SUB SURFACE GEOLOGIC SIGNIFICANCE OF GEOPHYSICAL ANOMALIES IN NORTH SINAI, EGYPT.

THESIS

BY

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رسالة

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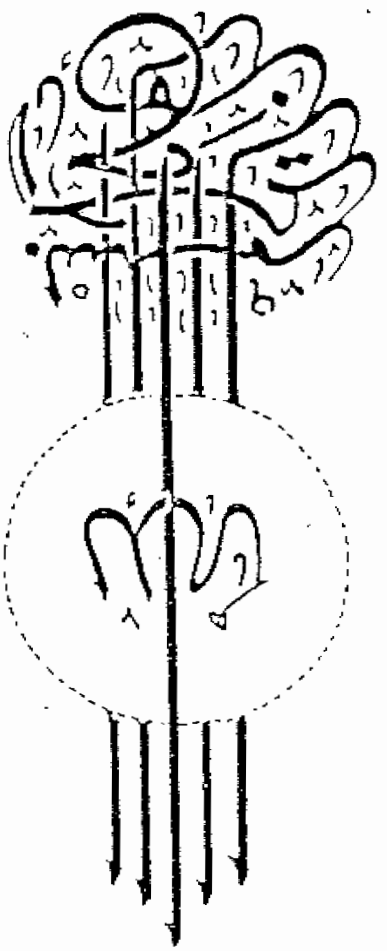

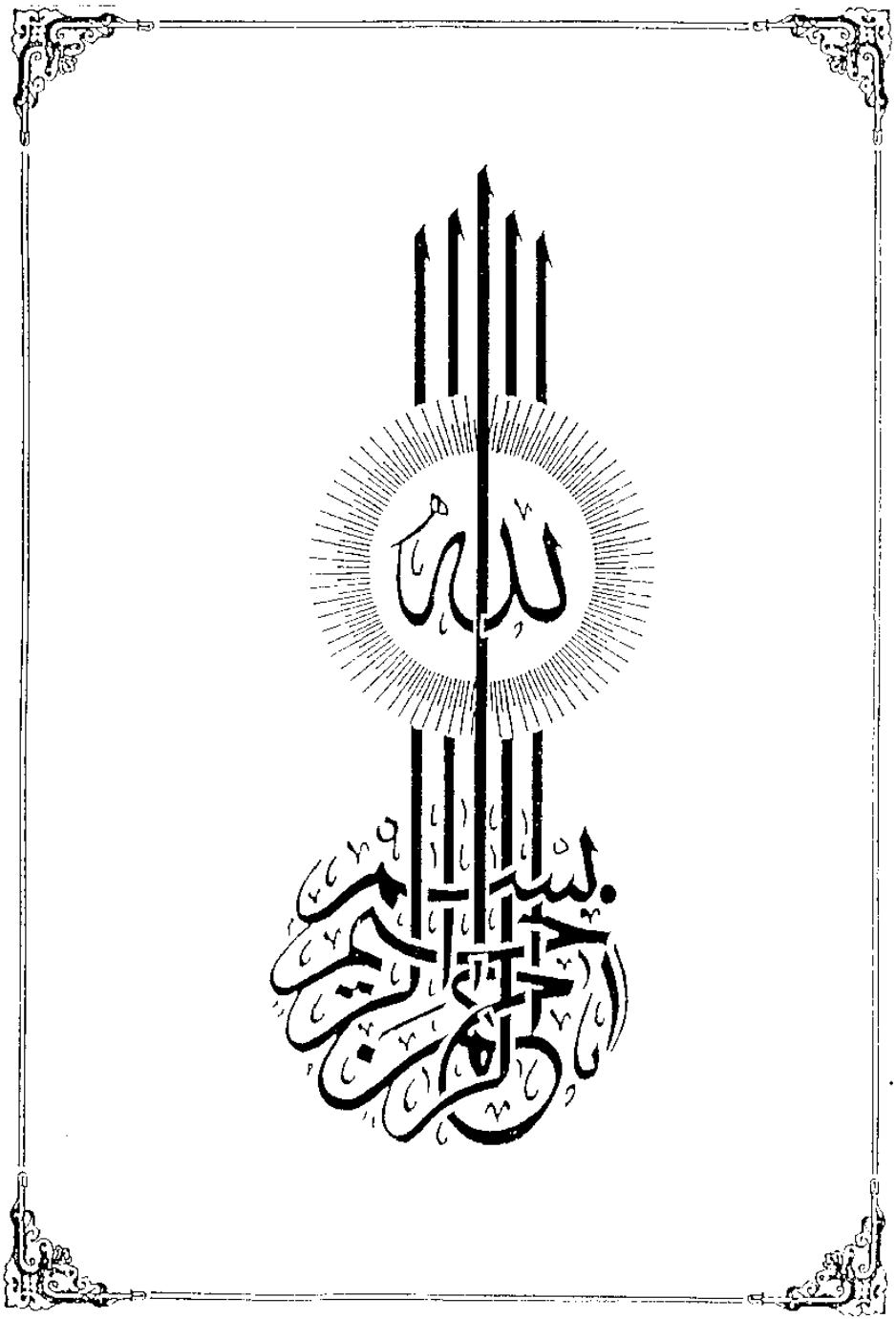

NOTE

The present thesis is submitted to Ain Shams University in partial fulfilment for the requirements of the M.Sc. degree in Geophysics. Beside the research work materialized in this thesis, the candidate has attended nine graduate Courses for one year in the following topics :

1 - Staratigraphic setting of Egypt.

2 - Lab techniques.

3 - Mapping

4 - Geomorphology.

5 - Geotectonics.

6 - Potential theory

7 - Elastic theory.

8 - Gravity Methods .

9 - Magnstic Methods.

He has successfully passedt the final examination of these Courses.

He has also passed in examination of German language.

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A C K N O W L E D G M E N T S

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The results achieved from the analysis of such data being ambiguous, that is, different possible solution for one problem are expected, urge to get some approach leading to one unique solution, or at least, minimizing their number as possible it can be. However, the auther finds it very difficult to identify the subsurface structure, within the area under study through the analysis of available gravity and magnetic Data alone.

In order to assign the problem, another information about the area is looked for such information can be provided upon the study of the geology of the drilled well and well loggs or even from the geological features exposed on the ground surface. Unfortionately, the region under test is deviod except of very few wells drilled in it (namely El Maghara well, and also in the surrounding area namely Abu Hamth and El Khabra wells, drilled by some of old petroleum companies.

CHAPTER – I

THE REVIEW OF GEOLOGICAL AND GEOPHYSICAL WORK WITHIN THE INVESTIGATED AREA

STRATIGRAPHIC SETTING OF THE AREA

The regional geology and stratigraphy of the area range in age from upper Jurassic to Recent. (Moon and Sadek "1921"; Hume "1929"; Sadek "1928"; Tromp "1938"; Shata and Gourial "1946"; Thiebaud"1941"; and Said"1962").

Special attention is paid to the Jurassic outcrops and their relation with the overlying cretaceous rocks. Allover north Sinai; Jurassic forms the most complete and thickest Jurassic exposure in Egypt.

The mountain range at Maghara forms an ellipse about 40 Km long and 25 Km wide. Its major axis trends in the shouthwest - northeast - direction. The elevation of such mountains reaches 500 m to 640 m in the heighest point. In (Shushet El-Maghara) it attains 735 m. The structure is pericline (sloping from a common center of strata). Not far away, other in ealier of jurassic rocks (Limestone believed to be of lower Kimmeridgian or Upper Oxfordian age) occuring in the isolated dome of Gebel Um Mafruth (260 m.) and in a hills called Jeham in the Resain El Aneiza group (Farag, 1947). The stages identified by Fossils, range from the lower Bajocian or ealier to the lower kimmeridigian overlain by the non-fossiliferous sandstone of the Nubia facies which is presumed to be of lower Cretaceous age. But no where else, has normal contact been observed. The lower Cretaceous has also been carefully studied. Its change of facies and its increase of

thickness should particularly be pointed out. Lithogically speaking, the limit corresponds to a striking change in weathering.

The upper pensylvanian-lower permain section (250 ms. thick) is exposed at the eastern slopes of the Northern Galala (Abdallah and Adindani, 1963) the succesion comprises unfossiliferous sandstones, red shales, crinoidal limestone and silt stone have the top of section.

The Jurassic formation in north Sinai is exposed at the following localities.

Gebel Maghara, Risan Aneiza and Gebel Minshereh.

Gebel Maghara:

The arrangement of sediments around the center of Maghara dome is the result vertical pressure at early Tertiary.times .The structure of the Maghara inlier is apericline in the center of which Jurassic rock occupy an ellipse (37x14Kms.). The long axis runs NE-SW direction. The total thickness of the exposed Jurassic rocks is 2000 meters, ranging in age from lower Bajocian or earlier to lower kimmeridgian followed by nonfossiliferous Nubia sandstones assumed to be lower creataceous age. Limestones and marls are developed in the upper part of the Jurassic succession, while the lower part is mostly formed of sandstone. The liassic seems to be poorly represented, Plat (I) shows a summary of exposed section from top to bottom.

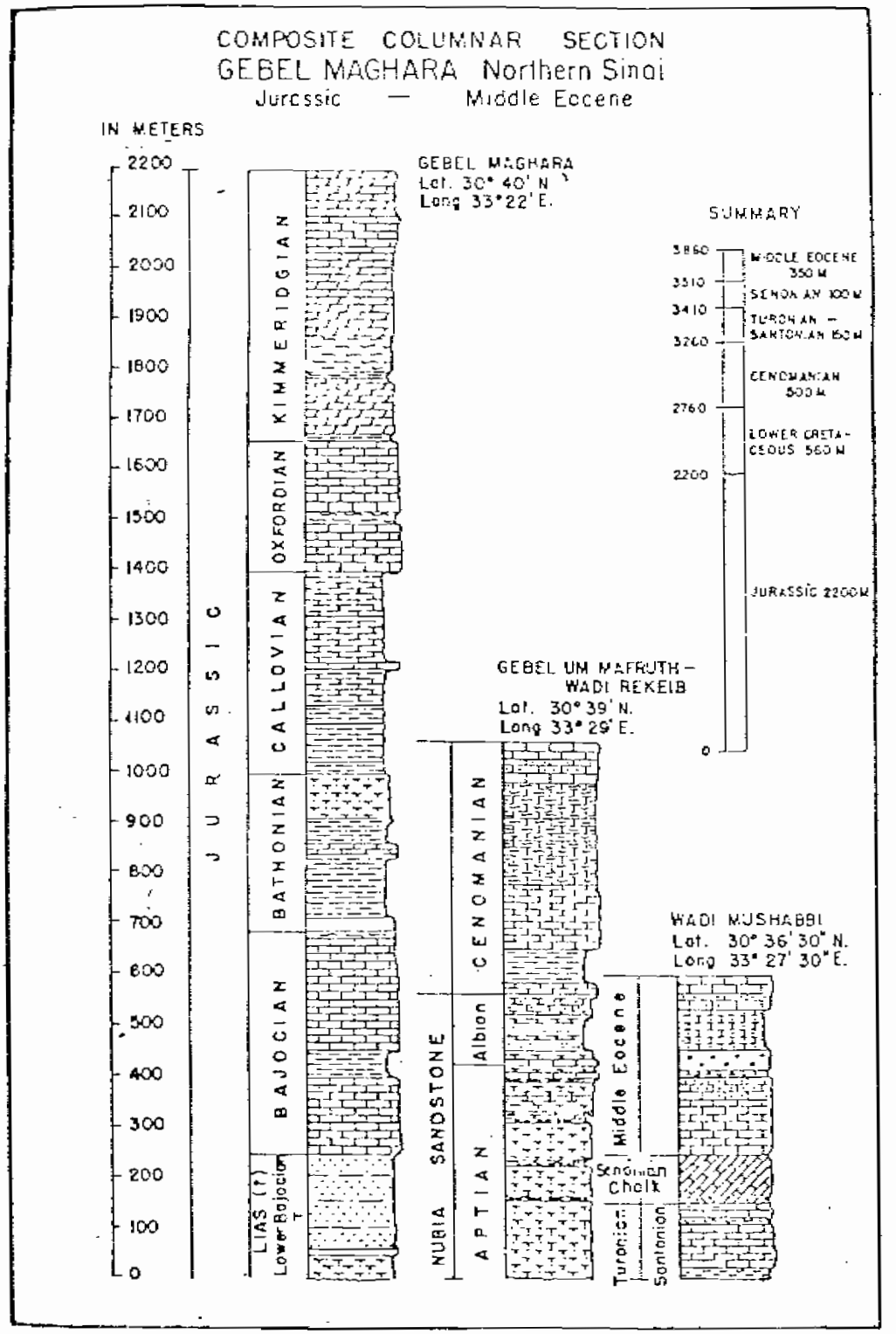
COMPOSITE COLUMNAR SECTION
GEBEL MAGHARA Northern Sinai
Jurassic — Middle Eocene
IN METERS
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
JURASSIC
KIMMERIDGIAN
OXFORDIAN
CALLOVIAN
BATHONIAN
BAJOCIAN
LIAS (?)
Lower Bajocian
GEBEL MAGHARA
Lat. 30° 40' N
Long 33°22' E.
SUMMARY
3860
MIDDLE EOCENE 350 M
3510
SENONIAN 100 M
3410
TURONIAN – SANTONIAN 150 M
3260
CENOMANIAN 500 M
2760
LOWER CRETACEOUS 560 M
2200
JURASSIC 2200 M
0
GEBEL UM MAFRUTH – WADI REKEIB
Lat. 30° 39' N.
Long 33° 29' E.
CENOMANIAN
Albion
APTIAN
NUBIA SANDSTONE
Middle Eocene
Senonian Chalk
Turonian
Santonian
WADI MUSHABBI
Lat. 30° 36' 30" N.
Long 33° 27' 30" E.

PLATE I