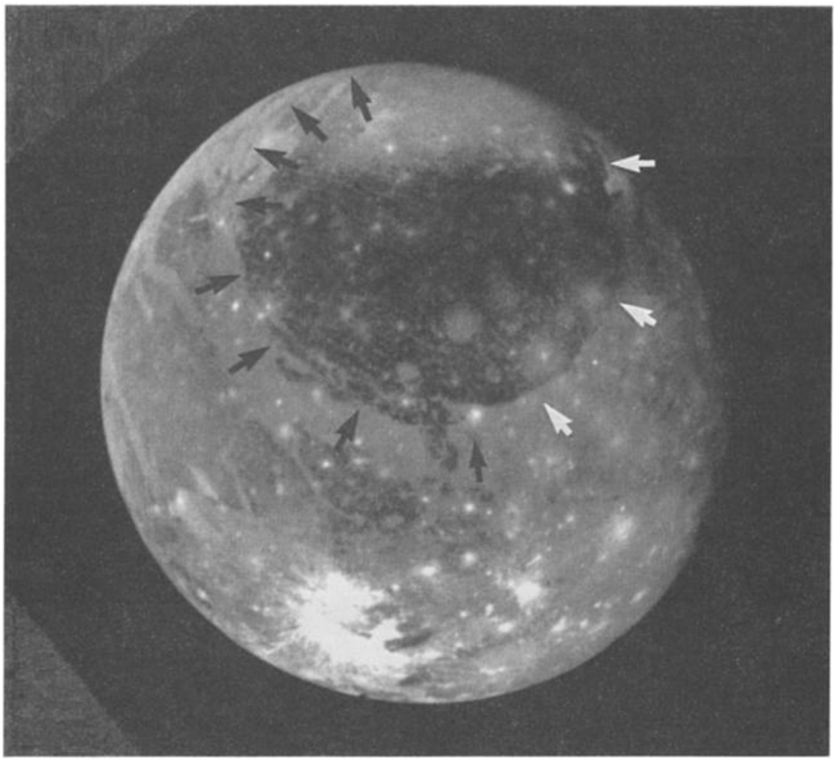

Fig. 9. Full disk image of Ganymede showing the circular outline of Galileo Regio. Black arrows indicate the part of lineament I observed at high resolution; white arrows indicate the small circle continuation. Disk is 5260 km in diameter, and north is up. (Voyager 2 image 20608.27, centered near 5°N,139°W.)

circle also defines the northern and eastern boundaries of Galileo Regio (area 1) that were observed by Voyagers 1 and 2 only at low resolution (Figure 9). The fit of lineament I to a small circle trace makes it a clear candidate for a zone of left-lateral shear along which area 1 underwent minor (about 14°) clockwise rotation, and which was later occupied by younger light grooved terrain. Irregularities in the lineament's trace mandate that if shear motions across it did occur, then it must be accompanied by an adjacent zone of distributed deformation.

Lineament II separates Galileo Regio and northern Marius Regio (areas 1 and 2) from central Marius Regio (area 3). It is composed of Anshar Sulcus and its continuation to the east as a throughgoing groove that defines the southern margin of Uruk Sulcus ("C," "D," and "E" in Figure 2*b*). This lineament exhibits a major right echelon bend between areas 2 and 3, compatible with the lineament being the southern boundary of the zone of distributed left-lateral shear that is hypothesized above. Surrounding the bend in the lineament are numerous east-southeast oriented groove lanes, consistent in orientation with transtensional deformation ("F" in Figure 2*b*). The northern boundary of the zone of distributed shear presumably would be lineament I; if it exists, the zone would therefore include all of area 2 as well as light terrain to its north (Elam Sulci) and southeast (Uruk Sulcus). Lineaments I and II become indistinguishable east of about 140°W.

Central-southern Marius Regio boundary. Lineament III is composed of Tiamat Sulcus and several groove lanes to the east, and coincides over much of its length with the southern boundary of area 3. To the east, the lineament is obscured by the ejecta of several large craters. Lineament III makes several 30°-40° changes in its orientation, forming two left echelon bends (Figures 7*b* and 10). At each bend there are west to northwest oriented grooves consistent in orientation with transtensional deformation. Therefore the orientation, morphology, and style of deformation along lineament III are compatible with its being a zone of very minor right-lateral shear offset of areas 3 and 4, the same sense of shear suggested by separations of the furrow poles of areas 3 and 4. However, the irregularity of lineament III is evidence against the magnitude of any shear exceeding about several tens of kilometers. Most of the furrow pole separation is therefore probably due to minor noncircularity of arcuate furrows in area 4.

Offsets of Distinctive Structures

If shear motions across the hemispheric scale structural lineaments did occur, then offsets of distinctive structures may be observable. However, a large fraction of any such offset structures may be difficult to identify because of (1) the 100- to 400-km width of light grooved terrain between large dark terrain areas that may have buried all or parts of offset structures, (2) variations in morphology of offset features on either side of the light grooved terrain, and (3) the tendency for structures to terminate in T-relationships against major throughgoing structures and thus sometimes to resemble features offset by shear. For these reasons, the search for offset structures was focused on morphologically distinctive, throughgoing features having observed undeformed lengths in excess of several hundred kilometers. The system I arcuate furrows themselves are not suitable because of their pervasiveness and indistinctive morphology. Suitable structures may include (1) elongate, distinctive grooved terrain structures, (2) the few long system II radial furrows, and (3) other throughgoing dark terrain troughs. Two of