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Biology, Geology and the Bible: Research Expeditions of the Hebrew University Scientists

ABSTRACT

Since the 1920s, soon after the establishment of the Hebrew University of Jerusalem, zoologists, botanists, and geologists on the academic staff participated in research expeditions, both within the official borders of Mandatory Palestine and in neighboring lands. After the establishment of State of Israel in 1948, the geographical areas available for research tours became far more limited. In the aftermath of the Six Day War, Israeli scientists felt an urgent need to explore the newly occupied territories, particularly the Sinai Peninsula. The article examines their expeditions which mostly followed the European model of identifying, classifying and collecting the flora, fauna and natural resources. Yet, the Hebrew University researchers were also impelled by the Zionist search for national identity, and their scientific findings included biblical features in the landscape that evoked their affinity with local nature.

Keywords: The Hebrew University, Research expeditions, Israeli scientists, Israel prize, the Bible, The Six-Day War.

INTRODUCTION

The Hebrew University of Jerusalem was established in 1925, and as per its founders' vision, was intended as a prestigious scientific institution and symbol of the Jewish national renaissance.[1] And yet, many in the pre-state Jewish community perceived the lofty institution on Mount Scopus as insufficiently identified with the Zionist endeavor and the interests of the Yishuv. The "mountain," professors were engaged in intellectual

work and saw themselves as belonging to the global scientific community. Consequently, they were regarded as alienated from the Jezreel Valley pioneers and their ethos of physical labor and love of the land and nation.[2] Nevertheless, the test case of scientific expeditions I have studied, reveals that university researchers were guided by the national ethos and values of the surrounding society. The scientists on the "mountain" shared the valley's desire to strengthen and deepen ties to their old-new homeland and its adjacent territories, and they too sought to embody the archetype of the brave "new Jew." I shall argue moreover that their scientific activity to some extent betokens the nation-building process.

The notion that science and nation building were often intertwined is not new; a number of scholars have studied the central role played by science in the Yishuv and the nascent State of Israel. Some historians and sociologists have examined scientific endeavors that did not necessarily have practical implications, but were directly related to human society and history, and hence to national identity-shaping efforts.[3] Other scholars have focused on scientific research, which served as a Zionist or colonialist tool; this research purpose was to show the extensive capacity of the land to absorb Jewish settlers and improve their health and the productivity of their land and livestock.[4] The aim of the current article on the other hand is to show that research in biology and geology, even when focused on flora, fauna, and natural resources and with no immediate practical implications, were part and parcel of an effort to construct a collective national identity. This was done by strengthening the bonds between the "returning newcomers" to the Land of the Bible.

I chose to focus on five Hebrew University scientists whose work prominently featured research expeditions and who in later years received the prestigious Israel Prize, conferred every Independence Day to citizens who have made outstanding contributions to society.[5] I examined one aspect of their scientific activity: research expeditions they conducted beyond the borders of Mandatory Palestine, and later, beyond Israel. My objective here is to identify the motives and emotions evoked in them by the flora, fauna, and landscapes they explored as reflected in the norms and values of the Jewish Yishuv and later in Israeli society. In each of the expeditions I studied, there were between 2 and 9 participants, so while I focus on five scientists as a starting point, my findings reflect a wider phenomenon.

In 1954, the second year the Israel Prize was awarded, entomologist and zoologist Simon Friedrich Bodenheimer (1897–1959) and botanist Michael

Zohari (1898–1983) were among the recipients. Four years later, the prize was awarded to geologist Leo Picard (1900–1997). Botanist Michael Evenari (1904–1989) received the prize in 1986 for his life's work in desert research, while Naomi Feinbrun-Dotan (1990–1995) had to wait until she reached the age of 91 to be awarded the 1991 Israel Prize for her contribution to Land of Israel studies.

Of the nearly 700 Israel Prize recipients to date, some 40% have been Hebrew University faculty members.[6] This fact is not surprising, as the Hebrew University is Israel's oldest university and was founded prior to the establishment of the state. A few years after Israeli independence, it was still one of only three institutions of academic education in the country, alongside the Technion in Haifa and the Weizmann Institute in Rehovot. The five Israel Prize recipients I treat here were highly admired for their engagement in the sciences in accordance with the long-standing norms of Israeli society.

To acquaint myself with the faculty-led research expeditions, I relied on a range of sources: The Hebrew University archive on Mount Scopus, the arguments of the judges on the Israel Prize committee and contemporary press releases. I also drew on memoirs written by the scientists themselves, which although subjective and uncritical, enabled me to identify their feelings, experiential and value-based perspectives that rarely appear in the archived documents or scientific articles the researchers published. These memoirs include *A Biologist in Israel*, published by Simon Friedrich Bodenheimer when he was 63; *The Awakening Desert* written by Michael Evenari when he was in his eighties; and *Pioneering Geology of Eretz Israel* by Leo Yehuda Picard, published when he was 96.[7]

A drawback of these more recent writings is that they rely on the writers' memory (and memory lapses) and the preservation of legendary stories. Thus, it was sometimes difficult to determine whether the writer's point of view reflects the spirit of his words at the time the events took place or the time they were recorded. Nevertheless there are advantages for the historian in these later writings: The distance of years affords a fuller interpretation of events, often one that is more balanced, allowing the writer to separate the wheat from the chaff. Thus, the significance of events becomes more clear-cut, and successes, failures, and missed opportunities take on new meanings.[8] I made cautious use of theses autobiographical accounts alongside my heavy reliance on archived documents and press releases and write-ups from the period in question.

THE HEBREW UNIVERSITY IN ITS EARLY YEARS

The Hebrew University's research and pedagogical traditions did not appear as a fait accompli, but were mostly the result of cultural transfer. From the mid-19th century until the 1930s, Germany was the scientific center of the world, and the professionalization of scientific research there inspired scientists throughout the West.[9] Most of the Hebrew University's faculty at its founding were German-born or German-educated, and this trend grew more pronounced with the Nazi rise to power.[10] The architecture of the buildings on Mount Scopus was German, all equipment was manufactured in Germany, and the first foreign language to taught there—and the only one for several years—was German. In fact, at its inception, the Hebrew University's German character was so pronounced that when the French consul visited in 1925, shortly before the university's official opening, he saw it as a German institution.[11] Jewish emigrant scientists from Germany brought to Jerusalem the academic model of their own educations, based on uniform instruction and research and a hierarchical academic structure. The German model had a decisive influence on the tradition of biological research tradition, though it was not the only one.

A certain degree of Soviet influence occurred among the botanists of the Hebrew university, as most of whom had emigrated from the USSR. Otto Warburg (1859–1938),[12] the founder of the Botany Department and its head in the early years, was a product of German academia, but Alexander Eig (1894–1938), who replaced him, as well as his fellow botanists Michael Zohari and Naomi Feinbrun, were all born and educated in Eastern Europe. Moreover, botanist Nikolai Ivanovich Vavilov (1887–1943) from Leningrad visited Palestine in 1926 on one of his research expeditions, where he met with local botanists.[13] At Vavilov's invitation, Alexander Eig traveled to Leningrad, but continued three months later to Germany, Switzerland, and Italy and ultimately completed his doctorate in France. Eig's two colleagues also spent a significant period at Central European universities. Naomi Feinbrun went to Germany in 1931 in order to study genetics, and in 1936, Michael Zohari completed his doctorate at the German University in Prague on the dispersion of seeds in Palestine.[14]

Before describing the expeditions of the Hebrew university researchers, it is worth mentioning that the tradition of field studies using observation and the collection of flora, fauna, and soil specimens directly from the observed area began in the 18th century. It continued well into the 19th century and even to the first decades of the 20th century. The journeys

of colonial scientists were funded either by the colonizing country or by private patrons.[15] In addition to satisfying intellectual curiosity, these journeys played a crucial part in the process of establishing control and increasing the prestige of the colonizing entities.[16] Colonial scientific expeditions to the Middle East in general, and to Palestine in particular, also took place from the mid-18th Century.[17]

The research expeditions conducted by the botanists, zoologists and geologist of the Hebrew University were likewise influenced by the colonial tradition. However, as we shall see, their expeditions were also influenced by a Zionist and national ethos, which placed high value on knowledge of the natural surroundings and an affinity to biblical landscapes. The research expeditions in which Bodenheimer, Picard, Zohari, Feinbrun, and Evenari took part, as presented here, reflect the values and emotional features of their scientific quest.

THE 1920S: THE SEARCH FOR THE BIBLICAL MANNA

Zoologist and entomologist Simon Friedrich Bodenheimer completed his doctorate in natural sciences at the University of Bonn in 1921, and a year later moved to Palestine, where he was appointed head of the Department of Entomology at the Tel-Aviv Agricultural Experimental Station established by the Zionist Executive. In 1928, Bodenheimer officially joined the faculty of the Hebrew University's Institute for the Study of Nature in the Land of Israel. This Institute was planned and established with an agenda driven, as per the model of colonial institutes for settlement.[18]

Bodenheimer developed the field of applied entomology with a focus on the fruit fly, the citrus pest known as the orange scale, the almond worm, and tobacco pests. His scientific activity was of great importance in the development of agriculture in the Yishuv, and later in Israel. He was the first to discover that the locust lays its eggs in moist soil, a discovery that helped fight locust. In 1930, Bodenheimer published a detailed book about the pest population in the Land of Israel.[19] His keen interest in the local fauna and his attraction to biblical stories led him to seek connections between ancient accounts and the natural environment. Following these studies, Bodenheimer published two volumes about fauna in the Bible, attempting to locate species that existed then in 20th century Land of Israel.[20]

In July 1927, a year before he officially joined the faculty of the Hebrew University, Bodenheimer accompanied fellow entomologist Oskar Theodor to the Sinai Peninsula. Their objective was to study the tamarisk manna, a shrub with sweet-tasting berries possibly identifiable with the biblical manna, and to examine the aphids that create their sweetness. The meager funding they obtained for the trip from the Hebrew University afforded them minimal comfort: third class tickets on a train to Suez, and from there third class passage by boat, and finally, a camel caravan to their destination. In his book, Bodenheimer says that the desert will only reveal its secrets to those who reach it by such modest means.[21]

A chemical analysis of the tamarisk manna berries revealed that they contain sugar. Bodenheimer explained that the aphids that live on the tamarisk produce the berries by secreting honey-like droplets. In his attempt to identify whether this was in fact the manna referred to in the Bible, Bodenheimer studied the relevant passages in relation to the area of plant's dispersion, the season in which the berries appear, and their biological features. He also consulted Josephus Flavius' historical text, and the meanings of Hebrew words.

The manna study was of interest not only to entomologists, but to Evenari the botanist in his trip to the Kurdish forests in 1933, which will be described presently. This is how Evenari described it, 50 years later in his autobiography:

> The oaks also provided the Kurds with manna. At the end of the growing season, oak leaves are covered by manna, a layer of a sugary material, excreted by aphids when they feed on the leaf sap. The peasants collect these leaves and soak them in water, which is then boiled in large cauldrons until it turns into syrup.[22]

The use of the Bible as a guiding text was also taken up by other Hebrew University scientists like zoologist Israel Aharoni, who devoted time and effort to determining the Hebrew names of animals.[23] Relying on biblical text in genetic of Jewish population studies appeared during the 1950s and 1960s in articles published by Chaim Sheba and his team.[24] Using the Bible as a source was also common in Israel's biblical archaeology, during the same period, when it forfeited its independence as a scientific field of research. In its use of biblical accounts as a foundation for the history of ancient Israel, archaeology became an instrument for providing "roots" and to a certain extent, a substitute for religion.[25]

THE 1930S: FROM JERUSALEM TO THE KURDISH FOREST

In 1933, four years after Iraq gained its independence, the Iraqi Agricultural Ministry invited a delegation of scientists from the Hebrew University to conduct a survey of the Kurdish forests.[26] These forests were critical to Iraq's economy, as most of its territory did not contain trees. Hebrew University personnel were asked to draft a list of existing trees and submit proposals for forestry and conservation efforts. When the Israel Prize judges were perusing the results of this research, in their arguments for awarding the prize to Michael Zohari, they wrote:

> The flora of Aram-Naharayim [Upper Mesopotamia], which was largely unknown in the scientific literature, merited for the first time a comprehensive description in the work of Prof. Zohari. This research was published by the Iraqi government.[27]

In other words, it was perceived as a study of the flora of Aram-Naharayim, the birthplace of the founder of the Jewish faith, the patriarch Abraham. Botanist Michael Evenari and geologist Leo Picard, two other members of the delegation to the Kurdish forests, wrote extensively about their experiences and their impressions of the local population, and particularly of their encounter with the Jews of Kurdistan.

Picard, the founder of the Hebrew University's geology department, joined the university just months after its founding in 1925. Most of his scientific work was devoted to investigating the structure and development of the geology of the Land of Israel and its neighbors, and to the issue of finding groundwater. Alongside this work, he served as a scientific advisor to the Dead Sea Potash Works, the Electric Company and the Mekorot Water Works Company.[28]

The seven-member delegation that departed at the end of the summer set out in two vehicles loaded with necessities. Their equipment included a mobile laboratory and many crates containing instruments for performing ecological and climatic measurements that would enable them to investigate the forest from ecological, phytogeographic (the study of the dispersion of flora), and phytosociological (the study of groups of species usually found together) angles. Picard was asked to study the geobotanic conditions of the soil and rock on the forest floor and answer botanists' ecological queries. In fact, Picard took advantage of the trip to conduct a thorough study of the geology of Iraq, particularly Kurdistan.

En route, the delegation passed through Jericho and Amman, and crossed the Syrian desert, collecting desert plants by day, classifying them in the evening, and drying them overnight. When they reached the Kurdish mountains, they pitched a camp that included two oak huts which served as a kitchen and a laboratory. Every morning at dawn, Eig, Zohari, and Feinbrun mounted their horses and set off to chart the cartographic and photographic layouts of the forest. Evenari began to conduct eco-physiological measurements of the forest trees at dawn. In the evening, the researchers met back at camp and enjoyed a meal prepared for them by a Kurdish cook. The locals even provided the scientists with escorts and protection, and shared local knowledge with them, as Evenari described:

> They [the Kurds] showed a remarkable knowledge of the plants growing in their country. Once, they brought me two plants that looked very similar, which they referred to by two different names. On further investigation, Eig found that these really were two different species.[29]

The scientists documented their impressions of the scenery, as well as their encounters with the locals. Picard wrote about the innkeeper where they lodged outside Amadiya:

> The brunette, beautiful, graceful property owner, with her Greek facial features, greets us with an inviting movement. What a mixture of peoples and how many hereditary factors of different races, since the Assyrians and since Alexander the Great, are repeatedly expressed in this region.[30]

Evenari recalled that every day he examined 15–20 Kurds and supplied them with medicines, and described them thus:

> From observing the Kurds at close hand, it was obvious that they were not of Semitic origin. They are very different from the Arabs, whom they hate and fight to this day. Their clothing is distinctive, and they have blue eyes and brown or blond hair.[31]

Evenari included in his writing a detailed description of the local garb, their language, their history, their livelihoods, and the layout of their villages and houses. Later in the trip, they met members of the Assyrian minority—Aramaic-speaking Christians—who were remnants of a massacre in 1932 by the Kurds. Nevertheless, the greatest excitement was meeting the Kurdish

Jews, who spoke Aramaic, and in his description of them, Picard even attributed Zionist aspirations to them:

> They are the purest Jewish types . . . Do they see me as their people, or just a clean-shaven Hebrew-speaking gentile? New Year's Eve is approaching and this gentile is traveling around the country at the invitation of the government; the same government that does not allow them to immigrate to the Land of Israel, the land their souls longed for.[32]

At the end of their trip, which lasted over a month, the researchers submitted a report of the conditions of the Kurdish forests, based on which the Iraqi government enacted conservation laws. Among others, the Iraqis adopted the proposal of celebrating an Iraqi version of Tu Bishvat,[33] where Iraqis would plant trees and enjoy their ancient forests.

The expedition to the Kurdish forests afforded the researchers, who were all European born, an opportunity to explore the plants and soil of a Middle Eastern country and thus strengthen their connection to local landscapes. Moreover, the Hebrew University staff sought to establish a Middle Eastern science center similar to the worldwide one in Germany, in the Jewish spirit of being "a light unto the nations." The invitation to explore the Kurdish forests, like Bodenheimer's invitation to Turkey and Iraq in his capacity as an expert in entomology,[34] testifies to the fact that at least at a certain level, this aspiration of becoming a local scientific center was fulfilled. In addition, the scientists' attitude toward the Kurdish Jewish community reflected their internalization of the Jewish-Zionist concept of the ingathering of the exiles.

THE EARLY 1940S: RESEARCH EXPEDITIONS DURING WORLD WAR II

The journey to Iraq was unique in the scope of its participants and its duration of over a month. Nonetheless, the Hebrew University researchers took many other trips—shorter than the trip to Kurdistan—inside Mandatory Palestine, as well as abroad. Thus, for example, in 1936, Evenari conducted research in Transjordan,[35] and in 1940, zoological delegations studied the fauna in Hula Lake.[36] A lengthier trip to Egypt in April-May 1940 comprised nine researchers, six of whom were from the Hebrew University Botany Department, among them Evenari, as well as Zohari and Feinbrun.[37]

Locating medicinal plants was one facet of harnessing the university to the war effort, beginning with the outbreak of World War II.[38] At that time, it was difficult to import raw materials, and the university researchers provided the pharmaceutical industry in Palestine with herbs such as solanum, whithania, and valeriana. Thus, the ostensible purpose of the 1940 Egypt expedition was to explore and collect medicinal plants. They planned to look for Hyosciamus, Artemisia, and Pyrethrum in the Sinai desert, and hoped to find Hagenia Abyssinica, Flores Koso, Balsamodendron, Folia Senna, and Strophantus in mainland Egypt.[39] Their aim was to grow these plants in the northern Dead Sea region. The delegation members from Jerusalem obtained information on growing medicinal plants, and also received *Oleum-chenopodii* seeds, as well as those of a few other plants, from the Egyptian Agriculture Ministry. In addition, they purchased medicinal plant seeds in Cairo's spice market, and in the Sinai desert, found seeds of Hyoscyamus muticus and Artemisia Judaica.[40]

The trip was also exploited to establish scientific ties with Cairo University's Botany Department, and with the King Fuad Agricultural Museum, where the delegates received on loan from Mr. Shabtai, the Jewish administrator of the herbarium, material needed for a botany student in Jerusalem. At the same time, the researchers used the trip for basic research. A good deal of their time was devoted to collecting seeds from wild plants that grew in mainland Egypt and in the Sinai Peninsula. They also aimed to study the phytogeography of Egypt and the Sinai Peninsula, viewing this as a foundation for understanding the phytogeography of the Arava and the arid parts of Palestine. They collected plants for systematic research, including Red Sea algae and algae from freshwater pools in Sinai.[41]

The delegates' attraction to the Sinai Desert is understandable not just in the context of their interest in desert botany. As in the aforementioned trip to the Sinai in search of the biblical manna, and Evenari's trips to the Sinai in the 1950s and 1960s (described below), the researchers were attracted to the peninsula due to the mythic importance of Mt. Sinai, where according to tradition, the Israelites received the Torah and then wandered in the desert for 40 years, during which time they became a nation.

In 1942–3, Feinbrun, Zohari, and others took a few more trips to the neighboring countries, including a two-week trip to Lebanon, then under French rule, and two trips to Jordan.[42] Occasionally the research expeditions were taken jointly with researchers from other countries. In 1944, Feinbrun traveled to Egypt's eastern desert as part of a research team funded by the

Egyptian Agriculture Ministry. The head of the delegation was British botanist Peter Hadland Davis, and they were joined by Mr. Shabtai, administrator of Cairo's Agricultural Museum.[43]

In addition to their travels to neighboring countries, the researchers went on many excursions within Mandatory Palestine, to the Judean Desert, the Dead Sea, the Negev, the Sea of Galilee, Hula Lake, and the rest of the Galilee. While the years of World War II were characterized by multiple research expeditions, in the latter half of the 1940s these trips slowed down and came to a halt in 1948 with the establishment of Israel.

THE LATE 1940S: FROM THE FIELD TO THE LABORATORY

In his autobiography, Bodenheimer established that as it grew, particularly after the establishment of the state, the Hebrew University became a source of professional knowledge and stopped educating students toward broad knowledge and thought. He added that this dangerous trend was a worldwide one.[44] In fact, Bodenheimer lamented the waning of the German orientation of the Hebrew University and the ascent of the American trend. In the sub-disciplines of biology, this also entailed a transition from mostly observational research carried out mainly in the field, to experimental biology, which is generally conducted in the laboratory.

As early as the 19th century, the distinction grew sharper between biology, with its focus on laboratory experiments, and natural science, which was studied in the field. The transition from observation-based research that included collecting specimens to laboratory-based research, can be identified at the Hebrew University starting in the mid-20th century with the work of Feinbrun, Evenari, and others, as evinced in the diary and letters of a brilliant student named Tuvia Kushnir, who was killed during the War of Independence on his way to Gush Etzion in the Convoy of 35.[45]

Despite the fact that Kushnir was primarily interested in systematics due to his encounter with fauna and flora in their natural environment, the more he studied, the stronger he felt the pull of genetics and biochemistry. This transition can be found in his letters:

> Systematics for example is by definition a narrowing of horizons. Its preoccupation with details demands a reduction of one matter or another. Genetics by its very nature is perhaps the broadest and deepest of all, as it lends meaning to all other branches of biology and gives rise to all the rest. Two

> or three months ago, when I opened my first genetics textbooks I felt as if I had grown wings…[46]

In his focus on biochemical genetics, Kushnir succeeded in identifying new trends in science, which gradually penetrated into the Hebrew University, mainly owing to the influence of American research. Taxonomical research that was designed in the spirit of Central Europe gradually came to be viewed as outdated.

The worldwide transition from field studies to laboratory studies was not the only cause of the dramatic drop in research expeditions. After the establishment of Israel, travel to the neighboring countries became impossible. Although in the years following 1948, excursions continued within the borders of the new state, botanical and zoological expeditions hardly took place, even within the armistice lines.[47]

THE 1950S: RESEARCH EXPEDITIONS ABROAD

The wall of Israel's political isolation, not only from neighboring countries but also from the rest of the Muslim world and Africa, began to show cracks in the early 1950s. Political transformation allowed Israeli scientists to conduct research abroad. So, for example, in the wake of diplomatic ties with Turkey, in 1952, Michael Zohari was invited by the Turkish government and Ankara University to conduct a geobotanical study in Ankara.[48] In 1960, Zohari went on a month-long trip to Iran, made possible by warming relations between Israel and Iran.[49]

At the beginning of the 1950s, commercial ties began to form between Israel and Ethiopia, and after the 1956 Sinai Campaign, with the opening of the Straits of Tiran, maritime trade between Israel and Ethiopia increased, leading to diplomatic relations. Israeli scientists were aware of the change and were resolute in their desire to seize the opportunity to send research delegations to Ethiopia. In October 1958, a joint delegation of eight researchers from the Hebrew and Tel-Aviv Universities went to Ethiopia, headed by Hebrew University's entomologist Oskar Theodor. The delegation's research lasted 50 days. One of its goals was to learn about living conditions in arid zones.[50]

The delegation was officially hosted by the Ethiopian Agriculture Ministry, and the researchers were warmly welcomed by the Ethiopian government agencies, owing largely to Israeli consul, Hanan Baron. As part of their preferred status, the researchers obtained permission to take many

photographs of fauna, landscape, and people, deviating from the blanket prohibition on tourists taking photographs in Ethiopia. The researchers were also permitted to take home any plants and animals they wished, and indeed they brought back hundreds of tropical plants, birds, grasshoppers, and desert rodents, including specimens which had never been studied before.[51]

In 1959, two more Israeli delegations set off for Ethiopia and neighboring African countries: an eight-member team of geologist to research the Syrian-African Rift,[52] and a delegation of geneticists and physicians to study the hereditary traits of the Beta Israel and other Ethiopian tribes.[53] The hasty organization of research delegations to African countries so soon after Israel's establishment of diplomatic relations with them points to the delegates' stifling sense of isolation in consequence of the new borders. When the War of Independence ended, Israel covered 20,770 square kilometers and was surrounded on all sides by enemy nations, and the only route out of the country was the Mediterranean, by ship or by air. The strong desire of the researchers to join expeditions outside Israel's borders manifested not only in their travels to Africa but in their haste to pursue research in the territories captured by Israel in the Sinai Campaign and the Six-Day War.

THE 1950S AND 1960S: RESEARCH TRIPS TO SINAI

On November 5, 1956, the IDF completed its takeover of Sinai, and within a short time, members of the Hebrew University's Botany Department traveled to the Sinai Peninsula. By January 1957 they had already mapped the flora there and reported the similarities between what they had found and the flora of the Negev.[54] In 1956, zoologist Heinz Steinitz organized a delegation that explored the marine life along the Sinai coast and the Suez Canal.[55]

Similar quick action was taken by Hebrew University scientists at the end of the Six-Day War. In the wake of the war, critical voices were heard, some of them from the Hebrew University faculty who viewed the captured territories as potentially causing grievous damage to Israel. However, these voices were drowned out amid the euphoria of the Israelis over their newly expanded borders. The Hebrew University geologists, botanists and zoologists, who did not live in an ivory tower, viewed themselves as on rescue missions in the new territories. Maya Duani described a similar process at Beit Ussishkin on Kibbutz Dan, where Mount Hermon

and the Golan Heights were viewed as new territories for research. Hiking, discovering, and documenting constituted the civic praxes of appropriating new space.[56]

In a later account of the expedition to Sinai, botanist Evenari described his fear in June 1967, that the peninsula would remain in Israeli hands for only a brief period. Thus, soon after the dust of battle had settled, he contacted Defense Minister Moshe Dayan requesting permission to organize a delegation of botanists and geologists for a study of the Sinai desert.[57] Dayan, who had a long acquaintance with Evenari, gave his permission for the trip, and even promised that a dedicated IDF unit would attend to all the logistics.

IDF involvement was common in other scientific studies during the same period. For example, in the 1960s, massive military aid was extended to the archaeological excavations at Masada led by archaeologist and former chief of staff, Yigael Yadin;[58]and the IDF cooperated with climate studies conducted at Tel Hashomer Hospital.[59] Such collaborations between scientists, scientific institutes and the IDF formed links between two elite entities of Israeli society. In addition to the mutual benefit they gained from the standpoint of budget, human resources, and feasibility, each of the parties benefitted from the symbolic capital of their fellows.

In July 1967, a 25-member delegation from the Hebrew University's Botany and Geology Departments set off for the Golan Heights, the West Bank, and the Jordan Valley and the Sinai desert:

> We are set to depart tomorrow to tour the captured territories, i.e., the Golan Heights, the West Bank, the lower Jordan Valley, and the Sinai desert. The objective, which will be carried out under the supervision of the IDF, is to draft a land use plan that will give the relevant institutions a scientific and rational foundation for every decision regarding the future of these territories, including resettlement of the refugees.[60]

This letter shows that Hebrew University's academic staff did not see their goal as limited to scientific achievements but hoped their research would assist in the making of decisions about the future of the territories and in finding a solution to the refugee problem.[61] Moreover, the research delegation was secured by the IDF and also received funding from the university budget for security-related research.[62] The botanists already possessed material collected before 1948, and their objective now was to fill in the missing information that would enable them to publish phytogeographic and phytosociological maps of the area.[63]

During a two-week expedition to Sinai in the summer of 1967, the Hebrew University geologists examined various rock formations in southern Sinai, while the botanists explored desert flora at various altitudes up to 2,600 meters at the peak of Mount Sinai.[64] Evenari indicated in his book that the expedition to the Sinai desert was not without danger: Large swaths of the peninsula were sown with landmines, and Egyptian soldiers still patrolled the area. Burned cars, trucks, tanks, artillery, and launchers remained there. One night, as they lodged next to an IDF explosives convoy, they woke up in panic to the sound of heavy bombardment, and found themselves within range of an artillery duel between Egyptian ships and Israeli gunners.[65] Yet the compensation for their nocturnal terror was the desert landscape, the ability to discover unknown flora specimens, and study geological phenomena, as well as the opportunity to tour land suitable for agriculture.

Upon their arrival to the Santa Katarina Monastery at the foot of Mount Sinai, the Hebrew University researchers were welcomed with honor by the monks and by Moshe Dayan who arrived on the scene by personal helicopter. Evenari later recalled that it was the first time during their journey that they slept in beds rather than sleeping bags in a tent. The close relationship with Defense Minister Dayan eased the way for research and living conditions and sometimes even provided an opportunity to conduct further research. In such cases, the boundaries between scientific research, the advancement of political and security policy and Dayan's personal desires become blurred.

Just a few days after the group's return from Sinai, Dayan phoned Evenari with an invitation to join him in a helicopter flight over Sinai for the purpose of identifying captured land suitable for farming on which to resettle the residents of refugee camps. A geologist joined the flight as well, and the pilot turned out to be none other than Mordechai Hod, commander of the Air Force. Evenari gave Hod directions and pointed to an area he deemed suitable for agriculture and the geologist pointed to likely sites of mineral deposits. Dayan exploited the flight to pick up a gravestone covered in hieroglyphics from an ancient Egyptian temple with the help of two soldiers who loaded it onto the helicopter on a stretcher.

Over the next three years, delegations of botanists, zoologists, geologists, and hydro-geologists visited Sinai, and Evenari wrote, "We investigated every wadi, even the most inaccessible ones. We now know every nook and cranny of the peninsula."[66] For many years, much of Evenari's time was dedicated to exploring Nabataeans runoff agriculture in the desert and studying the adaptation of plants to salty marshes and other desert

conditions, in an effort to make the desert bloom.[67] Yet, in his autobiography he admitted:

> It was not only the scientific work that made us "Sinai-crazy". We were captivated by the Northern Sinai plains, the regs covered by black shining stones, seemingly stretching into infinity over which we could race our jeep at the highest speeds.[68]

In the descriptions of the desert in Evenari's book, the wonder at the landscape transcends that aroused by the flora, even though the latter was the official subject of the study.

CONCLUSION

The values underlying the research expeditions of the Hebrew University scientists, as well as the values that manifested during the trips themselves, reflect the dual commitment of the university's founders. On the one hand, scientific research as per the accepted praxes of the time around the world, and on the other hand, the expression of the nationalist values of strengthening the connection to local landscapes. The scientists perceived the landscapes not only through their contemporary sensory experience but also through the cultural-historical context of the Bible. In the pre-state period, the objectives of some of the expeditions such as tracing the biblical manna were directly tied to the Bible. In the years following the establishment of the state, the subject and official aims of research became "neutral", yet at the same time, the scientific observations that were conducted then entailed both exhaustive observation and strong emotions in the encounter with biblical landscapes.

When examining the destinations of the research trips, a special affinity for the desert during the pre-state period and thereafter is evident. This affinity of course has a professional-scientific facet. In the context of worldwide science, the desert constituted an opportunity for the Hebrew University scientists to engage in unique and innovative research; yet desert research had heroic pioneering dimensions as well that enabled the scientists to relate to the Zionist national values of the surrounding society. The desert posed great physical difficulties and coping with these conditions prior to Israeli independence matched the perception of the new Jew, manly, strong, and courageous, as opposed to the stereotypical weak, pale diaspora Jew. Following the establishment of the state, ideas

of heroism and resilience blended merged in the admired "military man", and scientists like Michael Evenari were eager to emulate the national hero archetype.

Based on the distinction proposed by sociologist Oz Almog between a trip and a journey,[69] the expeditions of the Hebrew University scientists to the desert fulfills most of the criteria of a journey. These travels entailed a long presence in the locale, sleeping in tents, physical exertion, the motif of discovery and "conquest", as well as danger, adventure, pioneering, and heroism. Heroism as a formative value appears in other contexts of scientific research as well, particularly field research. The view of the (mostly male) scientist, who acts resolutely to expand scientific knowledge, undeterred by the dangers facing him, manifests mainly in the scientists' presentation of their activity in the media or in textbooks.[70]

In both Sinai expeditions—that of Bodenheimer in 1927, and that of the 1967 delegation—the dangers and physical challenges are described as leading to a connection or even a covenant between human beings and the desert. However, whereas the two researchers who went to study biblical manna in 1927 made do with a meager budget and spartan transportation, the delegation to Sinai 40 years later enjoyed generous financial support and was "covered" by a massive military presence.

To conclude, even scientific disciplines that do not address human history, sociology, or health may be affected by national ideology. Although the official aim of the Hebrew University researchers described herein was their biological or geological investigations, they were also inspired to reinforce the Jewish connection to the Land of Israel and to the Middle East. Coming to know the local landscape and the Land of Israel (in the historic sense, not bounded by political borders) fostered a sense of belonging in what they perceived as their homeland, even though it was not the country of their birth.[71] The Hebrew University researchers I have presented here were influenced by the norms of the society in which they operated. Their research expeditions expressed not only their intellectual and scientific curiosity but also their desire to know the Land and belong to its specific geographic location as the imagined new Jews whose most salient traits were bravery, affinity to nature, and love of the homeland.

Can scientific research be totally separated from a scientist's beliefs and ideologies? Likely not. Often, when the values involved come from an official ideology (Fascism, Communism), the ideological effects are easily detected. However, in the current case it appears as if the scientists themselves were not always aware of their internalization of national ideology; in the Yishuv society, these scientists were perceived as belonging to the "the

mountain" of academia, detached from the rugged values of "the valley" pioneers. The awarding of the Israel Prize to Bodenheimer, Zohari, Picard, Evenari, and Feinbrun-Dotan indicates that after the establishment of the State of Israel, the connection between scientific activities and nation-building was fully recognized.

Notes

1. Bezalel Barshai, "The Hebrew University of Jerusalem from Plan to Reality," *Cathedra* 25 (1982): 65–78; Michael Heyd, "The Early History of the Hebrew University—Between National and Universal Orientation, Between Research and Teaching," in Rivka Feldhay and Immanuel Etkes, eds., *Education and History—Cultural and Political Contexts* (Jerusalem, 1999), 355–75 [both in Hebrew].

2. Anita Shapira, "The Labor Movement and the Hebrew University in Palestine," in Shaul Katz and Michael Heyd, eds., *The History of the Hebrew University of Jerusalem—Origins and Beginnings* (Jerusalem, 1997), 675–89; Uri Cohen, *The Mountain and the Hill—The Hebrew University of Jerusalem During Pre-Independence period and Early Years of the State of Israel* (Tel-Aviv, 2006) [both in Hebrew].

3. Etan Bloom, "What 'The Father' Had in Mind? Arthur Ruppin (1876–1943), Cultural Identity, Weltanschauung and Action," *History of European Ideas* 33.3 (2007): 330–49; Nadia Abu El-Haj, *Facts on the Ground: Archaeological Practice and Territorial Self-Fashioning in Israeli Society* (Chicago, 2001); *The Genealogical Science: The Search for Jewish Origins and the Politics of Epistemology* (Chicago, 2012); Raphael Falk, *Zionism and the Biology of Jews* (Cham, 2017); Nurit Kirsh, "Population Genetics in Israel in the 1950s: The Unconscious Internalization of Ideology," *Isis* 94 (2003): 631–55.

4. S. Ilan Troen, "Scientific Research and the Issue of the 'Economic Absorptive Capacity' of Eretz-Israel," *Iyunim Bitkumat Israel* 1 (1991): 481–95 [Hebrew]; Falk, *Zionism and the Biology of Jews;* Dafna Hirsch, "'We Are Here to Bring the West, Not Only to Ourselves': Zionist Occidentalism and the Discourse of Hygiene in Mandate Palestine," *International Journal of Middle East Studies* 41 (2009): 577–94; "Zionist Eugenics, Mixed Marriage, and the Creation of a 'New Jewish Type," *Journal of the Royal Anthropological Institute* 15.3 (2009): 592–609; Dana von Suffrin, "The Possibility of a Productive Palestine: Otto Warburg and Botanical Zionism," *Israel Studies* 26.2 (2021): 173–97; Tamar, Novik, "Local Biology," *Zmanim* 145 (2021): 80–9 [Hebrew]; Sigrid Vertommen, "From the Pergonal Project to Kadimastem: A Genealogy of Israel's Reproductive-Industrial Complex," *BioSocieties* 12.2 (2017): 306–82.

5. See Or Barak, *The Israel Prize: Politics Behind Glory* (Rehovot, 2018) [Hebrew].

6. https://new.huji.ac.il/%D7%94%D7%95%D7%A7%D7%A8%D7%94-%D7%95%D7%A4%D7%A8%D7%A1%D7%99%D7%9D, accessed May 16, 2022 [Hebrew].

7. Evenari, *The Awakening Desert* (New York, 1987); Leo Yehuda Picard, *Pioneering Geology of Eretz Israel* (Jerusalem, 1996) [Hebrew]; Friedrich Simon Bodenheimer, *A Biologist in Israel* (Jerusalem, 1959). On Evenari's difficulty in writing his autobiography in Hebrew, see Evenari to Pazi, March 19, 1987, Hebrew University Archives (HUA)—personal file (1974 onwards).

8. My thanks to Dr. Gilat Gofer for drawing my attention to these aspects.

9. Claudius Gellert, "The German Model of Research and Advanced Education," in Burton R. Clark ed., *The Research Foundations of Graduate Education: Germany, Britain, France, United States, Japan* (Berkeley, 1993), 7–9; Joseph Ben-David, *Scientific Growth: Essays on the Social Organization and Ethos of Science* (Berkeley, 1991), 165.

10. Of the 660 scientists who left Germany in the two years after the Nazis came to power, only 40 arrived in Jewish Palestine. Although only about 6%, relative to the small scientific community that existed there, this was a significant addition. Yoav Gelber, *New Homeland* (Jerusalem, 1990), 64, 454–62 [Hebrew].

11. Dominique Trimbur, "La Politique Culturelle Extérieure de L'Allemagne, 1920–1939: le Cas de la Palestine," *Francia XIX–XX Siécle* (Paris, 2001, Band 28.3): 1–73.

12. Warburg, third president of the Zionist Federation, 1911–1921. *The Warburg Book: His Life, Tributes to Him, Letters, Speeches, and Articles* (Herzliya, 1948); Derek, J. Penslar, "Zionism, Colonialism and Technocracy: Otto Warburg and the Commission for the Exploration of Palestine, 1903–7," *Journal of Contemporary History* 25 (1990): 143–60.

13. Upon establishing the USSR's academic agricultural studies, Lenin appointed Vavilov early in his career to head the All-Russian Union Research Institute of Plant Industry. Vavilov's most important scientific contribution was his research on the origins of cultivated plants. With the rise of Lysenkoaism in the USSR, he was incarcerated in 1940 and died in a Siberian prison camp in 1942. Conway Zirkle ed., *Death of a Science in* Russia (Philadelphia, 1949), 47–8, 80–9. On his visit to Palestine, see Rivka Ashbel, *For Out of Zion Shall Go Forth the Torah—The History and Contribution of the Scientists of the Hebrew University of Jerusalem Over a Period of Sixty-Six Years, 1925–1991* (Jerusalem, 1991), 328 [Hebrew].

14. Curriculum, Vita, Dr. Naomi Feinbrun Promoted to lecturer, October 1, 1951, HUA—Feinbrun personal file; Ashbel, *For Out of Zion*, 147–73.

15. Keith R. Benson, "Field Stations and Surveys," in Peter J. Bowler and John V. Pickstone eds., *The Modern Biological and Earth Science, The Cambridge History of Science, vol. 7*, (Cambridge, 2006), 76–89; Mott T. Greene "Geology," *ibid.,* 183.

16. David Ellis Allen, "Amateurs and Professionals," Bowler and. Pickstone, *ibid.,* 15–33; Benson, "Field Stations and Surveys," 76–82; Richard Drayton, *Nature's Government* (New Haven and London, 2000), 17.

17. See Henry Baker Tristram, *The Land of Israel; A Journal of Travels in Palestine* (London, 1865); David Gurevich and Anat Kidron, eds., *150 Years of the Palestine Exploration Fund*, (Sheffield, 2019).

18. Asaf Zeltser, *The History of the Hebrew University of Jerusalem, 4th vol., Who's Who Prior to Statehood: Founders, Designers, Pioneers* (Jerusalem, 2003), 214–19 [Hebrew].

19. Isaac Harpaz, "Frederick Simon Bodenheimer (1897–1959): Idealist, Scholar, Scientist," *Annual Review of Entomology* 29 (1984): 1–23.

20. Friedrich Simon Bodenheimer, *Animal Life in Biblical Lands* (Jerusalem, 1956) [Hebrew].

21. Bodenheimer, *Animal Life in Biblical Lands, II*, 297–302; *A Biologist in Israel,* 91–7.

22. Evenari, *The Awakening Desert*, 52.

23. Israel Aharoni, *Memories of a Hebrew Zoologist* (Jerusalem, 2000) [Hebrew].

24. Kirsh, "Population Genetics."

25. Shulamit Geva, "Israeli Biblical Archaeology: The First Years," *Zmanim* 42 (1992): 92–102 [Hebrew].

26. Rivka Ashbel, *For Out of Zion,* 175–6.

27. *The University Lecturers—Israel Prize Laureates 1953–1958* (Jerusalem, 1958).

28. Zeltser, *The History of the Hebrew University*, 264–8.

29. Evenari, *The Awakening Desert,* 51.

30. Picard, *Pioneering Geology,* 59.

31. Evenari, *The Awakening Desert,* 52.

32. Picard, *Pioneering Geology,* 59.

33. The Jewish "New Year of the Trees," celebrated on the 15th of Shvat, which falls in January/February, when the almond trees bloom.

34. Zeltser, *The History of the Hebrew University*, 218.

35. "Travels and Research Tours" [n.d] HUA, - Evenari's personal file (until 1979). From 1921 to 1946, the Emirate of Transjordan was a British protectorate, so that Palestine and Transjordan were partially under the same governing power.

36. Ashbel, *For Out of Zion*, 239.

37. HUA-B (Botany Dept.), Zohari, Evenari, Rayss, Feinbrun, Zaitschek to Fekete, May 19, 1940.

38. Hedva Ben-Israel, "Politics on Mount Scopus during the Mandatory Period," in Hagit Lavsky ed., *The History of the Hebrew University of Jerusalem—Academic Progression in a Period of National Struggle* (Jerusalem, 2009), 3–86; Rivka Ashbel, *As Much as We Could Do: The Contribution Made by the Hebrew University of Jerusalem and Jewish Doctors and Scientists from Palestine during and after World War II* (Jerusalem, 1989) [both in Hebrew].H

39. HUA-B, Michael Evenari and Michael Zohari to Senator, Hebrew University administrator, March 29, 1940.

40. HUA-B, Evenari and Zohari to Magnes, May 29, 1940.

41. HUA-B, Zohari, Evenari, Rayss, Feinbrun, Zaitschek to Fekete, May 19, 1940.

42. HUA-B, From Ben-David, to whom it may concern, July 8; July 14, 1942; to the Aliya Department, Mandatory Palestine, March 28, 1943.

43. *Observer,* June 5, 1944. Thanks to Dr. Assaf Nevro who directed me to this source.

44. Bodenheimer, *A Biologist in Israel* (Jerusalem, 1959), 44.

45. An article by Kushnir on a new species of mole cricket with a unique number of chromosomes that constitutes the evolutionary link between the European and African mole cricket, was accepted for publication in *Nature*, the notification of which Kushnir received, but did not live to see published. His widow, Aviva Kushnir [later Hazaz] completed his thesis on evolution and the cytogenetics of mole crickets, which he had begun, together with his thesis advisor, Elisheva Goldschmidt. Tuvia Kushnir, *Nature Research and Letters* (Tel-Aviv, 1982) [Hebrew].

46. Kushnir to his father, January 30, 1946, *ibid.,* 153.

47. On botanical research at Hebrew University post-1948 see Naomi Yuval-Naeh, "The Botany Department and the Spatial Question, 1948–1967," in Yifat Weiss and Uzi Rabhon eds., *History of Hebrew University vol. 5*, Jerusalem (forthcoming).

48. HUA—Zohari personal file, Zohari to Evenari, October 30, 1952.

49. *Ibid.,* Zohari to Reshef, June 27, 1960.

50. A zoological and parasitological expedition to Ethiopia—a document signed by O. Theodor, May 5; *ZIM* Integrated Shipping Services to O. Theodor, August 29; Yoseph Hadas to the Zim management board, August 29; Ben-David to the inter-ministerial committee for overseas travels, September 23; Jerusalem Office telegram to Israeli Government representatives in Addis Ababa, October 10, 1958.

51. Mordechai Shefi, "Abyssinia Through the Eyes of a Zoologist," *Lamerchav*, February 15, 1959.

52. [No name] "Geological Delegation to Eastern Africa," *Al Ha-Mishmar*, July 7; [No name] "Israeli Scientific Delegation Conducts Research in Africa," *Maariv*, July 6, 1959.

53. Nurit Kirsh, "Jewishness, Blackness, and Genetic Data: Israeli Geneticists and Physicians Tracing the Ancestry of Two African Populations," in Uri Dorchin and Gabriella Djerrahian eds., *Blackness in Israel* (London, 2021), 43–57.

54. *Lamerchav,* January 9, 1957, 2.

55. Ashbel, *For Out of Zion*, 242.

56. Maya Duani, "Forever is Always 'Meanwhile': The Development of Nature and Human Conservancy in the Beit Ussishkin Museum at Kibbutz Dan," *Zman Chinuch* 5 (2019): 201–21 [Hebrew].

57. Evenari, *The Awakening Desert*, 163–5.

58. Nachman Ben-Yehuda, *The Masada Myth: Collective Memory and Mythmaking in Israel* (Madison, WI., 1995).

59. Ari Barell and Nurit Kirsh, "The Hospital as a Laboratory: Biomedical Research at Tel-Hashomer Hospital in Israel (1950s–1960s)," *Science in Context,* forthcoming.

60. HUA-B, Evenari to Rector Rotenstreich, July 4, 1967.

61. In the aftermath of the Six-Day War the Israeli government initiated and funded academic research on Palestinian society to gain reliable, useful knowledge and inform its policies. See Omri Shafer Raviv, "Studying an Occupied Society: Social Research, Modernization Theory and the Early Israeli Occupation, 1967–8," *Journal of Contemporary History* 55.1 (2020): 161–81.

62. https://doi.org/10.1177/0022009418785688.

63. HUA-B, University vice president to Prof. Z. Lev, July 12, 1967.

64. HUA-B, Evenari to Rotenstreich, July 4, 1967.

65. HUA-B. "For Immediate Release," July 27, 1967.

66. Evenari, *The Awakening Desert*, 163.

67. *Ibid.,* 166.

68. Michael Evenari, Leslie Shanan and Naphtali Tadmor: *The Negev: The Challenge of a Desert* (Cambridge, MA., 1982).

69. Evenari, *The Awakening Desert*, 166.

70. "Tiyul" versus "Masa", Oz Almog, *The Sabra: A Portrait* (Tel-Aviv, 1997), 274 [Hebrew].

71. See Naomi Oreskes, "Objectivity or Heroism? On the Invisibility of Women in Science," *Osiris* 11 (1996): 87–113; *Catherine Milne,* "Philosophically Correct Science Stories? Examining the Implications of Heroic Science Stories for S*chool Science," Journal of Research in Science Teaching 35 (1998): 175–87.*

72. In contrast, it is interesting to note that while researchers in the natural sciences idealized the scenery of the Middle East, in the 1930s, Middle Eastern scenery was altogether absent from the stages of the two repertoire theaters, Habima and Ha-Ohel, where the landscape of Eastern Europe and the shtetl, "played starring roles." See Shelly Zer-Zion, "The Shtetl in the Hebrew Theatre of Mandatory Palestine during the 1930s," *New Theatre Quarterly* 36.2 (2020): 177–91.

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