

length of a degree to be $694 \frac{1}{4}$ stadia. The olympic stadium being equivalent to $605 \frac{1}{2}$ english feet, this would give about 79 miles, a measure considerably in excess, but which yet regulated the construction of charts for some time. The map of Eratosthenes showed the *oikoumene* as extending from Thule in the north, lat. $66^{\circ} 27'$, to $11^{\circ} 25' N$. In the west were figured the three peninsulas of Greece, Italia, and Liguria: and in the East, the four quadrilaterals of India, Asia, Media, and Arabia. Libya appeared as a triangle. The meridians were numbered from that of Alexandria.

Coming down to the times of Julius Cæsar, we find the large mind of the dictator revolving manifold schemes for the correct measurement and delineation of the Roman provinces. At his summons and command, three scientific Greeks, Zenodochus, Theodotus, and Polyclitus, were sent out, to the East, South, and North, to direct the necessary geometric operations. Their mission lasted twenty-five years (44 to 19 B. C.): in fact till after the emperor's death. His successor and grandnephew, Augustus, warmly interested in the statistics of the Empire, carried on the work, and, with the aid of a numerous staff of geographers and draughtsmen, completed that extensive map of the *Ager Romanus* which, under the name of the *Orbis*, was afterwards exposed to the view of the people. There yet remain a few fragments of this important work, which show that it was drawn on a cylindric projection.

The public roads of the Romans, the *via militares*, eternal and indestructible as their laws, covered the habitable world, and extended far and wide into the remotest districts of the Empire. Those dark-looking, narrow, compact, stone-built lines of travel, still visible in many places, reached like monstrous tentacula or feelers, over morass and mountain, plains, rivers, and deserts, into the farthest corners of the provinces embraced within the "*ditio potestasque Populi Romani*." Thence it ensued that for the convenience of travel, and for military and civil purposes, there were constructed numerous itinerary maps. These were long and narrow bands, where the positions and distances of all the stations and places of importance were noted. They were pictorial,—"*itineraria descripta, non tantum adnotata sed etiam picta*." The Pentingerian and Ravennate are especially noteworthy.

These itineraries from their extensive use and unscientific character may have had a prejudicial effect in making the construction of legitimate maps less common.

In the second century of our era, Ptolemy of Pelusium, aware of the convergence of the meridians, and the insufficiency of the cylindric projection to give room for the increasing number of northern discoveries with any tolerable accuracy, proposed the conic, which gives less distortion, and as a still farther improvement, he introduced a projection in which on the plane of the meridian, the equator and parallels are represented by circular arcs, and the meridians by arcs of an ellipse. This was an important service rendered to cartography.

Amid the darkness and suffering which gathered round the latter days of the Empire, chorographic science advanced but slowly. In the still deepening gloom we can but dimly discern the figures of the Emperor Theodosius II, who in 422, at Ravenna reconstructed the public maps, and of the Alexandrian geometer, Agathodæmon, who a century later produced his maps, on the ptolomean system.

During the terrorism and mutual isolation that attended the migration of the German and Slavonic races, all intellectual progress was arrested. It was a time of much misery. The open country, the uncultivated wastes of Europe swarmed with a desperate and wandering population without a country and without a home. In Italy, the old free peasantry had long since disappeared. Rome had been an exacting mother,—her armies had conquered the world; but in the process her sons had left their bones to bleak in every climate under heaven. The common soldier, the Italian legionary, crossed the sea with his eagles and spent his life beneath their shade: they were his household gods, his home, his civil polity, his all: and from the morasses of Germany and the sands of Syria he rarely returned to visit his paternal fields. Thus died out the hardy race of husbandmen, of those from whose ranks the seven hilled City had not unfrequently selected the leaders of her armies. Not all a dream, nay rather an absolute reality, were the warlike, simple minded races, whom the poets loved to depict as living with their robust offspring under the shadow of the oak-crowned Appenines. Vain was the attempt to supply their place by a discharged soldiery. The lands, where cultivated at all, fell into the hands of a few large proprietors, who possessed a multitude of slaves. Throughout the *Ager Romanus*, and Rome at that time still comprised the greater part of Europe, slaves took the place of the free laborer. Not unfrequently, the death of the proprietor, or the failure of his fortunes, threw vast numbers of these *servi* into the proletariat. Destitute and degraded, without a sesterce and without a friend, they formed a useless and helpless rabble, whose numbers were increased by an amalgamation with the remains of the old plebeian order and the colluvies of all the subject nations. The public highways were deserted: the municipia fell into ruin: travel ceased: and hordes of robbers and assassins swarmed in the open country, where the foot prints of civilization were disappearing one by one, and the morass and the forest were resuming their ancient sway. The barbaric invasions, recurring without cessation, everywhere possible and always imminent, destroyed all regular and reliable connexion between the various parts of Western Europe. There was no security, no sure prospect of the future, the ties were broken which bound together even the inhabitants of the same country, or the moments of the same life. Men were isolated, and the days of each man. The culture of the land, was impossible: and social activity everywhere became paralyzed. It was only under the shelter of religious institutions, in the cloister of the cœnobite, or the narrow cell of