

their distances, have, by leading to the improvement and perfection of arc-graduation and optical instruments in connection with micrometric appliances, contributed more than any thing else to raise the science of observation to the height which, by the ingenious employment of great meridian-circles, refractors, and heliometers, it has attained, especially since the year 1830.

The quantity of the measured proper motions of the stars varies, as we intimated at the commencement of the present section, from the twentieth part of a second almost to eight seconds. The more luminous stars have in general a slower motion than stars from the fifth to the sixth and seventh magnitudes.\* Seven stars have revealed an unusually great motion, namely: Arcturus, first magnitude ( $2''\cdot25$ );  $\alpha$  Centauri, first magnitude ( $3''\cdot58$ ); †  $\mu$  Cassiopeiæ, sixth magnitude ( $3''\cdot74$ ); the double star,  $\delta$  Eridani, 5.4 magnitude ( $4''\cdot08$ ); the double star 61 Cygni, 5.6 magnitude ( $5''\cdot123$ ), discovered by Bessel in 1812, by means of a comparison with Bradley's observations; a star in the confines of the Canes Venatici, ‡ and the Great Bear, No. 1830 of the catalogue of the circumpolar stars by Groombridge, seventh magnitude (according to Argelander,  $6''\cdot974$ );  $\epsilon$  Indi ( $7''\cdot74$ , according to D'Arrest); § 2151 Puppis, sixth magnitude ( $7''\cdot871$ ). The arithmetical|| mean of the several proper motions of the fixed stars in all the zones into which the sidereal sphere has been divided by Mädler would scarcely exceed  $0''\cdot102$ .

An important inquiry into the "Variability of the proper motions of Procyon and Sirius," in the year 1844, a short

\* Bessel, in the *Jahrbuch von Schumacher für 1839*, s. 38. Arago *Annuaire pour 1842*, p. 389.

†  $\alpha$  Centauri, see Henderson and Maclear, in the *Memoirs of the Astron. Soc.*, vol. xi., p. 61; and Piazzzi Smyth, in the *Edinburgh Transact.*, vol. xvi., p. 447. The proper motion of Arcturus,  $2''\cdot25$  (Baily, in the same *Memoirs*, vol. v., p. 165), considered as that of a very bright star, may be called very large in comparison with Aldebaran,  $0''\cdot185$  (Mädler, *Centralsonne*, s. 11), and  $\alpha$  Lyræ,  $0''\cdot400$ . Among the stars of the first magnitude,  $\alpha$  Centauri, with its great proper motion of  $3''\cdot58$ , forms a very remarkable exception. The proper motion of the binary system of Cygnus amounts, according to Bessel (Schum. *Astr. Nachr.*, bd. xvi., s. 93), to  $5''\cdot123$ .

‡ Schumacher's *Astr. Nachr.*, No. 455.

§ *Op. cit.*, No. 618, s. 276. D'Arrest finds this result on comparisons of Lacaille (1750) with Brisbane (1825), and of Brisbane with Taylor (1835). The star 2151, Puppis, has a proper motion of  $7''\cdot871$ , and is of the sixth magnitude. (Maclear, in Mädler's *Unters. über die Fixstern-Systeme*, th. ii., s. 5.)

|| Schum., *Astr. Nachr.*, No. 661, s. 201