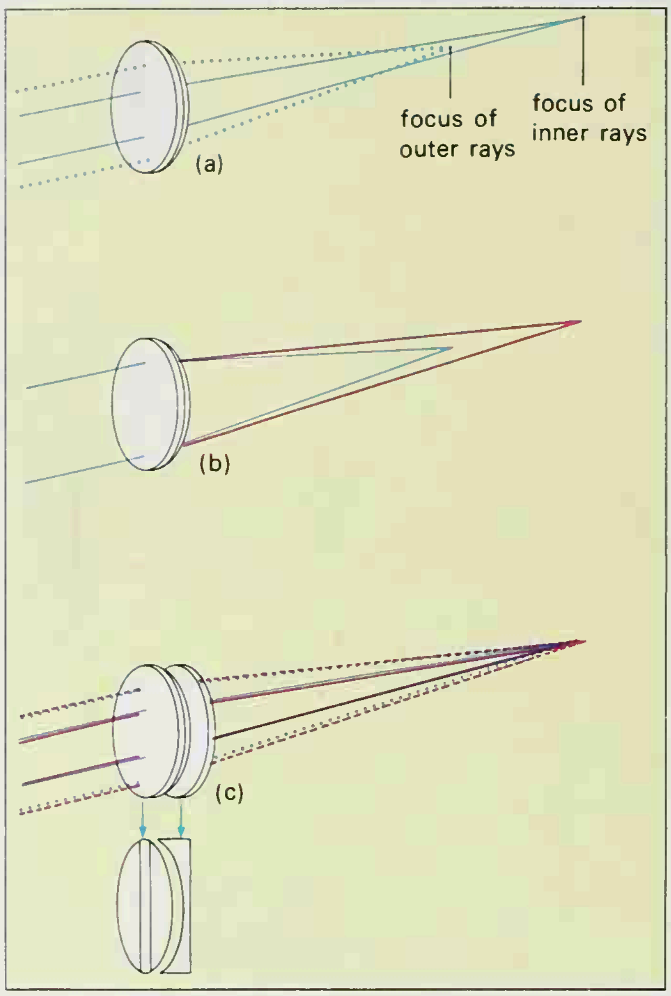

Fig. 9·1 right: A single lens brings rays passing close to its edge to focus at a different point from those passing near the centre (a). This is because the surfaces of the lens are spherically curved, and this fault is known as **spherical aberration.** *A single lens also brings rays of different colours to focus at different points (b). This is because the lens disperses white light into its separate colours. This is known as* **chromatic aberration.** *A two component lens, with one component having convex surfaces and the other a plane surface and a concave one (c) may be designed to minimize spherical aberration and also to overcome chromatic aberration for two specific colours.*

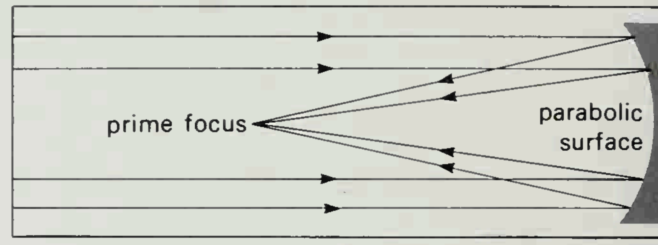

Fig. 9·2 top right: *Use of a concave mirror to bring incoming light to a focus.*

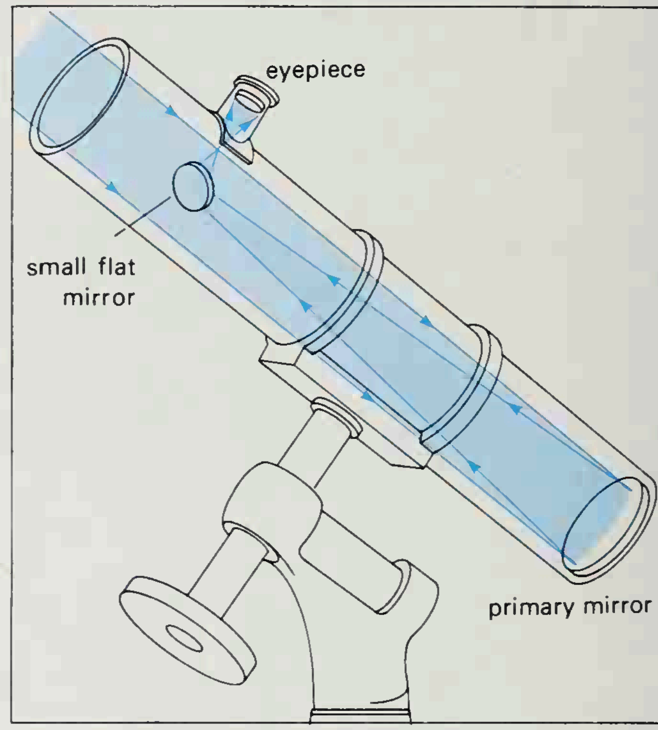

Fig. 9·4 far right, centre: *The Newtonian focus as used in many amateur reflecting telescopes.*

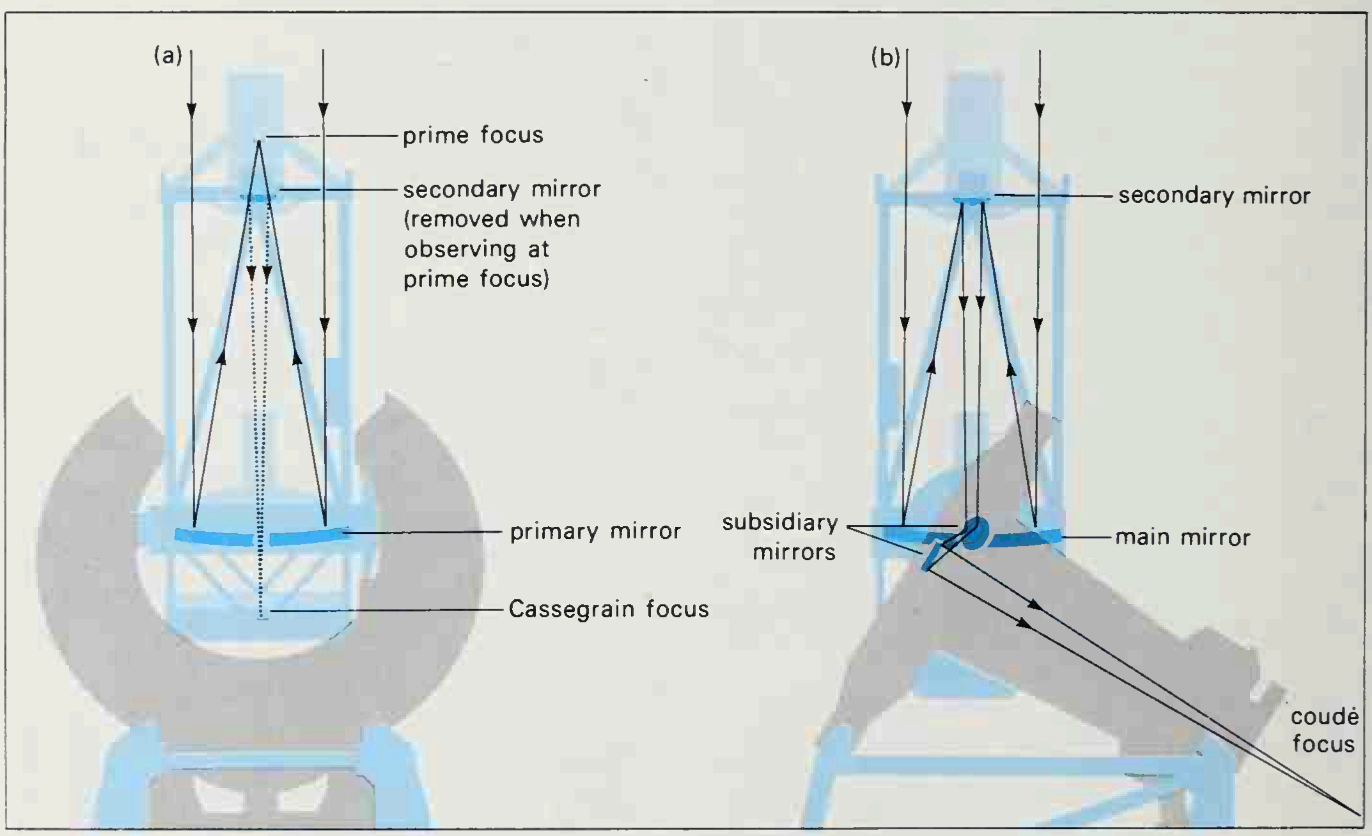

Fig. 9·3 Two drawings of a modern telescope showing the prime focus and Cassegrain focus (which lies below the primary mirror) in (a), and the fixed coudé focus (b).

The Schmidt and other telescopes

Even with all modern refinements, the field of view of a large reflecting telescope is small. The area of really sharp definition on a photograph is about 1° square and although this is perfectly adequate for the detailed examination of specific objects, it is too small an area for any large scale surveys or statistical work. Something with a wider field of view is required for these. In the 1930s the Estonian optician Bernhard Schmidt developed a new wide-angle telescope especially for photographic work, and since then the Schmidt telescope has become one of the optical astronomer's most powerful tools. The instrument uses a spherical primary mirror and at the front of the tube there is a correcting plate. This has a complex shape (Fig. 9·5, page 232) and can be said to parabolize the light as it enters the tube. The spherical primary gives a wide field coverage, typically some 40° square and although the telescope cannot