

Such telescopes might be expected to add something to our knowledge of the heavens, if they had not been anticipated by reflectors of an equal or greater scale. James Gregory had invented, and Newton had more efficaciously introduced, reflecting telescopes. But these were not used with any peculiar effect, till the elder Herschel made them his especial study. His skill and perseverance in grinding specula, and in contriving the best apparatus for their use, were rewarded by a number of curious and striking discoveries, among which, as we have already related, was the discovery of a new planet beyond Saturn. In 1789, Herschel surpassed all his former attempts, by bringing into action a reflecting telescope of forty feet length, with a speculum of four feet in diameter. The first application of this magnificent instrument showed a new satellite (the sixth) of Saturn. He and his son have, with reflectors of twenty feet, made a complete survey of the heavens, so far as they are visible in this country; and the latter is now in a distant region completing this survey, by adding to it the other hemisphere.

In speaking of the improvements of telescopes we ought to notice, that they have been pursued in the eye-glasses as well as in the object-glasses. Instead of the single lens, Huyghens substituted an eye-piece of two lenses, which, though introduced for another purpose, attained the object of destroying color.<sup>6</sup> Ramsden's eye-piece is one fit to be used with a micrometer, and others of more complex construction have been used for various purposes.

### *Sect. 2.—Observatories.*

ASTRONOMY, which is thus benefited by the erection of large and stable instruments, requires also the establishment of permanent Observatories, supplied with funds for their support, and for that of the observers. Such observatories have existed at all periods of the history of the science; but from the commencement of the period which we are now reviewing, they multiplied to such an extent that we cannot even enumerate them. Yet we must undoubtedly look upon such establishments, and the labors of which they have been the scene, as important and essential parts of the history of the progress of astronomy. Some of the most distinguished of the observatories of modern times we may mention. The first of these were that of Tycho Brahe

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<sup>6</sup> Coddington's *Optics*, ii. 21.