AIN SHAMS UNIVERSITY
FACULTY OF SCIENCE

HYDROGEOLOGICAL STUDIES OF SPRINGS IN THE AREA TO THE EAST OF CAIRO

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THESIS

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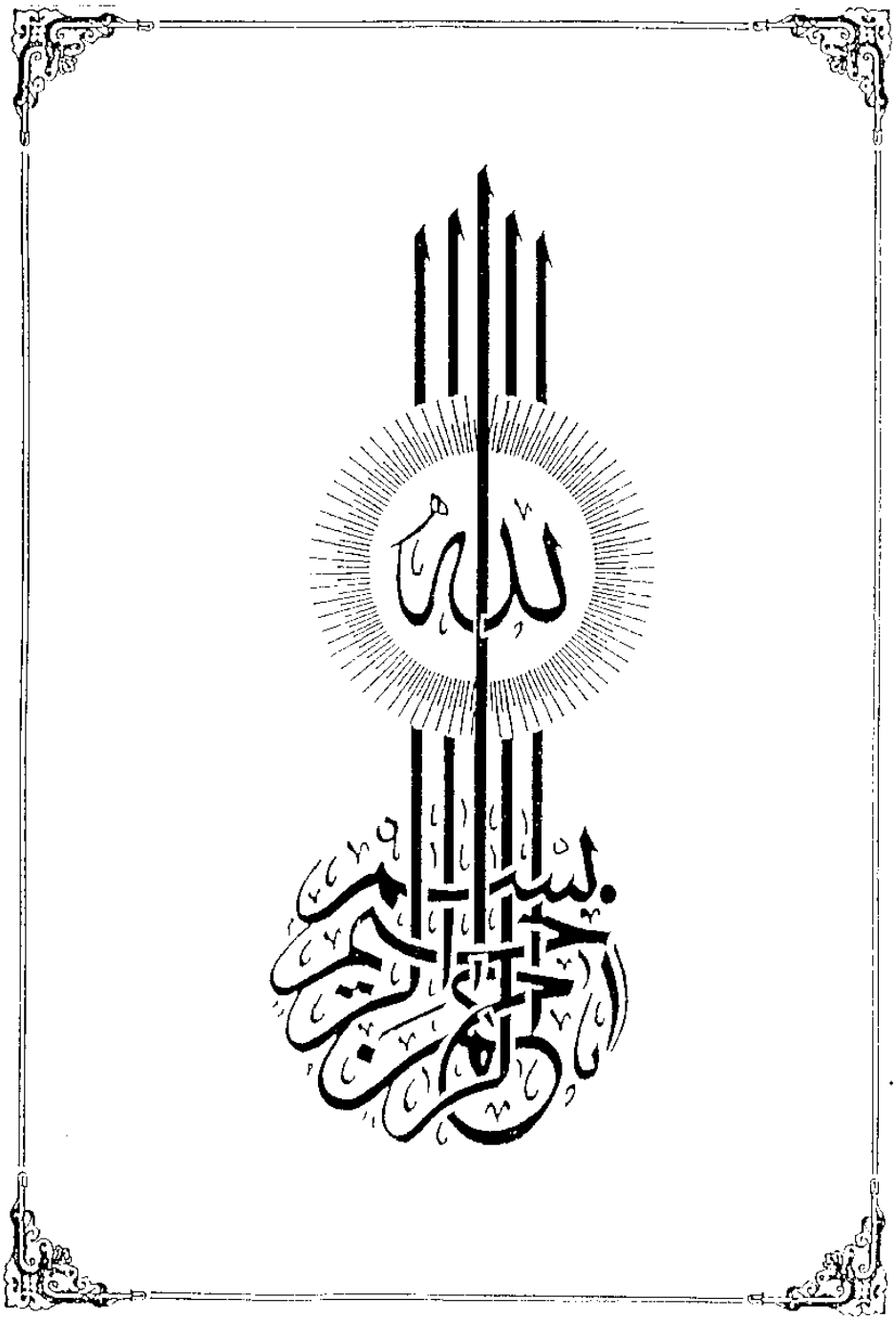

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" This research work was carried out in the Desert Institute, Matariya, Cairo. The writer wishes to express his gratitude to the authorities of this Institute for the different facilities provided to him."

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CHAPTER I

INTRODUCTION

General Outline:

The present study deals with the hydrogeological and hydrogeochemical aspects of the ground water in the area to the east of Cairo. In this area, scattered ground water points (fit for therapeutic purposes) are found and are exemplified by Ain El-Sira and "Ayoun" Helwan@.

The area of study (Fig. 1) lies between Anshas to the north and El-Tabbin to the south. It has a length of about 60 Kms and a maximum width of about 25 Kms. It is included between latitudes 30° 17'N and 29° 45'N, and between longitudes 31° 05'E and 31° 27'E. This area is bounded on the western side by the River Nile and on the eastern side by the escarpment of El-Mokattam Hills.

Previous Work:

In the literature, much information is available about the topography and geology of the area of study. These can be found in the work of Barron (1907), Hume (1926), Sandford and Arkell (1939), Shukri (1953), Abbas (1953), Said (1954,

@Ain (plural Ayoun) = Arabic word for spring.

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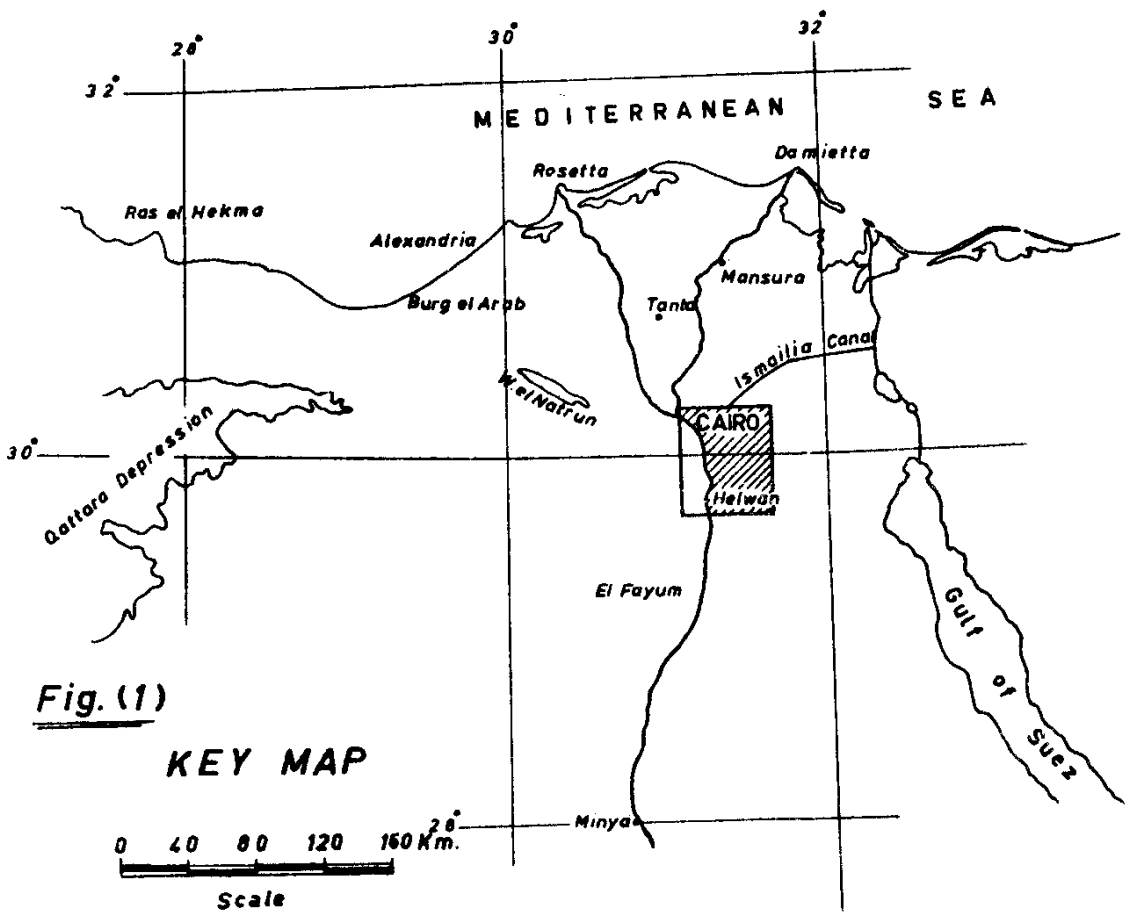

Fig. (1)

KEY MAP

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1955 and 1962), Said and Beheri (1961), Yallouze and Knetsch (1954), Farag and Ismail (1955, 1959 and 1964), Ismail and Farag (1957), Azer (1962) and El-Fayoumi (1968). On the other hand, little information is found about the hydrogeology and hydrogeochemistry of this area and dates back to 1866. These were essentially devoted to the study of the chemistry of the ground water and include Gastinel (1866 and 1883), Groff (1895), Azadian (1930), Ibrahim (1941), Ramadan et al., (1960), El-Sabban et al.(1964), Abdel-Aziz and Cairella (1964), El-Kiki (1965), Hazzaa et al.(1966), Sorour (1968) and El-Ramly (1969).

Present Work:

The present study, dealing with the hydrogeology and hydrogeochemistry of the area to the east of Cairo, aims at the recognition of the sources of its ground water with special reference to Ain El-Sira and El-Imam El-Shaffie pools and "Ayoun" Helwan.

In this study, both field and laboratory work was conducted.

In the field, the author carried out the following:

a) General reconnaissance surveys of the physiography of the area.

b) Examination of the main rocky formation exposed in the

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area and collection of representative samples (18) for the chemical analysis.

c) Examination of the main water points in the area; Ain El-Sira and El-Imam El-Shaffie pools, "Ayoun" Helwan, Tura and El-Maasara Oozes, Bir Youssef, Bir Sidi Abou El-Seoud, a number of wells drilled by the Underground Water Departement (Ministry of Irrigation)@ and a number of wells drilled by the Iron and Steel Factory (Ministry of Industry)@@ at El-Tabbin.

d) Supervision of the drilling of 15 test bore holes in Helwan district.

e) Determination of the locations ground elevations and water level in above as well as in other localities.

f) Conduction of two pumping tests for "Ayoun" Helwan and measurement of the discharge of the spring issued at Helwan after the earthquake of 31/3/1969.

g) Collection of 110 samples of water for the chemical analysis; emphasis was given to Ain El-Sira and El-Imam El-Shaffie pools as well as to "Ayoun" Helwan.

@Wells No. 39, 40, 41, 42, 43, 44, 45, 45', 46, 48, 93, 94, 95, 96, 97, 98, 202 and 214.

@@Wells No. 11, 12, 14, 15, 16 and 17.

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In the laboratory the following investigations were carried out:

a) Periodical chemical analysis of the spring water samples (6 samples spread over two years from January, 1967 to October, 1968), However, the new spring(Helwan) which issued after the earthquake of 31/3/1969 was sampled from April, 1969 till July, 1969 (a total of 6 samples).

b) Chemical analysis of about 50 single water samples collected from other localities including the drilled wells, the open wells, the test bore holes and the River Nile.

c) Examination of 12 water samples both biologically and for the determination of the trace elements (B, Fe, Sr and SiO_2).

d) Chemical analysis of 18 rock samples collected from the exposures (Eocene limestone) at Ain El-Sira and El-Imam El-Shaffie pools as well as at "Ayoun" Helwan.

The present thesis comprises three main chapters dealing with the following:

- Geomorphology and Geology.
- Hydrogeology and Hydrogeochemistry.
- Evaluation of Ground Water particularly for therapeutic purposes.

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