the form of the crater which is produced is always circular, regardless of the direction of the impacting body. Explosion craters have been studied on Earth and they show rims of uplifted bedrock which correspond to the raised walls of lunar craters, while measurements of the diameters and depths show complete agreement between the two bodies. Elastic rebound of the rocks can cause the central peaks and peak rings which are seen in the larger, naturally formed craters on both the Earth and Moon. Débris from the explosions can be seen as characteristic **ejecta blankets** and the larger fragments can themselves produce further secondary craters. Under Earth's high gravity conditions, the ejecta fall close to the main crater, but because the Moon's gravity is only about one-sixth of that of the Earth, relatively young craters on the Moon often show bright rays which may stretch for hundreds of kilometres. These and the smaller, bright haloes are composed of fine dust and glass beads flung out by the impact.

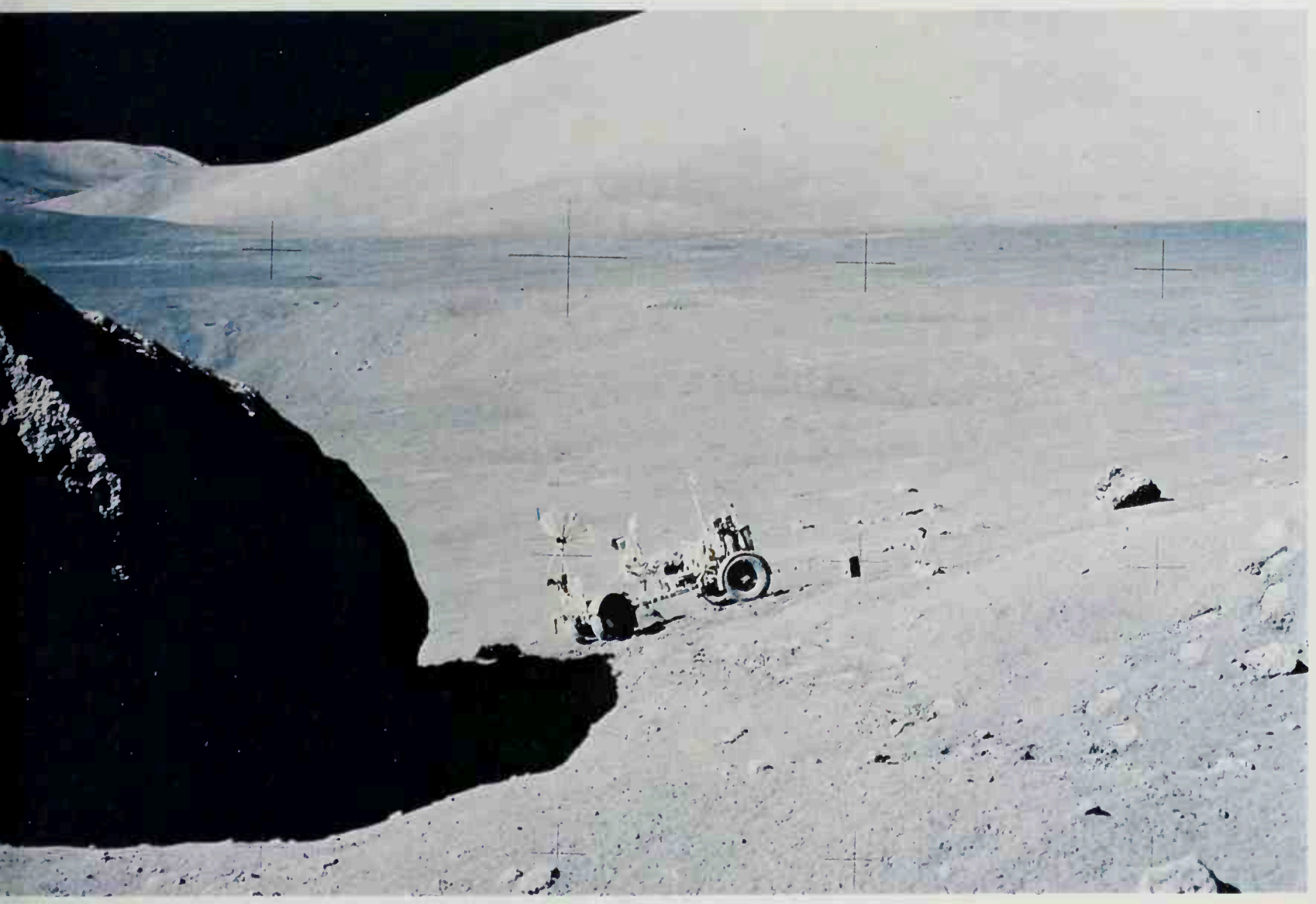
The large multi-ringed structures are thought to have been caused by the impact of very large bodies, perhaps tens of kilometres in diameter, although there is still considerable discussion over the exact way in which the surrounding mountain rings were formed.

The vast ejecta blankets from these impacts can be traced over wide areas of the Moon's surface, while some of the earlier structures have been almost obliterated by large numbers of smaller, later craters.

At the other end of the scale, low-velocity impacts of small bodies do not cause explosive cratering, but merely excavate pits by throwing out loose materials. Such activity is important in the uppermost layers of the surface, termed the **regolith**, which varies in thickness from 4–5 m on the maria to 10 m and more in the highlands. The uppermost surface layer is composed of the finest dust, but the regolith's composition ranges from this to large blocks several metres across.

In the airless and waterless lunar environment it is impacts which have fractured and powdered this material, and which are responsible for the very gradual erosion and obliteration of craters and other features such as ray systems.

A type of rock which is very common in lunar samples is a **breccia**, in which fragments of rock have been welded together by the heat of later impacts, before being broken up yet again. In some highland samples, as many as four different generations may be recognized, showing the results of repeated impacts.



A composite of two photographs taken on the lunar surface at the Apollo 17 landing site in the Taurus Mountains near the crater Littrow. The valley is thought to be a graben flooded with basalt flows totalling about 1 400 m. Astronaut Schmidt and the Lunar Rover give an idea of the scale of the surface features, while South Massif on the right is about 8 km distant and reaches a height of 2 500 m. The large broken boulder is a breccia, and has rolled about 1·5 km down the slope.