



PERSPECTIVE

Centennial Anniversary of the Department of Ophthalmology of the Hadassah Medical Center, 1918–2018



JACOB PE'ER AND ITAY CHOWERS

IN NOVEMBER 1909 HENRIETTA SZOLD, A JEWISH ZIONIST leader and educator, visited Jerusalem, at that time under the Ottoman Empire rule in Palestine. Ms Szold was overwhelmed by the scope of eye diseases she found, especially the discharge and the flies on the children's eyes caused by trachoma, and decided to bring medical personnel, doctors and nurses from her native America, to treat the diseases. These medical missions led eventually to the establishment of the Hadassah Women's Zionist Organization of America in February 1912 at New York City's Temple Emanu-El and the foundation of the Hadassah Medical Organization in Palestine, later Israel.^{1,2}

The first Hadassah hospital was established in 1918, after the end of the First World War when Palestine, including Jerusalem, was already under the British Mandate. In June 1918, after obtaining authorization from the American and British governments, the American Zionist Medical Unit (AZMU) left from New York City aboard the S.S. Megantic, bound to Jerusalem via England and continental Europe. Their medical advisor was the ophthalmologist Dr Harry Friedenwald. On board of the S.S. Megantic was the ophthalmologist Dr Joseph Krinsky.²

On their way to Palestine, the AZMU mission presented their plans to Baron Edmond de Rothschild in Paris. The Baron agreed in principle that the Meyer de Rothschild Hospital in Jerusalem, established in the Jewish Quarter of the old city of Jerusalem in 1854 and moved outside of the city walls in 1888, would be given to Hadassah and renamed "Meyer de Rothschild–Hadassah Hospital." In the summer of 1918, considerable work was undertaken to bring the old Rothschild Hospital building located on the Street of the Prophets into usable condition. In October 1918, Major James de Rothschild formally signed papers that transferred the management of the Rothschild Hospital to the Americans and agreed to the renaming of the facility as the Rothschild Hadassah Hospital.²

The 90-bed Rothschild Hadassah Hospital included 5 medical departments: Internal Medicine, Pediatrics, Obstetrics and Gynecology, Dermatology and Syphilology, and the Department of Ophthalmology, headed by its first director, Dr Joseph Krinsky.¹

THE OTTOMAN PERIOD: UNTIL 1917

OPHTHALMOLOGY IN PALESTINE STARTED IN APRIL 1882 when Sultan Abdul Hamid II issued permission to the British to establish an eye hospital in Jerusalem. The Order of St. John of Jerusalem, which received the royal charter from Queen Victoria, had purchased a building along the road to Bethlehem and established the eye hospital, with Dr G.S. Waddell as the first ophthalmologist to practice in Palestine. The St. John Eye Hospital continued to operate (except for being closed in 1914–1918 by the Ottomans during the First World War) until 1948, the year of the Israeli War of Independence. It was re-established in 1960 and functions to this day in East Jerusalem, serving the Palestinian population of East Jerusalem, the West Bank, and the Gaza Strip.²

The first Jewish ophthalmologist in Palestine was the renowned Dr Moses Erlanger of Lucerne, Switzerland, who practiced in the Lemaan Zion Eye Hospital located outside the walls of the old city of Jerusalem during the years 1908–1910. This hospital closed for 2 years until the arrival of Dr Avraham Albert Ticho in June 1912.²

Dr Ticho was born in Moravia (today the Czech Republic) in 1883. He graduated from medical school at the University of Vienna in 1908 and did his 4-year ophthalmology training as an assistant to Professor Otto Bergmeister in Vienna. The German Jewish organization Lemaan Zion recruited him, and he served in this hospital until 1917. Dr Ticho devoted time to prevention and treatment of trachoma among kindergarteners and schoolchildren with the assistance, among others, of 2 Hadassah nurses (Figure 1). As an Austrian citizen, Ticho had to leave Jerusalem for Damascus in December 1917 together with the Austrian Army after the British Army conquered Jerusalem

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FIGURE 1. Examining schoolchildren for trachoma in the early 20th century in Jerusalem.

in November 1917. He returned to Jerusalem only at the end of 1918.²

In 1912 another clinic was opened in Jerusalem by the American philanthropist Nathan Straus: the Jewish Health Bureau. Dr Ze'ev Brunn, the director of the new Health Bureau, hired Dr Aryeh Feigenbaum, who immigrated to Palestine in January 1913 and who was appointed the director of the Trachoma Division. Dr Feigenbaum was born in 1881 in Levov, Galicia, at that time part of the Austro-Hungarian Empire (today Ukraine). He also graduated from the University of Vienna and was trained in Berlin in 1911-1913 by the renowned ophthalmologist Professor Julius Hirschberg. Dr Feigenbaum established the Jewish Eye Hospital on Jaffa Road, outside the Jerusalem old city walls, and supervised the eye clinic of the Jewish Health Bureau in the old city. He also examined children in Jewish and Arab schools, fighting trachoma. Two ophthalmologists, Dr Aryeh Makler and Dr Miriam Neufach (the first female ophthalmologist in Palestine), worked with him. In December 1917, Dr Feigenbaum was arrested and exiled to Damascus. He managed to escape from jail, and in the spring of 1918, he returned to Jerusalem and reopened the Jewish Health Bureau's eye hospital.^{2,3}

HADASSAH HOSPITAL EYE DEPARTMENT DURING THE BRITISH MANDATE: 1918-1948

THE YEAR 1918 MARKED A SIGNIFICANT CHANGE IN ophthalmology in Palestine, as the British took over after the end of the Ottoman rule and the end of the First World War. In this year, the St. John (British) eye hospital reopened its doors and the Department of Ophthalmology at the renovated Rothschild-Hadassah Hospital started functioning with its first director, the American ophthalmologist Dr Joseph Krinsky. Dr Ticho was invited to work for AZMU in the Rothschild-Hadassah Hospital, and he agreed to substitute for Dr Krinsky in the Eye Department when necessary, in his absence.^{1,2}

When Krinsky's 1-year contract was approaching its end, Dr Ticho was a natural candidate to succeed Dr Krinsky as the full-time chairman of the Eye Department. In 1919 2 young ophthalmologists who trained in Russia, Dr Judith Kozlo and Dr Yaakov Cohen, arrived in Palestine, and after a temporary assignment in Jaffa, they were transferred to Jerusalem to work under Dr Ticho. The arrival of more ophthalmologists and the

THE HADASSAH EYE DEPARTMENT SINCE THE ISRAELI INDEPENDENCE: 1948-2018

hiring of the additional nursing staff made it possible for Dr Ticho to re-establish the work in treating trachoma. Also, he began to teach students in the Hadassah Nurses Training School, also established in 1918. He also participated in the hospital's "grand rounds," presenting unusual cases.²

In February 1922, Dr Aryeh Feigenbaum was offered the position and became "chief ophthalmologist of the Hadassah Medical Organization (HMO) in Eretz Israel (the Land of Israel) and chairman of the Eye Department of the Rothschild-Hadassah Hospital in Jerusalem." At the same time, the formal transition of the AZMU to the Hadassah Medical Organization took place, so it is correct to say that Dr Feigenbaum was the first chairman of ophthalmology of the Hadassah Medical Organization.²

Dr Feigenbaum proved to be an excellent chairman with outstanding clinical, surgical, and teaching skills. At that time, the Department of Ophthalmology had 8-12 beds; the workload increased gradually. In 1938, the last year in the Hadassah-Rothschild Building, 44 000 patients were seen in the eye clinic, 4000 were new patients, and 3017 patients were admitted to the inpatient ward (82% of them required surgical treatment).^{2,4}

In May 1939 the department moved to the newly established Hadassah Hospital on Mount Scopus with 14-16 beds. In the new hospital, the department's staff was engaged, in addition to the clinical work, with research and teaching. Courses were given, among others, to general physicians from all over the country, so they might be able to treat eye diseases they encountered in their daily work.⁴

During Feigenbaum's time, the level of the eye care increased significantly, encompassing all existing diagnostic and surgical methods including, among others, keratoplasty, "magnet surgery" to remove metal foreign bodies, and retinal detachment surgeries. The number of successful retinal detachment operations increased, using the Gonin method. The number of patients who sought therapy for their eye diseases abroad declined. Many patients began to come to the ophthalmology department at Hadassah from neighboring countries such as Syria, Lebanon, Iraq, Turkey, Persia, and Egypt.⁴

In 1918, the cornerstone of the Hebrew University in Jerusalem was laid on Mount Scopus. Albert Einstein and Chaim Weizmann, who later on became the first president of the state of Israel, were heavily involved in fundraising and public relations. The University opened its doors on April 1, 1925.^{1,2} The Hadassah Medical Organization had close affiliations with the Hebrew University, and these 2 institutions joined together to establish the first medical school. Dr Feigenbaum was the first dean of the pre-Faculty of Medicine of the Hebrew University and its first professor of ophthalmology.

PROFESSOR FEIGENBAUM SERVED AS THE DEPARTMENT'S chair during the Second World War and the Israeli War of independence. During the War of Independence, the Jordanian army conquered Mt. Scopus and the Hadassah Hospital and the Hebrew University were abandoned. Their departments moved to many buildings in downtown Jerusalem. The Department of Ophthalmology relocated to buildings around the Street of Prophets, not far from the old Hadassah-Rothschild building; the outpatient clinic in one building and the inpatient ward in another one. The department operated there until 1962, when it moved together with all other departments to the new Hadassah Hospital in Ein-Kerem, in the southwestern corner of Jerusalem.^{1,2}

In 1954, after 32 years, Professor Feigenbaum was succeeded by Professor Isaac Caesar Michaelson. Professor Michaelson was born in Edinburgh, Scotland, in 1903. He studied ophthalmology at the University of Glasgow and in the early 1940s became the chief ophthalmic surgeon for the British Eighth Army, then fighting Nazi Germany in the Middle East, serving in Egypt. In 1948, after completing his doctorate, he immigrated with his family to Israel. Israel's newly created health ministry invited him to set up eye-care services for the new state. In 1949 Professor Michaelson was appointed the director of the Department of Ophthalmology at Rambam Hospital, Haifa, and in 1954 he became the director of the Department of Ophthalmology at the Hadassah University Hospital.⁵

Professor Michaelson's interest in research started during his work in Glasgow and continued intensively at the department in Hadassah, which became, under his management, the Ophthalmology Research Center in Israel, the first department of ophthalmology to include research laboratories. The development of the retina, retinal angiogenesis, and pathologic neovascularization were Professor Michaelson's primary fields of research and the basis of many of his publications. He predicted the existence of an angiogenic factor. Michaelson's X-factor was considered essential in the development of the retinal vasculature and could stimulate iris and retinal neovascularization in ischemic retinal diseases.⁶ Professor Michaelson wrote, together with Professor Arthur Ballantyne, the classic *Textbook of the Fundus of the Eye*.

Professor Michaelson established the first generation of ophthalmic specialists in Israel, and many eventually became heads of eye departments in various hospitals throughout Israel. In 1959, he began the tradition of our department's assistance to African countries and other developing nations, a commitment that continues to this very day. After his retirement in 1973, Professor Michaelson

established the Jerusalem Institute for the Prevention of Blindness, an institute that is part of the Hadassah Department of Ophthalmology and that was named for him after his death in 1982.

In 1973, Professor Hanan Zauberman, one of Professor Michaelson's students, succeeded him as chairman of the department. Professor Zauberman was born in Argentina in 1933 and immigrated to Israel in 1957. After working as a kibbutz doctor in the Negev desert in the south of Israel, he was recruited in 1958 by Professor Michaelson to be one of his first residents at the Department of Ophthalmology in Hadassah.⁵ He was one of the first 2 Hadassah ophthalmologists who served in Africa, 2 years in Monrovia, Liberia. After a fellowship in retinal disease at the Massachusetts Eye and Ear Infirmary in Boston under the mentorship of Professor Charles Schepens, Professor Zauberman joined the staff of the department at Hadassah. Professor Zauberman, who was one of the leading retinal surgeons in Israel and for whom retinal diseases were also the focus of his basic and clinical research, carried on the tradition of academic ophthalmology and the commitment of our department to developing countries. He was the first in Israel to set up specialized clinics in the various sub-specialties of ophthalmology, and the department under his leadership was the first in Israel in which the residents were required to rotate in the various sub-specialty clinics.

Professor Jacob (Koby) Pe'er succeeded Professor Zauberman as chairman of the department in 1998. Professor Pe'er, the first Israeli-born chairman, graduated from the Hebrew University–Hadassah School of Medicine and completed a residency in ophthalmology in the department at Hadassah. This training was followed by a fellowship in ophthalmic pathology under the mentorship of Dr Lorenz E. Zimmerman at the AFIP in Washington, DC. Professor Pe'er established the first Ocular Oncology Service in Israel and devoted his career to ocular oncology and ophthalmic pathology. In the years 1986-1988 Professor Pe'er worked in Kenya, establishing an eye department in Nakuru.

Professor Pe'er established services in all sub-specialties in ophthalmology, making his the first department of ophthalmology in Israel to have all of them. He also expanded the research activities, adding the molecular ophthalmology laboratory to the existing laboratories of histopathology, electrophysiology, and immunology; and the department benefited from these core research laboratories. The Hadassah Department of Ophthalmology is the only one in Israel to have in-house research laboratories accommodating medical students, master's degree students, and PhD students side-by-side with residents and faculty members. Recently, Professors Eyal Banin and Itay Chowers established the center for clinical research in ophthalmology.

During the tenure of Professor Pe'er, the number of patients in the outpatient clinic, which was renovated and expanded twice, has tripled, as has the number of

surgeries in all fields of ophthalmology, using the most updated techniques. The department's commitment to educating physicians from developing countries continues.

In October 2017, Professor Itay Chowers succeeded Professor Pe'er as chairman of the department. Professor Chowers was born at the Hadassah Medical Center, graduated the Hadassah Hebrew University Hadassah School of Medicine in 1995, and completed the residency program at the Department of Ophthalmology in Hadassah at 2000. Professor Chowers later performed a research fellowship under the mentorship of Dr Donald Zack at the Wilmer Eye Institute of Johns Hopkins University. He then performed a clinical vitreoretinal fellowship at the same institution. In 2003, Professor Chowers returned to Hadassah and established a research group that focuses on the study of the genetics and the pathogenesis of age-related macular degeneration. He will lead the department into its second century of achievement.

FIFTY-NINE YEARS OF COMMITMENT TO DEVELOPING COUNTRIES

IN 1959, PROFESSOR MICHAELSON RECOGNIZED THE SEVERE need of some African countries for a professional ophthalmologic workforce. At the time, the 11-year-old State of Israel was itself a developing country and could not afford to send funds for medical outreach. In conjunction with the Israeli Ministry of Foreign Affairs, a decision was forged to export physicians so that African countries might establish departments of ophthalmology.

Hadassah ophthalmologists opened or reopened 10 eye departments in Africa. The first one was in Monrovia, Liberia, followed by departments in Dar es Salaam, Tanzania; Blantyre and Lilongwe, Malawi; Kigali and Butare, Rwanda; Addis Ababa, Ethiopia; Maseru, Lesotho; Mbabane, Swaziland; and Nakuru, Kenya. The physicians who participated in this project were primarily Hadassah faculty and Hadassah residents. It was a requirement for each Hadassah resident to commit to serving in Africa for at least 2 years as a precondition to acceptance to the residency program.

Forty-eight ophthalmologists from Hadassah University Hospital have each spent 2-4 years in Africa on working missions. These ophthalmologists have examined more than 1 million outpatients and performed about 200 000 vision-saving operations, most of them cataract extractions, both in the hospitals and in "eye camps" in remote areas. At its inception, the program that Professor Michaelson envisioned consisted of "serving, teaching, and leaving," thereby creating self-sufficiency. The Israeli project was not a "bandage" effort but developed into a commitment to bringing about lasting and self-generating change in countries that had talent but lacked educators and institutions capable of serving their populations. One



Teaching pathology in the eye pathology laboratory

FIGURE 2. Professor Michaelson in a teaching session of foreign residents in the Department of Ophthalmology of the Hadassah-Hebrew University Medical Center (dated to the 1960s).

of the primary goals of the project was to educate physicians from African countries to become ophthalmologists.

Over the last 20 years, most of the Hadassah ophthalmic missions have been short-term, for 2-4 weeks, for treating patients and educating the local doctors. Most of these missions are to African countries, but there are also some to other regions.

Because training was impossible locally, a unique residency program was established in 1961, called the “Diploma Course in Ophthalmology,” to train foreign doctors in Jerusalem (Figure 2). Upon completing 3 years of postgraduate hands-on studies in the Hadassah Department of Ophthalmology and after successfully passing the examinations, the physicians now receive a diploma in ophthalmology from the Hadassah and Hebrew University School of Medicine in Jerusalem. Altogether, the department has provided an ophthalmic education to trainees from 38 countries on 4 continents. In the last 18 years, the department has hosted Palestinian residents from East Jerusalem, the West Bank and the Gaza Strip (Table). Many of the foreign residents stay an additional 1-2 years for subspecialty studies, before returning to their homeland.

Since its earliest years and except for the 19 years between 1948 and 1967, in which both institutions were on 2 sides of a border, there were excellent relationships between the Hadassah Department of Ophthalmology and the St. John Eye Hospital. Since the year 2000, these relations have tightened. Physicians from St. John Hospital

TABLE. Countries of Origin of Physicians Who Have Trained at the Department of Ophthalmology of Hadassah University Hospital

Africa	Latin America	Asia and Europe
Cameroon	Argentina	Albania
Ethiopia	Brazil	Azerbaijan
Ghana	Chile	Bulgaria
Ivory Coast	Costa Rica	China
Kenya	Dominican Republic	Cyprus
Lesotho	Ecuador	Greece
Liberia	El Salvador	Iran
Madagascar	Haiti	Palestine Authority
Malawi	Honduras	Poland
Rwanda	Mexico	Thailand
Swaziland	Panama	Turkey
The Gambia	Peru	Romania
	Saint Lucia	

have done full residency training in Hadassah, Hadassah ophthalmologists teach at St. John, St. John residents and specialists attend lectures in Hadassah, and patients from St. John are sent to Hadassah for examination in services that do not exist at St. John, such as ocular oncology and neuro-ophthalmology, and for management of challenging cases in other sub-specialties, as well as for specialized laboratory services. In the last 3 years, with funding

from the European Union for Israeli-Palestinian collaboration, a genetic ophthalmic service, including molecular genetics, has been established at St. John Eye Hospital, with training and mentoring by Professors Eyal Banin and Dror Sharon from the Hadassah ophthalmology staff.

We aim to continue our commitment to help ophthalmology in developing countries in the years to come and to continue our collaboration with St. John Eye Hospital. Currently, we have 10 foreign physicians in our Diploma Course and 5 foreign fellows, and a very long waiting list to join our program.

RESEARCH

BASIC AND CLINICAL RESEARCH HAS BEEN PART OF THE daily routine in the Department of Ophthalmology almost since its inception. In the early years, the primary interest was in eradicating trachoma, which affected large parts of the population. Dr Ticho and Professor Feigenbaum organized local conferences on trachoma that led mainly to epidemiology publications. Dr Batia Meitar, the deputy to Professor Feigenbaum, led the trachoma field.⁷

Professor Michaelson established 3 in-house core laboratories as part of the department. The ophthalmic pathology laboratory was directed by Professor W. Kornblueth, the ocular electrophysiology laboratory by Professor Edgar Averbach, and the laboratory of biochemistry of the eye by Professor Elaine Berman. In the 1970s, Professor David Ben Ezra established the laboratory for ocular immunology. Professor Saul Merin, who was trained in genetic eye diseases, did mainly clinical research until 2002, when Professor Dror Sharon was recruited to our department, and has since headed the molecular ophthalmology laboratory.

Because of Professor Michaelson's interest in retinal diseases, the research in the ophthalmic pathology laboratory focused on retina vascular research. Professor Michaelson continued his research on neovascularization of the retina, as well as of the iris and the cornea.⁶ Professor Moshe Lahav, who headed the pathology laboratory between 1975 and 1980, continued the research in the same direction.

In 1981, Professor Pe'er as a young resident took over the pathology laboratory, with a focus on ocular tumors. In the early 1990s Professor Pe'er, together with Professor Eli Keshet of the Faculty of Medicine, was the first to show that vascular endothelial growth factor is probably the leading candidate to be the X-factor Professor Michaelson envisioned over 40 years earlier.⁸ In recent years, Dr Shahar Frenkel has headed the pathology laboratory, investigating novel methods to treat metastatic uveal melanoma.

Currently, there are 5 basic research laboratories in the department, a dedicated clinical and translational research



FIGURE 3. The Hadassah Hebrew-University Medical Center today.

center, and multiple clinical research projects. This infrastructure, along with the vibrant research activity in the Faculty of Medicine and the Medical Center, facilitated the development of cutting-edge research. Novel therapies were developed from the bench to the bedside in the department by Professor Eyal Banin, who is assessing gene and stem cell therapies in human subjects with retinal degeneration and macular degeneration, respectively.⁹ Genetic studies led by Professor Sharon and Professor Chowers have facilitated the characterization of multiple novel genes associated with retinal degeneration, as well as the genetic architecture of age-related macular degeneration in the Israeli population, respectively.^{10,11}

LOOKING TO THE FUTURE

TODAY, THE DEPARTMENT HAS EXPANDED FURTHER TO include facilities at the Ein Karem Campus in the west side of Jerusalem (Figure 3) and the Mt. Scopus Campus at the east side of the city, as well as refractive centers in Jerusalem and Tel Aviv. A brand new inpatient ward and operating theaters are under construction. The 24 faculty members of the department commit to taking part in formulating the new era in medicine and ophthalmology, integrating and developing cutting-edge technologies in collaboration with the vibrant Israeli high-tech scene. Ongoing projects focus on big data and image analysis in collaboration with multiple Israeli and international research groups, as well as startup companies. New compounds and novel therapeutic modalities are being developed and tested for ocular diseases. These programs, built on the foundations laid in Jerusalem 100 years ago, maintain the tradition of a comprehensive and inclusive clinical service of excellence, with outreach to developing countries and cutting-edge research and educational programs.

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