

for instance, in the large comets of 1402, 1532, 1577, 1744, and 1843. This latter circumstance indicates, in particular individuals, a denser mass, capable of reflecting light with greater intensity. Even in Herschel's large telescope, only two comets, that discovered in Sicily in 1807, and the splendid one of 1811, exhibited well-defined disks;\* the one at an angle of  $1''$ , and the other at  $0''\cdot77$ , whence the true diameters are assumed to be 536 and 428 miles. The diameters of the less well-defined nuclei of the comets of 1798 and 1805 did not appear to exceed 24 or 28 miles.

In several comets that have been investigated with great care, especially in the above-named one of 1811, which continued visible for so long a period, the nucleus and its nebulous envelope were entirely separated from the tail by a darker space. The intensity of light in the nucleus of comets does not augment toward the center in any uniform degree, brightly shining zones being in many cases separated by concentric nebulous envelopes. The tails sometimes appear single, sometimes, although more rarely, double; and in the comets of 1807 and 1843 the branches were of different lengths; in one instance (1744) the tail had six branches, the whole forming an angle of  $60^\circ$ . The tails have been sometimes straight, sometimes curved, either toward both sides, or toward the side appearing to us as the exterior (as in 1811), or convex toward the direction in which the comet is moving (as in that of 1618); and sometimes the tail has even appeared like a flame in motion. The tails are always turned away from the sun, so that their line of prolongation passes through its center; a fact which, according to Edward Biot, was noticed by the Chinese astronomers as early as 837, but was first generally made known in Europe by Fracastoro and Peter Apian in the sixteenth century. These emanations may be regarded as conoidal envelopes of greater or less thick-

Maine), between 1 and 3 o'clock in the afternoon.<sup>a</sup> The distance of the very dense nucleus from the sun's light admitted of being measured with much exactness. The nucleus and tail appeared like a very pure white cloud, a darker space intervening between the tail and the nucleus. (*Amer. Journ. of Science*, vol. xlv., No. 1, p. 229.)

\* *Phil. Trans.* for 1808, Part ii., p. 155, and for 1812, Part i., p. 118. The diameters found by Herschel for the nuclei were 538 and 428 English miles. For the magnitudes of the comets of 1798 and 1805, see Arago, *Annuaire*, 1832, p. 203.

<sup>a</sup> [The translator was at New Bedford, Massachusetts, U. S., on the 23th February, 1843, and distinctly saw the comet, between 1 and 2 in the afternoon. The sky at the time was intensely blue, and the sun shining with a dazzling brightness unknown in European climates.]—*Tr*