THE BOVEDAE FAUNA OF MIDDLE SINAP OF TURKEY

Türkiye Orta Süıap Bovidae Faunası

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ABSTRACT. — The Bovidae fauna of the Middle Si/nap are very interesting because, the representatives of this fauna are helpful in establishing further the association of species and genera between Europe and Asia. For this reason, the Bovidae fauna of the Middle Smap are very important in correlating the faunal scale between east and west (Asia and Europe) are established by Palaeoreas, Pseudotragus, Tragoreas and Helicotragus In addition to these, there is the association of species between Europe and Asia estabilhed by Piotoryx carolinae Major, Protoryx longiceps Pilgrim and Hop* wood, Gazella deperdita Gervais and Gazella gandryi Schlosser* On the other hand, these representatives generally migrated from th middle Anatolia (Middle Sinap) to Aegean district and Asia»*

ÖZ. — Orta Sinap Bovidae faunası çok ilginçtir. Çünkü, bu fauna topluluğu gerek Avrupa ve gerekse Asya genus ve espès birliğinin tesisinde büyük rol oynamaktadır. Bu sebepten Orta Sinap Bovidae faumam doğu ile batı arasındaki gerçek bir faunik skalanın kurulmasında ilgi çekicidir Bu temsilcilerden Palae* oreas, Pseudotragus, Tragoreas ve Helicotragus ile doğu ve batı (Asya ve Avrupa) arasında genus birliği tesis edilmiştir. Protoryx carolinae Major, Protory oö longiceps Pilgrim* ve Hopwood, Gazella deperdita Gervais ve Gazella gaudryi Schlosser ile de Avrupa ve Asya arasındaki espes Mrliği kurulmuştun Bu nedenle Orta Sinap Bovidae fawnasi Türkiye için olduğu kadar Asya-Avrupa fa* imik Mrliğinin kuruluşunda da büyük önem taşır.*

INTRODUCTION

The Bovidae family discovered in the Middle Sinap series[1] was a very interesting development for Anatolian paleontology. This family is equally important for Asia and Europe because,

(*) The detailed study on Middle Sinap faunas is in preparation.

these representatives of the Middle Sinap are Asiatic like Maragha fauna and European like Samos, Pikermi and Saioniea fauna. There are 81 extinct genera of this family, but we discovered 8 genera in the Middle Sinap series; one of them is a new genus, 15 species which belong to these genera and are distributed systematically in the following subfamilies:

Subfam, Bovinae
Palaeoreas brachyceras Ozansoy
Palaeoreas elegans Ozansoy

Subfam. Hippotraginae
Protoryx carolinae Major n. var.
Protoryx longiceps Pilgrim and Hopwood n. var.
Protoryx capricornis n. sp.
Pseudotragus paraïlélocornis n. sp.
Tragoreas sinapensis n. sp.

Subf am. Antilopinae
Helicotragus incarinatus Ozansoy
Sinapocerus ozansoyi n.gen. n.sp.
Gazélla deperdita Gervais n. var,
Gazélla ancyrensis Tekkaya
Gazélla cf. *ancyrensis* Tekkaya
Gazélla gaudryi Schlosser
Gazélla sp,

Incertia sedis*
Qurliqnoria şenyüreki Ozansoy

Palaeoreas

The correlation was carried out morphologically, biometrically and graphically on the specimens of the Middle Sinap and the other representatives of the other areas of Turkey, Europe and Asia* We especially considered the stratigraphical periods and systematical points. In the light of present knowledge we investigated the association of species and genera, the faunical migration of the Middle Sinap and the other areas of Turkey, including Asia and Europe. In this way, the evolutional continuity of the genus was determined.

According to published records, *Palaeoreas* is generally found in Thrace (Turkey) and in the other parts of Anatolia, in Aegean district and in France. *Palaeoreas lindermayeri* Gaudry was found in Mont Léberon (France), In Salonica, in Pikermi and in Samos (Greece), in Thrace-Küçükçekmece and Dardanelles in Turkey (Gaudry, 1862-67; Major, 1891; Pilgrim and Hopwood, 1928; Arambourg and Piveteau, 1929; Malik and Nafiz, 1933; Melentis, 1970; Gentry, 1971; Tekkaya, 1973b). There are new species in the Middle Sinap series in Anatolia. They are *Palaeoreas brachyceras* Ozansoy and *Palaeoreas elegans* Ozansoy. Later, *Palaeoreas* sp. was found in Manisa, in Uşak, and at different places in and round Ankara (Ozansoy, 1957, 1965; Yalçınlar, 1946, 1947). *Palaeoreas* is not found in the other parts of Europe and Asia. For this reason, it has a very important place in the evolution of mammals. In our opinion, this genus lived during the Pliocene only in the Aegean area, in western and middle parts of Anatolia. It never occured in the Miocene or in the upper Pliocene.

Protoryx

It lived in Pikermi, Samos and Salonica, in Greece, at Maragha in Iran, in Turkey and in China. *Protoryx carolinae* Major in Maragha and Salonica, *Protoryx carolinae* Major, *Protoryx hentscheli* Schlosser, *Protoryx carolinae* Major n. var. *laticeps, Protoryx* cf. *carolinae* Major and *Protoryx longiceps* Pilgrim and Hopwood was discovered in Samos. *Protoryx carolinae* Major was also found in China (Mecquenem, 1924,1925; Andrée, 1926; Pilgrim and Hopwood, 1928; Arambourg and Piveteau, 1929; Major, 1891; Bohlin, 1936; Schlosser, 1904; Gentry, 1971; Tekkaya, 1972). *Protoryx carolinae* Major was first discovered at Çobanpmar (Ankara), Turkey, by Ozansoy (1957, 1965, 1969). *Protoryx carolinae* Major n. var., *Protoryx longiceps* Pilgrim and Hopwood n. var., *Protoryx capricornis* Tekkaya were found by the author in the Middle Sinap series. Bohlin (1935), Teilhard and Trassaert (1938) uncertainly recorded this genus in China. According to Gentry (1971) some *Protoryx* and *Pseudotragus* species belonging to *Pachytragus laticeps* Andrée can be noted as follows:

Protoryx carolinae Major (Mecquenem, 1924; Major, 1891)
Protoryx carolinae var. *laticeps* Andrée (Adnree, 1926)
Protoryx cf. *carolinae* Major (Schlosser, 1904)

Protoryx longiceps Major (Major, 1891)
Protoryx gaudryi Major (Major, 1891)
Protoryx hippolyte Major (Major, 1891)
Protoryx hentscheli Schlosser (Schlosser, 1904; Andrée, 1926; Pilgrim and Hopwood, 1928)
Protoryx hentscheli var. *tenuicornis* Andrée (Andrée, 1926; Pilgrim and Hopwood, 1928)
Protoryx crassicornis Andrée (Andrée, 1926)
Protoryx carolinae var. *crassicornis* Andrée (Pilgrim and Hopwood, 1928)
Protoryx longiceps Pilgrim and Hopwood (Pilgrim and Hopwood, 1928)
Protoryx laticeps Andrée (Pilgrim and Hopwood, 1928)
Pseudotragus capricornis var* *hippolyte* (Pilgrim and Hopwood, 1928)

Protoryx has not been found in Europe and it was discovered only in the Aegean region, in Asia minor (Anatolia) and in Iran. However, this genus may have migrated from middle Anatolia or the area of comprising middle Anatolia to the Aegean district and Asia. *Protoryx* lived during the Lower Pliocene and it has never been found in the biozones of Miocene or the Upper Pliocene.

Pseudotragus

This genus is known in Samos, Muğla and China. *Pseudotragus longiceps* Andrée, *Pseudotragus capricornis* Schlosser, *Pseudotragus capricornis* var. *Mppolyte* Schlosser were found in Samos (Schlosser, ibid; Andrée, ibid; Pilgrim and Hopwood, ibid). *Pseudotragus* cf. *longicornis* Pilgrim and Hopwood was first discovered in Muğla (Ozansoy, 1951, 1967).

In the Middle Sinap, we also found a new species which was called *Pseudotragus parallelocornis* n. sp. In our opinion, this species is very important for the Anatolia region because there exists only one representative, *Pseudotragus capricornis* Schlosser from China. And according to Gentry (1971), *Pseudotragus capricornis* Schlosser (Andrée, 1926) and *Pseudotragus longicornis* Andrée (Andrée, 1926) belong to *Pachytragus crassicornis* Schlosser, It is unknown whether *Pseudotragus* lived in Europe or whether it lived only during the Lower Pliocene in the Aegean region and in Anatolia, For this reason, it is very interesting to show with this species the f aunal

association of these areas. This genus may have migrated from middle Anatolia or the area of surrounding of the middle Anatolia to the southern part of Anatolia or Samos island and then to China.

Tragoreas

It was found in the Middle Sinap series, in Samos, in Sebastopol and in China. *Tragoreas sinapensis* n. sp. was discovered the first time in the Middle Sinap, in Turkey. There are *Tragoreas oryxiodes* Schlosser and *Tragoreas* sp. in Samos (Schlosser, 1904). Borissiak discovered a new species called *Tragoreas leskewitschi* Borissiak in Sebastopol, in 1914. *fTragoreas lagrelii* Bohlin and *fTragoreas palaeosinensis* (Schlosser) Bohlin lived in China. *Tragoreas* is known in Europe, more than this genus may be distributed to the eastern area of Sebastopol or the upper region of Black Sea, and later the first group may be have migrated from here to middle Anatolia (Orta Sinap), and then from the middle Anatolia to Samos island. The second group migrated from the Black Sea region to China.

Helicotragus

Helicotragus rotundicornis Weithofer (Syn. *Helicophora rotundicornis* Weithofer) was found in Pikermi, in Salonica and in Maragha (Mecquenem, 1925; Arambourg and Piveteau, 1929; Major, 1891; Rodler and Weithofer, 1890; Melentis, 1970). At the same time *Helicotragus fraasi* Andrée (Syn. Helicoceras fraasi Andrée) was found in Samos by Andrée, in 1926. *Helicotragus rotundicornis* Weithofer has a very extensive distribution in Turkey. This species was discovered in Thrace-Küçükçekmece (Major, 1891; Malik and Nafiz, 1933). Şenyürek found t|ıe same species in Elmadağı (Şenyürek, 1952). Ozansoy discovered a new species called *Helicotragus incarinatus* Ozansoy at the Middle Sinap (Ozansoy, 1957, 1965), Gentry (1971) mentioned all thé *Helicoreas rotundicorne* Weithofer, *Helicophora rotundicornis* Weithofer, *Helicotragus rotundicornis* Weithofer and *Helicoceras fraasi* Andrée belong to *Prostrepsiceros rotundicornis* (Weithofer). This genus is unknown in Europe and Asia. *Prostrepsiceros (Helicotragus)* lived only in Aegean and in Anatolia regions. This genus may have migrated from the middle Anatolia to the eastern part of Anatolia and then Iran and to the western part of Anatolia and then to Samos.

Sinapocerus

This is a new genus and new species. Bohlin found some horn-cores in Tsaidam in China (Bohlin, 1937). But the horn-core of Tsaidam is unlike the horn-core of Sinap. Prof. Ozansoy discovered the same horn-cores in the Middle Sinap series but he called these materials only *Antilope* gen. and sp. indet. These horn-cores are never comparable or similar to the other genus of Bovidae in Pliocene. For this reason, we called these materials *Sinapocerus ozansoyi* n. gen and n. sp.

Gazella

The genus *Gazella* is still living, but some species of *Gazélla* are extinct. *Gazella stehlini* Thenius has reportedly occured in the upper Miocene. It lived in the Rhône and in Saône regions in France, in la Chaux-de Fondes district in Switzerland and in Vienna, m Austria (Stehlin, 1937; Thenius, 1951; Gentry, 1964). At the same time, Thenius stated that this species had lived in Nikolsburg, m Czechoslovakia and in Chios, in Greece (Thenius, 1952; Papp and Thenius, 1959). *Gazella anglica* Newton (Newton, 1884) and *Gazella daviesi* Hinton (Hinton, 1908) were found in the Pliocene deposits in England. *Gazella deperdüa* Gervais and *Gazella burbomca* Deperet were discovered in Teruel and in Alcoy district in Spain (Crusafont and Truyols, 1954). *Gazella deperdita* Gervais lived in Crox-Rousse in Lyons and in Mont Déberon in France (Gaudry, 1873; Pilgrim and Hopwood, 1928; Major, 1891; Heintz, 1969, 1971). According to some writers *Gazella baltavarensis* Benda, *Gazella capricornis* Rodler and Weithofer, *Gazella gaudryi* Schlosser, *Gazella deperdüa* Gervais lived in the Baltavar region in Hungary (Major 1891; Pilgrim and Hopwood, 1928). *Gazella capricornis* Rodler and Weithofer, *Gazella deperdita* Gervais, *Gazella mytilinii* Pilgrim *Gazella schlössen* Pavlow have been discovered in Romania and Ukrama (Pilgrim and Hopwood, 1928). Kretzoi mentioned that *Gazella* lived near the Karpad region. *Gazella gaudryi* Schlosser, *Gazella longicornis* Andrée, *Gazella schlössen* Andrée, *Gazella mytilinn Fûgvım, Gazella deperdita* Gervais were found in Samos, *Gazella deperdita* Gervais, *Gazella capricornis* Rodler and Weithofer were discovered in Pikermi and *Gazella gaudryi* Schlosser, *Gazella deperdita* Gervais were found in Salonica (Andrée, 1926; Melentis ^1970; Gaudry 1862-67; Gervais, 1859; Arambourg and Piveteau, 1929; Pilgrim and Hopwood, 1928; Schlosser, 1904; Major, 1891).

There are many species of *Gazella* in Turkey. *Gazella deperdita* Gervais and *Gazella gaudryi* Schlosser were found in Thrace. *Gazella burbonica* Deperet was discovered in Eskişehir. *Gazella otkuni* Ozansoy, *Gazella gaudryi* Schlosser were found in Muğla, in Akçaköy of Uşak and in Eşme of Manisa. *Gazella gaudryi* Schlosser, *Gazella deperdita* Gervais, *Gazella* cf. *deperdita* Gervais, *Gazella eleanorae* Şenyürek, *Gazella proatlantica* Ozansoy, *Gazella ancyrenşis* Tekkaya in the Middle Sinap, in Kavakdere, in Elmadağı and in Ayaş in the Ankara region. After the later *Gazella* sp. was discovered in Akdere in the Kayseri region and in Istanbul (Ozansoy, 1951, 1956, 1957, 1969; Yalçınlar, 1946, 1947, 1952; Malik and Nafiz, 1933; Kansu, 1936; Leuchs, 1949; Thenius, 1949, 1951; Şenyürek, 1952, 1953, 1954; Becker-Platen and Sickenberg, 1968; îzbırak and Yalçınlar, 1951; Tekkaya, 1969, 1970, 10f3a, 1973b).

Gazella gaudryi Schlosser and *Gazella deperdita* Gervais were discovered in Kerkük (Piveteau, 1935). *Gazella gaudryi* Schlosser was found in Sahandağ and *Gazella deperdita* Gervais, *Gazella capricornis* Rodler and Weithofer in Maragha in Iran (Mecquenem, 1924, 1925; Pilgrim and Hopwood, 1928; Rodler and Weithofer, 1890). Some writers reported that *Gazella deperdita* Gervais lived in Kazachstan and *Gazella gaudryi* Schlosser, *Gazella paeotehensis* Teilhard and Young were found in the western part of Mongolia (Thenius, 1949; Jaworowska, 1970). *Gazella dorcadoides* Schlosser, *Gazella gaudryi* Schlosser, *Gazella paeotehensis* leilhard and Young, *Gazella (protetracerus) gaudryi* Schlosser, *Gazella blacki* Teilhard and Young, *Gazella* cf. *blacki* Teilhard and Young, *Gazella sinensis* Teilhard and Piveteau, *Gazella* cf. *sinensis* Teilhard and Piveteau, *Gazella* cf. *subgutturosa* Güldenst, *Gazella kueitensis* Bohlin, *Gazella paragutturosa* Bohlin lived in Pliocene and Pleistocene periods in China (Teilhard and Young, 1931; Teilhard and Trassaert, 1938; Teilhard and Piveteau, 1930; Bohlin, 1938, 1941). *Gazella lydekkeri* Pilgrim and *Gazella* cf. *lydekkèri* Pilgrim were found in Siwalik series in India (Pilgrim, 1937, 1939).

According to Arambourg (1959) some species of *Gazella* lived in North Arfica, one of them, *Gazella praegaudryi* Arambourg occured in the upper Miocene and *Gazella sitifense* Pomel and *Gazella thomasi* Pomel were found in the Pleistocene series.

Gazella, widely distributed during the Pliocene and Pleistocene ages in Europe and Asia (including Turkey) has conclusively

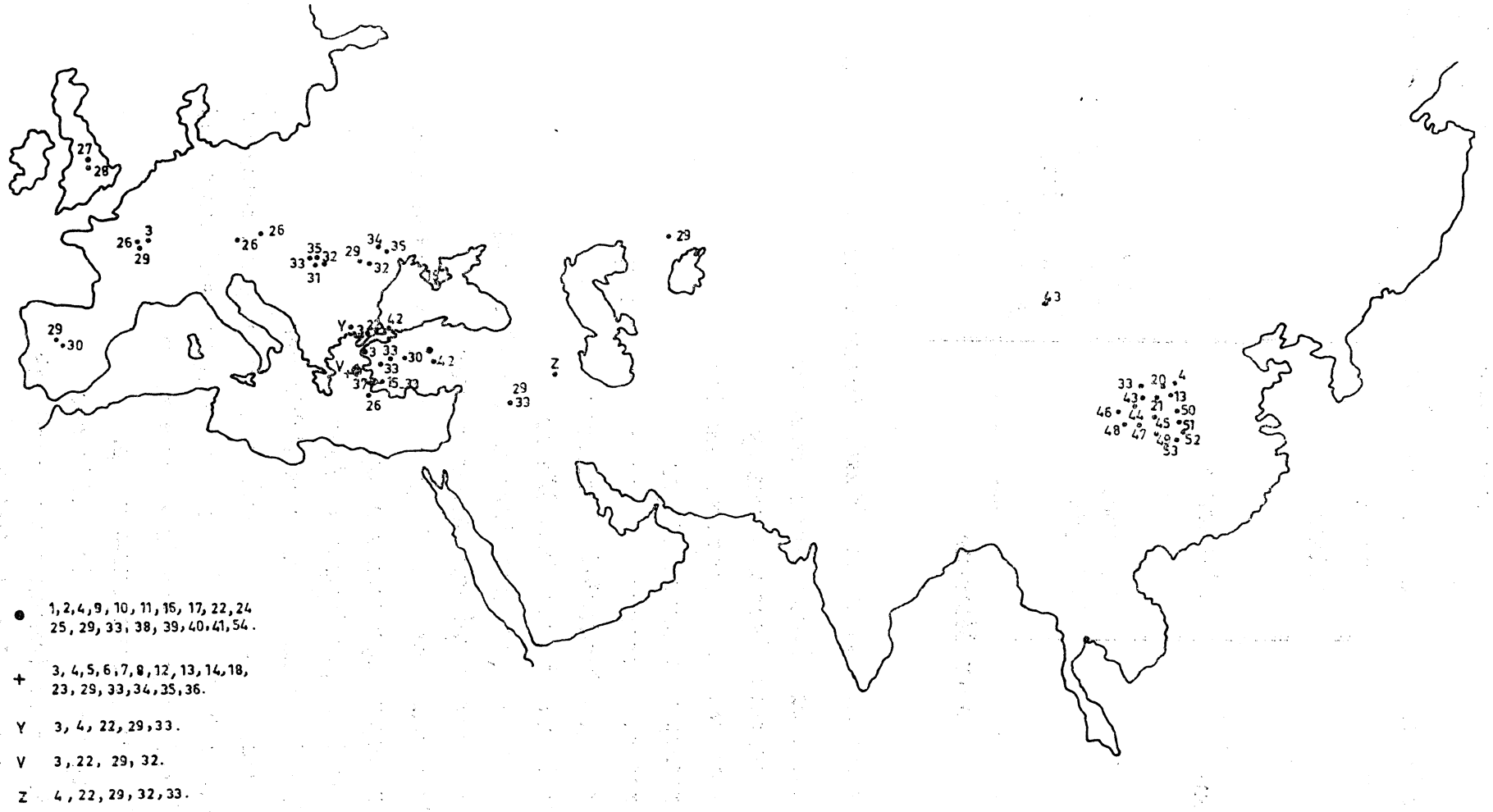
established the genüä association between Europe and Asia/At the same time, *Gazella gaudryi* Schlosser and *Gazella deperdita* Gervais have established the species west-east association between Europe and Asia. For this reason, these species have been characterized during the Lower Pliocene, from Europe to Asia. These two species have been found in the Pliocene age in Turkey. The other *Gazella* species have almost local characteristics, therefore, they hate not migrated to these continents. Teilhard and Trassaert (1938) discussed evolutionary points of *Gazella* in China. According to these writers, the first group of *Gazella gaudryi* Schlosser is characterized only the Lower Pliocene in Shensi, Shianshiang, Kansu, Tsaidam and Shansi (zone I) localities. The second group of *Gazella blacki* Teilhard and Young lived in the Middle Pliocene in Shiashaung, Shouyangyütze, Kansu, Taiku, Mienchich-hsinam and Shansi (zone II) localities. The other groups of *Gazella sinensi&* Teilhard and Piveteau, *Gazella subgutturosa* Güldenst occured in the ¥ülefranchian Age in Taiku, Yangton-yeh, Taoping, Wuhsiang, Fushan, Szechuan, Honan, Fukien, Yonan, Mienchich-hsinan, Nihowân, Yang-shäotsun, Kueite-tal, Hsi-kou and Shansi (zone III) localities in China.

Gazella ancyrensis Tekkaya belongs to the group of *Gazella gaudryi* Schlosser. For this reason, *Gazella ancyrensis* Tekkaya characterizes only the Lower Pliocene.

Qurliqnoria chensi Bohlin lived merely during the Pliocene age in China (Bohlin, 1935). *Qurliqnoria şenyüreki* Ozansoy was first discovered in the Middle Sinap series by Ozansoy (195Î, 1965). *Qurliqnoria* has made the faunal connection between Anatolia and China.

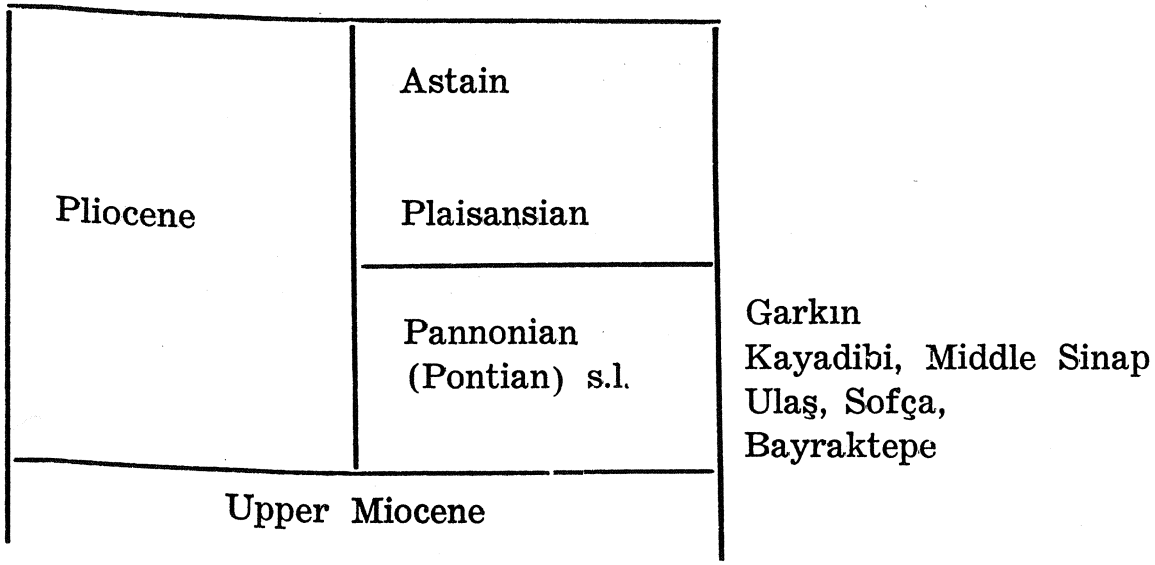
CONCLUSION

: It appears that, considering the extension of Bovidae fauna of the Middle Sinap, Anatolia was placed between Europe and Asia during Pliocene. Probably due to the widely-varied ecological zones öf Anatolia at that time, representatives of the Eurasiatic fauna sèèm to have come together in Middle Sinap times.



Distribution of the Fossil Bovidae Faunas of Eurasia.

The Stratigraphic position of the Bovidae faunas of Middle Sinap



The distribution list of the Fossil Bovidae faunas of Eurasia

1 — *Palaeoreas brachyceras* Ozansoy
2 — *Palaeoreas elegans* Ozansoy
3 — *Palaeoreas lindermayeri* Gaudry
4 — *Protoryx carolinae* Major
5 — *Protoryx carolinae* Major n. var. *laticeps*
6 — *Protoryx hentscheli* Schlosser
7 — *Protoryx* cf. *carolinae* Major
8 — *Protoryx longiceps* Pilgrim and Hopwood
9 — *Protoryx carolinae* Major n. var.
10 — *Protoryx longiceps* Pilgrim and Hopwood n. var«
11 — *Protoryx capricornis m* sp.
12 — *Pseudotragus longiceps* Andrée
13 — *Pseudotragus capricornis* Schlosser
14 — *Pseudotragus capricornis* var. *hippolyte* Schlosser
15 — *Pseudotragus* cf. *longicornis* Pilgrim and Hopwood
16 — *Pseudotragus parallelocornis* n. sp.
17 — *Tragoreas sinapensis* n. sp.
18 — *Tragoreas oryxiodes* Schlosser
19 — *Tragoreas leskewitschi* Borissiak
20 — *f Tragoreas lagrelii* Bohlin

21 — *fTragoreas palaeosinensis* (Schlosser) Bohlin
22 — *Helicotragus rotundicornis* Weithofer
23 — *Helicotragus fraasi* Andrée
24 — *Helicotragus incarinatus* Ozansoy
25 — *Sinapocerus ozansoyi* n.gen. n.sp.
26 — *Gazella stehlini* Thenius
27 — *Gazella anglica* Newton
28 — *Gazella daviesi* Hinton
29 — *Gazella deperdita* Gervais
30 — *Gazella burbonica* Deperet
31 — *Gazella baltavarensis* Benda
32 — *Gazella capricornis* Rodler and Weithofer
33 — *Gazella gaudryi* Schlosser
34 — *Gazella mytilinii* Pilgrim
35 — *Gazella schlössen* Pavlow
36 — *Gazella longicornis* Andrée
37 — *Gazella otkuni* Ozansoy
38 — *Gazella* cf. *deperdita* Gervais
39 — *Gazella eleanorea* Şenyürek
40 — *Gazella proatlantica* Ozansoy
41 — *Gazella ancyrensis* Tekkaya
42 — *Gazella* sp,
43 — *Gazella paeotehensis* Teilhard and Young
44 — *Gazella dorcadoides* Schlosser
45 — *Gazella (protetracerus) gaudryi* Schlosser
46 — *Gazella blacki* Teilhard and Young
47 — *Gazella* cf. *blacki* Teilhard and Young
48 — *Gazella sinensis* Teilhard and Piveteau
49 — *Gazella* cf. *sinensis* Teilhard and Piveteau
50 — *Gazella* cf. *subgutturosa* Güldenst
51 — *Gazella kueitensis* Bohlin
52 — *Gazella paragutturosa* Bohlin
53 — *Qurliqnoria chensi* Bohlin
54 — *Qurliqnoria şenyüreki* Ozansoy

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