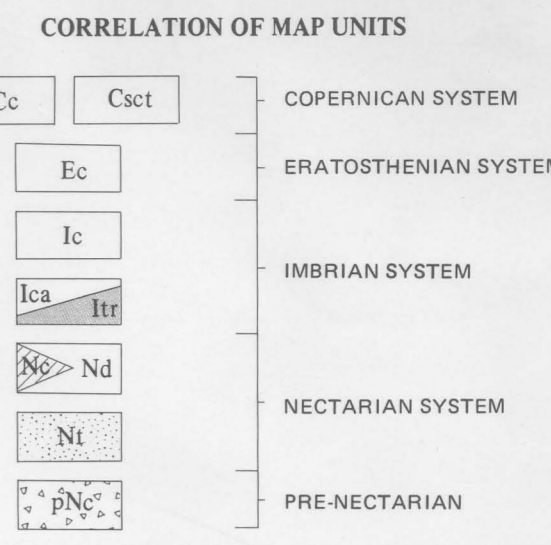




Topographic map of central area compiled at 1:100,000 scale from Apollo 16 metric photographs 975 and 976, on AP/C analytical plotter by Raymond Jordan, U.S. Geological Survey; photographic base from Apollo 16 metric photograph 439. Contours and spot elevations are expressed as radius vectors in meters with the first three digits omitted. For example a radius vector of 1737750 meters is designated as 7750 meters.

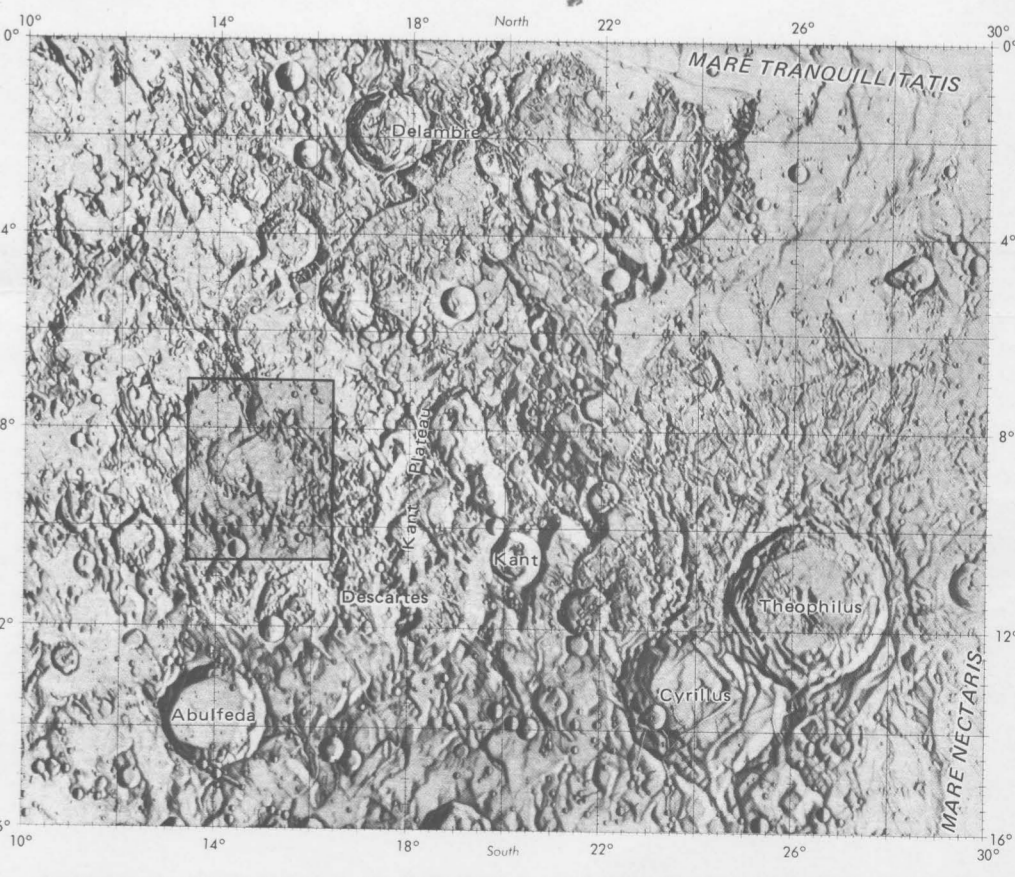
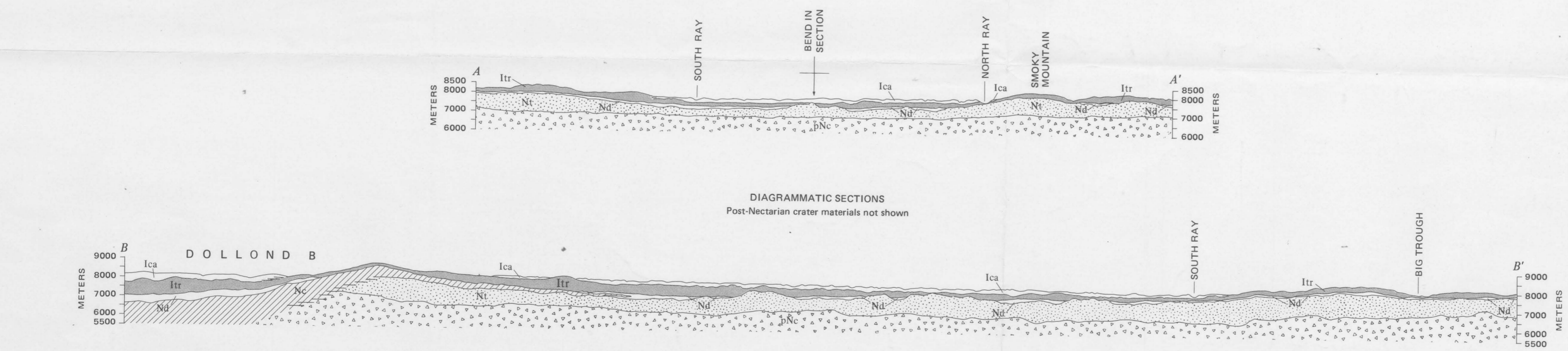
SCALE 1:200 000
CONTOUR INTERVAL 50 METERS ON TOPOGRAPHIC INSET

Geology by Carroll Ann Hodges, 1974, under NASA Contract No. T-5874A



DESCRIPTION OF MAP UNITS

- Cc** CRATER MATERIAL—Characteristics: Material of fresh circular craters having relatively sharp rim crests, surrounded by bright textured ejecta blankets and rays. Craters smaller than 700 m in diameter not mapped. *Interpretation:* Impact craters, as inferred from rays, raised rim crests, circularity, and blocky ejecta.
- Ccst** CRATERS SATELLITIC TO THEOPHILUS—Characteristics: Material of tangential or coalescing craters grouped in chains or clusters, some having raised rims; rim crests rounded and indistinct; slight development of herringbone ridges; chains oriented northwest; similar morphologically to craters clearly satellite to Theophilus outside map area. *Interpretation:* Secondary craters formed by ejecta from Theophilus, as suggested by alignment approximately radial to Theophilus, elongate or overlapping configuration, herringbone ridges (Oberbeck and others, 1972), and similarity in freshness, (and therefore age) to continuous secondary chains north of Theophilus; contact drawn at apparent limit of ejecta; queried where relation to Theophilus uncertain.
- Ec** CRATER MATERIAL—Characteristics: Material of circular craters having distinct rim crests with no observable bright halos or rays; rim crests sharp to rounded, depending on size, with small craters generally most subdued; central mounds common in craters 500 m or more in diameter. Craters smaller than approximately 1 km not mapped. *Interpretation:* Impact craters; central mounds on some crater floors probably interface with resistant substrate (Quaide and Oberbeck, 1968).
- Ic** CRATER MATERIAL—Characteristics: Material of circular craters with slightly raised, rounded rim crests and broad bowl-shaped interiors; shallower than younger craters of same diameter; craters smaller than 1.5 km not mapped. *Interpretation:* Impact craters.
- Ica** CAYLEY FORMATION—Characteristics: Material of plains having relatively broad level surfaces; intermediate albedo, higher than that of mare material; widespread throughout lunar highlands; superposed crater densities per unit area greater than on maria, less than Fra Mauro Formation (Soderblom and Boyce, 1972; Greeley and Gault, 1970; Gault, 1970), but equivalent to those on Hevelius Formation (Boyce and others, 1974). Faint expression of buried topographic surface. Samples returned from Apollo 16 site mainly feldspathic breccias and some crystalline rocks with evidence of intensive shock melting. *Interpretation:* Ejecta from impact craters and basins emplaced primarily in topographic depressions. Composed mainly of Imbrium breccia deposits; Orientale ejecta probably included in surficial materials. Underlain by Nectarian ejecta and locally derived debris. Shock melt in samples attributed to planar facies of Imbrium ejecta which flowed beyond margins of Fra Mauro Formation.
- Itr** RUGGED TERRA MATERIAL—Characteristics: Ridged and hilly materials of intermediate albedo surrounding Cayley plains. Clustered rounded hills and deep curving troughs particularly conspicuous in area of Stone Mountain and southward, including material overlapping crater Descartes. Relief northwest of Smoky Mountain generally more subdued, with furrows and ridges parallel to Imbrium sculpture. Contacts drawn on basis of topography. Samples collected from Stone Mountain mainly feldspathic breccias, similar to those collected from plains. *Interpretation:* Ejecta from impact basins, principally Imbrium. Rugged Nectarian ejecta probably present at depth. Surficial deposits possibly composed in part of Orientale ejecta. Furrows formed largely by gouging and cratering by projectiles from Imbrium, contemporaneous with deposition of ejecta from that basin; some lineations possibly formed by lateral flow of ejecta, representing distal facies of Fra Mauro Formation. Topographic configuration of Stone Mountain complex possibly imposed partly by banking of ejecta against Kant plateaus; mode of emplacement similar to that of deceleration ridges in Orientale ejecta (Trask and McCauley, 1972; Hodges, 1972).
- Nt** CRATER MATERIAL—Characteristics: Material of craters whose rim materials are scored by furrows and ridges parallel to Imbrium sculpture; partly filled with plains material. Elongate to circular in shape; rim diameters 10 to 35 km (Dollond B). *Interpretation:* Impact craters sculptured and partly buried by ejecta from Imbrium basin; formed partly in Nectarian ejecta. Exposed crater Descartes, where unit Itr was shed off slopes.
- Nd** FRAGMENTAL DEBRIS—Characteristics: Hypothetical buried unit, indicated by presumed hiatus between Nectarian and Imbrium basin-forming events; shown in cross sections only. *Interpretation:* Pre-Imbrium, post-Nectarian impact debris produced mainly by local craters, including Dollond B.
- Nt** TERRA MATERIAL—Characteristics: Material of isolated rugged mountains and subdued, grooved hills with steep escarpments; intermediate albedo, similar to that of surrounding units Ica and Itr. *Interpretation:* Impact ejecta, probably from Nectarian basin. Mostly overlain by younger debris but may be exposed or only thinly mantled on steep massifs. Possibly penetrated by North Ray crater.
- pNc** CRATER MATERIAL—Characteristics: Buried material of crater 150 km in diameter; shown in cross sections only. *Interpretation:* Pre-Nectarian impact breccias on large crater floor.
- (It)** Contact—Approximately located or gradational; dashed at uncertain margins of crater ejecta blankets; dotted where buried. Buried unit shown in parentheses.
- Gradational contact—Shown in cross sections only.
- Probable fault—Bar and ball on down thrown side.
- Furrow—Line along axis of prominent furrow or trough in units Itr, Nc, and Nt; most formed by chains of secondary craters.
- Scarp—Line at base of scarp within geologic unit. Bars on upslope side. Not shown at exposed geologic contacts; bars only on buried contacts.
- Crater rim crest
- Buried crater rim crest
- Central mound in Eratosthenian craters

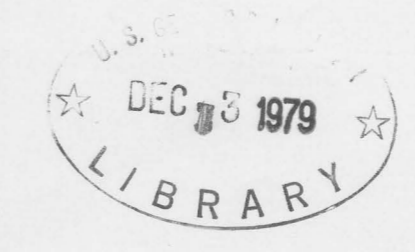


THEOPHILUS QUADRANGLE (LAC 78) SHOWING LOCATION OF DETAILED GEOLOGIC MAP OF THE APOLLO 16 (DESCARTES) LANDING AREA

GEOLOGIC MAP OF THE APOLLO 16 LANDING SITE AND VICINITY

By
Carroll Ann Hodges
1979

This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards and nomenclature.



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