errors.

A few observations were made with ring-micrometers, but it is not possible to determine how many. At Albany the ring was used until Sept. 21, afterwards the filar micrometer.

The following table shows the constant difference for each observer when there are three or more observations given, and includes nothing later than Sept. 26:—

Observatory.	No. of observations.	$\Delta\alpha \cos\delta$.	$\Delta\delta$.
Albany, B.	8	— 1″	0″
Albany, E.	4	+ 2	+ 3
Cincinnati	4	0	+ 7
Harvard, Wn.	7	+ 18	+ 2
Kiel	7	— 5	+ 4
Leiden	3	— 3	+ 4
Pulkowa	3	+ 4	0
Strasburg	4	— 1	— 3
Wien	3	— 1	+ 1

These constant errors, though founded on rather slender material, probably represent fairly what is to be expected from modern observations of comets.

Following are the heliocentric co-ordinates:—

$$x = r\,(9.580346)\ \sin\,(153^\circ\ 14'\ 15.1'' + v)$$
$$y = r\,(9.996200)\ \sin\,(\ 82\ \ 04\ \ 40.0\ + v)$$
$$z = r\,(9.970401)\ \sin\,(174\ \ 59\ \ 17.4\ + v)$$

H. V. EGBERT.

Dudley observatory, Albany, N.Y.,
Nov. 6, 1883.

Rapid geological changes in Alaska.

Mr. Dall kindly calls my attention to an error in the note of my remarks, given in SCIENCE of Oct. 19. Hood's Bay is nearly a degree south of the locality of the submerged forest described. Looking at my diary, I find the entry 'Hoona,' which is, I believe, synonymous with 'Bartlett Bay' of some charts. While making my verbal remarks at the academy, I mistook my pencilling of 'Hoona' for 'Hood.' The exact location of the forest is latitude 58° 27′, longitude 135° 40′. I am very much pleased to find from Mr. Dall's letter that my view of the modern changes, drawn from botanical facts chiefly, derives support from some geographical evidence within his reach.

THOMAS MEEHAN.

The mechanism of direction.

I read with interest Professor Newcomb's article on the sense of direction (SCIENCE, Oct. 26). Professor Newcomb says nothing about the behavior of the subjective co-ordinates under a slight change of angle. My experience in this respect I give below, and I have reason to believe the experience to be quite general.

The street A B turns into B C. Walking from A to B, my co-ordinates begin to change when about a hundred yards from B. By the time I get to B, or rather just after B, they have changed by the angle A B C, no matter how large or how small A B C is. The same takes place in going from C to B to A. While close to B on either side, I can by an effort imagine myself under the old co-ordinates; but the new ones are much more natural. In the dark, I think the turn is not seen so far ahead, and the change takes less time. If I go from A to B, with my eyes turned towards A, I have a different experience. I have never tried it by *walking* backwards; but I have observed my sensations while riding on the back platform of a street-car. As the car turns at B towards C, and I am looking towards A, my co-