İskenderun Neojen Havzasının Stratigrafisi (Özet)

A. ten DAM

İskenderun Neojen havzasına ait olan bu etüd bölgedeki çalışmaların kısa bir tarihçesini verdikten sonra sahada 1300 metre kadar deniz Mioseni ve 1200 metre kadar da Karasal Pliosenin mevcudiyeti zikredilmektedir. Miosen sedimanlarının çöken bir havza içine kenarlarında kumtaşları ve basenin ortasına doğru kil ve kumtaşı ile nihayet marnlı olarak teressüp ettiklerine işaret edilmektedir. Kenarlarda görülen kumtaşlarının hazne taşı ve ortadaki marnların ana taşı vazifesini görebilecekleri ve kumtaşları basenin ortasına doğru incelip kaybolmadıkları takdirde teraküm kabil olacağını söylemiştir. Havzanın serpantinleşmiş ofiolit sahalariyle çevrildiği ve bunların üzerinde görülen kalkerlerin bir Lithotamniüm ve Mercan resifi olduğu ve bunların Miosenin kaidesini teşkil etmiyerek basenin ortalarında teşekkül eden bütün sedimanlara tekabül ettiği ileri sürülmektedir. Ofiolitlerle bahsedilen resifli kalkerin temas satıhları normal olarak görülen yerlerde resifli kalkerin içinde serpantin çakılları müşahede edilmiştir. Bu resif kalkerleri düz bir satıh üzerinde değil ivicaclı bir transgresiyon sathı üzerinde teşekül ederken basenin diğer taraflarında milli kumtaşları ve marnlar hemen inkıtasız bir surette çökmekte olan basenin içinde teressüp etmişlerdir.

Miosen sedimantasyonu sonunda altere marnlar ve killer üzerinde görulen bir itikal sathı üstünde Karasal Pliosen teressüpleri gelmektedir. Her nekadar bu sahraların yaşı fosillerle tesbit edilememiş ise de yeni bir sedimantasyon devri başladığı aşikardır. Pliosen sedimanlarının oldukça büyük bir kalınlık göstermesi deniz çekildikten sonra basende bir miktar çökmenin vaki olduğuna işaret etmektedir.

Pliosen konglomeralar ve milli kumlardan mürekkep olarak tipik bir sel vadisi teressübüdür. Konglomeralarda ofiolitik unsurlar görülür. Serinin üstünde bir kaliş zonu müşahede edilir.

Pliosen ve ekseriya Miosen tabakalarını genç mil, kumtaşı., konglomera ve kalişden mürekkep sel vadisi teressüpleri örter. Bazı yerlerde bu genç sahralar bile meyilli olmaları tektonik hareketlerin son zamanlara kadar faal olduğunu göstermektedir.

Miosenin başlangıcından itibaren basenin etrafında mavimsi marnlar ve kumtaşları teressüp ederken sahil yakınlarında da Lithothamnium resifleri transgresiyonla beraber gittikşe sahile yaklaşarak teressüp etmekte idi. Nihayet basenin çökmesi sona ererek şurada burada gölcükler hasıl oldu ve marnlı jipslerle masiv jips tabakaları teşekkül etmeğe başladı. Çökmedeki bu tevakkuf sahayı çevreliyen ofiolitik sahraların yükselmesinin daha evvel başlamış olduğuna ve yükselme Pliosen iptidalarında âzami hadde vardığına işaret etmektedir.

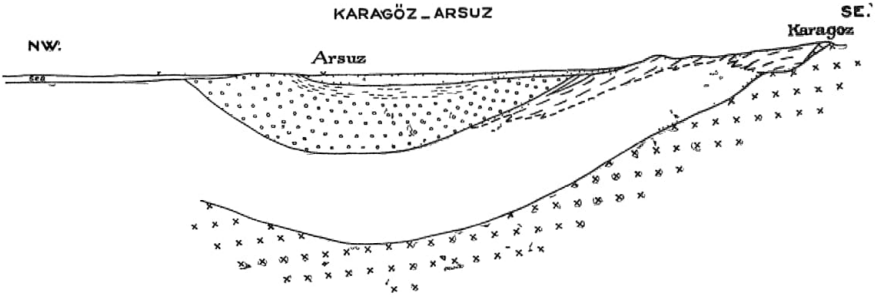
Çengen 1 ve 2 numaralı kuyularda rastlanan mikrofosillerin etüdünden bunların tipik Miosen mikrofonası oldukları ve Miosenin altından üstüne kadar devam ettikleri görülür. Basenimizde Oligosene veya daha eski bir devre ait fosil bulunmamıştır. Pelajik mikrofonanın detaylı etüdü bunların topluluklar halinde bir müşir rolü oynamalarına imkân verebilir. Rastlanan mikrofonanın kısa bir incelenmesi neticesi olarak bunların Mısır, Cezayir ve Fas'da görülen mikrofonaya müşabih olduğunu göstermektedir.

Petrol emareleri Çengen köyünde Miosen kumları içinde gaz emaresi de Ekver köyü civarında Yanartaş mevkiinde Serpantin içinde görülür. Ayrıca Çengen 1 kuyusunda da Miosen içinde bariz gaz tezahürüne rastlanmıştır.

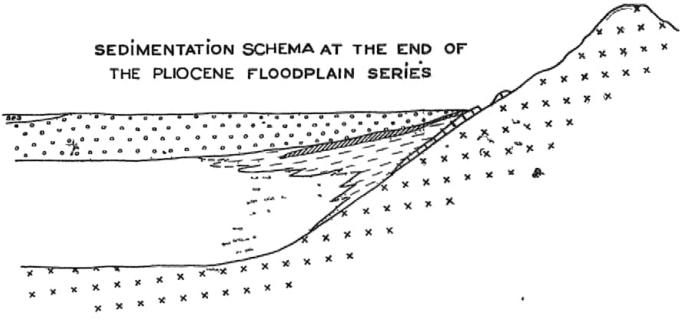
SCHEMATIC SEDIMENTATION HISTORY IN THE SOUTHERN PART of THE NEOGENE ISKENDERUN BASIN

Dr A ten Dam

SEDIMENTATION SCHEMA ALONG A SECTION KARAGÖZ - ARSUZ



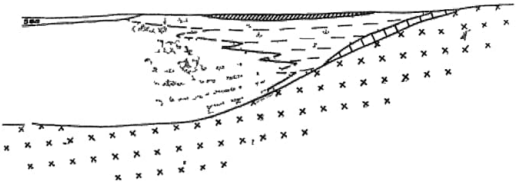
SEDIMENTATION SCHEMA AT THE END OF THE PLIOCENE FLOODPLAIN SERIES



LEGEND

- *Recent flood plain series*
- Pliocene
  - *Lacustrine series*
  - *Flood-plain series*
- *Gypsum*
- Miocene
  - *Silty-sandy formation*
  - *Marly-sandy formation*
  - *Marly formation*
  - *Reef limestone*
- *Ophiolitic basement*

SEDIMENTATION SCHEMA TOWARDS THE END OF THE MIOCENE



Sedimentation, Facies and Stratigraphy in the Southern part of the Neogene Basin of Iskenderun

A. ten DAM [1])

This is a study of the sedimentary and facies conditions in the Neogene of the southern part of the Iskenderun basin. The continous downwarping of this basin during neogene times resulted in the accumulation of marine sediments of miocene age up to a thickness of 1300 meters and of continental sediments of probable pliocene age up to a thickness over 1200 meters. It is possible that the deep neritic sediments of miocene age, towards the centre of the basin, in the form of blue marls or marly claystone hame constituted a source-rock for petroleum, whereas a part of the sandy banks in the shallow neritic facies towards the border of the basin may have constituted a reasonably good reservoir - rock. So it seems possible that there exists petroleum-accumulation in these sandy parts if favorable structures can be discovered. The presence of petroleum in the miocene rocks is proven by the petroleum seepages near the village of Çengen aind by the gas-seepages near Yanantaş. It is however probable that these sandstones and sands wedge out too rapidly towards the centre of the basin, so that it will be impossible to find any sufficiently porous rocks in the parts of the basin where we might expect some favorable structures although it is possible that the sandy beds in the upper parts of the miocene, wedge out somewhat farther from the basin-border than the lower miocene sandstones. It must be excluded to expect any accumulation in the reef-limestone of the Miocene, because those limestones are only to be found on the border of the basin, where they constitute a fringing eerf.

I — INTRODUCTION

This study was carried out in order to try to reconstruct the stratigraphical and sedimentary history of the Neogene in the Çengen-Arsuz area of the Iskenderun-basin and finally to examine whether formation and ac-

1) Senior Paleontoliogist M.T.A. Institute; *paper preserited before the session of the Geological Society of Turkey on October 31, 1951.*

cumulation of petroleum might have been possible in the sequence of Neogene sediments.

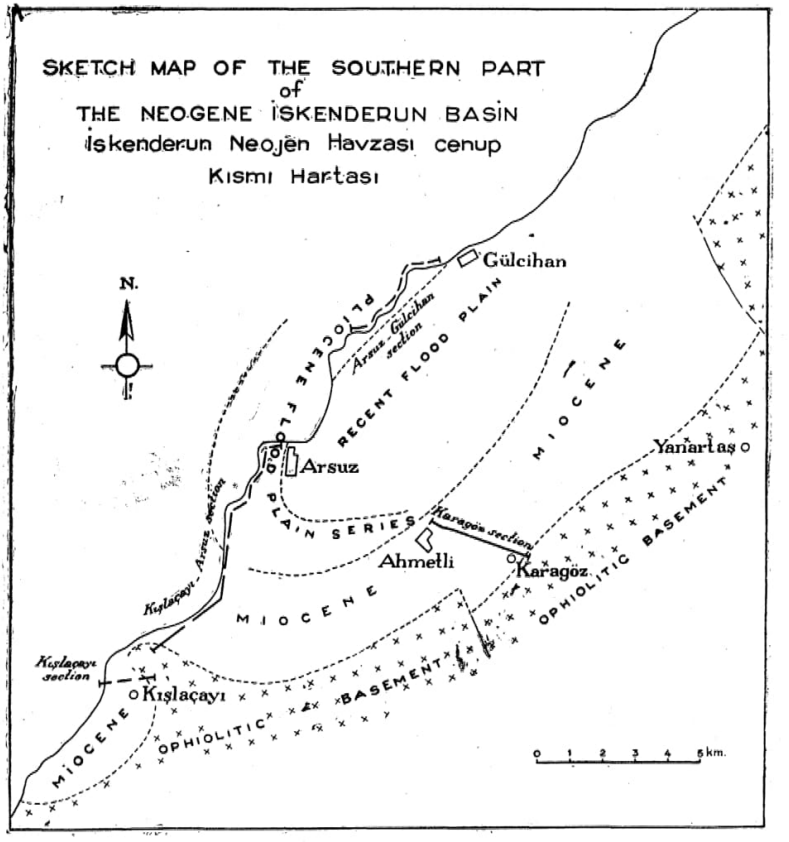
The part of the basin studied by the author is situated between Aşagı Çengen in the NE and the village of Kışlaçayı in the SW and comprises the zone of Neogene sedimentation in between the ophiolotic mountain - bloc of the Kızıldağ and the Gulf of Iskenderun. The lengh of this part of the basin is approximately 25 km. and the maximum breadth 9 km.

In order to be able to draw a picture of the sedimentory and stratigraphical conditions in this basin four type - sections have been measured, mapped and sampled in the southem part of the basin. We have been obliged to choose our sections in the southern part of the basin, because everywhere else we are sure that the Miocene overlies unconformably the premiocene basement, and is thrust against or over it, whereas in certain points in the southern part of the basin the contact between Miocene and basement is a normal one and not by fault. None of these sections showed faulting of the Miocene beds so that we may expect a continuous section. Since sedimentary conditions seem to be identical in the northern and southern parts of the basin, it will have no effect on the general sedimentary picture. The type-sections are not described here in detail, since all essential details will figure in the chapter on stratigraphy.

The fieldwork was carried out in the spring of 1951 on behalf of M.T.A. Enstitüsü. The collected samples have been analysed in the Paleontoliogical Laboratory at Ankara and have been compared with the results of the two deep test-wells that have penetrated the whole Miocene into the ophiolitic basement.

It has been impossible to incorporate in this study also the results of a detailed analysis of the microfaunae. A rapid survey of the samples from the sections and from the two test-wells shows clearly that a dotailed and scientific study of the microfaunae from the Miocene of the Iskenderun basin will give positive results for the correlation.

Measuring and mapping of the sections in the field and the final elaboration of the results have been carried out in close and cordial collaboration with Mr. Ziya KIRMAN, who was charged with the geological and tectonic study of the same basin.



II — HISTORY

Before going into details something has to be said about previous work in this region, as the area studied by the author has been the subject of several more or less detailed investigations by earlier uuthors.

Although Iraq Petroleum Company camed out some geological research in this area, nothing has ever been published afoout the results of these investigations.

The first publication conceming the Iskenderun basin is from the hand of H. VAUTRIN (1933, Liftt.1). In Ms paper Vautrin gives a fairly detailed description of this basin and although he largely underrated the thickness of the neogene sediments and although he considered the different facies - units of the Miocene as stratigraphic horizons, his paper gives already a fair general picture of this area.

In 1940 D. B. ERICSON (1940,Litt.2) prepared his report on the geology of Hatay, in which he gives a detailed survey of the Iskenderun basin. He did however not recognize the synclinal structure of the Arsuz-Gülcihan plain, the most striking character of the whole region and he did not understand the stratigraphic position of the reef-limestones along the border of the basin.

Finally in 1944 I. ORTYNSKI (1944, Litt. 3) made a detailed study of the area of Aşağı Çengen, only dealing with the direct neighbourhood of this village. His report does not enable us to draw a picture of the neogene sedimentary history of the Iskenderun basin as a whole.

These few papers and reports constitute the entire written documentation on the geology of the Iskenderun basin although several geologists have visited this area occasionally.

These investigations did not llow us to draw a clear picture of the stratigraphical, sedimentary and facies conditions of the ne-ogene Iskenderun-basin, so that a detailed study of this kind became a necessity.

III — STRATIGRAPHY

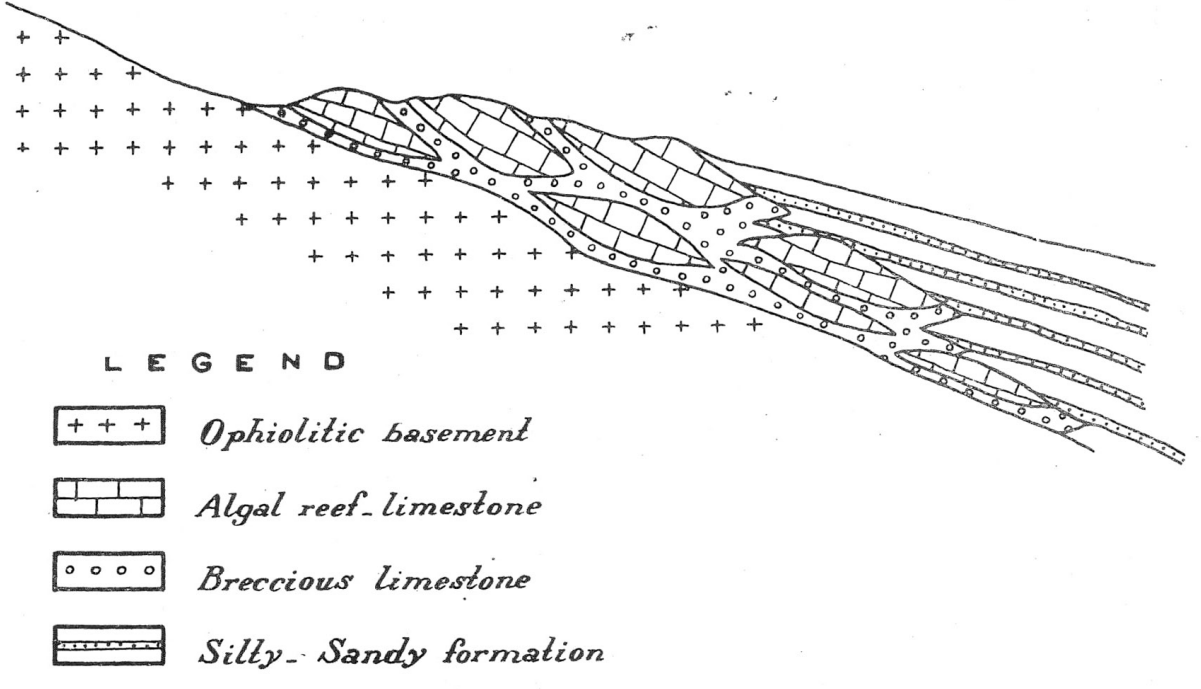
The complex of neogene formations in the Iskenderun basin is unconformably overlying the pre-miocene basement. In the investigated area, i. e. between Çengen and Kışlaçayı this basement complex is uniformously composed of more or less strongly serpentizined ophiolitic rock. The Mio-Pliocene formations are generally conformable among them selves and have been submitted to the same deformational stresses that folded and faulted the entire complex towards the end of the Pliocene.

a — Pre-miocene basement

As already mentioned above, the pre-miocene basement, as far as it is outcropping in the area investigated, is composed of the complex of ophiolitic rocks. It is constituted by more or lss fresh gabbros, serpentinized gabbros and chloritized gabbros. An important part of these rocks are of a dark-green colour, sometimes almost black. According to

EXAMPLE OF BIOHERMS (REEFS) DEPOSITED ON A STEEP SLOPE DURING TRANSGRESSION OF THE MIOCENE SEA

(observed near Karagöz)



the authors who studied this ophiolitic formation, it constitutes an intrusion into sedimentary rocks of cretaceous age. Alteration products of these rocks build up a great part of the neogene sediments and continue still actually to contribute on a large scale to the recent sediments in the large Arsuz- Gülcihan flood-plain.

In certain parts of Hatay lutetian limestone with pebbles of ophiolitic rocks overlie the serpentine-formation, but in the investigated area no traces of these sediments have been observed, although it seems possible and even probable that they might be found more towards the centre of the Miocene basin, that is to say under the actual Gulf of Iskenderun.

b — Miocene

The Miocene formations are overlying unconformably the ophiolitic basement and are composed of a series of beds deposited in continuous sedimentation. Since we can only observe the miocene deposits along the border of the basin and the more central part of the miocene basin is covered by the sea in the actual Gulf of Iskenderun, it is difficult to draw here an exact picture of the beginnimg of miocene transgression, which first affected the more central part of the subsidence basin and finally reached the actual visible border after gradual downwarping of the basin.

The sedimentation-conditions on the border of the basin prove us that the lower parts of the Miocene must be expected towards the centre of the basin, under the actual Gulf of Iskenderun, since we only see neritic and shallow neritic facies, with indication that the coast was never far away. Of this miocene basin we can only describe the sedimentary conditions along the border and only by extrapolation something might be said about the conditions towards the middle of the basin.

The stratigraphic units of the Miocene, as described by the different authors who have investigated this basin are in no way real stratigraphic units but clearly facies-units. The oldest horizons of the Miocene outcropping in our area are blue and blue-grey marls and argillaceous marls with numerous thin, more or less lenticular intercalations of very finely grained sandstone and silty sandstone with thicknesses up to 5

cm. These blue marls are changing vertir cally towards the top and horizontally towards the basin-border into silts and marly silts with increasing amount of sandstone-beds. The thickness of these sandstone-beds is extremely variable, locally reaching several meters, the same bed splitting towards the centre of the basin into several thin beds interfingering with silts and silty marls finally disappearing completely. Towards the end of this silty-sandy formation massive gypsum beds altemating with more or less gypsiferous marls and silts sometimes with thin sandy beds are developped. Lateralty this silty-sandy formation may transgress immediately over the ophiolitic basement, locally with a well developped basal sandstone with serpentine pebbles. More frequently however, especially on the basin-border, this silty-sandy formation changes laterally into a transgressive reef-limestone, mainly Lithothamnium-limestone, occasionally with corals. This reef-limestone is composed of a serles of superposed lenticular reefs, separated by more less breccious zones. Where there is a normal contact between the ophiolitic basement and the reeflimestone we have locally observed the presence of serpentine- pebbles in the limestone. These frimging reefs have been formed not on a flat surface, but on a very irregular transgression-plane. They have been formed at the same time as the silty-sandy series and show clearly the characters of a transgression reef. Consequently they represent a lateral facies change of a great part of the Miocene. In three of our type-section these characters have been observed with great clearness.

Locally where a complete section of the Miocene has been observed it has been found that the gypsiferous formation at the end of the miocene sedimentation cycle is overlain by yellowish brown more or less altered marls or clays. It is probable that these altered beds have to be considered as the ancient erosion surface between the Miocene and Pliocene.

On the border of the basin, in our type sections, we come to a total thickness for the marine miocene sequence of approximately 800 m, but from the two deep tests at Çengen it is already known that the miocene series reaches thicknesses of over 1300 m, towards the centre of the basin. This proves that gradual thickening of the miocene sediments takes place from the original basin border towards the centre of the basin.

It is clear that the lithologic units, mentioned above are the same as those of the previous authors, but contrary to their opinion we are obliged to consider these units as facles units in the entire miocene sedimentation cycle. The blue marls with thin sandy streaks are probably intermediate between the sandy-silty-marly series on the basin border and a more marly formation which will probably constitute the bulk of the sediments in the centre of the basin, although no outcrops of this formation are known from our area. It seems possible that the thick complex of marls, met in the deeper parts of the Çengen No. 3 test-well represents already partially this deep facies of the more central parts of the basin. It is also clear that the limestone series, only observed along the actual border of the basin, does by no means represent the statigraphic base of the Miocene sequence, but is a lateral change of a great part of the Miocene, forming a transgressing fringing reef. This fact is of primary importance for the understanding of the structure of this basin.

The miocene basin was distinctly a subsidence-basin and one must expect that the total thickness of miocene sediments is regularly increasing towards the centre of the basin. This thickness may be a few meters on the border of the basin and will increase to far over 1200-1300 m. towards the centre. A real marly series is not represented on the border, but will certainly constitute a great part of the whole miocene sequence towards the middle of the basin, whereas the silty-sandy series on the basin border is decreasing considerably towards the centre in thickness. The gypsiferous beds represent locally developped regressive conditions and are only of secondary importance. Towards the centre of the basin we can not expect them. The reef-limestones only rarely reach more than 30 m of thickness and are distinctly a border-facies. Towards the centre of the basin no reef-limestones should be expected, except perhaps for some local reefs on ridges in the original miocene sea.

c — Pliocene

The altered marls and clays, probable the ancient erosion surface of the Miocene, marking an interruption in the sedimentation, form the limit between the Miocene with principally marine sedimentation and

the Pliocene with principally continental sedimentation. Only in one of our sections the relation between these two sedimentation cycles has been observed in all detail. It must however be stated here that it is impossible to be sure of the pliocene age of this continental sedimentation cycle, as no fossils have been met with in this formation. Since there is a distinet indication of an interruption in the sedimentation between the marine sediments and the continental sediments it seems reasonable to consider this limit as the limit between the Miocene and the Pliocene. The possibility exists however that also this complex of continental deposits belongs still to the Miocene. In this study it is nevertheless accepted that this compltex is of pliocene age.

The Pliocene outcropping on the border of the Iskenderun basin is entirely of continental origin, so that the emersion starting towards the end of the Miocene, has continued during Pliocene, but the often considerable thickness of this continental Pliocene tells us that the downwarping of the basing has continued during the Pliocene.

Pliocene sediments are only outcropping along the actual coast of the Gulf of Iskenderun on the NW flank of the Arsuz-Gülcihan syncline, where they are conformable with the Miocene. It is probable that there exists a slight unconformity between Miocene and Pliocene towards the border of the basin, on the other flank of' the Arsuz-Gülcihan syncline, where the Pliocene and Miocene are actually covered by recent flood-plain deposits.

The pliocene sedimentary sequence is principally composed of an enormous mass of conglomerats, loams and sandstones, a typical flood-plain-complex. The maximum thickness observed in our type - sections is over 1000 m. It is an alternation of more or less lenticular conglomerate- beds, composed of ophiolitic elements, and of equally lenticular fine to coarsely grained sandstones, with serpentine pebbles. It represents a typical flood-plain series, as deposited at the foot of a nearby mountain-chain. The conglomerates and sandstones are generally well cemented by calcareous material. Towards the top of the series a few fossilized caliche-horizons have been observed. This series reaches its greatest thickness near the ancitent pliocene coast and will wedge out towards the sea and to¬wards the mountains.

Between this flood-plain series and the underlying Miocene beds there is locally an intercalation of fine and very finely grained, yellowish, thinly foedded, sandstones with cross-bedding, typicaily a sanddune - formation, deposited at the beginning of the Pliocene. This sanddune-formation has up till now only been observed in the section between Arsuz and Kışlaçayı. It is certainly not more than a local phenomena and it should not be expected elsewhere at the base of the flood-plain series. In the Arsuz-Kışlakaya section this sanddune complex reaches a maximum thickness of 395 m.

Between Arsuz and Gülcihan, along the coast, whitish or brownish argillaceous limestone with more or less lignitic traces have been found overlying the flood-plain series. This formation is of lacustrine origin and shows occasionailly a few beds of conglomerate or conglomeratic sandstone and it represents the highest known part of the Pliocene in our area.

The entire Miocene and Pliocene have been summitted to deformational stresses that are at the origin of the actual structure of this basin.

d — Pleistocene and recent

The Pliocene and often also the Miocene formations in and along the Arsuz-Gülcihan plain are overlain horizontally or subhorizontally by a recent or subrecent flood-plain series composed of loams, sandstones and conglomerates and locally by caliche. These deposits show the same characters as the pliocene flood-plain series and are certainly of the same origin. These recent conglomerates however are more varied in their composition as the pliocene conglomerates. They are composed of numerous pebbles from the ophiolitic formation, and of sandstone and limestone pebbles from the miocene formations.

At certain points even these recent sediments have been tilted, proving that the deformational stresses have still been Working in recent times.

IV — SEDIMENTATION AND FACIES

As already mentioned above the sequence of Neogene sediments has been deposited in a subsidence basin, of which only a part of the ancient

border is outcropping and of which no sediments are known, clearly representing basinal conditions. A downwarping movement continued throughout the Neogene period, almost without interruption.

Except for a few serpentine pebbles at the base of the Miocene reef-limestones and at the base of the silty-sandy formation where it transgresses directly over the ophiolitic basement no coarse detritic material is known from the entire Miocene. The Miocene sediments are composed of fine or very finely grained, partially argillaceous sands and sandstones, finely sandy silstones, siltstones and marls or silty marls, all of them distinctly of fine or very fine texture. So it is quite evident that during Miocene time there did exist only very little coastal relief, i. e. no high hills or mountain ridges near the coast. The transgression must have been fairly rapid, since there has been no time for the formation of real basal conglomerates. From the beginning of the Miocene blue marls have been deposited, towards the border of the basin with increasing amounts of sandstone and siltstone, on the border typically fringing reefs, mainly composed of Lithothamnium. The sedimentary series is fairly uniform, although more or less rhytmical, especially in the upper parts of the Miocene, where frequent alternations of marly, sandy and silty beds have been observed. For the greatest part of the Miocene the speed of sedimentation was equal to the speed of subsidence of the basin. As already mentioned above this marly formation becomes finally towards the top and laterally towards the border more and more sandy and silty indicating shallower depths and increased speed of sedimentation. Simultaneously with the formation of these marly and silty-sandy deposits, fringing reefs of calcareous algae grew along the border of the basin and gradually advanced over the continental slope with the progression of the miocene transgression. Finally the subsidence of the basin must have become nearly stopped since salty lagoons could be formed, where the gypsiferpus marls and the massive gypsum-beds were deposited. These gypsiferous beds were finally covered by more or less sandy loams and clays, marking the end of Miocene sedimentation. This interruption of the gradual subsidence of the basin towards the end of the Miocene is an indication that the upwarping of the ophiolitic masses along the border of the basin had already started, reaching its

climax in early Pliocene times.

The facies of the Miocene sediments is not very variable. The marly-sandy formation represents a neritic facies, whereas the silty-sandy formation represents a shallow neritic facies, partially very close to the coast. Locally there was sufficient infftux of fresh- water from rivers that brackish water conditions could be formed, so that a part of the silty-sandy formation represents a brackish water facies.

At the beginnig of the Pliocene there were locally deposits of sand-dunes on the miocene erosion-surface and at the same time increasing amounts of pebbles, blocks and sandy material started to flow down from the upwarping ophiolitic masses into the coastal plain. Subsidence of this part of the basin continued during the entire Pliocene and an impressive thickness of flood-plain, sediments has been deposited in this part of the neogene basin. At the end of the Pliocene a lake has been formed in certain parts on this coastal plain where lacustrine limestones have been deposited, At the same time the flow of flood-plain sediments was somewhat interrupted, starting again after the tilting of the Pliocene sediments and continuing up till recent times, the actual plain between Arsuz and Gülcihan being filled up again by pebbles, sand and blocks, flowing down from the ophiolitic mountain-chains of the Kızıldağ.

The principal character of the neogene basin as a whole is certainly the deep Arsuz-Gülcihan syncline, approximately coinciding with the actual Arsuz-Gülcihan plain. In the SW the Miocene overlies normally the premiocene basement, but towards the NE the Miocene has been thrust against and partially on the premiocene basement.

V — MICROFAUNA

A rapid survey of the samples of the Çengen No. 1 and 2 test-wells and of the samples of the type-sections enabled us to draw a picture of the general composition of these microfaunae.

It can be said that the Miocene of the Iskendemn basin is characterized by typically a neocene microfauna. Many species occuring in the lower parts of the Miocene continue into the upper parts of the Miocene or may even be found in the actual Gulf of Iskenderun. At

the other hand no Oligocene or older species have been observed. It is probable that the evolution or the varaation of the pelagic forms will be sufficiently rapid to enable us to use them as stratigraphic markers but this would require a detailed study of these forms. We have also observed that severai representatives of the foraminiferal family Buliminidae show a similar evolutionary trend, but here also it will require a detailed study of the species concerned. At first view and certainly with the method only counting the different genera one must have the impression that this fauna is fairly uniform and that there are almost no genera with restricted vertical distribution. The same problem has been met in other parts of the world: Algeria, Trinidad, Venezuela and Egypt. Only a very detailed study of the species and of the distribution of these species throughout the miocene column did give in those regions satisfactory results for the stratigraphy.

A rapid survey of the species has shown us already that the miocene microfauna of the Iskenderun basin is closely related and even mainly identical with the miocene microfauna of Egypt, Algeria, Morocco and the Balears.

VI – HYDROCARBONS

Liquid hydrocarbon shows and gas-seeps have been observed in different parts of this basin, mainly as surface indications, rarely as subsurface-indications in testwells.

a - Surface- indications

The known oil-seepages in the Neogene Iskenderun basin are all concentrated in the direct neighbourhood of Çengen, approximately

at 250 m S of this village. The oil seeps from a finely grained, more or less argillaceous sandstone with grey marly intercalations. It seems probable that this seepage is connected with the faults traversing this area.

Some gas-seepages are known since a very long time. They are occuring around Yanantaş, S of Zilli Çayı and seem to come from more or less fractured serpentines. It is possible that these gas seepages are orig-

inating from the Miocene through faults, but it is equally possible that they are coming from petroliferous formations below the serpentine, migrating along faults.

b — Subsurface - indications

These surface indications near Çengen were the reason of the wells drilled in this area. Several older wells drilled by previous investigators near the end of the last century in the direct neighbourhood of Çengen have found small quantitles of gas at very shallow depths. The deeper tests drilled by M.T.A. between 1939 and 1951 did find only small quantities of gas at very shallow deptlis and only once very slightly impregnated sands. No other shows are known from the wells drilled in this region.

c — Possibilities

Nowhere in this region we have been able to observe miocene sediments which might be considered with a certain probability as source-beds of petroleum. It seems however possibie that the marly facies with thin silty or sandy beds, probably changing to piain blue marls towards the centre of the basin might be considered as source-beds for petroleum. It must be emphasized here that these rocks are not known from surface sections and that only indica-tions exist that the marly section in both of the deeps test-wells at Çengen might represent deeper neritic conditions and point towards the presence of an entirely marly section towards the centre of the basin.

As for reservoir-rocks, it is sure that the marly-sandy and silty-sandy facies along the border of the basin can a priori be considered as a fairly favorable reservoirrock. It must however be feared that a great part of the sandstones are too finely grained and too much mixed with argillaceous material to be able to Show any appreciable porosity or permeability. A great part of the sandstones observed in the field are in any case too argillaceous and they show only a very reduced apparent porosity and permeability.

There is still another factor which plays a big role and that is the fact

that most of the sandstones are thinning out considerably towards the centre of the basin and that finally they disappear completely, so that already at a short distance from the actual border of the basin only very little sandstones are left in the miocene section, as has been proven in both of the deep tests at Çengen. Only the upper parts of the Miocene section, might show some porous beds at greater distances from the basin border.

Some of the geologists who have worked in this area previously attached much importance to the possibility of oil accumulations in fractured limestones at the base of the Miocene section, also towards the centre of the basin. Since these limestones, have only been observed along the border of the basin and are certainly only a lateral equivalent of the marly-silty-sandy series and since even their absence has been proven in the two deep tests at Çengen and in some of the field sections it seems highly improbable that these limestones should be found towards the centre of the basin, so that oil-accumuiation in fractured limestones of miocene age must be excluded. Only if further towards the centre of the basin, under the actual sealevel of the Gulf of Iskenderun there existed in mio¬cene times underwater ridges, shallow enough to permit formation of Lithothamnium reefs or coral reefs, lenticular bodles of reeflimestones can be expected towards the centre of the basin. Since nothing is known about the central parts of the basin, now covered by the sea, this is only hypothetical,

The conclusion must be that the best chances for petroleum - accumulation in the neogene basin of Iskenderun should be expected in the apparently fairly porous sandstones towards the top of the Miocene series, if these sandstones can be found under a sufficiently impervious cover. Near the border, where most of the wells have been drilled, the upper parts of the Miocene are for the greatest part eroded, especially on the structures where drilling has been going on.

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