

NOTES TO ACCOMPANY SECTION F
(Seismic profiles P1168, P1171, half of P1138)

- Acquisition and processing
- All seismic profiles along the section intersect at each of the physical splice points. Profile P1171 was reprocessed separately. In that processing the data above the 0 ms (sea level) datum has been omitted. There are polarity reversals at the splices of P1171 with the adjacent lines. The interpretation of profile P1138 continues on Section G.
 - A mismatch of reflectors occurs at and below the top of the Thumb Mountain Formation (OTM) near CDP 99, profile P1168. This mismatch is attributed to residual velocity pull-up to the west created by a facies change from shales of the Cape Phillips Formation (SDC) to carbonates of unit OSC immediately above the Thumb Mountain at this location. West of CDP 99, the pull-up creates apparent structural relief of nearly 100 ms.
 - Up to 50 ms of residual velocity pull-up occurs under the anticline at CDP 825, profile P1171. This pull-up of the reflectors at and below the top of the Eleanor River Formation (OER), and the reflection pull-up occurring under all anticlines on these seismic profiles is attributed to thrust stacking of high velocity carbonates and evaporites higher in the section.
 - Diffractions within anticlines on profile P1171 (for example below CDP 210) were not entirely eliminated by time migration. There may be two reasons for this. Migration is ineffective when the seismic profile is not perpendicular to structure. On P1171, the line of section is 50° removed from perpendicular. Residual diffractions will also remain on the migrated section when selected migration velocities are too slow.
 - Reduced data quality between CDP 44 and 68 on P1171 is attributed to a 33% reduction in stacking fold.

- Seismic stratigraphic features
- One of the clearest examples of Proterozoic seismic stratigraphy occurs below 3700 ms west of CDP 60 on P1168.
 - The chaotic internal reflection pattern of unit OSC, (at 1500 to 1800 ms west of CDP 75, on P1168), corresponds to an interval of shallow-marine dolostones in the Dundas C-80 and N. Dundas N-82 wells. The irregular upper surface of unit OSC is interpreted to be a subaerial erosion surface (disconformity) overlain by a transgressive unit that correlates with black mudrocks of the Kitson Formation (Dk) in the two Dundas wells. Unit OSC is in part overlain by and in part interfingered with mudrocks and basal carbonates of the Cape Phillips Formation (SDC and OSDC) which thickens rapidly east of the N. Dundas N-82 well.
 - One of the thickest developments of unit sP2 occurs beneath CDP 700, profile P1171. With an estimated interval velocity of 5.7 km s⁻¹ this may represent 3300 m of section.
 - The base of unit sC1A is irregular and in many areas is not associated with a basal reflection. Between CDP 250 and 360 on P1171 there is an obvious reflector. Three or four overlapping reflectors occur immediately above the base of the unit in this area.
 - The contact between the Cape De Bray (Dca) and Weatherall (Dw) Formations is a markedly diachronous surface drawn above regionally extensive clinoform reflectors. This contact steps upsection between CDP 430 and 528 on P1171.
 - There are apparently two contrasting reflection attitudes in unit sP2. Near CDP 810, profile P1171, there is a subhorizontal regional reflection attitude and a second superimposed east-dipping set. The dipping reflection set could be attributed to either internal structural complexity of the unit or (more likely), a set of intrusive sills. Other examples occur in unit sP2 near CDP 696, on P1171, and between CDP 100 and 200 on P1168.
 - Lateral termination of reflectors above and below unit Oer1 near CDP 178, profile P1168, is attributed to a westward disappearance of evaporites in Oer1, thus eliminating the impedance contrasts with overlying (Oer2) and underlying (Oer) carbonate units.

- Structural features
- A tectonic thickening is interpreted to exist in the Oer1 interval between CDP 88 and 178, P1168. The unit is apparently terminated to the west (note 12), and is thinner where it continues to the east.
 - Reflectors in the Cape Phillips Formation (OSDC) and at the top of the Thumb Mountain Formation (OTM) are displaced by a north-vergent thrust in the vicinity of CDP 830, P1171. This fracture system does not appear to offset the upper OSDC reflectors. Neither does it appear to break the reflectors downsection near the base of the upper Bay Fjord (Oer2).
 - Minor internal reflections in the lower Bay Fjord (Oer1) salt well of the Cape Clarendon Anticline (CDP 825, P1171), are imbricated into what appears to be a southerly-vergent thrust stack beneath a local upper detachment near the upper contact of unit Oer1.
 - Possible thrusts in unit sP2 are placed where steeper dipping reflections overlie shallower dipping reflectors. These faults(?) and the moderate dips of sP2 reflectors clearly do not extend into sC1A or overlying units. The weak subhorizontal reflection segments below sC1A are reverberations.
 - The Cape De Bray Formation (Dca) interval is at least 200 m thicker where northerly-vergent thrusts in the Cape Phillips Formation (OSDC) merge upsection into Dca. These thrusts do not penetrate the continuous reflector at the top of the Cape De Bray. It is possible that some thrusts in the Dca interval may have ramped upsection on clinoform surfaces and then have occupied a horizontal detachment on or near the topset beds above Dca.

Depth conversion

Dk:	3.6 km s ⁻¹
Dw, Dca:	4.0 km s ⁻¹
Dca:	3.7 km s ⁻¹
OSDC, SDC:	4.4 km s ⁻¹ (south)-5.0 km s ⁻¹ (north)
Dk:	4.5 km s ⁻¹
OSC:	5.7 km s ⁻¹
OTM, Oer2:	6.4 km s ⁻¹
Oer1:	5.3 km s ⁻¹
sP2-Oer:	5.7 km s ⁻¹
below sP2:	6.2 km s ⁻¹

Method of cross-section construction and restoration

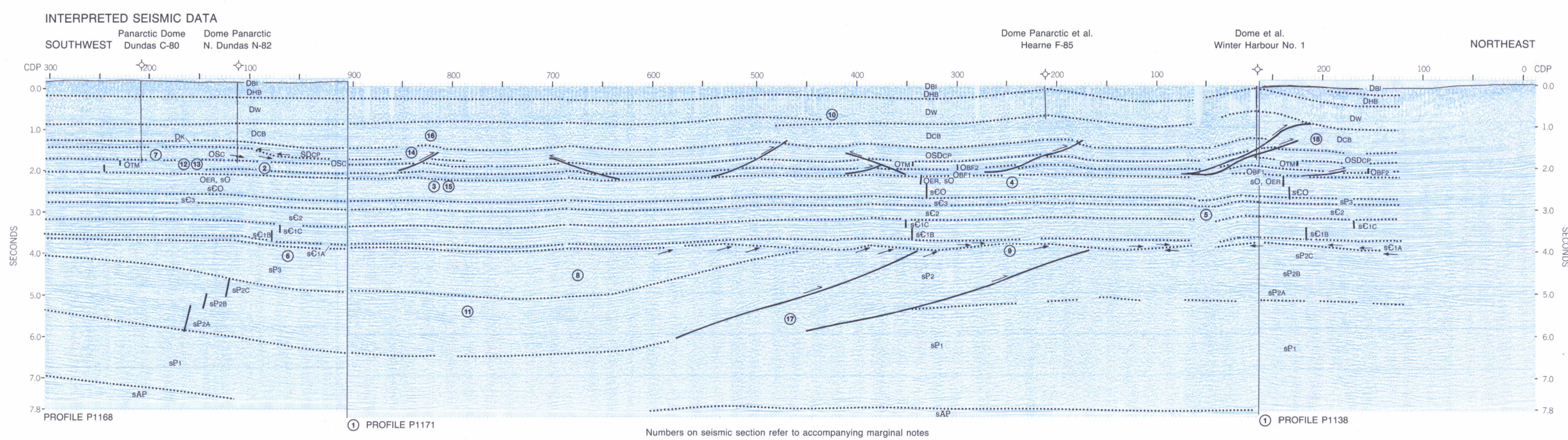
Bed length measurement and balancing of the contacts above Oer1, Oer2, OTM, and OSDC between pairs of adjacent pin lines. Deformation is assumed to be negligible southwest of pin line 1.

Bed length measurement of the contacts above Oer and Dw.

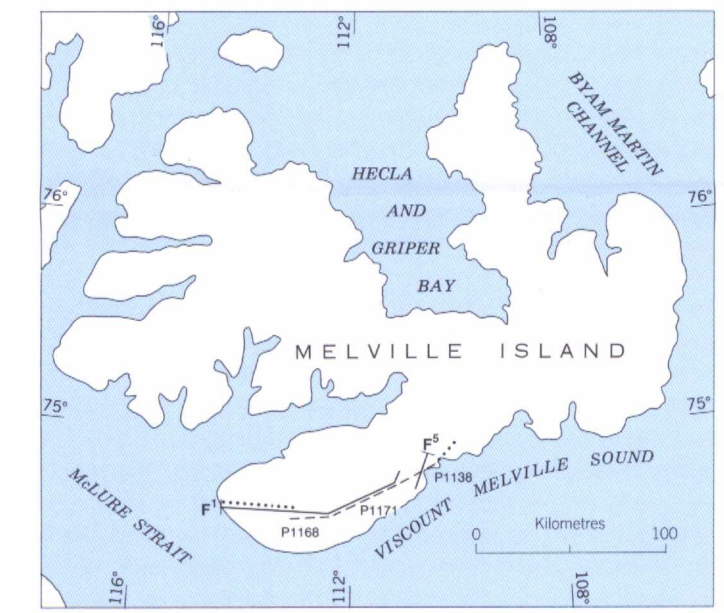
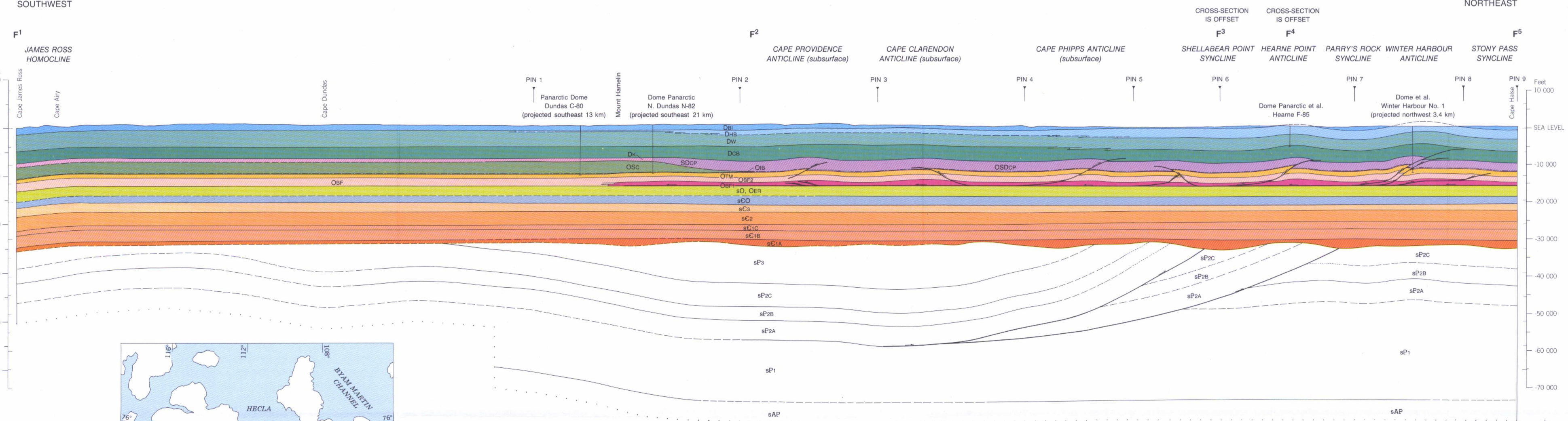
Area measurement and restoration of Oer1, Dca, Dw, Dca, and Dw between pairs of adjacent pin lines. This method assumes that horizontal shortening of units Oer1 and Dca-Dw is the same as that expressed by bed lengths of contacts above Oer1-OSDC.

Results

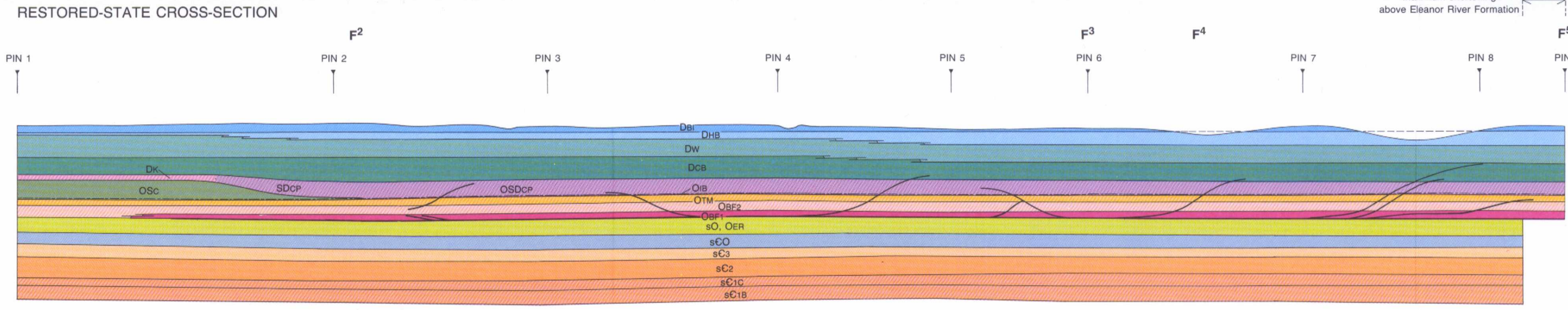
Section length (measured from pin 1 to pin 9 only): 81.1 km
 Bed length of OTM (this section): 83.4 km
 Shortening of OTM (this section): 83.4 - 81.1 = 2.3 km (2.8%)
 Estimated shortening in foreland: nil
 Total shortening of OTM from foreland: 2.3 km (2.8%)
 Bed length of Oer (this section): 81.1 km
 Shortening of Oer (this section): nil
 Estimated shortening in foreland: nil
 Total shortening of Oer from foreland: nil
 Deformed-state bed length of Dw: 82.2 km
 Apparent shortening of Dw (this section): 82.2 - 81.1 = 1.1 km (1.3%)
 Estimated apparent shortening in foreland: nil
 Total apparent shortening of Dw (from foreland): 1.1 km (1.3%)
 Range of assumed tectonic thickening of Dw-Dca (approximate): 1-6%
 *The foreland limit of visible compressive deformation is observed a short distance northeast of pin line 1 on this section. A gentle flexure of the Cambrian(?) to Devonian succession is, however, also evident at the west end of the cross-section (James Ross Homocline).



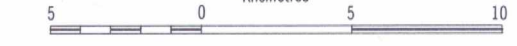
DEFORMED-STATE CROSS-SECTION



Location of structure sections and seismic profiles
 Line of structure section (with offset) F1 - F5
 Seismic reflection profile (displayed) P1168, P1171, P1138
 Seismic reflection profile (consulted only) P1168, P1171, P1138



SECTION F
(MAP 1844A)
**CAPE JAMES ROSS (ON M'CLURE STRAIT) TO STONY PASS
 SYNCLINE (NEAR CAPE HALSE), MELVILLE ISLAND**
 DISTRICT OF FRANKLIN
 NORTHWEST TERRITORIES
 Scale 1:250 000



Geology by J.C. Harrison 1984, 1985 and 1987
 Geological cartography by the Institute of Sedimentary and
 Petroleum Geology, Geological Survey of Canada
 Any revisions or additional geological information known to the user
 would be welcomed by the Geological Survey of Canada

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