Sanitation in the Holy Land*

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In the short span of 15 years, historic Palestine has emerged, from a war-torn, oriental country infested with malaria, trachoma, and other infectious diseases, as one of the very few prosperous sections of the world. The illuminating story of this remarkable metamorphosis is one of consistent progress in public health and sanitation matching economic development, step by step. Credit for this achievement is due the British Department of Health of Palestine, Louis J. Cantor of New York City who was its first sanitary engineer, and the Hadassah, Women's Medical Auxiliary of the Zionist Organization of America.

Before their retreat in 1917–1918, the Turkish Army, following the example of other armies during the great war, deliberately wrecked the country, ravaging the homesteads, and conscripting the population or sending it into exile, leaving behind the weak, the old, and the very young. The land was denuded of stocks of cattle and horses; orange groves were ruined by lack of irrigation; and cultivated fields were abandoned.

The war’s depredations in Palestinian towns are mirrored in the harrowing experiences of Petah Tikvah. Forty years before, that inspired Joshua Stemper, who was loved even by his opponents, had walked from his birthplace in Hungary to Jerusalem and, though the son of a Rabbi and untrained as a cultivator, had founded the colony of Petah Tikvah. It developed splendidly under the Palestine sun, the transformation of every parcel of sand into bearing vineyards and orange groves arousing great joy among the educated but manually untrained young farm hands. Then came the war and the colony’s tragic decline; the requisition of cattle and other possessions, and the ruthless cutting of trees by the Turks and the Germans to run their locomotives; the destruction of all crops by clouds of locusts making night of day; invasion by warring armies, twice by the Turks, twice by the English, and four times the scene of battle; the evacuation of the population and, finally, their return to empty houses in October, 1918. In the intervening months, the exiles were driven from place to place, sleeping in the open, sick and weary; their bodies utterly filthy with sores and wounds; their every possession sold, lost, or stolen.

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In Jerusalem the Jewish population was in the most precarious position of all. Composed largely of old men and women devoted to study and prayer who had come, with insufficient funds, to spend their last days in the Holy City and to be buried on the Mount of Olives, scores died of sheer want after their monthly subventions from Europe and America were cut off by the war. Serious outbreaks of disease reduced their number still further, leaving weak and dispirited survivors. Their vicissitudes reduced the Jewish population in the city to 32,000 early in 1919. Half what it was before the war, and among them approximately 1 in every 10 was an orphan.

Immediately following British occupation of Jerusalem on December 11, 1917, the Occupied Enemy Territorial Administration (O.E.T.A.) was organized, with military governors at Jerusalem and elsewhere; food was brought by military transport, and merchants were permitted to import goods from Egypt via the military railway. Among the most urgent tasks of the O.E.T.A. was the development of a Medical and Health Service in the country ravaged by war and decimated by disease. Few traces were found of any pre-existing government health service—in theory there existed under the Ottoman Code the outline of an organization which would have served the primary needs of the country, if in practice it had been adopted but, beyond the employment of part-time municipal doctors on small retaining fees, little was done. Within a year the new Department of Health, assisted by the Hadassah Medical Unit, and for a time the American Red Cross, established and actually conducted in nearly all the larger towns their sanitary services, instituted an epidemic and disinfection program, laid the foundations of an anti-malarial organization embracing all towns and colleges, and founded a central hygienic laboratory at Haifa, with branch laboratories at the government hospitals in Jerusalem, Jaffa, Gaza, and Nablus.

To supplement government health and social activities, the English agreed to the despatch of a Zionist Commission to Palestine to form a link between the British authority and the Jewish population and to coördinate their relief work and other efforts; also, to the sending of an American Medical Unit by the Hadassah to assist their coreligionists with urgently needed medical relief. Such is the story of the official existence of the present activities of these groups in Palestine in assisting not alone Jews but also Arabs and Christians in the daily amenities of life, particularly medical relief and sanitation.

With the American Medical Unit of 20 doctors and 20 nurses was a sanitary engineer, Louis J. Cantor, chosen because of his anti-malaria experience with the United States Government in the Panama Canal Zone and destined because of his inspired, unflagging, zealous efforts in the face of innumerable difficulties to become the pioneer sanitation engineer of Palestine.

On August 8, 1918, the unit arrived at Jerusalem while the world was still at war. The sanitary engineer was at once assigned to the 123rd Sanitary Section of the British Royal Army Medical Corps for direct army control of anti-malarial work, scavenging, and food establishments in Jerusalem. Noting that the overburdened hospitals were filled with malaria patients and the city saturated with mosquito propagating cisterns and water receptacles, Cantor asked for and received 6, later increased to 12, Jewish soldiers of the 39th Battalion, Royal Fusiliers, as sanitary inspectors. He immediately instituted a thorough search for all mosquito-bearing water containers, and began their oiling to prevent the innumerable eggs from developing in
the embryo stages in the vitally necessary water. Garbed in their uniforms, invested with the authority of the British Army, and conversant with Eastern ways and languages, the inspectors sprayed cisterns, cesspools, drains, leaders, water-jars, overhead water reservoirs, and rain barrels in gardens with a special crude oil mixture provided by the unit. Cursed alike by the Arab and the Jew who did not want their sweet-tasting water fouled with the oil, and at times showered with water and over-ripe vegetables by irate householders, the inspectors stoically proceeded with their spraying. In the case of an old woman, this tumultuous greeting of the inspectors was replaced with a quiescence almost of welcome. Upon investigation the paradoxical situation was solved. After the inspector sprayed the surface of the water in the open cistern which in common with most others in the city had a rope and pail but no pump, the crafty woman inserted a cloth, sopped up the oil and squeezed it into a vessel. Later she fed the reclaimed oil to her kerosene stove which is universally used for cooking in Palestine. Despite similar rebuffs, the results of this campaign were immediate and astounding; the number of malaria deaths in the city decreased from 113 in the last 9 months of 1918, to 35 for the year 1919, and to 5 for all 1922. When viewed in the light that for each malaria death there are hundreds of malaria cases, the reduction in human suffering in Jerusalem can better be appreciated.

But oiling was expensive and had to be continued weekly. To exclude the female mosquito from the water, a movement was begun to persuade the householder to cement the top of his cistern and attach a hand pump. The few well-to-do did so at once, but the poor could not afford the expense involved. Cantor induced the Hadassah to purchase 10,000 hand pumps and make them available for general distribution through the government at a nominal charge. This action proved of incalculable value. But there were still many who persisted in the customary use of the open cistern. At last it was necessary to resort to sterner measures. On November 16, 1919, a notice was published in the Official Gazette that—

The public water supply is only available for the Army, Railroad, Institutions, and necessary trades. Therefore, it is necessary for the public to use cisterns and maintain same with cover or pump in a sanitary condition on fine of £5 or imprisonment of one month; and the Military Governor, if he thinks fit, can have the work carried out and charge the expense to the owner or occupier. Gradual enforcement of this order brought the desired results.

With his energetic sanitary inspectors, Cantor supervised the frequent collection of house, trade, market, and street refuse, loading it in bags atop donkeys—according to the practice of the ancients—hauling to dump grounds
outside the city and burning it in small incinerators. In cleaning up the Jewish quarters, relief funds were assigned through the Zionist Commission to provide work under Cantor's direction for the unemployed old Jews ranging in years from 40 to 70. At the maximum, 110 of these laborers were employed.

To overcome the carefree public custom of throwing garbage into the street oblivious of passers-by and at times spattering them, or dumping it in open kerosene tin cans, the Department of Health on Cantor's recommendation required the householder to provide suitable garbage containers. A model garbage can with cover was made and displayed in his office and throughout the city. This was followed by a campaign of persuasion resulting in their widespread installation. The public demand from all Palestine for garbage cans is now being supplied by a factory in Tel-Aviv.

The Hadassah Medical Unit was originally housed in the Baron de Rothschild Hospital at Jerusalem. Immediate renovation of this hospital and construction of additional service buildings was the first of Cantor's major assignments. A hurried survey of available means for this building project was disheartening and showed, in the words of Cantor's diary,

Labor available—old men and boys (able-bodied men in the army), no mechanics nor skilled workmen; materials—stone (badly dressed), lime (not burned), wood (not obtainable), roof tile (demolish buildings), water supply (cisterns, goat skins, and petrol tins), glass (priceless), paint (expensive), tin (use petrol tins), timber (dismantle old buildings); transportation—porters for lumber and glass, donkeys for sand and stone, camels for tiles and cement, wagons for lumber, cement, and stone, and automobiles for general duty.

But Cantor undaunted carried on. From the wood of the 1,883 cases of freight containing the Unit's supplies which arrived in September, chairs, tables, hospital shelving, and other articles were made. Finding among his soldier inspectors one with a working knowledge of plumbing, he taught a few local tinsmiths—the only skilled laborers available—how to do simple plumbing operations. Masons and carpenters were developed to carry out his ideas. Supplies were obtained by dismantling old buildings, from the Unit's freight when available, by purchase from the British Army or the American Red Cross, or by personal trips to Cairo. From all this there was developed in a short time a completely renovated main hospital building having clinics and dispensary provided with modern hospital equipment, such as X-ray and disinfecting machines, and with water for a hot and cold system for baths, showers, lavatories, and sterilizers; latrines; a laundry building; a morgue; storehouse; garage; laboratory; nurses' home; and headquarters.

Next came the cleaning and renovation of existing Jewish hospitals, orphanages, schools, and other public institutions including Mikvehs or baths. To the consternation of the orthodox Jews, the bathing pools in the Mikvehs were treated by the inspectors with bleaching powder to destroy infectious germs, and bathers contrary to life-long habits were required to soap themselves and take a thorough shower before entering the pools. To show orthodox students that the clusters of long hair growing on their cheeks in the form of "payas" or side-burns and acting as dirt and disease-germ catch-alls could be maintained in a sanitary manner despite the religious prohibition against cutting them with a knife, Cantor grew them for a year and had them trimmed with scissors. Because of increasing public demand for modern plumbing and Cantor's persuasion and unfailing assistance, the local tinsmiths and hardware stores, within a year and for the first time in the history of Palestine, made available to the public the various
appurtenances known as modern plumbing. Today well equipped stores in Jerusalem and elsewhere in Palestine display the products of large sanitary supply firms of both Europe and America, and a factory in Tel-Aviv is manufacturing sewer tile.

At the same time that Cantor commenced his sanitary work in Jerusalem, Dr. S. M. Schmidt of the Unit originated similar work in Jaffa, all under the authority and supervision and with the coöperation of the O.E.T.A. The first operation was a house-to-house medical and sanitary survey which revealed the need for scavenging, inspection, distribution of insecticides, and rat and mouse traps, screening, and oiling of wells. About 1,600 wells were sprayed. After a considerable number of men had been trained as sanitary inspectors, including some for anti-malaria operations in Haifa, the Unit was charged with the sanitation of 10 military camps and billets, and was assigned by the Municipality of Jaffa to the inspection of cafes, bakeries, barber shops, and other public buildings. Latrines were set up for the use of the Egyptian labor corps employed by the O.E.T.A. In a few months the persistent oiling caused a great reduction in the number of malaria-mosquito infested places.

About the middle of October one of Jaffa’s sanitary squads was sent to Tiberias to combat the outbreak of cholera which before its termination caused 60 deaths. The source of infection was the water supply from the Sea of Galilee on whose shore the town is located. The lake was polluted with street washings, direct defilement by persons defecating in it, bathing and fishing. Jugs and kerosene tins were filled with this water, which was practically the only supply at the time, and carried to the houses. In controlling the epidemic, the British fenced off the entire city shore line with a wire netting, leaving but five stations for taking water. These were constantly protected against pollution. When a water carrier left one, a sanitary inspector placed bleaching powder in the container. Ten houses on the lake were evacuated to guard against pollution of the water. Empty lots were closed up, streets cleaned, and latrines and other nuisances abated. Anti-mosquito measures were adopted and carried through rigidly with the backing of the O.E.T.A.

Unfortunately, with the termination of the epidemic, the city resumed its ancient customs. An inspection by Cantor early in 1922 disclosed general sanitary negligence; the barricades to the lake had almost all been removed; the vacated lake houses opened; animals were being cleaned at the point of water supply; mosque latrines were emptying into the lake near the water pump; and the water was being taken at all points without any supervision. Action was quickly instituted to remedy these insanitary conditions.

Another sanitary squad was sent by the Jaffa Unit to Safed early in 1919. Schools, orphanages, and other public buildings were cleaned; necessary scavenging accomplished; houses and yards inspected; and cisterns oiled, sealed, and marked.

When Dr. Schmidt left the country in July, 1919, Cantor was placed in charge of all the Unit’s sanitary activi-
ties in Palestine. Gradually, as trained personnel were provided for municipal sanitary services, the Unit's efforts were concentrated on sanitary improvements and anti-malaria activities in the Jewish agricultural colonies. Daily inspections were made of houses, yards, and water supplies of all the colonies, and a house-to-house educational program was conducted. In view of the large and increasing immigration through Jaffa, an immigrant delousing plant was established there. Immigrants were distributed among various labor camps whose sanitation was supervised by Cantor's inspectors.

In the meantime the O.E.T.A. through the Royal Engineer Corps made a health survey and census of Jerusalem. In the Jewish quarters this was accomplished by the government-loaned inspectors. With a view to installing a new system to improve the offensive sewerage conditions, cistern data were obtained, first for the northwestern section, and then the old or walled city. Certain cisterns would be used to flush proposed sewer lines, due to the inadequate city water supply.

Upon the survey's completion, Cantor was appointed sanitary engineer in charge of design and construction of the sewerage system for the northwest district, in addition to his other activities. The Zionist Commission donated $50,000 for this project, and the O.E.T.A. granted $10,000 for the treatment plant. Surveys were made, the system was planned, and the project presented to the city and O.E.T.A. for approval.

But at this point the scheme was almost defeated. When permission to purchase the land for the treatment works was sought from the Arab Mayor, he at first refused. His father and grandfather had lived in Jerusalem and had found a cesspit satisfactory, why should there be any change? Finally, approval was granted.

During its construction innumerable difficulties were overcome. Supplies had to be purchased in Cairo and transported to Jerusalem. Skilled labor had to be procured. Arabs, the only workmen practised in the use of dynamite, were employed under an experienced Arab foreman in blasting a trench for the sewer pipe through the rock of the streets of the old orthodox Jewish quarter, Meashorim, meaning Hundred Gates. The 100 gates did not let in light or clean air, though. The streets were lean and crooked, the houses decrepit. The smells were of the vilest and most persistent.

Then followed a great religious controversy. True Arabs observe their day of rest on Friday, the orthodox Jews on Saturday. Not to lose time or money in construction, blasting was continued even on Saturday when Jewish services were being conducted. The Rabbis complained bitterly, to Cantor most of all, for he was in charge. But he could not delay the work, the funds were insufficient to provide for the extra expense involved. So the Rabbis solemnly proclaimed "Herem" (Hebrew word meaning outcast of the community), thereby excommunicating Cantor who was of their faith, forbidding God-fearing Jews to have anything to do with him. It was not until a year later, after the system was working and the offensive drainage conditions had been removed, that the Rabbis and the whole district publicly acclaimed Cantor for this achievement.

So the work progressed, the treatment plant was installed, and the completed project was turned over to the Municipality of Jerusalem in an official ceremony on November 12, 1920. Somehow the troubles did not cease. Because the funds were inadequate and the works were to be temporary, until the large city sewerage scheme was perfected, the treatment plant was placed in the Wady Joz. This location was just below the hill on which were some
fine residences including the Mayor's and several English officials'. Complaint of offensive odors from the treatment plant ascribed to poor construction was lodged with the Mayor. He in turn complained to the British Government, making of it a political issue, to the effect that the Jews were trying to poison the Arab neighborhood and were creating a nuisance involving the spread of disease. So persistent and so influentially pressed was this complaint that the matter became a government issue. The government requested of Egypt that a sanitary engineering expert be sent to Jerusalem to investigate the situation. This was complied with and the sanitary engineer in time made the investigation and reported that the treatment works should be located farther down the valley. But money was not available for this; so the plant has remained in the same spot to this day. However, with the construction of the larger drainage system begun in 1932, the temporary works will be replaced by an adequate plant in the Valley of Kidron.

At present the only rivulet at Jerusalem is the effluent flowing from the sewage treatment plant in the Wady Joz. Strange to say, Arab women who enjoy picnics hold these functions beside this stream where it passes through the valley of olive trees and vegetable gardens.

Another example of the insanitary conditions under which the people of Jerusalem lived at the time of the O.E.T.A. is furnished by the memorable experience with the greatest snowfall in the city in 40 years. On February 10, 1920, there began a snowstorm without let-up until the 13th. More than 4 feet of snow fell. No one left his house the first day. On the next Cantor, knowing of the sick and poor in the Jewish quarters and the damage that would follow when the melting snow would flood the lowlands, en-davored to enlist help from the Rothschild Hospital. However, the attendants who were orthodox Jews refused to assist in removing the snow. They said they could not remove what God had sent from Heaven, it would be sacrilegious. But the doctors saw the need and cleared paths through the snow from different pavilions of the hospital. Cantor was placed in charge of relief work by the Unit. Doctors were assigned to various districts to visit the sick. Finding the bakery closed and without flour, Cantor asked the Governor for and obtained the loan of animals from the Department of Health, purchased flour, brought it to the baker, and then distributed the bread to various snowbound houses, using the willing Maccabean youths with donkeys. From the British Army he obtained soldiers to clear paths in the snow.

The snow was so heavy that the overburdened roofs of the Unit Nurses' Home and many other houses collapsed. All night long on the 12th, the doctors worked the pumps at their home and the hospital discharging water from the overflowing cisterns beneath the dining rooms to prevent flooding of the buildings. Snow was removed from house roofs. Weakened buildings were braced. Dwellers in low sections which might be flooded were moved to higher sections and temporarily housed. By the 14th paths were extended to the main streets, ditches opened for the melted snow water, families rescued from falling buildings, and a thorough canvass made of the districts, using the men and horses obtained from the O.E.T.A. On the next day, Sunday, with the snow generally melting, the city was subdivided into districts, 43 pumps with crews assigned for emptying overflowing cisterns, and labor gangs designated to help the sufferers, reinforce the weakened buildings and demolish dangerous dwellings with ropes. Over 100 workers cleared the
debris in the old city where some buildings collapsed in the week following the snow storm, killing several occupants. In this manner the great storm passed, leaving comparatively little public suffering and flooding of buildings in its wake.

Other activities of the indefatigable Cantor in the first 2 years may be likened to the development of an army to combat disease, including the training of chauffeurs in the hospital garage and of sanitary inspectors; conducting evening technical courses for developing draftsmen, foremen, and surveyors; and operating an employment agency and relief department for the Unit.

With the installation of the British Civil Administration on July 1, 1920, Cantor was appointed Sanitary Engineer of the Government Department of Health in recognition of his achievements. Without an office or furniture except for a table, he borrowed a chair and some paper and outlined his organization for the Sanitary Section. In time this included an assistant sanitary engineer, a draftsman, plumbing and sanitary inspector, a clerk, and a Museum of Sanitation. Its multiple activities included anti-malarial measures; sanitation of all government and public buildings; preparation of plans for model dairies and food establishments of all kinds; cooperation with municipal and village governments in water supply, drainage, scavenging, and supervision of trades and industries; and general dissemination of sanitation information.

One of the first accomplishments of the new Department of Health was the appointment of a permanent Anti-Malarial Advisory Committee in September, 1920. For centuries malaria had decimated the population and barred the development of large tracts of fertile land. At times it assumed epidemic magnitude wiping out in the space of a few months the populations of whole villages. Few regions in Palestine were wholly free from it before the war. Every autumn hospitals in Jerusalem and most of the other towns were crowded with malaria patients. Anti-malarial government measures were carried out by the Sanitary Section. Necessary funds were provided and other assistance was rendered by a Survey Section of the International Board of Health and the Malarial Research Unit of the Jewish Joint Distribution Committee.

The Rothschild Foundation drained the Kabbara swamp between Jaffa and Haifa. Jewish agricultural colonies and towns drained nearby marshes and pools. Wells were covered. By 1925, more than 105 miles of drainage canals and ditches affecting 5,574 acres had been constructed, and 45,000 wells, cisterns, and cesspits were being oiled regularly. The malaria mosquito had disappeared from all the large cities except Haifa, and new cases of malaria were rare in them. A vivid picture of the transformation accruing from these efforts in the important Valley of Esdraelon is given by Sir Herbert Samuel, first English High Commissioner, in the following words:

When I first saw it in 1920 it was a desolation. Four or five small and squalid Arab villages, long distances apart. . . . For the rest the country was uninhabited. There was not a house, not a tree. . . . The River Kishon, which flows through the valley
and the many springs which feed it from the hillsides, had been allowed to form a series of swamps and marshes, and, as a consequence, the country was infested with malaria. Since then, 20 villages have been founded with a population numbering 2,600. . . . All the swamps and marshes have been drained, and cases of malaria are proportionately rare. The wooden huts of villages . . . the plantations of rapidly growing eucalyptus trees . . . fields of vegetables or cereals cover many miles of land.

Today in most Palestinian cities malaria has been brought under control by the Department of Health. Persistent drainage measures have practically conquered the disease in Jewish and neighboring Arab villages, while in non-Jewish areas (Acre, Huleh plain, and the region east of Beisan) malaria is still rampant. In rural and certain urban communities, much remains to be done.

Through efforts of the Department of Health, a Town Planning Ordinance was passed in 1921 establishing a Central Town Planning Commission to supervise new building construction in town areas. These buildings were to be provided with approved types of sanitary facilities. Under this ordinance, local town planning committees were formed in Jerusalem, Jaffa, and other cities. Model sanitary by-laws prepared by the sanitary section were approved by the commission for adoption by the cities, and a model plumbing code similarly prepared was published in the three official languages—Arabic, Hebrew, and English—by authority of the Commission.

Finding unsatisfactory plumbing installations being made by tinsmiths, locksmiths, and blacksmiths, due to the great scarcity of qualified plumbers, Cantor established a plumbing course in Tel-Aviv in 1926. At its conclusion, an examination was held. Thirty-five qualified to practise as plumbers, and 60 men were classified as assistants. Because of its success it was established as an annual institution. Similar courses were given in Jaffa in 1928 and in Jerusalem and Haifa in 1930. In 7 years, 85 candidates were awarded certificates to practise as plumbers. For instructing classes in plumbing at the Haifa Technical Institute, Montefiore Technical School in Tel-Aviv, and the new Y.M.C.A. in Jerusalem, syllabi and sets of drawings of standard sanitary installations were provided. Defective plumbing material foisted on the country at the beginning was gradually replaced. So much good resulted from these efforts, that the Director of the Department of Health in 1929 stated:

The training and examination of plumbers undertaken by the Sanitary Engineer of the Department has had considerable influence in the improvement in house drainage.

An interesting experiment in social hygiene and domestic medical education was successfully encompassed in the first Palestine Health Week, November 23–30, 1924. The idea originated with the Hadassah which bore all expenses, was fostered by the Government,
and assisted by 25 leading local groups. Through the Government Department of Education, teachers talked in 716 schools in 353 cities, towns, and villages, on the daily health topics—Health, Baby, Food, Microbe, Recreation—and distributed pamphlets in Arabic and Hebrew to the pupils. Lectures and demonstrations were delivered at meetings of parents. A contemplated Prize Baby Competition was cancelled because of the superstition prevailing among mothers that personal exhibition of their babies would work to their physical harm.

A Health Exhibition to exemplify by demonstration and models the lessons indicated by Health Week was opened in Jerusalem on November 17, 1924, by the High Commissioner and visited in the 2 following weeks by no less than 34,090 people, including 4,830 children, an extraordinary attendance mark for a city of 65,000. The Government loaned the Sanitary Engineer, as Chairman of the Exhibition Committee, and his staff for 3 weeks to prepare and supervise the exhibition material. The Department of Health assisted in furnishing demonstrators in charge of several of the 14 sections and loaning equipment, including a complete mobile unit for combating disease epidemics. A special Harem Day was designated for Moslem women when only women demonstrators and guides were present. Many attended, lifting their veils and touching the exhibits, being deeply impressed through such physical handling.

Early in 1925 at the request of the Zionist Commission, the Department of Health sent Cantor as its representative on their committee to advise on the sanitation of all Jewish colonies in the Emek Valley. Many insanitary conditions were found, particularly the privies. Various improvements were recommended in a private conference with the colony leaders. Despite the seeming fact that Arabs were immune to certain infectious diseases and Jewish immigrants not, these recommendations were not acted on. It was claimed they would prove a hardship on the colonies, were not required of the Arabs by the Government, and would be unfair. That summer a severe outbreak of typhoid fever occurred among these colonists, causing 192 cases and many deaths.

From the very beginning of the British occupation, water was scarce in Jerusalem, despite the 5,300 cisterns. To provide sufficient drinking water for the army, a pipe line was laid for over 13 miles, from Solomon's Pools to the city. Still the supply was insufficient. In 4 months the British Army Engineers rehabilitated the old unused aqueduct constructed by Pontius Pilate and brought water through its 40 miles of winding conduit from Ain Arrub springs. As abnormally low rainfalls decreased the supply, in 1923 water was transported by motor lorry from Nablus and other towns. Dirty Arabs peddled water from donkeys laden with six 4 gallon kerosene tins filled at the large cistern in the sacred Haram Sharif Area, charging 25 cents per tin. Those unable to pay these exorbitant prices waited patiently in queues at neighborhood standpipes from early morning until the special attendant's arrival to obtain the two tins of 8 gallons allotted each family every 2 or 3 days at a cost of 1 cent for 4 gallons. Only those possessing a ticket obtained from the Municipal Government showing the number of members in a family were provided with this water. The fee was used to pay the attendant's salary, there being a number of them who for one hour during the appointed day turned on the water from a neighborhood standpipe.

To relieve the sorely pressed city further, the Government in May, 1925, passed the Urtas Spring Ordinance to provide water from the Arab spring of
Urtas Village for a temporary period of 12 months by the construction of suitable works and pipe lines to Solomon's Pools. The city took only part of the water from this spring, the villagers having more than sufficient for their limited domestic wants and for irrigating their apricot orchards, vineyards, and fields. Compensation was made by the city on account of complaints of the villagers of possible damage to their crops from such diversion.

Nevertheless the ordinance proved a great shock to the villagers. They claimed the spring was theirs, and no one had a right to usurp their property. They said the water was taken for Jewish building purposes in Jerusalem, and pointed to the large amount of building in progress at the time to substantiate this accusation. The Executive Committee of the Palestine Arab Congress sent a long communication of protest to the Secretary of State for colonies in London. The inhabitants of Urtas brought suit to restrain the Government from using the spring. They claimed the ordinance was void because it failed to respect Arab rights guaranteed by the Mandate. The case came before the Supreme Court of Palestine. The Court held the ordinance repugnant to and inconsistent with the Mandate, because it failed to safeguard the civil rights of all the inhabitants, and declared it invalid. Appeal was made by the Government to the Judicial Committee of the Privy Council which reversed the Court's decision regarding the specific situation, holding that "there is no suggestion that any such discrimination is to be found in the Ordinance now under consideration."

The rainfall proving inadequate in 1926, water was hauled by train from Lydda. In later years additional supplies were piped from nearby springs, Ain Farah, Ain Fawar, and Wadi Kelt, but to little avail. The rapidly growing population and low rainfall were too much for the available supplies. Finally, in accordance with the recommendations of the Municipal Water Department, concurred in by the Department of Health, a new supply from Ras-el-Ain springs at the head of the Auja River north of Jaffa was approved, money provided, and construction of the necessary pipe line and pumping stations begun in 1933. This water will be pumped 37 miles and raised 2,635 feet at a cost approximating 1½ million dollars, and will be sold to the public at the comparatively high price of 10 or 11 gallons for 1 cent (in New York City the householder pays that for 80 gallons).

It was Cantor's practice when finding insanitary conditions in cities, to try out remedial measures in Tel-Aviv or elsewhere. When they were successful, he would endeavor to have the Department of Health adopt them for the country. Gradually, as a result, the cities undertook, with municipal funds, such sanitary services as the provision and maintenance of a scavenging staff and equipment, street watering, public drainage and water supply. The Department of Health was strongly opposed to past practices of letting contracts for scavenging and other munici-
pal services. All such sanitary services were inspected regularly whether in towns or villages. However, to insure more constant supervision in the larger cities, Cantor recommended the appointment of Municipal Surveyors. This was approved by the Government, and Municipal Surveyors were provided in Jerusalem, Haifa, and Jaffa. In Tel-Aviv this supervision was arranged for through a qualified plumbing inspector. For villages his recommendation of the appointment of a Local Council to supervise sanitation was adopted, and several such bodies were designated.

Finding that trade and industrial establishments were increasing rapidly without due consideration of sanitary principles, the sanitary section worked for a law to provide necessary safeguards. In 1927 an Ordinance for Licensing and Control of Trades and Industries was enacted with general supervision over its application vested in the Department of Health, more specifically, the Sanitary Engineer's Office. Before a new building coming under this classification was erected, the plans were laid before this Office for approval as to structural, safety, and sanitary provisions. Before it was placed in operation, it had to receive such approval again, always after a personal inspection. In the case of a cinema in Jerusalem, the builder complained because of the requirement of providing a suitable number of separate closets for men and for women. He stated his theatre was not for that purpose and that the requirement was more stringent than in Paris. In due time, he was persuaded as to the desirability of the requirement.

Similarly, the Sanitation Section instituted activities tending to provide good water and drainage facilities and cleanliness in public restaurants, hotels, and other food establishments. Such efforts were directly reflected in the decrease in dysentery cases. In Petah Tikvah from 63 in 1927, to 13 in 1930. The Director of the Department of Health, referring to this work, said in 1930:

The control of drainage, ventilation, and sanitary conditions in hotels, restaurants, and cafes, which, in so many countries in the East are the source of disease, has reduced to a minimum the apprehensions of tourists and visitors who are so important a source of the revenue of the country, and has developed in the proprietors and their local clientele a sense of cleanliness and hygiene unknown a few years ago in Palestine. The department has little difficulty now in obtaining reasonable sanitation in old establishments, and a high standard in new. The people themselves are beginning to demand it.

Note: Louis J. Cantor, whose work in Palestine is described in this paper, died there on January 8, 1933. That he was the father of sanitation in the Holy Land, no one can deny. Colonel Herron, Director of the Department of Health, summed up Cantor’s achievements at the time of his death in these words: “His wide and accurate knowledge of a great variety of subjects dealing with Public Health have been of the greatest value in guiding developments in Palestine on correct lines.

His splendid work is reflected especially in the very remarkable improvement in the plumbing, drainage, and sanitary installations in private and public buildings and in trades and industries, which has been such a feature throughout Palestine and which has so effectively reduced the incidence of preventable diseases. His achievements will live after him.”