the standard previous to the operation, and again when the measurement was finished. The details of the operation are entirely similar to those respecting the Hounslow Heath base ; and the apparatus was different in no material respect. The base contained ninety-two hypothenuses, and the ap­parent length was 366 chains, minus 9∙939 feet. The ab­solute length of the standard chain was assumed to be the same as it was found by Ramsden in 1791, by comparison with the standard scale ; and after all the different reduc­tions had been applied, the correct length of the base, at the temperature of 62° of Fahrenheit, and at the same level as the base on Hounslow Heath, was found to be 36,574∙4 feet (nearly seven miles).

On computing the distance between the terminal points of this base, deduced from the Hounslow Heath base by different combinations of the triangles, the greatest and least results were found to be 36,574∙8 and 36,573∙8 ; the mean being 36,574∙3 feet, or about one inch short of the measurement. So near an agreement must doubtless be ascribed, in part at least, to casual compensation of error ; but it nevertheless affords a very satisfactory proof of the great accuracy with which the different parts of the work had been conducted.

The distance between Beachy Head and Dunnose, on which the determination of the length of a degree of the great circle perpendicular to the meridian was to depend, being computed from four different combinations of tri­angles, the mean of the four results was found = 339,397∙6 feet, and the greatest difference from the mean was less than four feet. On computing from this, and the observed angles made by the straight line joining the two stations with the meridians at each, according to the method which will be subsequently explained, the length of a de­gree of the great circle perpendicular to the meridian at altitude 50° 41' (nearly that of the middle point between Beachy Head and Dunnose), was found to be 61,182·3 fa­thoms, = 367,093∙8 feet ; and hence the degree of longitude at the two stations (which is found by multiplying the de­gree of the perpendicular circle by the cosine of the lati­tude) was obtained as follows: Beachy Head 232,312 feet, Dunnose 232,914 feet, the assumed latitudes being respec­tively 50° 44' 24" and 50° 37' 7". These results are re­spectively greater by about 772 feet than the corresponding degrees on the spheroid, which best represents the whole of the measured arcs of meridian, and of which the elements are given in Figure of τηε Eλrth, p. 563.

In order to mark permanently the two important stations of Beachy Head and Dunnose, an iron gun was inserted in the ground at each of the places, having the diameter of the bore in the same vertical line with the point over which the axis of the instrument had been placed. Unfortunately this precaution did not prove sufficient ; for when Captain Kater was about to remeasure the angles at Beachy Head in 1826, the gun was not to be found. *“ In consequence of some misapprehension,* it had been removed along with some old guns which were formerly near that place, and thus one of the valuable parts of the survey of Great Britain was irrecoverably lost.” (Phil. Trans. 1828, p. 154.)

The account of the survey for the years 1791-4 inclusive, in addition to the particulars now stated, gives also the la­titudes and longitudes of a great number of places deter­mined by intersections made from the principal stations, and referred to the meridian of Greenwich, or, if towards the western extremity of the series, to that of Dunnose. At all the principal stations the angles of elevation and de­pression were observed; and these observations being recip­rocal, gave not only the relative altitudes of the stations, but also the mean refractions, assuming the spherical sur­face of the earth. With a view to obtain the absolute al­titudes, the height of the station at Dunnose above low water was ascertained by levelling down to the sea-shore near Shanklin, a distance of about a mile. The mean re­fractions were found to vary from 1/7th to 1/15th of the con­tained arc. It was also noticed, that the relative heights deduced from elevations and depressions cannot always be depended upon (on account of the variable state of the re­fraction) to less than about ten feet, even supposing them to be the mean of two or three independent results, except, perhaps, reciprocal observations are made at the same in­stant of time. the observations from which the relative altitudes were deduced were made on cloudy days, or to­wards the evenings, when the tremulous motion of the air is commonly the least.

During the years 1795 and 1796, the triangulation was continued from the stations near the base on Salisbury Plain, along the coasts of Dorsetshire, Devonshire, and Corn­wall, to the Land’s End, as it was considered desirable to have an early determination of the latitudes and longitudes of the great headlands in the channel, and also of the Scilly Isles. The details of the operations, including the calculations of the side of the principal triangles, the heights of the stations, the mean refractions, the distances of a great number of intersected objects from the principal stations, are given in the Philosophical Transactions for 1797, and form the last part of the first volume of the Trigonometrical Survey. The same paper also contains the bearings and distances from the meridian and parallels, and also the la­titudes and longitudes of a number of places observed in Kent in 1795, with a smaller theodolite (half the size of the principal one), for the purpose of completing the map of that county.

The next account of the operations connected with the Ordnance survey is contained in the Philosophical Trans­actions for 1800, and is given in the name of Captain Wil­liam Mudge alone, Mr Dalby having now retired from the service. This account describes the operations in 1797, 1798, and 1799, and is divided into three sections of which the first contains the calculations of the sides of the prin­cipal and secondary triangles extended over the country in those three years, together with an account of the measure­ment of a new base line on Sedgmoor. The second section contains the computed latitudes and longitudes of those places on the western coast which had been intersected in 1795 anil 1796, and also of such other places as were found conveniently situated in respect of three new meridians, the determination of which forms part of the present account. The last section contains the triangles which were carried over Essex, the western parts of Kent, and portions of the counties adjoining Kent, Suffolk, and Hertfordshire.

With respect to the determination of meridians, just al­luded to, it is to be observed, that by reason of the curva­ture of the earth, and the errors consequently arising from computing on the supposition that the earth is a plane, it becomes necessary that the direction of the meridian be determined anew where the operations are extended over distances of about sixty miles in an eastern or western di­rection. The distance from Dover to Land’s End is some­what about 300 miles, and between these places five inter­mediate meridians were observed, dividing the distance in­to six nearly equal parts. These were Beachy Head and Dunnose (already mentioned), Black Down in Dorsetshire, Butterton Hill in Devonshire, and St Agnes Beacon in Cornwall. In computing the longitudes and latitudes, the places were of course referred to the nearest of those me­ridians; and a place in the middle between two was re­ferred to both, and the mean of the results taken.

The operations of 1797 commenced with the observa­tion of the pole-star at Black Down, early in April ; and in the course of the summer the great theodolite was taken to twenty-one other stations, at which the angles were de­termined, all included between the meridian of that station and St Agnes Beacon. It was judged inexpedient to carry