



The hydrogen distribution in the spiral galaxy NGC 5907 which is seen edge-on, showing clear evidence for a warping of the galaxian plane farther out than the limit seen in the optical photograph.

half a dozen dwarf ellipticals; those in the constellations Sculptor and Fornax are the most conspicuous. The Andromeda galaxy (M 31) also has several companions. There could be many more dE galaxies in the Local Group, more distant from us and very faint.

Proper motions of galaxies are undetectable; our only information about their motion through space comes from their line-of-sight or radial velocity v , and from this it is evident that the Local Group galaxies are all in orbit about a common centre of mass, although observation suggests that the system is not gravitationally stable and will break up. For the more distant of the galaxies concerned, distances are not so accurately known and membership of the Local Group is uncertain. It is generally assumed that the Group includes all galaxies out to a distance of 1 Mpc.

It has already been mentioned that galaxies near the galactic plane suffer obscuration. An intrinsically bright nearby galaxy could therefore be heavily reddened and appear faint optically, but it would be brighter in the infrared. Several heavily reddened galaxies are known, some of which are probably in the Local Group. In 1968, two galaxies, called Maffei

1 and 2, were discovered by infrared observation. Maffei 1 is a large E, or S0 galaxy and could well be a Local Group member about 1 Mpc away; Maffei 2 is a spiral and is almost certainly outside the Local Group.

Local intergalactic matter

Radio observations of hydrogen at 21 cm wavelength (page 186) show that there are high velocity clouds of gas at high galactic latitudes, with radial velocities up to ± 250 km per s. Since it is not possible to determine their distances, there is some doubt about their true nature. They could be nearby interstellar clouds, or be part of the outer structure of the Galaxy, or even be intergalactic, either as satellite clouds of the Galaxy at tens of kpc or as separate member clouds of the Local Group at hundreds of kpc from the Sun. It is possible that the clouds include objects of all these different types.

In 1974, D. S. Mathewson and colleagues, in Australia, detected an extended, continuous belt of high-velocity hydrogen gas, passing near the south pole of the Galaxy and enveloping the two Magellanic Clouds. Evidently this material, called the Magel-