

Orta Anadolu'nun jeolojisi hakkında

E.LAHN

ÖZET:

Burada tarif edilen mıntaka, Kuzey Anadolu iltivaları ile Güney Anadolu iltivaları arasında bulunan ara sahasının bir kısmıdır. Kırşehir masifi, Yukarı Sakarya masifi ve Akdağ masifi gibi kristalin ve plütönik sahelerden müteşekkil olan eski masifler, bu bölgenin temelini teşkil etmektedirler. Bunlara benziyen eski masifler muhtemel olarak Tuz Gölü ve Konya havzalarının genç (Neojen - Kuaterner) teressüpları ile örtülüdürler. Alpin ana iltivalarından ayırmış olan kol iltivaları, masifler arasındaki tam rijit olmıyan sahalara girmektedirler. Meselâ: Ankara ve Çorum yelpazeleri, Boz Dağlar Silsilesi. Eski masifler, ekseriyetle, Tuz Gölü havzasının doğu kenarından geçen fay gibi tektonik arızalar tarafından çevrilmiştirler. Böylece, iki alpin ana uçları arasında bulunan ara bölgesi, hakiki bir ara strüktürleri şebekesi (fay ve iltivalar) tarafından kaplıdır. Eski masiflerin kenarlarına veya komşu alpin iltivalarına müvazi olan bu strüktürler, çeşitli tektonik nazariyelerin sebebi olmuşlardır. (meselâ: P. ARNI 1, N. EGERAN 8).

Muhtemelen kısa olan bir Üst Kretase transgresyonundan maada (Tuz Gölünün kuzey-doğusunda inkişaf eden Hippurit'li kalker), Mesozoik denizi Orta Anadolu'ya girmemiştir. Buna nazaran daha uzun bir zaman süren Lütesyen transgresyonu tarafından bırakılmış teressüpler, bölgemizin birçok yerlerinde keşfedilmiştir.

Bölgemizin en mühim kısımları Eosen'den sonraki tabakalar tarafından örtülmüştür: Kuaterner tatlı su (veya hafifçe somatr), Neojen tatlı su ve jipsli-tuzlu Oligosen yatakları bölgemizin havzalarını doldurmakta, hatta eski masiflerin bazı kısımlarını örtmektedirler.

Alpin orojenik hareket safhasından sonra meydana gelmiş şakulî kra-tojenik hareketler, bölgemizin tektonik strüktürlerine hakimdirler. Bu kra-tojenik arızaların bazılarının çok genç olması, Üst Neojen tabakalarını ihlâl eden faylar tarafından gösterilmiştir. Hattâ, Konya havzasındaki Neojen ile Kuaterner tabakaları arasında 400 metreyi aşan bir şakulî atımı gösteren bir dislokasyon tesbit edilmiştir. (14). Bunun gibi genç tektonik arızalar da Kırşehir-Yerköy ve Ilgın mıntakalarındaki sismik faaliyetin sebebidirler.

On the Geology of Central Anatolia

E.LAHN

Introduction:

The intermediate zone of Central Anatolia lies between the folds of Northern Anatolia (Anatolides) in the north and the folds of Southern Anatolia (Taurides) in the south. It consists of a system of basins, tablelands, isolated folds, volcanic areas and old crystalline masses. The central part of this intermediate zone and its frame form the subject of the present paper. In our area, we can distinguish the major geological units of the central part of Anatolia and their components as follows: 1) parts of the Anatolide folds, as the fan of Ankara, the Çankırı-İskilip ranges and the fan of Çorum representing the western, northern and north-eastern boundary of the area; 2) the volcanic zone of the Hasan Dağı in the south-east of the region and 3) the inner part of the Tauride folds limiting the region in the south. The central part of Anatolia described here is divided by the high grounds of Kırşehir- Keskin and of the Boz Dağlar into three depressions, the Middle Kızılırmak- Delice Irmak basin, the Tuz Gölü basin and the Konya-Ereğli basin.

Details about parts of this region are scattered through the geological literature: Apart from P. DE TCHIHATCHEFF'S (22) early but still interesting descriptions, we find some preliminary details about the Ankara, Konya Tuz Gölü and Hasan Dağı regions in the papers published by E. CHAPUT (7); P. ARNI (1) has described the Kırşehir area and M. BLUMENTHAL (2-6) parts of the Tauride and Anatolide folds bordering our region. The author of the present paper working in Central Anatolia since 1939 describes in the following lines the essential geological features of this region, features which are typical of an intermediate zone of the alpine system.

The fan of Ankara:

The folds composing this fan originate in the Anatolide folds from which they are detached in the Çankırı region in the north and they plunge under the Oligocene-Neogene cover of Central Anatolia in the south. This unit is divided into two areas by the axial elevation of the Elma Dağı - İdris Dağı formed by greywackes without fossils but closely associated with

marbles and limestones containing Fusulinides, as was established by E. CHAPUT (7).

The part of the Ankara fan situated west of the Elma Dağı axis, and not described here, shows a varied stratigraphical succession extending from Triassic to Eocene (see: E. CHAPUT). The zone east of Elma Dağı is characterized by a very simple stratigraphic column. The oldest rocks of this region are green rocks accompanied by radiolarites, slates, and limestones without fossils. The age of this series has not yet been exactly established but a lower Mesozoic age is very probable, as was supposed by E. CHAPUT (7). This "green and red series" is overlain by flysch containing several limestone intercalations and including Upper Cretaceous, Paleocene and Eocene (up to the Lutetian). As an example of this development we indicate below the succession in the Haymana region south of Ankara (E. LAHN K. LOKMAN 16):

- 1) Senonian flysch (grey-blue marls prevailing) with Hippurites, Gryphea and Neithea;
- 2) Marly Cyclolithes-limestones corresponding probably to the Maestrichtian;
- 3) Thin-bedded Lithothamnium limestones indicating the passage between Cretaceous and Paleocene;
- 4) Paleocene flysch characterized by frequent conglomerate intercalations and by its darker colours; the very rich fauna of this horizon contains for instance numerous Balillaria;
- 5) Sandy and light Lutetian flysch with great Nummulites and *Assilina*.

The presence of this uniform succession enclosing the green red series and flysch can also be established on the southern border of the Çankırı-İskilip mountains and on the borders of the Çorum fan. This development is typical for the "arriere-fosse" situated between the Anatolide ranges and the Central Anatolian intermediate zone. In the part of the Ankara fan described here the folding movement is directed from north or north-west to south or south-east towards the intermediate zone. Between Ankara and Haymana, the green rocks are pushed over the Paleocene flysch; east of Elma Dağı, Paleozoic slates and limestones overlie the Mesozoic green rocks and radiolarites; "klippes" of Permocarboniferous limestone swim here upon broken green rocks. All these overthrusts are local and not of

great horizontal extent, but they show the existence of tangential movements in a north-south direction.

The Çankırı-İskilip Mountains:

On the southern border of this range we find stratigraphical conditions similar to those observed in the eastern part of the Ankara fan. The Upper Cretaceous flysch here overlying the green-red succession is characterized by coloured marls, slates and conglomerate intercalations recalling the alpine "Gosau" facies. The Paleocene - Eocene flysch succeeding the Cretaceous is divided into a marly lower and sandy upper series. Igneous intercalations (andesites and porphyrites) are frequent in the Upper Cretaceous and in the Eocene of this region.

Tectonical movement is ill-defined in this part of the Anatolide ranges. Near Tuht (east of Çankırı), southwardly overturned folds of Cretaceous flysch overlie the Oligocene of the Kızılırmak basin. But in the İskilip region, the folding movement was from south to north.

The Çorum fan:

These folds originate in the north (as the Ankara fan does) in the Anatolide folds and disappears in the south under the Oligocene of Central Anatolia. The fan consists of a central region of metamorphic rocks surrounded by the green-red succession overlain by Cretaceous flysch and light coloured limestones. The external borders of this structure are formed by Eocene flysch in which *Ampullina cf. willemeti* DESH. and *Rhinoclavis cf. contraotum* BELL. have been found proving the existence of the Auverasian in these folds the Eocene succession of which finishes normally with the Lutetian.

In the south, near the margin of the Kırşehir Massif, the flysch passes to hard and yellow silicified marls with small Nummulites and is accompanied by basaltic flows.

The Kırşehir-Keskin region:

This includes a system of elevations and tablelands belonging to the Kırşehir mass and formed by igneous and crystalline rocks partially covered by Eocene, Oligocene and Neogene deposit. In our region this system separates the Kızılırmak-Delice Irmak basin from the Tuz Gölü basin. P. ARNI has made a general study of the Kırşehir mass (1). The observation reproduced here have been made by the author, of the present paper in the Yozgat-Yerköy section.

The igneous rocks of the region are of various types. The oldest rock is a diorite the fragments of which are included in the main rock of the mass, a coarse-grained granite often with large red feldspars. Younger dykes of diorite, gabbro, aplite and quartzporphyry cut the granite (determinations: Mineraogical Service of the M.T.A. Institute in Ankara). White contact-marbles of very coarse grain are frequent in our part of the Kırşehir massiv, but cristalline rocks (in the strict sense of the words) are rarely found there.

The age of our masif cannot be exatly established. The oldest strata overlying these rocks are Eocene beds. Mesozoic strata do not exist here and neither tectonic movement during the Mesozoic, nor intrusion during this time can be proved in this part of Anatolia. Our mass is very probably an old massif of hercynian age.

In the Yozgat region the old mass is covered by a series of Lutetian marls, sandstones and conglomerates containing a rich fauna characterized by abundant big corals and big gastropods. The Eocene series is followed, for instance in the western part of our area, by gypsiferoua Oligocene and Miocene-Pliocene freshwater beds.

The volcanic zone of Hasan Dađı:

This zone contains the most prominent topografic feature of our area, the Hasan Dađı (3200 m.). It forms the western part of a very large volcanic region, the Hasan Dađı-Erciyes Dađı area, covers more then 10.000 km². In this part, volcanic activity began with the deposition of dacitic and rhyolitic tuffs (following. E. CHAPUT 7) particularly in the country between the Karacadađ and Aksaray. Hipparion gracile has been found in the basal tuffs in the Ürgüp region (out-side of our area) and the tuffs must be (at least partially) of Upper Miocene age (E. CHAPUT 7).

Andesitic and trachyandesitic rocks succeeded the deposition of the tuffs (determination: P. DE WIJKERSLOOTH, 24). This phase of volcanic activity has furnished both large areal flows and aiso volcanic cones, the most important of which are the Karacadađ and the Melendiz Dađları. The andesitic eruptions were followed by a basalttic phase characterized by well-preserved volcanos, like the large cone of Hasan Dađı or the craters and crater-lakes of Karapınar (E. LAHN, 11, 12). Near Karapınar the strand-cliff of the Konya Quaternary lake is cut into the basalts. The basalt flows from Hasan Dađı descend to the actual plain south of Aksaray. The extrusion of the basalts therefore began early in the Quaternary, before the

formation of the Konya lake, and finished only towards the end of this period. Branches of the Hasan Dağı volcanic zone cross the Konya basin and reach west-ward into the Konya region: ruins of andesitic volcanos built upon a large basement of tuffs like the Karadağ, the Erenler Dağları or the pics of Sile near Konya.

The ridge of the Bozdağlar:

The Bozdağlar, separating the Konya basin and the Tuz Gölü basin, originate, in the East, in the Bolkar Dağı range, a part of the interior Toros folds. The hills of the Ilgın region are the western extension of the Bozdağlar. In the north, branches of the Bozdağlar constitute isolated elevations in the Tuz Gölü plain.

Grey marbles predominate in the Bozdağlar, (the name means "grey mountains"), but quartzites, serpentines and diorites also occur. The only fossils found were Radiolariae and sections of a badly preserved algae similar to the Permocarboneferous *Mizzia velebitana* SCHUBERT. A Permocarboneferous age for the Bozdağlar (except perhaps for the green rocks) is very probable. This is supported by the close relations between this range and the Permocarboneferous mass of the Bolkar Dağı.

During the cratogenic movements following the alpine paroxysm, the Bozdağlar were cut by numerous faults and divided in several blocks which explains the complicated outlines of this unit.

The Tauride Folds of the Konya-Beyşehir-Ereğli region:

Only the northern (interior) part of the Tauride folds, constituting the southern frame of Central Anatolia, belongs to our area. This part of the Tauride folds is composed of several zones, as the zones of Niğde, Ereğli, Bolkar Dağı (described by B. BLUMENTHAL, 2 and E. CHAPUT, 7) and Beyşehir. In the region of the lake of Beyşehir, the base of the Beyşehir zone is represented by lightly metamorphosed slates, crystalline limestones and quartzites forming the range of the Sultan Dağları (south and south-west of Ilgın). Sections of crinoids and undeterminable gastropods are the only fossils found in these strata provisionally assigned to the Upper Paleozoic. This series is overlain by sericitic and sandy red or greenish slates recalling the alpine Werfenian. To the south of the lake Beyşehir, these slates pass upward into dark limestones with crinoids corresponding probably, to black limestones found on the top of the slates north of the Beyşehir Gölü where they contain sections of big *Diplopora* resembling species frequent in the Middle Triassic of the Eastern Alps and the Dinaride ranges. The *Diplopora*

limestone is overlain by a very thick succession of bedded and unbedded limestones alternating with dolomites, marls or sandy strata. The presence of a Liassic horizon (marls with *Astarte* sp., following the Paleontological Service of the M.T.A. Institute) and of Upper Cretaceous Hippurites limestones has been established in this series the top of which is formed by sandy limestones with little Nummulites. In this part of the Toros there exists therefore a limestone series extending from the Middle Triassic to the Eocene without any obvious discontinuity, like the series found by A. PHILIPPSON in South-Western Anatolia and in Greece (18).

In the Beyşehir region, narrow scales of flysch strata, slates, limestone blocks, radiolarites and a mixture of basic rocks (serpentines, diorites, melaphyres etc.) appear between the limestones, from which they are always separated by faults or overthrusts. The age of these rocks is considered provisionally as Mesozoic in general but cannot be determined with any greater accuracy.

The scales of the Beyşehir region were pushed north- (or north - east-) wards, against the Central Anatolian masses. It must be added that in the southern parts of the Toros a very clear movement in the opposite sense has been established by M. BLUMENTHAL (6).

The basin of the Middle Kızıl Irmak-Delice Irmak:

This basin is largely occupied by the "gypsiferous formation". The base of this series is formed by grey sandstones and conglomerates including sometimes volcanic flows. These are followed by bedded, red or brown sandstones the lower beds of which contain rock salt and little gypsum occurrences. Saltwater and salt springs are frequent. Springs and rock salt occurrences are not related to "salt domes" as has been supposed (C. E. TAŞMAN 20), except for the great occurrence of Kayatuz Mağarası near Çankırı which shows effectively dome structures, the thickness of salt occurrences is not usually sufficient for the formation of dome structures due to movements in the salt masses. White and very gypsiferous marls overly the coloured sandstones. The marls sometimes pass into marly limestones.

This gypsiferous formation with its white or red coloured strata predominates in Central Anatolia where it dominates the landscape of large areas of the country (The principal river of this region, the Kızıl Irmak /= "Red River" takes its name from the material derived from the destruction of the gypsiferous beds and giving to it its typical colour). The absence of fossils permitting an accurate stratigraphical classification makes difficult

the establishment of the age of our series formed evidently in temporary lagoons, lakes and swamps in desert climate. We can establish only that our series covers the Eocene flysch the top of which is formed by Lutetian (or sometimes Auversian) strata and that it is overlain itself by marine Burdigolian and Helvetian beds in the Sivas region (see V. STCHEPINSKY 19). The gypsiferous formation therefore must be included in the interval between the Middle Eocene and the Burdigalian, especially in the Oligocene.

In the South, the Oligocene covers simply the rocks of the Kırşehir mass. On the other hand, tectonic complications can be observed in the northern part of the Kızıl Irmak basin the border of which is formed by alpine elements. A very sharp discontinuity here separates the gypsiferous formation from the Eocene flysch and dislocations are frequent on the borders of the basin in the gypsiferous beds. Frequently, gypsiferous strata are inclined towards the Eocene flysch and in the neighbourhood of Tuht (east of Çankırı) the Upper Cretaceous seems to be pushed over the gypsiferous beds. In the marginal zone of the basin, Oligocene strata are considerably folded (but not so intensively as the neighbouring flysch!). The axes of these gypsiferous structures are always parallel to the neighbouring alpine folds. A light discontinuity can be established between the lower red and the upper white parts of the Oligocene. It is not only that tectonic movement is less intensive in the white part than in the red, but the white strata sometimes pass over the limits of the lower red part and directly cover the basement rocks.

The basin of the Tuz Gölü:

The oldest strata found in this large depression situated in the center of Central Anatolia are some isolated outcrops of Hippurites limestones (Upper Cretaceous) and Nummulites sandstones discovered in the escarpment bordering the Tuz Gölü basin in the east (23 and W. TROMP, oral information). These outcrops are overlain by the gypsiferous formation divided into two parts as in the Kızıl Irmak basin. In the north-western corner of our basin, a discontinuity separates the gypsiferous formation from the underlying Eocene flysch (Ankara fan), but east of the Tuz Gölü, the Eocene passes to the gypsiferous without any hiatus.

A very large and thick series of white or yellow freshwater deposits (limestones and marls) overlying the gypsiferous formation occupies the greatest part of our depression, covering more than 5000 km². (together with the neighbouring Upper Sakarya basin). At the borders of the basin,

passages from limestone or marl to clastic deposits (such as conglomerates or sandstones) or to tuffs can sometimes be observed. Very many freshwater fossils such as *Limnaea*, *Planorbis Bithynia*, *Vivipara* and *Hydrobia* can be found in this series. The recent character of this fauna (the species of which are living even today in the waters of the region), together with the absence of any trace of folding in these deposits make it necessary to assign a very recent age to this series. P. Oppenheim (18) has put into the Pontian similar strata encountered in Western Anatolia. But a Pliocene age for these freshwater marls and limestones is not impossible (E. LAHN 14).

There is no trace of folding in the Neogene deposits of the Tuz Gölü basin. Very slight tectonic movement can be established only on the borders of the basin between the Neogene and the older rocks. In the great Neogene depression is included a less extensive basin containing the actual lake with its alluvial plains and limited by a system of faults and fault-scarps (like the steep slope formed by the Neogene limestone on the southern border of the Tuz Gölü plain or the escarpment of Koçhisar) younger than the Neogene deposits which are themselves affected by these tectonical accidents. Similar statements-secondary young basins of tectonic origin occupied by actual lakes or by Quaternary lake deposits, within larger Neogene depressions-have also been made for the Konya basin and for the "region of lakes" of the Western Toros (E. LAHN 13).

The extremely high salinity of the Tuz Gölü (its name signifies: Salt lake) is not entirely due to the rapid evaporation in this large but shallow closed basin; salts are brought into the lake also by rivers originating in the gypsumiferous and salty areas (Oligocene) east and north of the Tuz Gölü basin (see also: C. E. TAŞMAN 21 and E. LAHN 15).

The Konya-Ereğli basin:

This large basin is situated between the Toros folds, the range of the Bozdağlar and the Hasan Dağı mass. Neogene freshwater deposits similar to those described from the Tuz Gölü basin are visible in the marginal zone of this depression also. In its eastern corner outcrops of Oligocene have been found. The central part of the basin is occupied by sand, clay and pebble beds, the deposits of the large Quaternary Konya lake. E. CHAPUT (1), H. LOUIS (17) and the author of the present paper (14) have collected here numerous fossils (*Limnaea*, *Vivipara*, *Neritina*, *Dreissensia*, *Adacna*, *Pisidium* etc.) representing a freshwater fauna with slight brackish tendency.

The Konya, basin is a depression of tectonic origin, as it is proved by numerous tectonic disturbances on its borders. A younger system of dislocations sometimes forming scarps separates the. Quaternary and the Neogene deposits. Here we have also two tectonic depressions of different ages, the one intercalated in the other one. The Konya basin is a closed depression with subterranean karstic drainage (E. CHAPUT 7).

Conclusions:

The region described above belongs to the "Intermediate Zone" of Anatolia situated between the Anatolide ranges in the North and the Tauride ranges in the South. The basement rocks of the region consist of some (probably old) masses of cristalline and igneous rocks, as the Kırşehir mass described here, the mass of the Upper Sakarya River occurring to the west of the Ankara fan and the Akdağ mass situated east of the Çorum fan. Other similar masses are probably covered by the young (Neogene and Quaternary) deposits of the Tuz Gölü and Konya basins. Folds originating in the main alpine folds of the north (Anatolide ranges) and of the south (Tauride ranges) enter in the less rigid space situated between these old rigid masses: For example, the fans of Ankara, and Çorum and the Bozdağlar ranges. Fault systems very often surround the old masses; the faults bordering the Kırşehir mass in the southwest (eastern side of the Tuz Gölü basin) is a very good example of such a structure. Thus, a veritable network of intermediate structures (folds and faults) corresponding to less rigid zones between the old rigid masses covers the space between the two alpine main-zones in the north and in the south. The trend of these structures follows the outlines of the old masses and the structures seem to pass from one to the other of the alpine mainzone and have thus given rise to very contradictory tectonical theories. (see P. ARNI 1, N.EGERAN 8)

Except for a probably brief Upper Cretaceous transgression (deposition of Hippurites limestones north-east of the Tuz Gölü), the Mesozoic sea, did not reach into Central Anatolia. The Lutetian transgression is considerably more extended and its deposits have been found in several localities of our country.

The greatest part of our intermediate region is covered by post - eocene deposits: freshwater (or slightly brackish) Quaternary, freshwater Neogene and Oligocene gypsiferous beds occupy the depressions of the

region and even some parts of the old masses. The origin of the Oligocene gypiferous formation, so typical of a great part of Inner Anatolia can be explained by the unstable geographical conditions in the time between the alpine folding and the disappearance of the Eocene Sea on the one hand and the formation of a regular hydrographical system on the other side. In the transitional period, saltwater lagoons (relics of the older Eocene Sea) are still persisting along side of freshwater basins within a region of more or less desert climate.

The limits of our intermediate zone towards the alpine ranges in the north and in the south are characterized by the absence of any sharp border line. Tectonic units originating in the alpine main-zones penetrate into the intermediate area. "Arriere-fosses" with prevailing flysch beds, accompanied by green rocks and radiolarites, appeared on the inner (southern) side of the North Anatolian folds (in the Ankara-Çankırı-Çorum region) and on the inner border of the South Anatolian folds (in the Ereğli region). Advancing from the intermediate zone towards the alpine folds, it is only after the arriere-fosses have been past, that the "normal" rich facies of the alpine-folded system begins.

The tectonics of the intermediate zone (excepting the alpine folds penetrating into this zone) are dominated by the vertical movements of the cratogenic phase succeeding the alpine folding movements. Some of these cratogenic disturbances are very young, as is proved by faults affecting the Upper Neogene deposits; in the Konya basin a fault with a vertical displacement of more than 400 m. separates Neogene and Quaternary deposits (14). To the presence of such young movements must be attributed the seismic activity in the Kırşehir-Yerköy and in the Ilgın regions (P. ARNI 1, E. CHAPUT 7).

Generally, the "alpine" tectonic geologists interpret the <<intermediate zone>> separating the two main-zones of the alpine system, as a unit similar to the Danubian intermediate mass (between Carpathian and Dinaric Ranges). Here, all structures are buried under a thick (several thousands of meters) cover of Oligocene and Neogene beds and this intermediate zone seems therefore to be a homogenous unit. Only geophysical investigations could prove the existence of the various structures hidden by the young cover. The central part of Asia Minor has not been reached by Oligocene

and Neogene transgressions and the structures of this area rested largely exposed, giving us a picture of the tectonic complications which exist in an intermediate area of the alpine zone.

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LEVHA-PLATE I.

Orta Anadolu'nun jeolojik krokisi: (1/800.000 ölçekli Türkiye Jeolojik Haritasına göre çizilmiştir).

Géological sketch-map of Central Anatoli: (following the Geological Map of Turkey 1/800.000).

İşaretler — Legend:

1 — Alüvyonlar, Kuaterner ve Neojen — Alluvium, Quaternary, Neogène.

2 — Oligosen — Oligocene.

3 — Genç volkanik arazi — young volcanic rocks.

4 — Kuzey Anadolu İltivaları — Folds of Northern Anatolia.

5 — Bu iltivaların iç-ili sahası — Item arrière-fosse 5a — Elma Dağı Eşiği — Ridge of Elma Dağı.

6 — Kırşehir masifi — Masif of Kırşehir.

7 — Bozdağların ara iltivaları — Intermediate folds of the Bozdağları.

8 — Niğde Kristalin zonu — Cristalline zone of Niğde.

9 — Ereğli iç-ili sahası — Arrière-fosse of Ereğli.

10 — Bolkar Dağı zonu — Zone of Bolkar Dağı.

11 — Beyşehir zonu — Zone of Beyşehiri.

11 a — Sultan Dağı Eşiği — Axis of the Sultan Dağları.

A — Ankara, Ak — Aksaray, An — Antalya, BG — Beyşehir Gölü, BD — Boz Dağlar, BK — Bolkar Dağı, Ç — Çankırı, Ço — Çorum, E — Ereğli, ED — Elma Dağı, ER — Erenler Dağları, H — Haymana, HD — Hasan Dağı, Ig — Ilgın, İs — İskilip, K — Konya, Kp — Karapınar, Kr — Kırşehir, Me — Mersin, N — Niğde, S — Sinop, SD — Sultan Dağları, TG — Tuz Gölü, Y — Yozgat

LEVHA — PLATE II

Orta Anadolu'nun tektonik krokisi — Tectonic sketch of Central Anatolia.

İşaretler — Legend:

1 — Tektonik birliklerin hudutları — Limits of the tectonic units.

2 — Genç volkanik arazi — Young volcanic masses.

3 — İltivaların mihverleri — Axes of the folds.

4 — Mühim tektonik ârızalar — Important dislocations.

BD — Orta Kızılırmak — Delice Irmak havzası — Basin of the middle Kızılırmak — Delice Irmak.

BK — Konya havzası — Basin of Konya.

BS — Yukarı Sakarya Nehri havzası — Upper Sakarya basin.

BT — Tuz Gölü havzası — Basin of Tuz Gölü.

FA — Ankara yelpazesi — Fan of Ankara.

FQ — Çorum yelpazesi — Fan of Çorum.

KA — Kırşehir — Akdağ Madeni masifi — Masif of Kırşehir— Akdağ Madeni.

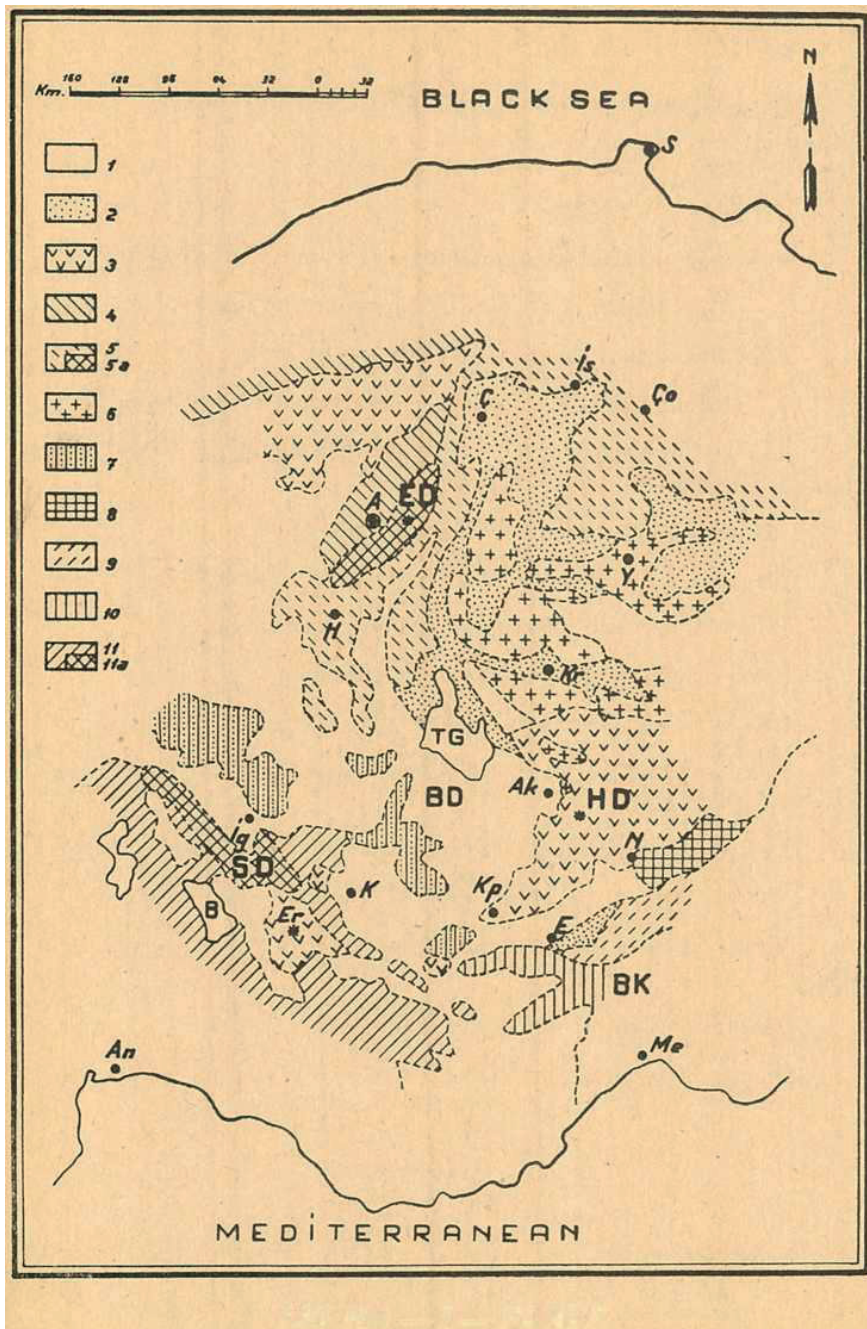
MS — Yukarı Sakarya Nehri masifi — Upper Sakarya massif.

VA — Ankara volkanik zonu — Volcanic area of Ankara.

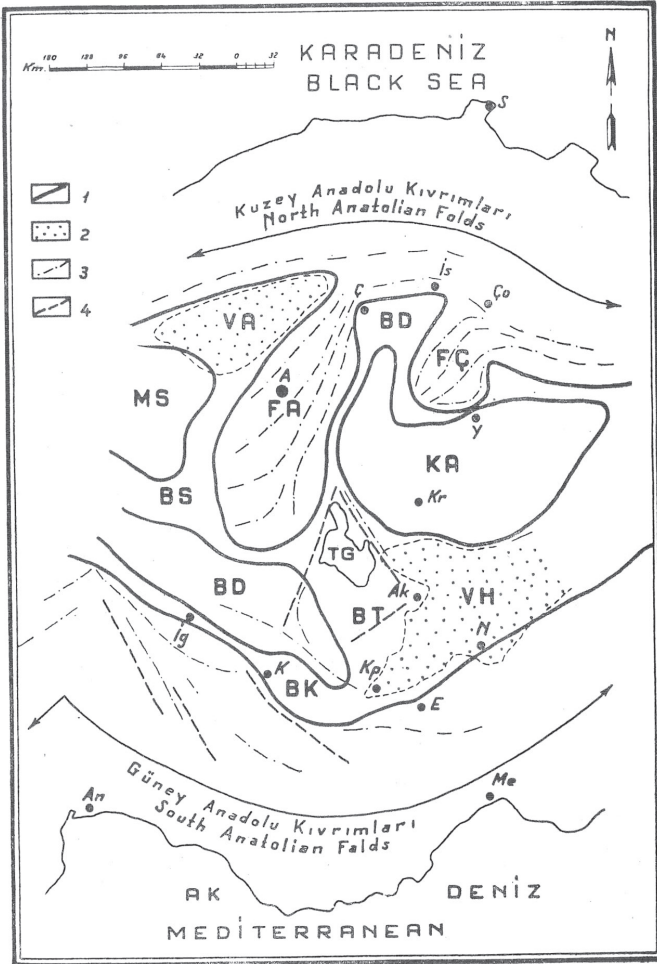
VH — Hasan Dağı volkanik zonu — Volcanic zone of Hasan Dağı.

Şehirlerin isimleri: 1 No. lu levhada.

Names of towns: see Plate I.



LEVHA - I - PLATE



LEVHA - II - PLATE