INVESTIGATIONS ON THE KARSTIC LANDSCAPE OF THE UPPER PART OF MOUNT PARNASSUS

By

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I. Introduction

1. Parnassus (2457 m.), the second in height mountain of Sterea Hellas (lat. 38°25′ — 38°40′) presents a large upper part.

Of about 250 km² extent over alt. 1000 m, is there till more than 15 km. width.

2. It consists chiefly of carbonate rocks (limestones dolomites, dolomitic limestones); thus presents a great interest in karstic point of view.

Particularly interesting are the remnants of ancient karstified surfaces (-horizons), so much the not fossilized which are of Post-Alpine age, as also the fossilized ones of Jurassic-Cretaceous age, in which frequently bauxites.

3. The Parnassus area in its evolution was closed connected with that of a Great Trench perpendicular to the axis of the Hellenic Arc.

To the development of the above trench contributed very greatly distensions and compressions due to the behaviour of the central part of the Aegean lithospheric plate.

Thus, the need to clear up the nature of the above behaviour, induce to researches upon the central area of this lithospheric plate.

II. The Post-Alpine non fossilized karstic surfaces (-horizons).

4. In the upper part of Parnassus were developed in Middle-Upper Miocene three karstic surfaces (-horizons). From west all the three above surfaces are well distinguishable, yet from enough great distance.

Surface (-horizon) A.

5. It is probably in early Middle Miocene that began the development of the more ancient important epigean karstification.

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Because of the after the Styrian I orogenetic phase uplift till c. 400 m. was greatly developed the hypogean karstification. In hydrologic point of view this surface became less rich in water. While, a part of the water began to supply springs at the line of contact with surface B.

6. Important remnants of the first surface (-horizon) are found only in the uppermost part of the mountain over c. 2000 m.

Surface (-horizon) B.

7. The second karstic horizon began in Middle Miocene (Helvetian) in various parts around the uplifted central part (§ 5). Becauce of the after the Styrian II orogenetic phase uplift of c. 500 m. was greatly developed the hypogean karstification.

In hydrologic point of view surfaces A and B became less rich in water, while a part of the water of them began to supply springs at the line of contact with the surface C.

8. Remnants of this horizon are found in various parts, mainly westward of Gerontovrachos — Voidomati between Koumoulia and Spanaki (distance c. 7 km) at alt. for the most 1700 — 1850 m.

Surface (-horizon) C

9. The more recent karstic horizon began to be developed in Upper Miocene in various parts around the uplifted part of Parnassus.

Remnants of it are found at various areas at altitudes around 1100 — 1250 m, as for instance in the large ridge over Delphi - Arachova, NW of Kalyvia Arachovitika etc.

The polje of Arachovitika Livadia.

10. In the above 3rd period of karstification was formed the little (c. 10 km^2) polje of Arachovitika Livadia (alt. c. 1100 m).

The eastern part of it is covered by ancient alluvions, the rest by recent. The deeper part is covered by water in winter.

The great fault Delphi-Zemeno.

11. The more probable in the Uppermost Miocene, consequently of an important uplift was developed a great fault line of c. 20 km. in the area Delphi - Zemeno.

III. Influences of the behaviour of the larger central area of the Aegean plate on the Hellenides.

12. The central area of the Aegean microplate is considered (MA-

KRIS, 1973) as a «doming». But the more probable the Aegean area consists of two different structural units, the:

a) a kind of shield in the central part, the Lycomedian (from the name of the Skyro-Dolopians of the island Skyros, king Lycomedes in the II mill B.C.).

b) a ring, wide for the most of c. 100 km. the Hephaestian (from Hephaestos name, god of the fire, who was by Jupiter slung from Olympus to the island Lemnos according the mythology).

The Lycomedian Shield.

13. Of an extent c. 45000 km^2, long N-S c. 270 km and wide till c. 180 km., this kind of shield is presenting three sectors:

a) a north, the Skyro-Dolopian.

b) a central, the Deianirian from the name of a Lycomedes daughter.

c) a southern, the Cycladic, the more extent

14. The presence of a pre-Pleistocene (Neogene) volcan, that of Kalogeri in the northeastern part of the Cycladic sector, as also of the heat flow value 261, one of the greater in the Aegean sea area are attesting in favour of an important dynamic mass of this shield.

15. As concerns the island of Skyros in which volcanic rocks are found in certain places so much on the southern part of it, as also in the northern, the more probable is situated at the limits of the Lycomedian Shield and the Hephaestian Ring.

16. In the Lycomedian Shield are noted only epicenters of shallow ($h < 60$ km) earthquakes and not enough frequent.

It suffers however from repercussions of the shallow and deep earthquakes epicenter of which is in the Hephaestian Ring, chiefly those found in the inner zone of it.

17. The Lycomedian Shield is the important part of the microlithospheric plate.

It constitutes a strong pivot which by its resistance contributed very greatly to the nature of the behaviour of the greater central part (Shield and Ring) of the Aegean lithospheric plate.

The Hephaestian Ring.

18. According radiodatations are attested till four periods of great intensity of volcanic activity in the space of the last 60.000.000 y.

19. For the last c. 30.000.000 y. (Miocene-Pliocene-Quaternary) for

which investigations are less difficult, are distinguishable two periods of around 14 or 15 mill y.

20. During each one of these periods, the volcanic activity was higher in one mostly sector of one of the 4 parts of the Ring.

As concerns the first of the periods for which question, this sector the more probable is to be placed in the Eastern part of the Ring.

After a certain time the higher volcanic activity was displaced to another sector of this quarter of the Ring.

Not rarely seems that fluctuations, with retrogressions in displacements of the higher volcanic activity, took place.

21. After a long time the higher volcanic activity was displacing towards the Northern quarter of the Ring.

Then follows displacements to the Western quarter and later to the Southern one.

During the last 30 000 000 years, this cycle of complicate displacements of the higher volcanic activity was repeated twice.

22. Researches in all that concerns the Hephaestian Ring, conduct to enough satisfactory explanations for the behaviour of the greater central area-mass (Shield and Ring) of the Aegean lithospheric plate towards the Hellenic Arc.

This behaviour is chiefly consisting of distensions and compressions.

The Patraïco-Corintho-Saronian perpendicular to the axis of the Hellenic Arc, Great Trench.

23. Consequently to in § 22 mentioned behaviour, was developed in the area of the actual gulfs Corinthian and Saronian, during Upper Miocene, a double (two parallel) trench.

Thus, ceased the unbroken of the Hellenic (mountainous) Arc in the area Sterea Hellas-Peloponnesus.

24. The two parallel trenches were separated by a ridge (Transtrenchian Ridge), remnant of which is the little mountain chain of Perachora-Geraneia.

25. The North trench, in the area of the actual Corinthian gulf was then a large valley WNW-ESE. Only in the easternmost part of it, between Geraneia and Patera nets, are attested infiltrations of the sea. In the area where the southern prolongation of Parnassus, because erosion, deep

narrow valleys were excavated. The lower parts of them are now submerged by the sea.

26. The South trench was mostly lacustrine - swamping.

On the Peloponnesian slope the rivers were forming very numerous torrential fans.

Infiltrations of the sea were enough frequent.

The destruction of the greater part of the Transtrenchian Ridge.

27. During the lowest Pliocene, because of the erosion, but mainly of tectonic activities the greater part of the Transtrenchian Ridge was destructed. Thus the two parallel trenches were united. So was formed a very important large trench (the actual Corinthian gulf) perpendicular to the axis of the Hellenic Mountainous Arc.

28. However, under the actual bottom of the gulfs Corinthian and Saronian and till a certain depth continues to exist the in double parallel trenches subdivision of the actual Great Trench.

The northward and eastward of Parnassus basins of western Locris - northwestern Boetia.

29. During the uppermost Miocene - lowest Pliocene, because of tectonic activities was developed a serie of little basins through which flows the river Boetian Cephissus, as also certain of its affluents.

30. There are chiefly three important such basins, the following from N to S.

a) Lilaia - Voïon in northwestern Locris.

b) Palaeon Thivon (or Pediaeon) in ancient Phocis.

c) Davlidos - Panopeous in northwestern Boetia.

31. Towards these basins Parnassus presents abrupt slopes, enough frequently yet precipitus.

They are covered in many parts by recent (Quaternary) sediments, mostly enough important.

32. The more ancient of them are cemented conglomerates of torrential origin. The gravels are mainly of limestone. Terraces are at 20 m.

33. More recent are colluvial deposits and slope fan debris.

In the oldest of them the terraces are up to 20 m. (in Tithorea etc.).

34. Pliocene sediments are not noted on these slopes.

Not far of them, are noted northward of Ano Kalyvia in a place eastward of the river Beotian Cephissus consisting of marls, clays, sandstones (lacustrine deposits). Far from these slopes are noted in numerous placesso much similar lacustrine deposits, as also consisting of conglomerates.

35. These lacustrine deposits are considered as of Levantine stage.

In certain areas, as for instance in that Viritzana - Mylos (northward of Ano Kalyvia) and Kallothronion - Drymaea are occuring in numerous places, and certain of them are of enough important extent.

The colluvial deposits and slope fan debris on the Upper part of Eastern Parnassus.

36. On the high part of the Xerorrema valley in the two branches of it, that of the Chouni and that of Papagiani, because of the glaciations in Würn the colluvial deposits and slope fan debris were altered, transformed in morainic formations.

37. On the southeastern part of the mountain, in the high valley of Kanalia, the colluvial deposits and slope fan debris, only in the uppermost part give the impression of remnants of morainic formations enough altered.

Lower, below the convent of Jerusalem, at alt. c. 600 - 700 m. is found a landscape resembling to an altered of a glaciation landscape, we do not know how ancient is.

A difficult thus problem is arising, needing new researches in order to find a satisfactory explanation.

38. On the northeastern - eastern part of the mountain enough extented colluvial deposits and slope fan debris are found between Kastron and Koumba, and higher in Krevati.

39. On the southern part of the mountain colluvial deposits and slope fan debris are less extensive.

Near Hag. Nikolaos at alt. around 1800 m. they are giving the impression of altered morainic formations and partly of nivation formations. Westward, these formations are nivation formations.

IV. The Fossilized Jurassic - Cretaceous karstic horizons.

The fossilized karstic horizons in which bauxites,

40. In Upper Parnassus are noted three fossilized karstic horizons into which are found bauxites, and one into which bauxite clay and bauxite.

In this paper are given only the more caracteristics concerning the horizons and bauxites.

Horizon A

41. The more ancient horizon has (according CELET 1962) as footwall Kimmeridgian limestones, and as hanging wall Tithonian (uppermost Jurassic) limestones.

Remnants of it are noted only in the eastern part of the mountain, from west of Tithorea in a line through Androutsos Cave, Trypi, Papagiani, till Meintannisorachi, Trypa.

42. The bauxites are reddish with pissolitic structure in some places and seldom oolitic; they contain diaspore (insoluble).

Horizon B.

43. The second horizon has as footwall uppermost Jurassic limestones and as hanging wall the so called Intermediate limestones (Tithonian-Cenomanian). Remnants of it are noted near the bifurcation of the new way to the Fernolakkos.

44. The bauxites are reddish-brownish showing pissolitic structure, mostly boehmitic (soluble).

Horizon C.

45. In the upper part of the Intermediate limestones at many places (in Gerontovrachos, Psilo, Dracokarcaros etc.) are noted limited remnants of an horizon in which bauxite clay and bauxite.

46. These bauxitic formations are presenting a pissolitic and oolitic structure.

Horizon D.

47. The more recent of the fossilized karstic horizon has as footwall the Intermediate limestones, and as hanging wall limestones into which rudist fragments (Upper Cretaceous?). Numerous remnants of it are noted in the central and western part of the mountain (Pyrgakia, Palaeavounia etc).

48. These bauxites are usually of a reddish-brownish colour with oolitic structure, mostly containing diaspore (insoluble). In some places the bauxites are presenting a white-gray colour and are rich in aluminium.

49. The bauxites of the Horizon D are the more important in economic point of view for Upper Parnassus.

V. Some Final Remarks.

Upper Parnassus as very proper field for karstic epigean and ypogean researches.

50. The upper part of Parnassus as:

a) consisting mainly of carbonate rocks of various kinds (dolomites, dolomitic limestones, thick bedded compact limestones, thin bedded limestones, oolitic limestones, microcrystalline limestones etc.)

b) are found in it fossilised karstic horizons with bauxites in many parts of them.

c) are prevailing on it various climatic conditions in the various parts of it, and more accused fluctuations of them in the past, in time.

d) the whole mountain mass was affected in the past by strong tectonic influences due mainly to the behaviour of the central part (Shield and Ring) of the Aegean microplate on the Hellenic Arc.

51. Thus Parnassus is a very proper field for researches:

a) speleological aa) in geologic point of view
bb) in geographical point of view
cc) in hydrological point of view

b) of travel (tourism)

c) of mineral resourches (bauxites etc.)

d) for educational studies, in field, of studens.

The area Parnassus - N. Corinthia as very proper field for researches on the behaviour of the central part of the Aegean plate towards the Hellenic Arc.

52. Paleogeographic researches on the whole Parnassian area, the Corinthian gulf area and the Corinthian area, are conducted to enough satisfactory explanations, as concerns the behaviour of the central greater part (Lykomedian Shield - Hephaestian Ring) of the Aegean lithospheric plate, to the evolation of the Hellenic mountainous Arc, in this area.

Indeed, these researches attested that above evolution is to be attributed mainly to alternate distensions and compressions, as was exposed in § 23 - 28.

53. However, are distinguished also tectonic activities to which are to be attributed large convexities and other tectonic forms.

Thus, need for new researches in order to obtain enough satisfactory explanations concerning these activities.

54. The more probable, new researches on karstic (in point of large view) evolution on the large Parnassis - Corinthia area, will conduct to further satisfactory explanations as concerns the behaviour of the Lycomedian Shield - Hephaestian Ring to a great part of the Hellenic Arc.

ΕΡΕΥΝΕΣ ΣΤΟ ΚΑΡΣΤΙΚΟ ΤΟΠΙΟ ΤΟΥ ΑΝΩΤΕΡΟΥ ΜΕΡΟΥΣ ΤΟΥ ΠΑΡΝΑΣΣΟΥ

I. Εἰσαγωγὴ

1. Ὁ Παρνασσὸς (2457 μ.) στὸ ἄνω τῶν 1000 μ. μέρος του, ποὺ ἔχει ἔκταση περίπου 250 τ. χλμ., παρουσιάζει πλάτος περισσότερο τῶν 15 χλμ. Ἀποτελεῖται κυρίως ἀπὸ πετρώματα ἀσβεστιτικὰ (ἀσβεστόλιθους, δολομίτες κλπ.). Ἐξαιρετικὸ ἑπομένως ἐνδιαφέρον παρουσιάζει σχετικὰ μὲ τὴν καρστίωση.

2. Ἰδιαίτερο ἐνδιαφέρον παρουσιάζουν τὰ λείψανα παλαιῶν καρστικῶν ὁριζόντων, τόσο τὰ τεσσάρων Ἰουρασικῶν - Κρητιδικῶν, ποὺ εἶναι ἀπολιθωμένοι καὶ ἔχουν βωξίτες, ὅσο καὶ τὰ τριῶν μετα - Ἀλπικῶν ποὺ δὲν ἔχουν ἀπολιθωθεῖ.

3. Ἡ ἐξέλιξη ἐξάλλου διαμόρφωσης τῆς περιοχῆς Παρνασσοῦ εἶναι στενὰ συνδεδεμένη μὲ ἐκείνη τῆς μεγάλης καθέτου πρὸς τὸν ἄξονα τοῦ Ἑλληνικοῦ Ὀρεοτόξου, Κορινθο - Σαρωνικῆς τάφρου.

4. Στὴν ἐξέλιξη ὅμως τῆς διαμόρφωσης τῆς τάφρου αὐτῆς πολὺ συνέβαλαν διατάσεις καὶ συμπιέσεις, ποὺ ὀφείλονται στὴ συμπεριφορὰ τοῦ κεντρικοῦ μέρους τῆς Αἰγαίας λιθοσφαιρικῆς πλάκας. Εὐνόητο ὅτι, τοῦτο ὁδηγεῖ σὲ ἔρευνες, γιὰ λεπτομερῆ μελέτη τοῦ κεντρικοῦ μέρους αὐτῆς γιὰ τὴ μεγάλης σημασίας θεωρία γιὰ τὴν κίνηση (motion) τῶν λιθοσφαιρικῶν πλακῶν.

II. Οἱ μετα - Ἀλπικοὶ μὴ ἀπολιθωμένοι καρστικοὶ ὁρίζοντες.

Ὁρίζοντας Α.

1. Τὸ πιθανότερο, ἡ ἔναρξη τῆς ἐπίγειας καρστίωσης ἄρχισε τὸ πρῶτο μισὸ τοῦ Μέσου Μειοκαίνου.

Συνέπεια τῆς μετὰ τὴν Στυριακὴ Ι ὀρογενετικὴ φάση ἀνύψωση, ἀναπτύχθηκε ἔντονα καὶ ἡ ὑπόγεια.

2. Λείψανα τοῦ ὁρίζοντα Α ἀπαντοῦν μόνο στὸ ψηλότερο μέρος τοῦ ὄρους πάνω ἀπὸ 2000 μ.

Ὁ ρ ί ζ ο ν τ α ς Β.

1. Ἔναρξη τῆς ἐπίγειας καρστίωσης ἄρχισε κατὰ τὸ Ἐλβέτιο. Συνέπεια τῆς μετὰ τὴν Στυριακὴ ΙΙ ὀρογενετικὴ φάση ἀνύψωση περὶ τὰ 500 μ. ἀναπτύχθηκε ἔντονα καὶ ἡ ὑπόγεια.

2 Λείψανα τοῦ ὁρίζοντα Β ἀπαντοῦν ἰδιαίτερα μεταξὺ Κουμούλια καὶ Σπανάκι σὲ ὕψη 1700 - 1850 μ.

Ὁ ρ ί ζ ο ν τ α ς Γ.

1. Ἔναρξη τῆς ἐπίγειας καρστίωσης κατὰ τὸ Ἀνώτερο Μειόκαινο.

2. Λείψανα τοῦ ὁρίζοντα Γ σὲ ὕψη 1100 - 1250 μ.

Ἡ κ α ρ σ τ ι κ ὴ λ ε κ ά ν η (p o l j e) Ἀ ρ α χ ω β ί τ ι κ ω ν Λ ε ι β α δ ι ῶ ν.

1. Κατὰ τὸ Ἀνώτερο Μειόκαινο διαμορφώθηκε καὶ τὸ μικρὸ (10 τετρ. χλμ.) αὐτὸ καρστικὸ ὑψίπεδο.

2. Τὸ ἀνατολικὸ μέρος του καλύπτεται ἀπὸ παλαιὲς προσχώσεις, τὸ ὑπόλοιπο ἀπὸ νεώτερες.

Ἡ μ ε γ ά λ η γ ρ α μ μ ὴ μ ε τ ά π τ ω σ η ς Δ ε λ φ ῶ ν - Ζ ε μ ε ν ο ῦ.

1. Κατὰ τὰ τέλη τοῦ Μειοκαίνου λόγω τεκτονικῶν διαταράξεων διαμορφώνεται ἡ μήκους περὶ τὰ 20 χλμ. πολὺ ἀξιόλογη αὐτὴ γραμμὴ μεταπτώσεων.

ΙΙΙ. Ἐπιδράσεις στὸ Ἑλληνικὸ ὀρεοτόξο τῆς συμπεριφορᾶς τοῦ κεντρικοῦ μέρους τῆς Αἰγαίας λιθοσφαιρικῆς πλάκας.

1. Τὸ κεντρικὸ εὐρύτερο τμῆμα τῆς Αἰγαίας λιθοσφαιρικῆς πλάκας ἀποτελεῖται ἀπὸ δύο διαφορετικὲς μονάδες, τὶς ἑξῆς:

α) Εἶδος ἀ σ π ί δ α ς στὸ κέντρο του, τῆς Λυκομήδειας (ἀπὸ τὸ ὄνομα τοῦ βασιλιὰ τῶν Σκυρο - Δολόπων Λ υ κ ο μ ή δ η).

β) Δ α κ τ υ λ ί ο υ περὶ αὐτήν, πλάτους τὸ πλεῖστο περὶ τὰ 100 χλμ., τοῦ Ἡφαιστειανικοῦ (ἀπὸ τὸ ὄνομα τοῦ θεοῦ τοῦ πυρὸς Ἡ φ α ί σ τ ο υ).

Ἡ Λ υ κ ο μ ή δ ε ι α Ἀ σ π ί δ α.

1. Μὲ ἔκταση περὶ τὰ 45000 τετρ. χλμ. καλύπτει τὸ μεγαλύτερο μέρος

τοῦ Αἰγαίου. Εὐδιάκριτα σ' αὐτὴ τρία τμήματα, τὸ Σκυρο-Δολόπιο πρός βορρά, τὸ Διηανείριο στὸ μέσο καὶ τὸ Κυκλαδικὸ πρὸς νότο.

2. Μόνο ἀβαθῶν σεισμῶν ἐπίκεντρα σημειώνονται στὴν Ἀσπίδα. Ἡ παρουσία σ' αὐτὴν τοῦ Νεογενοῦς ἡφαιστείου Καλόγεροι, καὶ ὁ βαθμὸς 261 γεωθερμίας χαρακτηρίζουν τὴν Ἀσπίδα μονάδα ἀξιόλογης δυναμικότητας.

Ὁ Ἡφαιστειανικὸς Δακτύλιος.

1. Σύμφωνα μὲ ραδιοχρονολογήσεις διαφαίνονται 4 περίοδοι μετατοπίσεως τομέα ἐντατικότερης ἡφαιστειότητας κατὰ τὰ τελευταία 60.000.000 χρόνια. Γιὰ τὰ τελευταία περίπου 30.000.000 χρόνια, γιὰ τὰ ὁποῖα περισσότερα δεδομένα, διαφαίνονται δύο περίοδοι κυκλικῆς μετατοπίσεως ἐντονώτερης ἡφαιστειότητας, μὲ διεύθυνση Α πρὸς Β, πρὸς Δ, πρὸς Ν.

Διαφαίνονται ἐπίσης δύο ζῶνες, μία ἐσωτερικὴ καὶ μία ἐξωτερική.

2. Ἀπὸ περαιτέρω ἔρευνες διαφαίνεται συμπεριφορά, πρὸς τὸ Ἑλληνικὸ Ὀρεότοξο, ἀπὸ διατάσεις καὶ συμπιέσεις.

Ἡ Κορινθο-Σαρωνικὴ κάθετος πρὸς τὸν ἄξονα τοῦ Ἑλληνικοῦ Ὀρεοτόξου μεγάλη τάφρος.

1. Συνέπεια διατάσεων καὶ συμπιέσεων διαμορφώθηκαν στὸ χώρο τῶν κόλπων Κορινθιακοῦ - Σαρωνικοῦ δύο παράλληλοι τάφροι χωριζόμενοι ἀπὸ ράχωση Διαταφρική.

2. Ἡ βόρεια τάφρος ἦταν κοιλάδα διεύθυνσης ΔΒΔ - ΑΝΑ μὲ διεισδύσεις θάλασσας πιθανά, μόνο μεταξὺ Γερανείων καὶ Πατέρα.

3. Στὸ χῶρο ποὺ βρίσκεται ἡ πρὸς νότο προέκταση τοῦ Παρνασσοῦ, διαμορφώθηκαν λόγω διάβρωσης βαθειὲς - στενὲς κοιλάδες.

Τὰ κατώτερα τμήματα αὐτῶν καλύπτονται τώρα ἀπὸ τὴ θάλασσα.

Ἡ καταστροφὴ τοῦ πλείστου τῆς Διαταφρικῆς ράχης.

1. Κατὰ τὸ Κατώτερο Πλειόκαινο, λόγω κυρίως τεκτονικῶν ἐπιδράσεων, τὸ πλεῖστο μέρος τῆς Διαταφρικῆς ράχης ἔπαυσε νὰ ἐμφανίζεται. Μικρὸ μέρος αὐτοῦ (Βουνὰ Περαχώρας - Γερανείων) διασώθηκε.

2. Στὰ βαθύτερα ὅμως, κάτω τοῦ τώρα πυθμένα, διατηρεῖται μέχρι κάποιου βάθους ὁ δυαδισμὸς τῆς τάφρου.

Οἱ μικρὲς λεκάνες στὰ βόρεια καὶ ἀνατολικά.

1. Συνέπεια τεκτονικῶν διαταράξεων διαμορφώθηκαν κατὰ τὰ μεθόρια Μειοκαίνου - Πλειοκαίνου μικρὲς λεκάνες, οἱ ἑξῆς:

Λιλαίας - Βοΐου στὴ βορειοδυτικὴ Λοκρίδα.

Παλαιῶν Θηβῶν (Πεδιαίων) στὴν ἀρχαία Φωκίδα.

Δαυλίδας - Πανοπέα στὴ βορειοδυτικὴ Βοιωτία.

2. Πρὸς τὶς μικρολεκάνες αὐτὲς παρουσιάζει ὁ Παρνασσὸς πλαγιὲς ἀπότομες, σὲ πολλὰ μέρη κρημνώδεις.

3. Τεταρτογενεῖς ἀποθέσεις ἀπὸ πλευρικὰ κορήματα καὶ κώνους κορημάτων καλύπτουν σὲ πολλὰ μέρη τὶς πλαγιές.

4. Ἐντὸς λεκάνης ἐμφανίζονται παλαιότερα Τεταρτογενῆ ἀπὸ κροκαλοπαγῆ συνεκτικὰ χειμαρρώδους προελεύσεως βορείως τῆς Ἀμφίκλειας. Ἐπίσης ἀπώτερα Πλειοκαινικαὶ λιμναῖες ἀποθέσεις.

Τὰ πλευρικὰ κορήματα καὶ οἱ κῶνοι κορημάτων στὰ ἀνώτερα τοῦ ἀνατολικοῦ Παρνασσοῦ.

1. Στὶς ψηλὲς κοιλάδες Χούνης καὶ Παπαγιάννης ποὺ συμβάλουν στὸ Ξερόρεμα, τὰ πλευρικὰ κορήματα καὶ οἱ κῶνοι κορημάτων ἀλλοιώθηκαν ἀπὸ παγετῶνας τοῦ Βυρμίου καὶ μετατράπηκαν σὲ λιθωνοειδεῖς ἀποθέσεις.

2. Στὴν ψηλὴ κοιλάδα Κανάλια δίδουν τὴν ἐντύπωση ἐλαφρότερης ἀλλοιώσεως.

3. Πολὺ χαμηλότερα, κάτω ἀπὸ τὴ Μονὴ Ἱερουσαλήμ, σὲ ὕψος 600-700 μ. τὸ τοπίο ὑπενθυμίζει ἐπίδραση Βυρμίου παγερῆς περιόδου, ἐλαφρὰ μᾶλλον ἀλλοιωμένο.

4. Στὴ βορειοανατολικὴ πλαγιά, ἐλαφρὰ μᾶλλον ἔχουν ἀλλοιωθεῖ τὰ εἰς Κρεβάτι, Κούμπα κλπ. μέχρι πλέον τῶν 1000 μ. πλευρικὰ κορήματα - κῶνοι κορημάτων.

VI. Ἀπολιθωμένοι καρστικοὶ μεσοζωϊκοὶ βωξιτοφόροι ὁρίζοντες.

Ὁρίζοντας Α.

1. Ὁ παλαιότερος ὁρίζοντας ἔχει ὑποκείμενο Κιμμεριτζίους ἀσβεστολίθους καὶ ἐπικείμενο Τιθόνιους. Λείψανα αὐτοῦ μόνον στὸ ἀνατολικὸ μέρος τοῦ ὄρους.

2. Οἱ βωξίτες εἶναι ἐρυθρόχροοι μὲ πισσολιθικὴ ὑφὴ κατὰ θέσεις, διασπορικοῦ (ἀδιαλύτου) τύπου.

Ὁρίζοντας Β.

1. Ὡς ὑποκείμενο ἀσβεστόλιθοι Ἀνωτάτου Ἰουρασικοῦ, καὶ ὡς ἐπικείμενο ἐνδιάμεσοι ἀσβεστόλιθοι (Τιθώνιο - Κενομάνιο). Λείψανα αὐτοῦ ἐλάχιστα.

2. Οἱ βωξίτες εἶναι ἐρυθρόχροοι - φαιόχροοι, πισσολιθικοὶ κατὰ πλεῖστο βοημιτικοὶ (διαλυτοί). Σπάνιες ἐμφανίσεις.

Ὁρίζοντας Γ.

1. Στὰ ἀνώτερα τῶν ἐνδιαμέσων ἀσβεστολίθων ἀπαντοῦν σὲ διάφορα μέρη (Γεροντόβραχο, Δρακοκάρκαρο κλπ.) λείψανα ὁρίζοντα μὲ βωξιτικὴ ἄργιλο καὶ βωξίτη.

2. Οἱ βωξίτες εἶναι πισσολιθικῆς καὶ ὠολιθικῆς ὑφῆς.

Ὁρίζοντας Δ.

1. Ὡς ὑποκείμενο ἔχει ἐνδιαμέσους ἀσβεστολίθους καὶ ὡς ἐπικείμενο ρουδιστοφόρους ἀσβεστολίθους (ἀνωκρητιδικούς;). Λείψανα πολυάριθμα στὸ κεντρικὸ καὶ δυτικὸ μέρος τοῦ ὄρους.

2. Οἱ βωξίτες εἶναι ἐρυθροκαστανόχροοι, ὠολιθικῆς ὑφῆς, κατὰ τὸ πλεῖστο διασπορικοῦ (ἀδιαλύτου) τύπου.

V. Μερικὲς τελικὲς παρατηρήσεις.

Ὁ Παρνασσὸς εἶναι πολὺ κατάλληλο πεδίο καρστικῶν ἐρευνῶν:

1. Τὸ ἀνώτερο μέρος τοῦ Παρνασσοῦ:

α) Συνίσταται ἀπὸ ἀσβεστιτικὰ κυρίως πετρώματα (ἀσβεστολίθους, δολομίτες κλπ.).

β) Ἀπαντοῦν σ' αὐτὸ ἀπολιθωμένοι καρστικοὶ ὁρίζοντες μὲ βωξίτες.

γ) Ἐπικρατοῦν σ' αὐτὸ διαφορετικὲς κλιματικὲς συνθήκες σὲ καθένα ἀπὸ τὰ τμήματά του, ἀλλὰ καὶ στὸ παρελθὸν ἐπικρατούσαν κάθε φορὰ διαφορετικὲς συνθήκες.

δ) Ὁ ὅλος ὀρεινὸς ὄγκος ὑπόκειται σὲ ἰσχυρὲς τεκτονικὲς ἐπιδράσεις ὀφειλόμενες στὴ συμπεριφορὰ τοῦ κεντρικοῦ μέρους τῆς Αἰγαίας λιθοσφαιρικῆς πλάκας.

2. Ἔτσι ὁ Παρνασσὸς ἀποτελεῖ πολὺ πρόσφορο πεδίο γιὰ ἔρευνες:

α) Σπηλαιολογικές, β) περιήγησης (τουρισμοῦ), γ) ὑδρολογικές, δ) ὑπεδαφικοῦ πλούτου, ε) ἐκπαιδευτικὲς ἀσκήσεις τῶν σπουδαστῶν καὶ στ) παλαιογεωγραφικές.

3. Οἱ τελευταῖες παρασύρουν σὲ βαθειὲς γεωτεκτονικὲς ἔρευνες, ποὺ εἶναι δυνατὸ νὰ ὁδηγήσουν σὲ ἱκανοποιητικὰ συμπεράσματα γιὰ τὴ φύση τῆς συμπεριφορᾶς Λυκομήδειας Ἀσπίδας - Ἡφαιστειανικοῦ Δακτυλίου ἐπὶ τοῦ Ἑλληνικοῦ Ὀρεοτόξου.

Ἡ εὐρύτερη περιοχὴ Παρνασσίδας - Φωκίδας, Κορινθιακοῦ κόλπου καὶ βόρειας Κορινθίας εἶναι πολὺ καλὸ πεδίο γιὰ ἔρευνες ἐπὶ τῆς Αἰγαίας λιθοσφαιρικῆς πλάκας.

1. Παλαιογεωγραφικὲς ἔρευνες ἐπὶ τῆς περιοχῆς αὐτῆς ὁδηγοῦν σὲ ἱκανοποιητικὰ συμπεράσματα, κατὰ τὰ ὁποία ἡ ἐξέλιξη αὐτῆς ὀφείλεται κυρίως σὲ ἐπιδράσεις τοῦ κεντρικοῦ μέρους τῆς Αἰγαίας πλάκας (Λυκομήδειας

'Ασπίδας - 'Ηφαιστειανικοῦ Δακτυλίου ὑπὸ μορφὴ κυρίως διατάσεων καὶ συμπιέσεων.

2. Διαφαίνονται ὅμως ἐπίσης καὶ ἐπιδράσεις, συνεπεία τῶν ὁποίων εἶναι εὐρεῖες κυρτώσεις καὶ ἄλλες τεκτονικὲς μορφὲς γιὰ τὶς ὁποῖες εἶναι ἀναγκαῖες σχετικὲς ἔρευνες.

3. Οἱ καρστικὲς μὲ τὴν εὐρύτερη ἔννοια ἔρευνες δύναται νὰ λεχθεῖ ὅτι ὁδηγοῦν πρὸς συμπεράσματα ἱκανοποιητικὰ γιὰ τὴ συμπεριφορὰ κλπ. τῆς Αἰγαίας λιθοσφαιρικῆς πλάκας.

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Fig. 2. Slope in the Upper Parnassus, in which remnants of the forest.
Εἰκ. 2. Πλαγιὰ τοῦ "Ανω Παρνασσοῦ, ὅπου διατηρεῖται σὲ σημεῖα ἡ δασικὴ βλάστηση.

Variety of Karstic epigean forms
Ποικιλία ἐπιφανειακῶν καρστικῶν μορφῶν.

In some parts tendency to desolation.
Σὲ μερικὰ σημεῖα τάση πρὸς ἐρήμωση.

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Fig. 3. View to the northwestern part of Upper Parnassus rich in forestial vegetation.
Εἰκ. 3. Ὄψη πρὸς τὸ βορειοδυτικὸ τμῆμα τμῆμα τοῦ ὄρους, ποὺ εἶναι πλούσιο σὲ δασικὴ βλάστηση.

(B) : Remnant of Post - Alpine Karstic surface B (1802 m).
Λείψανο της Μετα - Ἀλπικῆς καρστικῆς ἐπιφάνειας B (1802 μ).

(F) : Fterolakkos.
Φτερόλακκος.

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Fig. 4. View of the Post - Alpine karstik surfaces (- horizons) of Upper Parnassus.

Εἰκ. 4. Ὄψη τῶν Μετα - Ἀλπικῶν καρστικῶν ἐπιφανειῶν (- ὁριζόντων) τοῦ Ἄνω Παρνασσοῦ.

(A) : Surface A, Gerontovrachos ridge.
Ἐπιφάνεια Α, Γεροντόβραχου ράχη.

(B) : Surface B, Koumoulia, Psilo etc.
Ἐπιφάνεια Β, Κουμούλια, Ψηλὸ κλπ.

(C) : Surface C, Kalivia heights etc.
Ἐπιφάνεια C, ὑψώματα παρὰ τὰ Καλύβια κλπ.

(P) : Polje of Arachovitika Livadia.
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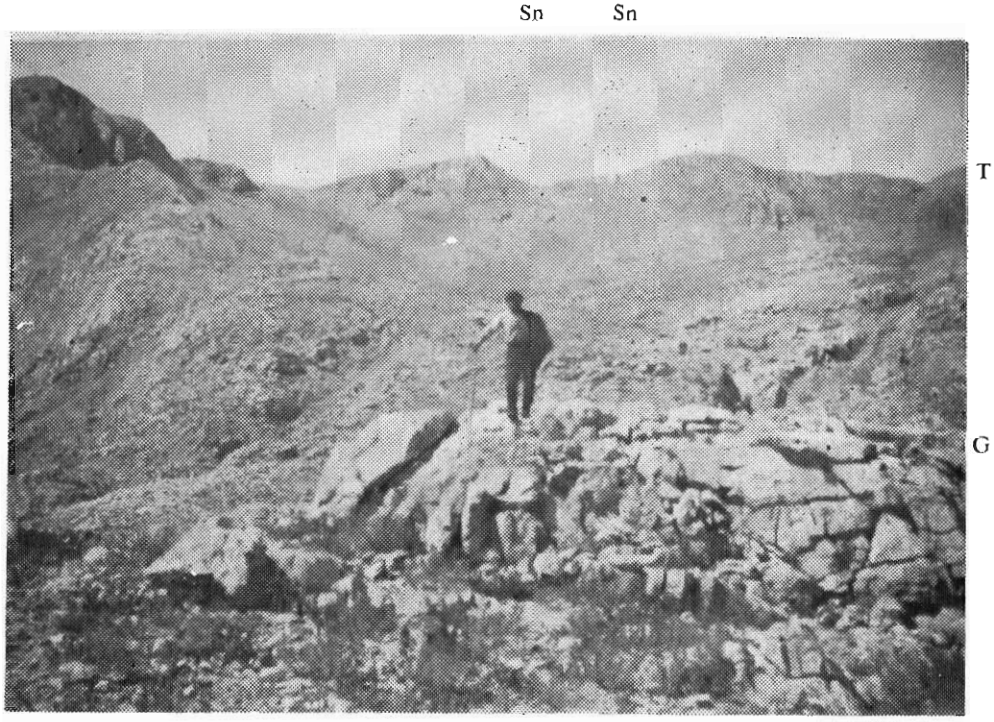

Fig. 5. View on the Great Lakka in the uppermost higher part Parnassus.
Εἰκ. 5. Ὄψη πρὸς τη Μεγάλη Λάκκα, στὸ ψηλότερο μέρος τοῦ Παρνασσοῦ.

(T) : Surrounded by the higher tops.
Περιβαλλόμενη ἀπὸ ψηλότερες κορυφές.

(Sn) : In some places is found little snow in great part of the summer.
Σὲ μερικὲς θέσεις διατηρεῖται λίγο χιόνι πολὺ διάστημα τοῦ καλοκαιριοῦ.

(G) : Very accused are the influences of glaciations, of the nivation etc.
Πολὺ ἐμφανεῖς εἶναι οἱ ἐπιδράσεις παγετώνων, χιονοδιαβρώσεις κλπ.

(K) : The epigean karstification is enough perceptible.
Ἡ ἐπιφανειακὴ καρστίωση εἶναι ἀρκετὰ αἰσθητή.

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