

difficult, in a work like the present, to give the proper degree of circumstantiality to the phenomena, which, although of frequent recurrence, have been observed with such various degrees of accuracy, or to separate the necessary from the accidental. It is only with respect to measurements and computations that the astronomy of comets has made any marked advancement, and, consequently, a scientific consideration of these bodies must be limited to a specification of the differences of physiognomy and conformation in the nucleus and tail, the instances of great approximation to other cosmical bodies, and of the extremes in the length of their orbits and in their periods of revolution. A faithful delineation of these phenomena, as well as of those which we proceed to consider, can only be given by sketching individual features with the animated circumstantiality of reality.

Shooting stars, fire-balls, and meteoric stones are, with great probability, regarded as small bodies moving with planetary velocity, and revolving in obedience to the laws of general gravity in conic sections round the Sun. When these masses meet the Earth in their course, and are attracted by it, they enter within the limits of our atmosphere in a luminous condition, and frequently let fall more or less strongly heated stony fragments, covered with a shining black crust. When we enter into a careful investigation of the facts observed at those epochs when showers of shooting stars fell periodically in Cumana in 1799, and in North America during the years 1833 and 1834, we shall find that *fire-balls* can not be considered separately from shooting stars. Both these phenomena are frequently not only simultaneous and blended together, but they likewise are often found to merge into one another, the one phenomenon gradually assuming the character of the other alike with respect to the size of their disks, the emanation of sparks, and the velocities of their motion. Although exploding smoking luminous fire-balls are sometimes seen, even in the brightness of tropical daylight,* equaling in size the ap-

* A friend of mine, much accustomed to exact trigonometrical measurements, was in the year 1788 at Popayan, a city which is $2^{\circ} 26'$ north latitude, lying at an elevation of 5583 feet above the level of the sea, and at noon, when the sun was shining brightly in a cloudless sky, saw his room lighted up by a fire-ball. He had his back to the window at the time, and on turning round, perceived that great part of the path traversed by the fire-ball was still illuminated by the brightest radiance. Different nations have had the most various terms to express these phenomena: the Germans use the word *Sternschnuppe*, literally *star snuff*—an expression well suited to the physical views of the vulgar in former