nel, in which it is no longer influenced by the forces of the moon and sun, it would take a certain time in reaching any place in that channel, and the circumstances of the tide at that place would not depend on the positions and distances of the moon and sun at the time when the tide happens, but on the positions and distances of those luminaries at a certain time, anterior to the time of the tide, by the interval occupied in the transmission of the tide along the channel. This interval of time, which, in his former papers, the author had called *the age of the tide*, he here terms the *retroposition of the theoretical tide in time.*

Adopting this phraseology, the author finds that the phenomena of the Liverpool tides may be expressed as follows.

1. The effects which the changes of the moon's force produce on the tides are the same as the effects which those changes would produce upon a retroposited equilibrium tide.

2. The retroposition of the tide in longitude is affected by small changes, which changes are proportional to the variations in the moon's force.

3. The retroposition of the tide in time is also affected by small changes, which changes depend on the variations in the moon's force.

On the hypothesis that an equilibrium tide give rise to the Liverpool tides, we must suppose that the channel by which they are transmitted occupies in length, from west to east, $11^h\ 6^m$ of longitude; or we may suppose the tide spheroid to lie behind the position of equilibrium by a certain space; and the longitude occupied by the channel from end to end, may be supposed to make up the rest of the $11^h\ 6^m$, the retroposition of the tide in longitude. The author proceeds to show how the circumstances of the tide may be hypothetically represented on these suppositions; although it is not to be imagined that these hypotheses are strictly accordant with the true state of the case. As the general laws of the tides at other places must resemble those at Liverpool, they will of course be capable of being represented in a similar manner.

The remainder of the paper is occupied by a comparison of the data of observations at London and Liverpool, and by an investigation of the corrections in the formulæ thence resulting.

November 26, 1835.

Sir JOHN RENNIE, Knt. Vice-President, in the Chair.

Robert Alexander, Esq.; Charles Elliott, Esq.; and Sir William Molesworth, Bart., M.P., were elected Fellows of the Society.

"Observations on Halley's Comet, made at Mackree, Sligo, in the Months of August, September, October and November 1835." By Edward J. Cooper, Esq. Communicated by Capt. Beaufort, R.N., F.R.S.

These observations are communicated in the state in which they were taken, and without the corrections for refraction and parallax, with a view to assist computers in the calculation of a new approxi-

mate orbit. They were made principally with the author's equatorial telescope, having a focal length of 25 feet 3 inches, and a clear aperture of 13·3 inches. Some few, however, were taken with the finder, which is 6 feet 6 inches in focal length, and 4·9 inches clear aperture. The eye-pieces used were, one by Frauenhofer (an illuminated wire-micrometer), one by Messrs. Troughton and Simms (an illuminated field-micrometer), a comet eye-piece, and the ordinary eye-piece of the finder. The first of these had a magnifying power of about 400, the second of 226, the third of about 95, and the fourth about 40.

"An Account of the great Earthquake experienced in Chili, on the 20th of February 1835," with a Map. By Alexander Caldcleugh, Esq., F.R.S.

An idea formerly prevailed among the inhabitants of Chili, that the earthquakes of those regions take place at certain regular periods; but it is now sufficiently proved, from the numerous catastrophes of this kind which have occurred during the present century, that they may happen indiscriminately at all times, and in all states of the atmosphere. The author is disposed to place but little reliance on most of the supposed prognostics of these convulsions: but he mentions that, previously to the earthquake described in the present paper, there were seen immense flocks of sea birds, proceeding from the coast towards the Cordillera, and that a similar migration had been noticed prior to the great shock of 1822. From his own observations, he concludes that the barometer usually falls shortly before any considerable shock, and that it afterwards rises to its ordinary mean height. Both before, and also at the time of the convulsion, the volcanos of the whole range of the Cordillera were observed to be in a state of extraordinary activity.

The earthquake began at half-past eleven o'clock in the morning of the 20th of February. The first oscillations of the earth were gentle, and attended with little noise: they were succeeded by two extremely violent tremors, continuing for two minutes and a half, the principal direction of the motion being from south-west to north-east; and they were attended by a loud report, apparently proceeding from the explosions of a volcano to the southward. All the buildings of the town of Conception were thrown down during these undulations. At the expiration of half an hour, when the inhabitants, who, on the first alarm, had fled to the neighbouring heights, were preparing to return to their houses, it was observed that the sea had retreated to such a distance that the ships in the harbour were left dry, and all the rocks and shoals in the bay were exposed to view. At this period an immense wave was seen slowly advancing towards the shore, and, rolling majestically onwards, in ten minutes reached the city of Conception, which was soon overwhelmed in a flood of an altitude of 28 feet above high-water mark. The few persons who had remained in the town had but just time to make their escape, and to behold from the rising grounds, the complete submersion of the city. All objects that were movable were swept away into the ocean by the reflux of this great wave, which was succeeded by several similar, but smaller