

-3. - OPHIOLITES AND CONTINENTAL FRAGMENTS IN THE NORTHERN APENNINES

by Fred SELIGMANN.

The view that ophiolites in Liguria are more connected with their primary geotectonic position to a now tilted and submerged continental/marine area rather than to a primary simatic crust is indicated by glaucophane - aegirine- plagioclase rocks with transitional contacts to hercynic granodiorites and granites which are incorporated in spilitic host-rocks of Upper Jurassic - Lower Cretaceous age. Those allogenic xenoliths found in the earliest orogenic volcanic rocks within the Ligurian geosyncline possess a significant value to indicate the petrographical character of the sialic geosyncline-basement through which the andesitic and basaltic spilites passed.

The observation assures that the Ligurian eugeosyncline originated on a sialic crust.

Further, authigenic xenoliths (peridotites) in inclusion - bearing spilites demonstrate that the orogenic ultramafic in Liguria have been primary uplifted in a solid state by volcanic forces of the xenolith-bearing spilitic extrusion from the Upper Mantle / Lower Crust in the Mesozoic sea-floor region.

Ophiolites are expected in the regions of small ocean basins of the Tethys-belt or in the Caribbean region (e.g.: in Liguria/Northern Apennines, the Sestri-Ligurian Sea-fault will be adequate to the Consolacion del Norte-fault or Pinar del Rio - fault in Cuba with associated polymetamorphic ultramafics ; the inside situated Paleozoic basement of Corsica is comparable with the crystalline nucleus of Isla de Pinos/Cuba-Caribbean sea) when a rift fault combined with a thrust-fault passes more or less parallel through the border of a basiflicated inside older crystalline basement with an immediately forward situated younger geosyncline, which is resting or running out on the older sialic substratum.

With regard to the tectonic development, geological distribution and mentioned continental xenoliths which reflect an older regional metamorphic event of an earlier orogenesis it is scarcely possible - contrary to current thinking - to compare Steinmann's green rocks in its classical area with relicts of a bipolar spreading simatic rise-ridge system in the Mesozoic Tethyan belt.

The ophiolite line in Liguria is rather due to an asymmetrical flexure, which originated on the older continental slope probably comparable with the Mediterranean Ridge in the Ionian Sea. Cratonic xenoliths in orogenic spilites are characteristic to indicate the first process of a deeply situated crustal corrosion (pre - orogenic stage of oceanization of the Paleo-Tyrrhenian continent).

With the view of the polymetamorphic texture of the Ligurian (Tethys-type ?) orogenic ultramafics with their kinematic and static phases of recrystallization and observed B- and S-tectonites which are older than the associated Mesozoic country-rocks and spilites, their distribution to low angle thrust-faults (axial-line Sestri-Voltaggio-Bastia) and their association with sialic xenoliths it is possible to conclude that the Paleozoic basement of the Tyrrhenian continent was probably petrographically similar to those in which the Shihimiya-or Barramiya - ophiolites (Eastern Egyptian desert/Red Sea region) intruded. Also in this rift-zone relics of limestone, peridotitic and gneissic fragments of the older sea-floor and basement are still preserved in spilitic host-rocks as in the continental island-arc system of the Danau-formation. Both different tectonic elements are not immediately related to alpine mountain-chains, but may be interpolated so as to form an earlier and successive structural link during the tectogenetic development of a continental island-arc system.

Intervention 6-3. -

FERNEX - Il conviendrait peut-être d'utiliser avec quelques réserves le terme -consacré- de métamorphisme "cinématique", surtout dans un colloque comme celui-ci. L'existence d'une orientation préférentielle des minéraux ne semble pas nécessairement liée à d'importants déplacements relatifs des masses rocheuses considérées, mais plutôt à une mise sous tension dirigée. Réciproquement, une phase de métamorphisme "statique" n'exclut pas un déplacement simultané. Mais j'aimerais surtout demander à M. SELIGMAN de préciser les raisons qui le conduisent à considérer l'Olivine comme néo-formée.

Réponse : SELIGMAN - "The textural evolution of ultramafic rocks of the ophiolite suite in the Northern Apennines is coined by several kinematic and static phases of recrystallization during the process of polymetamorphism. Only in this sense the used terms kinematic and static have been applied here to order the different phases during the development of the retrograde metamorphism. Recrystallization and new formation of olivine have been shown here on the slide (fig. 1). Forsterite grew in the asymmetric pressure- fringes of rotated clinopyroxene. The olivine replaced the clinopyroxene but is still pinker-likewise enclosed by (100)- lamellae of orthopyroxene."