Editorial Article

Article 1

The Faculty of Science, Cairo University and Its Role in Egypt's Scientific Renaissance During the Mid-20th Century

A. A. Mosharafa1*, A. F. Ghaleb1, **M. H. Annaby**1

1 *Department of Mathematics, Faculty of Science, Cairo University, Egypt*

*Correspondance: adelmosh@yahoo.co.uk

Abstract

Since its establishment in 1925, the Faculty of Science, the Egyptian University (currently Cairo University) has achieved remarkable success in its pioneering role within the Egyptian society, demonstrated by a series of accomplishments that persist to this day. This article aims to highlight several significant contributions of the Faculty of Science during the second quarter of the 20th century. The success of the faculty during this period was achieved through sound planning, intellectual leadership, and diligent efforts in various academic activities. Our research relies primarily on documented information from the faculty's annual reports for an extended period, as well as relevant details from Born-Brimble's related article, complemented by available publications and diverse online sources.

The Faculty of Science was established within the framework of the Egyptian University in 1925. The scientific leadership of its departments quickly took shape and developed as follows:

Dean of the Faculty: Professor Ivar Högbom (Swedish), a specialist in economic geology, served as the founding Dean of the Faculty for two years. He was succeeded by Professor Donald Hugh Bingham (British), one of the world's eminent chemists. Following them, Professor Ali Mostafa Mosharafa who became the first elected Egyptian Dean of the Faculty in 1936, serving for four consecutive terms.

Ivar Högbom
(1892–1962)

Donald Hugh Bangham
(1898–1950)

Ali Mostafa Mosharafa
(1895–1950)

Department of Pure Mathematics

The head of the department was Professor Edward Lindsay Ince, a distinguished mathematician known for his work on differential equations. Ince worked at the Faculty of Science from 1926 to 1931. During his stay in Egypt, he published his famous book on differential equations, with its preface signed and dated from Heliopolis, Egypt. Ince continued his research, proposing a new method for determining the stability constant of the Mathieu equation with constant coefficients, a topic of significance in many physics and engineering problems. Ince, with the assistance of Mansi Shehata, a teaching assistant in the department, also prepared tables of periodic Mathieu functions. During the 1927-1928 academic year, coefficients for 240 of these functions were calculated to 12 decimal places, and another 30 functions were approximated to 8 decimal places, with work on 60 additional functions completed—a challenging feat in the absence of modern computers. From 1928 to 1930, Ince and Mansi Shehata calculated the zeros and extrema of elliptic cylinder functions over a range four times broader than previously known.

Edward Lindsay (1891-1941)

Four prominent mathematicians joined the department:

1. Miltiadi Hanna, who earned his Ph.D. from the University of Leeds, England, and worked as a lecturer in the department from 1926 to 1935. He later became a professor at Ibrahim University (currently Ain Shams University) and its vice-dean upon its establishment in 1950.
2. Charles Edgar Wynn, an English mathematician from Trinity College, who joined as a lecturer in 1928 and produced significant research in mathematical analysis. He passed away in Cairo in 1941.
3. Ameen Yassin Ameen, who earned his Ph.D. from the University of Leeds and served as a lecturer from 1937 to 1943.
4. Jack Paul Semaika, who received his Ph.D. from the University of London in 1940 in mathematical statistics. He was appointed as a lecturer in 1945, later ascending to become a professor of statistics in 1954. His efforts led to the creation of a Bachelor's degree in statistics at the Faculty.

Professor Mohamed Morsi Ahmed was the first Egyptian to head the Department of Pure Mathematics. He played a pivotal role in Egypt's academic scene, serving as Dean of the Faculty of Science at Cairo University, President of Ain Shams University (1961-1967), and Cairo University (1967-1969), then Minister of Higher Education (1971-1972), and finally as Secretary-General of the Association of Arab Universities (1972-1980). Morsi Ahmed (1908-1989) obtained his Ph.D. from the University of Edinburgh under the supervision of the renowned mathematician and

historian Edmund Whittaker. He conducted significant research in mathematical analysis, particularly in approximation theory, in collaboration with Dr. Charles Wynn. Mathematician John Whittaker, Jr., referenced their research in his book on approximation theory. John Whittaker visited Fouad I University (now Cairo University) during his military service in World War II in 1942, authoring his book there under the university's imprint. He also supervised three master's students: Ragi Haleem Makar (later head of Pure Mathematics at Ain Shams University), Mohamed Tolba Owaida (second head of Cairo University's Khartoum branch and first president of Zagazig University), and Maher Nassif Ghabbour (head of Mathematics at Assiut University). Another contributor to the department's curriculum development was Raouf Haleem Doss.

Mohamed Morsi (1908-1989)

Department of Applied Mathematics

The head of the department was Professor Ali Mostafa Mosharafa, a globally renowned scientist in quantum mechanics and the theory of relativity. Mosharafa authored several books on mechanics, solid geometry, and trigonometry for pre-university education, as well as various scientific topics such as relativity theory and atomic structure. He also delivered numerous radio lectures and produced significant scientific papers in relativity and quantum mechanics, published in prestigious journals. Mosharafa played a key role in founding the Egyptian Mathematical and Physical Society and its scientific journal. During his tenure, research in classical mechanics advanced significantly under Egyptian scientists. Notable contributors include Mohamed Ali Omara (Ph.D. in fluid dynamics from the University of Grenoble, 1928) and Mohamed Ali Hegab (Ph.D. in electromagnetic theory from the University of Leeds), who helped to establish the Faculty of Science in Alexandria in 1942. From the mid-1930s, distinguished faculty members emerged from the department's graduates, including Ahmed Hammad Ahmed (head of the department from 1951, chairman of the Atomic Energy Committee in the late 1950s), Atiya Abdel Salam Ashour (head of the department, president of the International Union of Geophysics in the 1970s, and director of CIMPA in Nice, France), and Afaf Ahmed Sabry (an expert at the International Atomic Energy Agency before becoming a professor at Ain Shams University's Women's College).

Department of Astronomy

The Department of Astronomy was established in the 1937/1938 academic year under the supervision of Dr. Mohamed Reda Madwar, director of the Helwan Observatory. Abdul Hamid Mahmoud Samaha, also from the Helwan Observatory, taught astronomy courses. Notable graduates include Ibrahim Helmy Abdel Rahman (who later helped establish the Institute of Planning and served as Minister of Planning and Administrative Development from 1975 to 1976) and Salah Hamed (a future head of the department).

Department of Physics

The department was headed by Professor Thomas Lydiard RosgillAyres (British), who worked at the faculty from 1925 to 1950. Under his leadership, the department engaged extensively with radio transmission stations, power plants, the Helwan Observatory, medical imaging facilities at the Faculty of Medicine, and meteorological stations. They also studied radiation in hot springs across Egypt. Among the first graduates was Mahmoud Mokhtar, who later became Dean of the Faculty and a member of the Arabic Language Academy. Other notable physicists during this period included Aziz Milad Fereissa, Mohamed Fahmy, Mahmoud El Sherbiny, Youssef Leto, nuclear scientists Mohamed Abdel Maksoud El Nadi, and Samira Moussa Ali.

Thomas Lydiard Ayres

Francis Oliver (1864–1951)

Vivi Täckholm (1898–1978)

Department of Chemistry:

The head of the department was Prof. Dr. Donald Hugh Bangham, who also served as the Dean of the Faculty until 1936. Bangham was one of the world's leading scientists in coal chemistry. He worked at the Faculty of Science from 1926 to 1937. He was succeeded by Prof. Dr. Alexander Schönberg (German), who chaired the department for two full decades (1937–1957). The department produced numerous scientific studies on coal and explored the presence of heavy water in the Dead Sea. Among the distinguished researchers in the department who enriched the scientific community were Ahmed Zaki Akef, who later headed the Chemistry Authority and served as President of Cairo University (1953–1954), Ahmed Riyad Turki, who became the Dean of the Faculty (1953–1956) and later the President of the National Research Centre, Ralph Winton West (a British national) from Imperial College London, Frank Lewis Warren (a British national) who later headed the Chemistry Department at the University of Natal in South Africa, Wadie Tadros who later became the head of the

department, Rashad Razzouq, Fawzi Ghali Baddar, Radwan Mobasher, and Ahmed Mostafa Ahmed, who became the Director of the National Research Centre in 1967.

Department of Botany

The head of the department was Prof. Dr. Francis Wall Oliver (a British national), who worked at the Faculty of Science from 1929 to 1935. He continued to reside in Egypt at his farm in Wadi El-Natrun until 1950. Oliver developed the department's herbarium, which was initially established by the efforts of Swedish scientist Gunnar Täckholm, who worked at the faculty from 1925 to 1929, assisted by his wife, renowned botanist Vivi Täckholm. Oliver was succeeded as head of the department by Francis John Lewis (a British national) (1935–1945). One of the earliest botanists at the Faculty was Mahmoud Tawfik El-Hefnawy, who remained at the Faculty until 1930 before becoming Dean of the Faculty of Agriculture and later Minister of Agriculture. The department organized numerous scientific expeditions across Egypt to discover the country's botanical wealth and classify plant species. Additionally, research was conducted to support Egypt's cotton industry. Notable scientists of the department during this period included Younis Salem Thabet, who became a technical advisor at the Ministry of Agriculture (1958) and the National Research Centre (1960), as well as Chairman of the Egyptian Agricultural Reform Company in 1962, Abdul Latif El-Nayal, a specialist in freshwater algae who later became Dean of the Faculty of Agriculture in Shebin El-Kom, Hussein Said, who served as Minister of Scientific Research (1965–1966), Abdel Halim Montasser, who later became the head of the Botany Department at Ain Shams University in 1950, Dean of the same Faculty in 1954, and Director of Kuwait University in 1962. Among their ranks was also Mohamed Abdel Fattah El-Kassas, who had a prominent international role in environmental studies and served as President of the International Union for Conservation of Nature (IUCN) (1978–1984).

Cyril Crosland
(1879-1943)

Otto Zdansky
(1894-1988)

Hassan Shaker Aflaton
(1893-1957)

Adolf Neef
(1883-1949)

Department of Zoology

The first head of the department was Prof. Dr. Viktor Jollos (German) (1925–1929), who was also President of the Royal Egyptian Society of Zoology. He was succeeded by Prof. Dr. Adolf Naef (German), who worked at the faculty from 1929 to 1940. The department excelled in research, particularly in vertebrate biology, conducting a comprehensive survey of Egypt's animal resources, which contributed to developing these resources. Notable scientists in the department included Kamel Mansour, who later chaired the department and became the first editor-in-chief of the Egyptian Academy of Sciences' works, Ahmed Hammad El-Husseiny, Rashad El-Toobi, and Mahmoud Ahmed Malouk.

Department of Entomology

The Department of Entomology was established in the academic year 1937/1938, with Prof. Hassan Shaker Aflatoun as its head. The department had significant activities in insect taxonomy and pest control. Distinguished faculty included Mahmoud Hafez, who chaired the department and became President of both the Arabic Language Academy in Cairo and the Egyptian Scientific Society, Ahmed Imad Abu Al-Nasr, and Mohamed Tawfiq, who was seconded to Yemen from the department to study migratory locust swarms at the request of the Anti-Locust Research Centre in London and the Middle East Supply Centre in Cairo.

Department of Geology

The head of the department was Prof. Dr. Otto Zdansky (Austrian), who worked at the faculty from 1930 to 1951. He was a world-renowned paleontologist known for discovering the "Peking Man" fossil. During his tenure, department scientists conducted geological surveys in various areas of Egypt and Sudan. Prominent contributors in this field included Gerald Andrew (British), Jean Cuvillier (French), and Rushdi Said. Nasry Mitri Shoukry later chaired the department and conducted numerous studies on the stratigraphic formations of the Middle East.

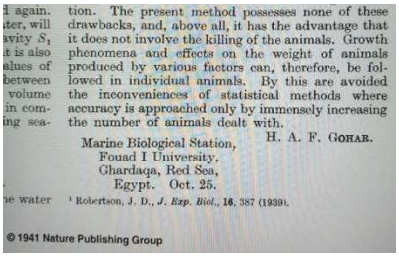
Marine Biology Station

The head of the station was Prof. Dr. Cyril Crossland (British), who worked at the faculty from 1929 to 1939. Crossland was renowned for his explorations along the coasts of East Africa, the Red Sea, the Azores, and the Pacific Islands. He developed the Marine Biology Station affiliated with the faculty, transforming it into a global scientific destination for marine biology experts. The station was later headed by the famous Egyptian marine biologist Prof. Dr. Hamed Abdel Fattah Gohar. In January 1929, a marine expedition from the Faculty of Science set out to explore the Red Sea coast near the Sudanese border and select a suitable location for the station. Participants included Donald Bangham (Chemistry), Viktor Jollos, Adolf Naef, and Kamel Mansour (Zoology), Gunnar Täckholm, Hassan Shaker Aflatoun, Otto Zdansky, Mohamed Waly, Mahmoud Tawfik El-

Hefnawy, Abdul Latif El-Nayal, Younis Salem Thabet, Ilhami Girgis, and Abdul Rahman Hassan.

Crossland left for England in July 1938, appointing Hassan Shaker Aflatoun to supervise the station. By September 1938, Hamed Gohar took over its management. The station developed significantly under Gohar's leadership, becoming home to a museum, a scientific journal of international interest, a meteorological station, and excellent accommodations for researchers. Gohar's international reputation elevated the station's standing.

Hamed Jawhar (1907-1992)



i again. ter, will vity S_1 it is also alues of between volume in com- ing sea-

tion. The present method possesses none of these drawbacks, and, above all, it has the advantage that it does not involve the killing of the animals. Growth phenomena and effects on the weight of animals produced by various factors can, therefore, be followed in individual animals. By this are avoided the inconveniences of statistical methods where accuracy is approached only by immensely increasing the number of animals dealt with.

H. A. F. GOHAR.

Marine Biological Station,
Fouad I University,
Ghardaqa, Red Sea,
Egypt. Oct. 25.

e water

[1] Robertson, J. D., *J. Exp. Biol.*, **16**, 387 (1939).

Research by Hamed Jawhar in the name of the Marine Research Station in Nature magazine in 1941

This distinguished group of faculty members significantly advanced the faculty's academic and research capabilities, organizing scientific expeditions across Egypt and contributing to the establishment of scientific institutions that leveraged the growing research output of Cairo University.

A Unified Address for the Faculty of Science

The Faculty of Science adopted a unified address under which its faculty members published their research and corresponded with international professors. Although the address underwent changes from one research paper to another and over different periods based on the university's name and the journal's requirements, there is no doubt that having a unified address highlighted Cairo University's name in international scientific forums. This, in turn, facilitated inviting prominent global scientists to visit the Faculty of Science, fostering academic exchanges, and organizing delegations abroad. Moreover, it streamlined interactions as a single scientific entity with various state institutions related to scientific research.

Below are examples of some scientific research from the Departments of Mathematics and Botany, showcasing various addresses affiliated with Cairo University:

- A study by Dr. Ali Mustafa Mosharafa (Applied Mathematics) and Dr. Mahmoud Mokhtar (Physics), published in Nature in 1937.
- A study by Dr. Charles Wynn (Pure Mathematics), published in MathematischeZeitschrift in 1937.
- A study by Dr. Younis Salem Thabet (Botany), published in Nature in 1940.

- Another study by Dr. Younis Salem Thabet (Botany), published in Nature in 1946.

There are also two studies by Prof. Dr. Fouad Ragab referring to Cairo University as "Heliopolis University," and a study by Prof. Dr. Nasry Mitry Shoukry referring to the Faculty of Science:

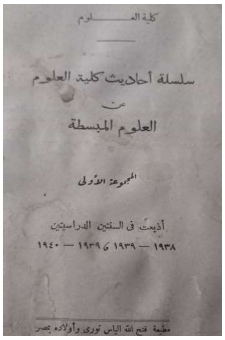
- A study by Prof. Dr. Fouad Ragab (Mathematics), published in the Glasgow University Journal in 1954, referring to Cairo University as "Heliopolis University."
- A study by Prof. Dr. Nasry Mitry Shoukry (Geology), published in Nature, referencing the Faculty of Science.

Cultural, Scientific, and Community Activities

The Faculty of Science, in agreement with the Egyptian Wireless Radio, organized several broadcasted talks aiming to simplify science and promote scientific awareness among the public. Faculty members delivered a treasure trove of knowledge from 1938 to 1945 (with a hiatus during 1943–1944) on various modern scientific topics. Some notable examples include:

- "Circulating Fluids in the Body" by Dr. Mohamed Waly (Zoology) on December 13, 1938.
- "Plant Sensation" by Dr. Abdel Halim Montasser (Botany) on December 30, 1938.
- "Modern Chemistry and Its Role in Crime Detection" by Dr. Abdel Fattah Ali Ismail (Chemistry) on January 3, 1939.
- "The Planets" by Dr. Ahmed Hammad (Applied Mathematics) on March 21, 1939.
- "The Universe as Seen by Physics" by Dr. Mahmoud Mokhtar (Physics) on March 10, 1940.
- "Egypt's Mineral Wealth" by Dr. Riad Hegazy (Geology) on April 7, 1940.
- "We and Science" by Dr. Ali Mustafa Mosharafa on February 24, 1941.
- "Light and Colors in Nature" by Dr. Mahmoud Ahmed El-Sherbiny (Physics) on May 18, 1942.
- "The Magic Antidote (Penicillin)" by Dr. Mostafa Abdel Aziz (Botany) on February 15, 1945.

The faculty's scientists contributed to the establishment of several scientific societies, such as the Egyptian Society for Mathematical and Natural Sciences (February 6, 1936), the Egyptian Academy of Sciences (October 1944), the Egyptian Assembly for Scientific Culture, the Journal of the Egyptian Society for Mathematical and Natural Sciences, and the Faculty of Science Journal.



Conclusion

This period was rich in Egypt's scientific history, with the Faculty of Science playing a pivotal role in fostering and expanding this richness. Covering it comprehensively in a few pages is challenging, especially given the scarcity or loss of sources. We apologize in advance for any overlooked pages, scientists, or entities, as this was unintentional. Wetried to investigate thoroughly and emphasize the need for further work to uncover the significant impact of this proud Egyptian institution. It is the responsibility of current and future generations to preserve and develop this legacy

References

- A.A. Mosharafa, A.F. Ghaleb, Pioneers of the Faculty of Science at the Egyptian University (Fouad I since 1940) in the period 1925–1950, GJSR 1, 1, 6–11, 2024.
- Faculty of Science reports, the Egyptian University for academic years 1928–1949.
- Graduates' Register, 1929–1954, Dar Masr Printing, 1956.
- History of Scientific Movements in Modern Egypt (Basic Sciences) (10 - Botany), 1996.
- Max Born and Lionel Brimble's article, "Science in Egypt," Nature, 1946.
- Simplified Science Talks series, Volume I, printed by Fathallah Elias Nouri and Sons, Egypt.
- Simplified Science Talks series, Volume II, printed by Fouad I University Press, 1945.