diameter, but the limit for the former was about two and one-half inches. However, about the opening of the Nineteenth Century, Guinand, a Swiss, discovered a process of making masses of optical flint-glass large enough to admit of the construction from them, of excellent three-inch lenses. The making of three-inch objectives, achromatic, or free from color, and of short focus, wrought a revolution in telescopes, and renewed the demand for refractors, though prices, as compared with those of the present day, were very great. The long telescopes were gladly discarded, because the new ones not only performed vastly better than they did, but were much more convenient in every way. Their length did not exceed five or six feet, which enabled the observer to house them in a building called an "observatory," and to work with a degree of comfort previously unknown.

Improvement succeeded improvement. Larger and still larger compound objectives were made, yet progress was so slow as to justify Grant, in 1852, in declaring that the presentation, about 1838, to Greenwich Observatory, of a six and seven-tenths object-glass, unmounted, was a "magnificent gift," and so it was esteemed by Mr. Airy, the Astronomer Royal. Improvement is still the order of the day, and, as a result of keen competition, very excellent telescopes, of small aperture, can be purchased at reasonable prices. Great refractors are enormously expensive, and will probably be so until they, in turn, are relegated to the lumber room by some simple invention, which shall give us an instrument as superior to them as they are to the "mighty" telescopes, which, from time to time, caused such sensations in the days of Galilei, Cassini, Huyghens, Bradley, Dollond, and those who came after them.

In several respects, giant telescopes have served Science well, but nearly all the really useful work has been done by instruments of less than twelve inches in diameter. Indeed, it may be safely asserted that most of this work must be credited to instruments of six inches, or less, in aperture. After referring with some detail to this point, Denning tells us that "nearly all the comets, planetoids, double-stars, etc., owe their detection to small instruments; that our knowledge of sun-spots, lunar and planetary features, is also very largely derived from similar sources; that there is no department which is not indebted to the services of small telescopes, and that, of some thousands of drawings of celestial objects, made by observers employing instruments from three to seventy-two inches in diameter, a careful inspection shows that the smaller instruments have not been outdone in this interesting field of observation, owing to their excellent defining powers and the facility with which they are used." Aperture for aperture, the record is more glorious for the "common telescope" than for its great rivals. The term, "common telescope," is to be understood here as descriptive of good refractors, with object-glasses not exceeding three, or three and one-half inches in diameter. In some works on the subject, telescopes as large as five inches, or even five and one-half inches, are included in the description of "common," but instruments of such apertures are not so frequently met with in this country as to justify the classing of them with smaller ones, and, perhaps, for the purposes of this article, it is well that such is the fact, for the expense connected with the purchase of first-rate telescopes increases very rapidly in proportion to the size of the object-glass, and soon becomes a serious matter.

In his unrivalled book, "Celestial Objects for the Common Telescope," Webb declares that his observations were chiefly made with a telescope five and one-half feet long, carrying an object-glass three and seven-tenths inches in diameter. The instrument was of "fair defining quality," and