CHAPTER 1

INTRODUCTION AND PREVIOUS WORK

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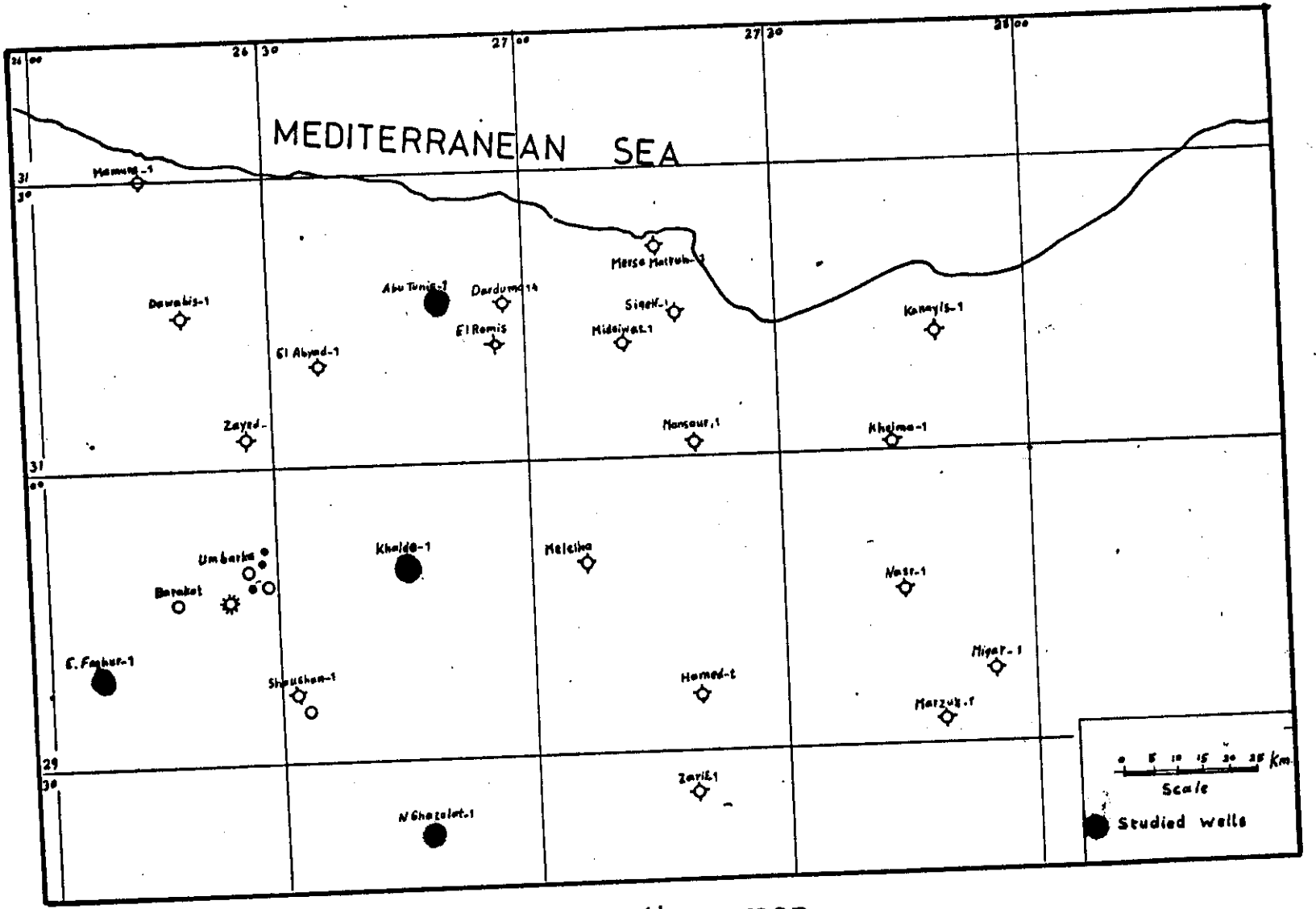
The exposed Oligocene sediments in Egypt are mainly composed of continental facies and volcanic flows; little attension has been given to those rocks compared with other stratigraphic units in Egypt.

Beadnell (1905) in his work on lower Oligocene fluviomarine series in the Fayum province, he grouped the Oligocene deposits under the so called Qatrani Formation and findout a few species of mollusca as : Lucina, Arca, Mutela, Lanistes and Cerithium; Barron (1907) in his regional work on the district between Cairo and Suez, he assigned a pre-Miocene time to the basalt and silicification features at the eastern part of the area which he reported in many places and he mentioned fluviatile origin for the Oligocene formations; Ball and Beadnell (1908) assumed similar lithology for Bebel Ahmer and Fayum province; Blanchenhorn (1921) recorded Oligocene and Miocene sediments together with basalts in Dar El Beida area; G. Andrew & J. Cuvillier (1938) discovered marine Oligocene beds in Burg El Arab Region, to the west of Alexandria and lake Maryut in thin section of limestone, they recognized foraminiferal assemblages and fragments of Heterostegina, Lepidocyclina sp. and Nummulites; Ball (1939) considered the band in norther part of Fayum



Fig(1) Location map

area is of Oligocene age as it contains silicified wood and remains of land animals and wrote that the area was a dry land and in the period between Eocene and Oligocene a great rise of the land by simple movements upward; Baily and Finlay (1940) proposed two Oligocene rock units on the eastern portion of the northern part of the Western Desert between wadi Farigh and Wadi El-Raml, the lower unit is (Khashab Red Beds Formation) which is thin unit consisting mainly of shales intercalated with varicoloured sandstones and it is unconformably underlained by the upper Eocene shales. The upper unit is called (Haddadin Basalt), this is the basalt sheats flow, overlying unconformably Kashab Red Beds; Barker (1946) considered Gebel Qatrani series to be of Oligocene age in Cairo-Fayum area and the basalts of lower Miocene; Shukri, M.K. El Ayouty (1956) described gravel in Gebel Iweibid and mentioned that it is belonging to Oligocene age; Akkad and Issawi (1963) defined Radwan Formation to the Oligocene sediments of Bahariya Oasis, they mentioned that this unit is made up of sandstones and Quartizites; Ghorab (1963) named the basalt of Abu Zabaal area (Abu Zabaal Formation); R.A. Reyment (1966) considered that the marine Oligocene of West Africa is represented by limestone containing algae, pelecypods, Amphistiginids, Nummulites and Lepidocyclinids; Salah El Akkad and A. Atif Dardir (1966) gave the term Nakhiel Formation to

the limestone bed in Wasif area (Quseir-Safaga district), the formation is barren of fossils and unconformably overlies the upper Eocene Formation, because it never contain any representation of basement and overlained by Middle Miocene conglomerates they considered it of Oligocene age; Norton (1967) during his work on the different rock units in the western desert had placed the Oligocene deposits under the Moghra group, this group is ranging in time from Oligocene to Miocene and consists of interbedded sandstones, marls, shale and gypsum with occasional limestones, it is characterised by the presence of several fossil wood and vertebrate remains, the Oligocene basalt is interbedded in this group to the west of Giza and it is of fluviatile environment, Norton classified Moghra group into (Qaret Shoushan Formation) the upper unit, it is composed of shale, sandstone and limestone, the age of it is Oligocene to lower Miocene and (Dabaa Formation), the lower unit, the age assignement is Oligocene to Upper Eocene it consists of shale interbedded with fine sandstones. Between these two formations there is unconformity surface; Marzouk (1970) in his study of the Oligocene rock stratigraphy of the western desert he identified four units as follows from top to bottom : (Abu Zabaal Formation), it represents the Oligocene basalt flow, it is

of late Oligocene to lower Miocene age, (Aham El Bueib Formation), this is the marine Oligocene facies in the western desert, it is consisting mainly of shale highly fossiliferous reflecting open marine facies, (Zebeida Formation); this unit is mixed facies fluviomarine to marine, (Qatrani Formation), this is the fluviomarine sediments below the basalt and above the Upper Eocene deposits and well represented in Fayum,area, (Agila Formation) this is the continental Oligocene facies in the western desert; N.M. Shukri, M.K. El Ayouty (1971) during their work on Dar El Beida area they concluded that the Oligocene exposuers is represented by gravels capped by basalt toward eastern part of the area, unconformable relationship between Oligocene and Miocene and Oligocene and Eocene, this relationship is known everywhere in the Cairo-Suez district and to the west of the Nile in the western desert; Omara and Auda (1972) while they were working on the northern western desert they named (Ghazalat Formation) to the thick marine Oligocene green shales and they erected the (Shoushan Formation) to the Oligocene white, hard limestone rich with shallow water benthonic association, they mentioned absence of this formation in the eastern portion; Bahay Issawi (1973) studied the southeastern corner of the western desert and gave the olivine

basalts flow and dykes a wide span of time ranging from the Oligocene to the Quaternary; Baher El Khashab (1974), from his work on Fayum province, the Gebel Qatrani Formation is the represented Oligocene along the north of Fayum depression, it lies conformably over Qasr El Sagha Formation (Upper Eocene), outcrops around hills of Widan El Faras, mainly composed of varicoloured sandstone and sands with some shales and limestone interbeds, the formation is subdivided into three fossil wood zones, silicified wood are abundant and are of terrestrial origin of deposition, basalt sheet covers large area in the northern part of the Fayum depression; El Wyn, L. Simons and Philip D. Gingerich (1974) collected new carvirous mostly species of Apterodon from the Fayum province and belonging to Oligocene. M.Y. Meneisy and B.A. El Kaluobi (1975) during their work on the age of the volcanic rocks of the Bahariya oasis they named four volcanic occurrences in the area, because of absence of Eocene in some parts where the basalt occur and no middle Miocene rocks are known they considered these basalts as of Oligocene age; Salem R. (1976) during his subsurface studies on the Eocene-Miocene sediments in parts of north Egypt he concluded that : Oligocene is characterised by high sand content along the Mediterranean coastline, East

of Cairo Oligocene Quartizitic sandstone is exposed at Gebel Ahmer, during Oligocene time an incipient North-West South-East structural trend inherited from earlier tectonic disturbances which become well developed;; Seigle (1977), assigned late Oligocene age to Sabastian Formation (Northern Peurto-Rico) because of the presence of Miogypsina thalmani, antillea, Miogypsina panamensis, Ammonia sp. and Elphidium sogra.

Frost & Weiss (1977) studied the marine Oligocene of west Indies and they mentioned that the Antiqua Formation is a marine Oligocene of reefal limestone containing Lepidocyclina spp, the predominant is Lepidocyclina (Eulepidina) undosa belonging to Middle Oligocene or early Late Oligocene; Baher El Khashab (1979) in his brief account on the Egyptian Paleogene proboscidea wrote : the most primitive true proboscideans of the genus Palaemastodon have been recorded in the early Oligocene of north Egypt (Gebel Qatrani Formation in Fayum area) in the lower fossil beds or lower fossil wood zone of early Oligocene.

Scope of the Present Work :

The present study deals with the investigation of the Oligocene sediments in the Northern Western Desert. Four wells are throughly investigated, they are illustrated in Fig. I (Location map of the wells in the Northern Western Desert).

About 200 ditch samples and 40 thin sections of the larger foraminifera were studied for their microfossil content. The main aim of this study is to classify the Oligocene sediments of this region into different biozones with the help of planktonic foraminifera, larger benthonic foraminifera and ostracoda. Subdivision of the Oligocene sediments into Lower(Lattorfian)-Middle (Ruppelian) and Upper (Chattian) on the basis of the foraminifera biozones is attempted. Attempt is made to define the Upper Eocene-Lower Oligocene boundary as well as the Upper Oligocene-Lower Miocene boundary according to the faunal content. Isopach and Facies maps are constructed. A correlation chart is made between the Oligocene rock units of the studied wells in the Northern Western Desert and the Oligocene rock units in the Middle East.

"Notes on the Surface Oligocene"

Deposits beleived to be of Oligocene age occupied one and half percent of Egypt's surface, oover areas in the desert between Cairo and Suez extending from Cairo South-Westwards for more than 200 kilometers and consists of gravels, sands and sandstones, devoid of fossils but containing only silicified wood in many places. The deposits are of fluviatile origin.

Rocks of the Oligocene system are of sedimentary and volcanic origins. Sedimentary rocks have a distinct character indicating deposition under continental conditions. In Gebel Ahmer these sedimentary rocks are composed of coarse and false bedded sandstones, with bands of rounded flint- and quartz-pebbles, mostly of black or dark brown colour on the surface. In some area (Fayum) this sandstone is containing abundant fragments of silicified wood. As for the rock of volcanic origin all these rocks are of basic character and fall under the designation of basalts and dolerites, they are partly intrussive and partly volcanic, that are solidified after extrusion on the surface.

Oligocene beds in the Gulf of Suez region are similar to these known from Gebel Ahmer near Cairo, but with several

basalt flows overlie the Oligocene sands and gravels and overlaid unconformably by marine Miocene sediments. Oligocene deposits unconformably overlie Upper Eocene sediments. The age of the Oligocene sands is given to them because of their stratigraphic position and with correlation with similar beds in Fayum. All the basalts in Cairo-Suez seem to belong to one phase of magmatic activity.

In the Bahariya Oasis because of absence of Eocene in some parts where the basalt occur and no middle Miocene rocks are known, these basalts are considered to be of Oligocene age.

Geology of Northern Western Desert : After Said R. 1962).

Topographically northern part of the Western Desert is consisting of plains which are cut by occasional low questas, the great Qattara depression, Siwa Oasis, and the Wadi Natrun hollows.

From subsurface drilling wells the sediments are subjected to compressional and tensional movements made a large numbers of the old tectonic activity.

Structure of the Northern Western Desert : (After Said 1962).

Northern Western Desert forms part of the unstable shelf affected by diastrophism on a large scale.

Many unconformities marked in the studied surface and subsurface sections, the most marked one is that which separates the Carboniferous from younger sediments. Unconformity between the Post-Jurassic and the Pre-Middle Cretaceous. Unconformity between the Cretaceous and the Eocene. It shows several folds both in surface and subsurface from which is that of West to North to East of South folds which affected the Oligocene and Younger sediments in the surface and subsurface.

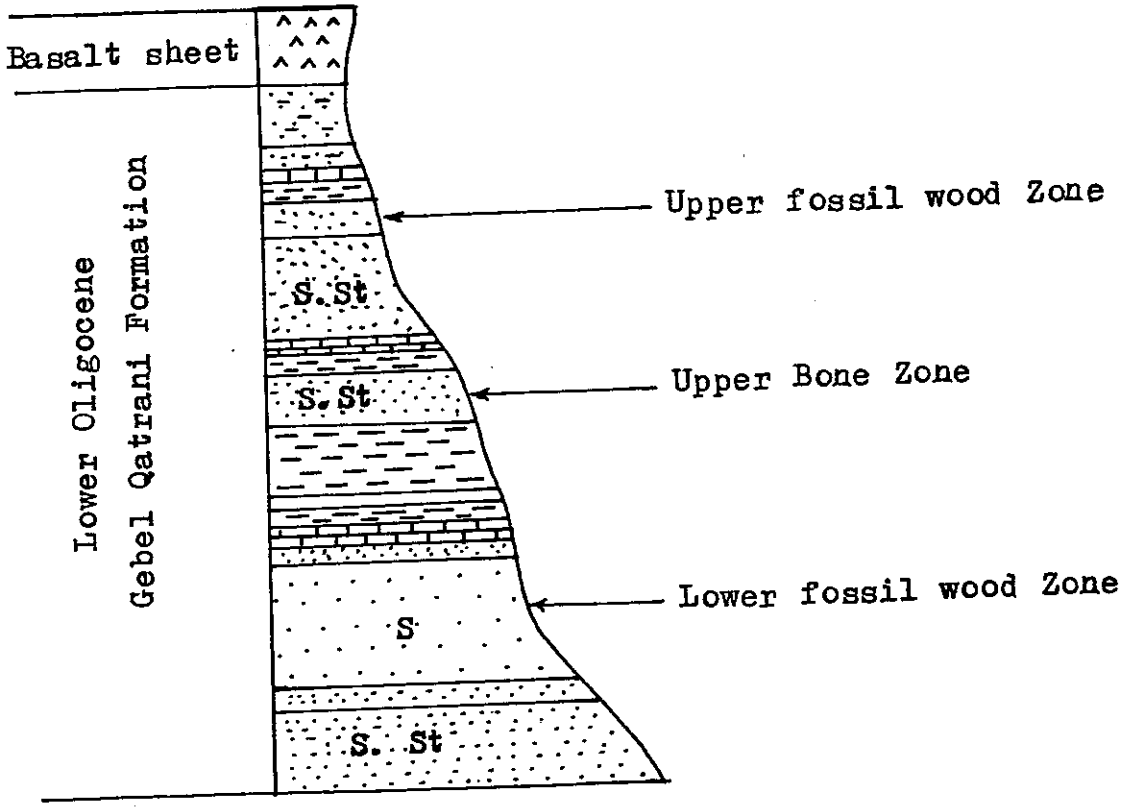


Fig. 2. Geological surface section through Oligocene north of Birket Qarun, (Fayum Province), After (Beadnell, Andrew, Granger, Obsorn, Simons, Vondra, 1967).