

The Tempo of Water

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ABSTRACT

During the Mandate period, Palestinian rural communities often shared their water sources proportionally in time-based rotations. Water use functioned as a temporal marker, embedded in the tempo of daily life. This article contrasts this way of distributing water with that of Zionist settlers and the British Mandatory administration, which typically measured water use in terms of volume. Volume-based measures, used by the British and by Zionist settlers, facilitated the commodification of water, transforming it into an object of investment for the development of colonial infrastructure, most notably irrigation and electricity. Time-based rotations, in contrast, were anchored in the movement of the sun and planets, seasonality (dry vs. wet season), and the needs of the community as a whole. The two approaches reflect different ways of relating to the environment and the natural world. Therefore, Zionist dispossession of water resources was not merely material, but it disrupted communal practices and obscured their associated temporalities.

KEYWORDS

water; infrastructure;
irrigation; commodity;
time; British Mandate;
Palestine

My relationship to place is, in fact, a relationship to time. I live in islands of time, some of which I already have lost; others I possess for a moment, then lose them, because I am always placeless... The places we yearn for are really periods of time.

—Mureed al-Barghouti

“Songs for a Country No Longer Known”¹

WE ARE ACCUSTOMED TO THINKING ABOUT INFRASTRUCTURE and the environment in terms of space. Explorations of the issue of water in Palestine have accordingly highlighted its spatial and geographic features—its role in “the construction of a homogenous national space”² for the Israeli regime and, when it comes to groundwater, as one of the physical layers of the architecture of Zionist occupation.³ Palestine is similarly often thought of spatially, either mapped out along its historical borders or in terms of the places encountered in daily life. What if we were to complicate this spatial understanding with a focus on the temporal? How might thinking about the temporal dimensions of water use add to our understanding of water and of the colonial project in Palestine?

In this article, I examine the historical roots of the Zionist dispossession of water in Palestine by looking at the ways in which water use changed and was contested over the course of the Mandate period. I show that this dispossession was not merely a theft of natural resources but also the more basic transformation of water into an object, disembedded from its social and environmental context. This process was driven by increased demand for water from Zionist settlement and British promotion of intensive agriculture. I take as my starting point Ghassan

Kanafani's insight that "agricultural life in ... the Arab world in particular, is not merely a mode of production, but equally a way of social, religious and ritual life."⁴ I explore how water use, including its sharing and management, is best understood as an activity that was not governed by explicitly formulated rules but by informal norms implicit in the set of background practices that comprised daily rural life. I show that the temporal rhythm of these practices formed a calendar by which villagers and farmers lived and worked.

Transforming water into a commodifiable natural resource disrupted these practices and their associated temporalities. Water was de-worlded, stripped of its social context and transformed into something increasingly object-like that could in turn be treated like a commodity. At the heart of this transformation, I will show, was something as basic as a different way of measuring water. Zionist organizations used this different way of measuring to transform Palestine's groundwater and rivers into objects of investment, first for irrigation, and, second, for the generation of electricity. This was part of a larger shift toward capitalist agriculture that, although not initiated by Zionist colonization, was nevertheless intensified by it and had dire consequences for Palestinian rural life.

By focusing on time, I hope to build on a growing body of literature that speaks to the "multiple temporalities"⁵ of Palestine. Much of this literature emphasizes the strange kind of "liminality"⁶ imposed on Palestinians by the ongoing occupation as well as refugeehood, such that Palestinians are perpetually caught in the in-between. Yet unlike these temporal rhythms that have been thrust upon Palestinians, and of which they are forced to be constantly hyper-aware, the one I explore here operates on the more taken-for-granted background level of our quotidian interaction with the world.⁷ The dispossession of water, I demonstrate, was not only a matter of material deprivation but also a robbing of everyday life. As water was gradually stripped of its social context and transformed into a commodity, the temporalities that had once accompanied its use were also effaced by a more abstract conception of time.

The article explores this transformation by drawing on archival and other contemporary primary sources. I have also supplemented the historical record with more recent primary sources from Palestine and by drawing comparisons to analogous accounts of water-sharing practices and institutions in other Arab countries. While numerous questions remain regarding Palestinian methods of water management more broadly,⁸ this study aims to reveal the origins of water theft in Palestine, situating it in the larger epistemic shift forged by a colonial understanding of water and the environment. It aims to serve as a point of departure for further research rather than to provide a definitive statement on the historical phenomena and processes it describes.

It is easy to measure material dispossession: the theft of dunums of land, houses, trees, and springs. Yet one can also find temporal measures of theft, not just in the loss of weeks and years spent waiting, or in the hopelessness of an indeterminate future, but, as Mureed al-Barghouti suggests in the epigraph, in all of those worlds, "islands of time" that are no longer accessible to Palestinians. There are places, like his childhood village near Ramallah, that still exist physically but are no longer recognizable because they have been recontextualized into other foreign worlds. This article similarly accounts for the appropriation of water, not merely in terms of lowering water tables and making rivers inaccessible but also in terms of the disruption of a set of practices. To salvage and keep alive these practices is an ongoing project, to which this article seeks to contribute in one particular way: by enabling us to discern the tempo of water.

Water as Calendar

April's water enliven man.

—Palestinian proverb

In the early 1930s, the British administration proposed an irrigation ordinance that would enable it to extend control over what had become a highly contentious issue: water. One of the first stipulations of the proposed ordinance was that the high commissioner was to have the authority to determine “the method of measuring water rights and quantities of water.”⁹ While it may appear strange that the British felt the need to bring an activity as banal as measuring water explicitly within their purview, the proposal was in fact quite significant and potentially controversial. Over the course of the Mandate, it had become clear that there were differing methods of measuring water in Palestine and, by extension, of making claims over its use. These divergent methods, furthermore, had the potential to create or exacerbate water disputes.

There existed a tension between volume-based units, on the one hand, favored mostly by European settlers and the British, and proportional or time-based water sharing, on the other, which were preferred by Palestinians. Water is often thought of in volume-based units—a liter or cubic meter, for example—that denote a certain fixed quantity. But in Palestine during the Mandate, and in some areas to this day, water is measured not in volume, but rather in time—days, hours, minutes, and even seconds of output or flow from a water source. Time-based measures are a proportional way of sharing water.¹⁰ For example, if five families sharing a spring each have a one-day share in a five-day rotation, they each effectively have a claim to 20 percent of the spring. What this meant was, in the words of the British irrigation advisor, water rights existed “in a multiplicity of units, one man being entitled to a proportion of the discharge of a spring, another to the volume passing through an opening of ascertained size, another to a certain number of hours of supply in a rotation of a certain number of days.”¹¹ These varying ways of measuring water not only created disagreement over claims to its use but also reflected different ways of relating to the environment and natural world.¹²

For those who measure their water in time, water use forms part of the temporal rhythm of daily life. In the village of Battir, for example, the eight large families in the village each receive a one-day-long share of the main water supply in a consecutive rotation,¹³ with a full rotation of all users spanning eight days. For this reason, the village has a saying that a week “lasts eight days, not seven.”¹⁴ Moreover, all over Palestine, local infrastructure has developed to accommodate and support these time-based sharing systems. Such infrastructure includes ways of telling time to know when to rotate the water supply, or mechanisms to help divide the water flow into proportional shares. Families in Battir used to rely on “the progression of the shadow of a given landmark to decide upon the beginning and end of each time portion.”¹⁵ Nowadays, they rely on newspapers and watches to know when the sun will set and, thus, when to shift the water to the next user.

Similarly, in Jericho until at least the late 1990s, more than nine hundred people had time-based claims to the output from ‘Ein al-Sultan spring.¹⁶ Farmers’ water shares “vary from two and a half minutes to thirty-two hours every week.”¹⁷ The municipality of Jericho employs twelve *qanawatis*, who coordinate the distribution of water through various canals (*qanawat*). A *qanawati* “rides a bicycle along the network and blocks and unblocks the bifurcations of

the canals according to a calendar set up to respect the water rights,”¹⁸ so that water flows to the designated user at the appropriate time. Physical infrastructure—those material aspects of our world that become useful or significant for us—reflects the way in which water is measured, and, in turn, how claims to its use are made.¹⁹ In the case of Jericho, calendars, canals, and even particular jobs, such as that of the *qanawati*, have emerged to facilitate this proportional method of water distribution.

Yet it is not just that time was or is a way of measuring water. Water was also a way of measuring time—of marking its passing in regular intervals. This was as much true for the year in general—a year that is, in Palestine, punctuated by a rainy season and a dry season—as it was for the daily life of the farmers awaiting their water turn. In both, the position of the sun and stars acted as guides. Just as the sun’s movement marked things like prayer time, it also indicated the rotation of water shares, as in the case of Battir. Stars could similarly guide the rotation of water shifts at night²⁰ and help farmers anticipate the rainy season. Two particularly important astral bodies “of practical significance for calculating time and for the economy,” were the Pleiades cluster (*al-thurayya*) and Sirius (*suheyl*),²¹,²² both of which appeared in the rainy winter months. Water’s annual cycles as well as its daily use thus formed part of a calendar by which people lived and worked.²³

Highlighting the existence of such a calendar is not meant to imply that, prior to European colonization and occupation, Palestine was a wholly precapitalist society. As numerous scholars have shown, by the mid-1800s, Palestine “produced large agricultural surpluses and was integrated into the world capitalist economy,”²⁴ cultivating crops for both neighboring markets and more distant, European markets²⁵ and responding to international market demands.²⁶ The emergence of commercial networks and a money economy led to the growth of a “rural middle class,”²⁷ meaning that Palestinian peasants were neither an undifferentiated nor homogeneous social group.²⁸ But being integrated into and producing for a capitalist economy does not necessarily mean either that capitalist time-discipline had permeated every aspect of labor or that agriculture itself had become wholly capitalist.²⁹ The daily work of a farmer is timed very differently than that of a factory worker whose shift is dictated by the clock. Whereas the former works according to “‘natural’ work-rhythms”³⁰—the position of the sun during the day, the annual planting and harvesting of crops, and the schedules of animals—the latter is assigned a task that can be continually repeated within the span of a certain number of hours that are demarcated by the clock. Not only do the two occupations have different temporal structures, but the nature and experience of the labor involved change as a result.³¹ Time, in the latter case, being no longer embedded in the rhythms of concrete experience, takes on a more abstract character, and is experienced, to borrow a phrase from Walter Benjamin, as empty and homogeneous.³²

Moreover, the intention in highlighting that water use formed one of the natural work-rhythms that structured daily life is not to imply that Palestinian water use was or is somehow more natural or closer to nature than water use predicated on volumetric measurements. On the contrary, what I am trying to show is that both systems built into their environment a complex set of practices and infrastructure to manage water use but differed markedly in terms of how they approached water. As will be explored in the next section, in proportional sharing systems, water is treated as a concrete thing that is not only part of the surrounding environment but also structures relationships within the community. By contrast, in volume-based measurement systems, water is treated as an abstract commodity, divorced from its social and

environmental context. In an agricultural society such as Palestine, proportional water sharing held deep significance and performed numerous functions. Beyond the varying kinds of infrastructure and norms of water sharing that organized water use, Palestinians had also developed sophisticated methods of irrigation to put that water to use.³³

Proportional water sharing constituted one of the practices that made up everyday life, especially rural life. Practices, in this sense, are those often unarticulated parts of our daily routine that we take for granted—when we are going through the motions, without paying complete attention or being totally aware—but that presuppose a common background against which they acquire meaning. It is not that we do not understand them but rather that they are not typically foregrounded in our daily experience.³⁴ Julie Trottier notes that, during her fieldwork when she asked Palestinians about their water distribution and sharing, her interviewees were not always able to articulate their proportional sharing as a kind of “law.” She often had to ask roundabout questions to piece together local water-sharing rules that did not neatly map onto some external rule source such as Muslim law.³⁵ This is precisely because these kinds of practices are not rules imposed from the outside but part of the practice of everyday life, learned through emulation. Similarly, I might not be explicitly aware, if asked, that I typically think about water in terms of volume and what that measurement connotes in terms of my relationship to that water. Only for an outsider externally observing the practice does it present itself merely as a set of rules.³⁶ Hence, for Trottier, the families of Battir “operate according to unwritten, but scrupulously respected rules”³⁷ that govern water allocation. For the villagers themselves, however, their practices are not simply rules or law as such, but rather the structure of everyday life and experience.

The British administration, however, did not value the significance and function of these practices, and scholars have, in turn, often missed the importance of proportional water sharing. Contemporary British characterizations of Palestinian practice were filled with orientalist tropes. “Use of land and water is at present as unsystematic and chaotic as can be conceived ... water channels wander about apparently with no object and no system. Yet they are all subject to well-known rights,”³⁸ remarked one British official. One goal of the proposed irrigation ordinance and British water policy more broadly was to civilize “native” practice and make way for the kinds of knowledge and expertise that the British administration and Zionist settlers found relevant. That knowledge, to state the obvious, was a colonial one. It did not flow from an understanding of Palestine itself but rather was imported from other colonial locations with the expectation that it could be scientifically superimposed onto Palestine. European settlers were eager to implement water laws and regulations from the western United States. The British government, on the other hand, at least initially, wanted to handle the case of water in Palestine according to its experience in other colonies.³⁹ These colonial ways of understanding—ways that are not born of local social contexts and thus inherently divorced from them—could not account for practices that had developed over time within a community to collectively manage its water. This was, at base, the most fundamental dispute over water during the Mandate.

Water as a Commodity

The tension between time- and volume-based measures and the associated devaluing of existing Palestinian practices of water use were part of the larger transformation of water into a

natural resource, that is, into an object stripped of its social and contextual significance and, I argue, into something more like a commodity. To understand this transformation, it is important to illustrate the basic differences between proportional and volumetric measures, the most fundamental of which is that the latter are standardized in a way that the former are not. Water measured in time is never constant. Its flow fluctuates based on factors such as weather, season, and geography. A “water day”⁴⁰ will produce more in spring after the rainy season than in late summer after the terrain has become dry. For this reason, proportional units never guarantee a definite amount of water, and proportional water sharing thus has a built-in way of adjusting when the water supply changes. In a drought or during summer months, the overall water available will decrease and each user’s turn will also decrease proportionally.

In this respect, time-based water measurements are just one example of numerous kinds of unstandardized measures used in Palestine prior to and during British occupation. Measurements of the same name indicated different amounts from one locality to the next, and the British administration’s attempt to standardize weights and measures by implementing the metric system was met with great resistance.⁴¹ As Beshara Doumani notes, “none of this was unusual in agricultural societies that enjoyed a degree of autonomy from central state control.”⁴² The history of implementing standardized measures in other contexts shows that such imposition was not merely about facilitating trade and commerce, but also about extending state authority across space and time.⁴³

Yet this shift—however incomplete it was—had repercussions at the local level. In terms of water rights in particular, water measured proportionally is embedded in a network of social relations in a way that water measured volumetrically is not. When users proportionally share a water source, each water user is forced to see their use in terms of the larger irrigation community. If someone takes more time than their allotted share or more than their given proportion, they are obviously encroaching on some other user’s claim.⁴⁴ On the other hand, if a user measures their water rights in terms of an abstract volume of water, they can take from a source until that amount is realized, regardless of what remains for others. Because volumetric measures conversely guarantee a definite amount of water, they make water something abstractable, divorcing it from its social and environmental context.

Time-based water rights thus delineate a relationship not only between a person and an object, but between the person, the community at large, and their collectively managed water source. As Laura Nader explains in the context of proportional water sharing in Morocco, water may be “one person’s property, but at the same time it forms part of a network of collective rules and obligations.”⁴⁵ Water cannot be divorced from that collective network. Unlike legal conceptions of property that focus on ownership of the substance itself, the emphasis in proportional sharing is on the human relationships linked to that substance. “The ‘thing’ mediates relationships rather than being sought as the object of the relationship,” as Nader puts it.⁴⁶ Moreover, because proportional water-sharing systems are embedded within the relationships and obligations of a given community, they end up reflecting the social dynamics of that community at large.⁴⁷ Yet while Nader frames this distinction as one between “Western law” and that of water sharing found in North Africa, I want to reframe this juxtaposition as one between volumetric and proportional or time-based water measurements.⁴⁸

This is not to say that proportional or time-based water distribution is necessarily more equal or fair. Precisely because proportional water sharing reflects relations in the community,

it can also embed social hierarchies. Those with more resources, especially money and land, often amass a larger proportion of rights than others.⁴⁹ Some water shifts, such as those at night or those on days of rest, are less desirable and may mark a lower social status.⁵⁰ In Palestine in particular, according to Trottier, “each irrigating Palestinian village is socially stratified according to water. There are those who may access the water and those who are excluded from it.”⁵¹ The latter group must buy or rent their water from those who control it: shareholders and well owners.

Volumetric measurements make it easier to conceive of water outside its social context. You cannot understand a day’s worth of water without accounting for the set of practices in which it is embedded and which, in turn, gives it meaning. Taken together, these practices and their environment constitute a world, a contextual whole within which each individual part—the practice, the water, the infrastructure—derives its purpose and significance. In Battir, for example, the landmark whose shadow villagers once used to determine when to rotate their water derived its significance as a marker of time from this larger practice of proportional water sharing. In Jericho, the role of the *qanawati* and the timeshare of water he delivers makes sense in the larger social world of the water community. But when conceived of in volumetric terms, it becomes easier to think about water, not as coming from a particular canal or well, in a certain season, or during a specific time of day, but rather as just another liter or another cubic meter that could have come from anywhere. It becomes a “*bare object* [that] is derived by leaving out the contextual meaning of everyday activity.”⁵² That world that gave it meaning is no longer there. Water is henceforth understood in a theoretical abstract way, divorced from the “whole” of which it was a part.

In this more abstract way of thinking about water, its significance becomes less about the role it plays in everyday background practices and daily life, and more about its value as an object that can serve as an input to some kind of scientific system—in this case, as the next two sections will explore, a system of intensive agriculture or of electric production. One can begin to look at water like “the scientist [who] is detached from and so is able to thematize and objectify his object, nature.”⁵³ Water can become part of an abstract theory or explanation. For example, water can be one of the inputs to a calculation of kilowatt hours and is no longer understood in terms of the social network of a particular irrigation community. It now derives its meaning from the relationship it has to other objects—in this case, to crop production and to electricity.

The second effect of volumetric measures being standardized is that they enable water to be more easily exchanged and, as a result, more commodifiable. For Marx, what differentiates a mere product from a commodity is that, while a product might be exchanged incidentally from time to time, a commodity is “produced for the purpose of being exchanged.”⁵⁴ Volumetric measures take an important step in this direction. Any unit of water can be bought, sold, or rented out. In Palestine, it is likely that, in some communities, users could alienate their shares outside of the group and, in others, they could not.⁵⁵ But volume-based units, because they convey a guaranteed amount of water, are more easily made commensurable to other things—either other commodities or money—and, therefore, more easily exchanged. A buyer can, without any knowledge of the local conditions, the season, or the weather, understand what a cubic meter of water is and how much it might be worth. A day’s worth of water, on the other hand, requires additional contextual information to be comprehensible and for its value to be ascertained. As a unit, therefore, volumetric measures make exchange, especially from a distance, much easier.

If we take these points together—that water measured in terms of time is embedded in a network of social relations, and water in volume is more easily exchanged—then we can begin to see how volumetric measures pave the way for the commodification of water. A “water day” is meaningless without knowledge about that water’s source. Volume-based measures, on the other hand, obscure the social and environmental relations that characterize the water. All of water’s “sensuous characteristics”—where it is from, which season it came in, what kind of work went into producing it—“are extinguished,”⁵⁶ because a cubic meter of water will always convey the same thing. This definite amount makes the water more easily bought and sold and gives the impression of ownership that is free of extraneous social obligations or attached social norms.⁵⁷ The relationship is between the person and the thing, and water itself becomes more abstract, understood without reference to its source or its community. This makes water not only more commodity-like but also more readily amenable to investment.

Water as Investment

Because standardized measures made water more easily exchanged and more legible from afar, they also transformed water into an object of investment. This means, I argue, that water was no longer given meaning by being part of the background practices or natural work rhythm of everyday life. Rather, as an investment asset, water was treated as a bare object. Its worth and significance were derived from those other things to which it could be made equivalent. Three kinds of water investment were of particular importance during the Mandate: investment in water rights in general, in mechanized irrigation required by intensive agriculture, and in hydropower to generate electricity. As we will see, proportional water sharing significantly hampered the first of these kinds of investment. Yet investors circumvented the difficulties posed by local water-sharing practices in the latter two kinds of investment by creating their own Zionist-owned infrastructures, each exclusive in its own way, which could exploit and lay claims to Palestine’s water. I use the term “investment” here in a capacious sense. Only the latter of the three, electricity, was to generate pecuniary return, and even electricity at first was not expected to generate profit.⁵⁸ In the case of water rights and irrigation, the understanding was that investing in water development would justify the expansion of absorptive capacity and, by extension, of European Jewish immigration. Water became seen as capable of being equated with increased immigration quotas and, by extension, people. Water research and development thus became a way of moving both capital and people into Palestine. Such investment was aimed less at generating returns than at establishing the infrastructure of a Zionist state.

Investment in water became hugely important to the Zionist project during the Mandate, largely because of the concept of absorptive capacity. Dictating European immigration quotas, absorptive capacity was premised on a statistical calculation of how many people the British thought could be settled on Palestinian land. Extensive agriculture, common in Palestine at the time, required more land per capita. Intensive agriculture, on the other hand, which involves more frequent crop rotation, the use of fertilizers, and mechanized farming techniques, could, it was thought, accommodate more people.⁵⁹ The British went as far as to call for “close settlement by Jews on the land,”⁶⁰ in the language of the Mandate itself, thereby making intensive agriculture an explicit part of their policy. As part of this emphasis on intensive agriculture, the British also pursued a policy of partitioning and settling land that had

until then been held in communal tenure (*musha*),⁶¹ despite the fact that *musha* was particularly well suited to proportional water sharing. Because of this policy of land settlement, high taxation imposed by the British administration,⁶² and the expense of adopting intensive agriculture, the shift to a new way of farming was particularly disruptive for existing practice.

The possibility of increasing absorptive capacity drove the Jewish Agency and, to a lesser extent, the British administration to invest heavily in agricultural research. In the words of one Jewish Agency official, “absorptive capacity is not an absolute category ... with the aid of science and politics absorption has become an elastic concept capable of considerable expansion.”⁶³ Intensive agriculture thus became part of the “science” that could justify increased immigration. Finding and investing in water, in particular, became something of a political cause. It was understood from the Zionist perspective that absorptive capacity would “inevitably depend on the intensive exploitation of water resources.”⁶⁴ The more water that was found, the more immigration could be justified.⁶⁵ The Jewish Agency established numerous agricultural research and training stations.⁶⁶ Its water research bureau also collaborated frequently with and received funding from the British administration.⁶⁷

Yet there was one wrinkle in this program of investment: preexisting, time-based water rights. Proportional water sharing had the potential to act as a kind of natural barrier against outside investment. If a group of farmers who collectively share a water source all invest in upgrading their system—for example, by switching from animal power to an electric pump—they each invest their share of money and receive as a return on their investment an increased output during their timeshare. But if an outsider wants to invest in the water system to increase its output and claim the surplus generated, they will not be able to do so because each of the preexisting users’ turns will simply increase proportionally. Any additional water output created by the outsider’s investment will already be allocated to the users who hold rights to the timeshares.⁶⁸ In other words, what is needed to invest in a time-based system is to buy time at the spring, not volume. Yet this meant inserting oneself into the network of social relations of that irrigation community, disrupting those relations and the social world that had developed around water use.

One major example of this was the rise of a speculative market for water rights, driven by the intense demand for water. A 1935 British memo noted that water and land rights were frequently sold separately from each other, and that “speculators” would buy up water rights in an area and “farm out the water ... to the highest bidders.”⁶⁹ According to a controversial early 1930s report by British official Lewis French on agricultural development in Palestine, this speculative market complicated proportional water sharing. French wrote that “affluent” land purchasers, meaning settlers, were buying up or leasing water turns from wherever possible, even if the water source was far from their land. “The complications are innumerable,” French noted. “Water may be leased for a crop, a season, a year or a period of years. It may be pawned and it may be sold in periods, or fractions of periods for one rotation.”⁷⁰ Springs would be split up into too many turns or shares, with some of the supply going to intensive and some to extensive cultivation. In such situations, French commented, “the weaker man usually goes to the wall,”⁷¹ meaning that Palestinian farmers, especially those with smaller shares of water to begin with, were being “steadily squeezed out.”

Exploiting groundwater was one way for Jewish settlers to get around these complications. Drilling a new well creates access to a water supply that is, at least in theory, unconstrained by any preexisting social network. The Jewish Agency brought in numerous foreign experts,

ranging from water dowzers who could allegedly divine “subterranean rivers and brooks”⁷² to well-known water engineers, such as Elwood Mead, to find groundwater.⁷³ Thanks to the British government’s exemption of import duties on machinery, the agency also imported expensive drills and pumps.⁷⁴ And, from 1930 to 1934, a period when Palestine at large was in extreme drought,⁷⁵ the Palestine Jewish Colonization Association (PICA) conducted “a systematic programme of deep-well drilling for underground water.”⁷⁶ Groundwater pumping proliferated and became the main water source for Zionist settlements by the end of the Mandate.⁷⁷ Water companies such as Mekorot, which remains to this day the Israeli state water company, emerged in the 1930s, using deep well borings to supply water to Jewish settlements.⁷⁸

The Jewish Agency was as a result vehemently opposed to any kind of law that might limit its uninhibited well drilling and water pumping. The British government attempted for years to regulate surface and groundwater.⁷⁹ Among the agency’s numerous objections was a provision allowing the British administration to restrict new well drilling in designated areas. The agency complained that the provision’s “immediate effect would be to discourage the flow of capital into Palestine.”⁸⁰ The legislation, they feared, would be an “indirect” method to limit this flow of people and capital, thereby inhibiting “the furtherance of ‘a National Home.’”⁸¹ Water became not only a way to move people into Palestine, but also a way to move money. This inflow of capital facilitated the creation of water infrastructure and provided a basis for the building up of Zionist agriculture.⁸² The British administration and the Jewish Agency fought for years over legislation, which became a “first-class issue,” on which the agency expressed the “most violent feelings.”⁸³ In the event, the regulations were ultimately never implemented.

Without any legal limitations, pumping continued. Yet groundwater pumping is not merely a means of securing water for oneself. It can also function as a way of indirectly appropriating water from others. As groundwater is pumped, the water around the wellbore sinks below the water table, forming what is called a cone of depression. If wells are placed too close together or overpumped, the cones of depression compound, reducing the overall water table. This can both deplete water, causing shallower wells to run dry, and, in extreme situations, even destroy the aquifer itself.⁸⁴ By the end of the Mandate period, the water table had decreased in Haifa, Tel Aviv, and in Jewish settlements near Lydda. Overpumping had also led to saltwater intrusion, making the groundwater saline.⁸⁵ But such ecological effects were secondary to the economic and political ones, namely that Zionist settlers exploited this water source for the establishment of large-scale intensive agriculture. Later, after the 1967 war, Israeli settlers in the occupied West Bank would replicate groundwater pumping as a method of appropriation.⁸⁶

By making water into an object of investment, the Jewish Agency was effectively able to lay part of the economic foundation of a future state, on the one hand, while Palestinian farmers lost control of their water, on the other. According to a 1929 report, a farmer who could not afford to switch to intensive agriculture was often “forced to forfeit his water right ... or sell his [water] holding to a capitalist who can develop it.”⁸⁷ As noted above, although “Palestine’s social and economic structure was already in a state of transition”⁸⁸ prior to European colonialism, “British colonial rule and European Jewish settlers’ capital only intensified the process of depeasantization already being undergone by the Palestinian peasants.”⁸⁹ While this phenomenon has often been analyzed in terms of the loss of land, it also included the loss of water.

The Jewish Agency, for its part, continued to amass groundwater sources that in turn fed a growing agricultural industry. This provided Zionist settlers economic stability and enabled them to undercut Palestinian agriculturalists in industries such as olive oil and citrus cultivation, leading to further dispossession and financial ruin.⁹⁰ Moreover, that investment either destroyed or found ways to avoid altogether the collective practices that Palestinians had developed to manage their water. While proportional water sharing blocked outside investment in some places, other water sources were lost to the market. The British policy of partitioning *musha'* land was also particularly destructive to time-based water-sharing schemes, especially for those with shorter turns.⁹¹ Because of this and the speculative water market, water ownership was “tending to pass into the hands of the capitalist.”⁹²

Water as Kinetic Energy

Yet the Jewish Agency and the PICA were not the only Zionist entities investing in water resources. Before the Mandate for Palestine was even finalized, the British government had granted concessions for the generation and supply of hydroelectricity in Palestine and Transjordan to Pinhas Rutenberg, a Russian Jewish settler. Rutenberg would eventually form the Palestine Electric Corporation (PEC) to operate the concessions, which granted him broad control over three major rivers, the 'Auja, the Yarmouk, and the Jordan, for the purposes of generating new electric supply.⁹³ Whether or not the British realized it at the time, this power would enable the corporation to severely restrict the ways in which these rivers could be used. The repercussions were profound. Farmers who had used this water since “time immemorial” were no longer able to do so.⁹⁴ Much of Palestine’s surface water was suddenly made inaccessible.

As mentioned previously, the PEC was eventually expected to return a profit and, as such, was a capitalist entity. It therefore complicates the socialist narrative that has often framed Zionist colonization—a tension reflected in the different political orientation of Rutenberg, a revisionist who favored geographic expansion at the expense of exclusive “Hebrew labor,” vis-à-vis Labor Zionist leaders, who were more set on demographic exclusivity at the price of territorial expansion.⁹⁵ While it has been argued that Rutenberg’s allegiance to the profit motive actually made the corporation apolitical in nature,⁹⁶ this section will briefly explore some ways in which the PEC excluded Palestinians, both from water and from exercising control over the production of electricity in Palestine, making it, I argue, a firmly Zionist organization. Moreover, the corporate form itself became a device that could exclude and funnel foreign capital into Palestine by making Palestine’s water legible to investors from afar. The more capital the corporation raised, the more powerful it became, and the more strongly it could assert itself against the British administration when their interests conflicted. Like Mekorot, discussed above, the PEC—which still exists today as the Israel Electric Corporation—formed part of the infrastructure of a future state. This more capitalist strand of Zionist colonization was, therefore, consequential for the Zionist movement as a whole, as by the end of World War I it struggled to develop a self-sustaining economic program.⁹⁷ By the end of the Mandate period, the British administration credited the appearance of Zionist industry largely to the cheap electric supply that the PEC had created.⁹⁸

The PEC’s control over northern Palestine’s rivers enabled it to exclude both Palestinians and European settlers alike from their use, much to the consternation of the British

administration. The Mandate authorities had granted Rutenberg rights to the 'Auja River not only for electric generation but also with the intention that the PEC build an irrigation scheme to service nearby farms and settlements. After years of confrontation with them on the issue, the PEC ultimately never built the scheme, because to do so would have obviated the largest source of demand for PEC electricity—pumping for groundwater, discussed above, which is highly energy intensive.⁹⁹ On the Jordan River, the PEC was similarly able to dictate use both upstream and downstream from its power plant. Upstream, Lake Tiberias was effectively turned into a holding basin for the powerhouse located immediately below it, meaning that the corporation could control the level of the lake.¹⁰⁰ Even farther upstream in the Huleh basin, the British administration made loans to farmers contingent on the corporation's approval of how much water they drew from the Yarmouk and the Jordan.¹⁰¹ Downstream water was similarly inaccessible. By the point at which it exited the corporation's turbines below the powerhouse, it was "*at too low a level to be of practical value.*"¹⁰² It had to be physically raised again, using some kind of power—such as electricity from the PEC—to be used for irrigation.

These were not the only ways in which the PEC was able to exclude. Rutenberg used the corporate form itself to keep control over electric production firmly in Zionist hands. Although anyone, European or Palestinian, could, at least in theory, connect to the electric grid, gain employment at the PEC, or own noncontrolling shares of the corporation, Rutenberg "did not want [Palestinians] to have any voice in the concession themselves."¹⁰³ To achieve this, Rutenberg constructed three classes of shareholders. Only one class, ordinary shareholders, had full voting rights, and these shares were held exclusively by five Zionist entities.¹⁰⁴ Preference shareholders held conditional voting rights, and ordinary "A" shareholders could not vote at all. This solved a major problem for Rutenberg, who knew that he would have to "allow" Arabs to purchase shares.¹⁰⁵ As Rutenberg wrote to a prospective investor in the United States, "I succeeded in creating a powerful political and economic instrument for the Jewish people in Palestine. And this instrument I have placed at the disposal of my people."¹⁰⁶ This corporate structure would later be repeated by companies such as Mekorot.¹⁰⁷

The PEC was also able to funnel foreign capital into Palestine and, in the process, fully transform water into an object of investment. In 1935, it publicly offered shares for sale in London, attracting largely non-Jewish investors who liked the idea of the "development of Palestine or 'the Holy Land.'"¹⁰⁸ The offering was oversubscribed,¹⁰⁹ which, according to an Anglo-Palestine Bank official based in London, was due to "an association of ideas, people being attracted by the word 'Palestine' both in the name of the [Palestine Electric] Company and in our own name."¹¹⁰ Many shareholders thus lived abroad and had no actual, practical knowledge of the place in which they were investing.

If volumetric measures helped decontextualize Palestine's water and strip it of its social world, the corporation took this decontextualization one step further. It took estimations of cubic meters of water and calculated potential kilowatt hours, which were then advertised to potential investors in prospectuses that promoted the "economic regeneration"¹¹¹ and "restoration of Palestine."¹¹² As Jessica Barnes notes in the case of water in Egypt, "the system of measurement is a process of doing work, of making something local ... into something that can travel—a figure."¹¹³ These figures presented to foreign investors a Palestine that existed only in their minds—a fictionalized "Holy Land." Numeric representations of cubic meters and kilowatt hours communicated across distances what days and hours of water could not. They made Palestine's water legible to foreign investors and shareholders, but only as a bare object—a commodity whose potential lay in the simple fact that it could be used to generate

another commodity—electricity. That farmers depended on these rivers for their livelihood, or that this water was part of a larger matrix of social life, was, needless to say, totally irrelevant. Palestine’s rivers had been thoroughly transformed into a source of potential profit.

The PEC thereby amassed a special kind of economic and political clout. By 1934, the company’s valuation was high enough that the British government could not afford to buy it out.¹¹⁴ This enabled the PEC to assert itself in its interactions with the administration, freely clashing with and challenging it when their interests conflicted, such as with the debate over the ‘Auja irrigation scheme that never materialized.¹¹⁵ The administration, moreover, had to answer not only to the corporation’s shareholders but also to the growing number of people and businesses that had come to rely on the electric grid.¹¹⁶ The relatively cheap energy source that the PEC provided “made [it] a practical possibility” to both grow industry, which had proliferated rapidly by the mid-thirties, and to pump groundwater, as detailed above.¹¹⁷ Yet the more people and businesses came to rely on the electric grid, the more vulnerable the entire system became. By the 1936–39 Revolt, the grid had created a physical network susceptible to attack. Rebels targeted PEC fixtures, water systems, and citrus groves.¹¹⁸ In one incident, transmission lines were destroyed, and the repair workers were then attacked and killed. A telegram stressed the importance of maintaining electric supply, without which there would be a ruined citrus crop, “dislocating industry and [the] security [of] towns.”¹¹⁹ There was also a general call to boycott the PEC¹²⁰ and a 1936 study noted that many citrus farmers were switching back to diesel and gasoline.¹²¹

* * *

In July, water boils in the jug.
—Palestinian proverb

The main contention of this article is that in Mandate Palestine water was de-worlded and subsequently de-contextualized. Volume-based measures, I have argued, were a prerequisite for this larger transformation. The difference between volumetric and proportional water sharing was not merely a discrepancy between two systems of measurement. Rather, these reflected two varying ways of being in the world. Proportional water sharing was not just a system of using water. It was also a set of practices that had developed over time, which mediated and maintained social relationships. It allowed a group of farmers to communally manage their water without having to make exclusive claims to its ownership. Moreover, because shares were often measured in time, and because of the cyclical nature of water more generally, water set the temporal rhythm of daily life. A water turn, like the larger annual water cycle, was a way of marking the passage of time.

Volume-based measures were the first step in this progressive de-worlding. A cubic meter of water, as opposed to a day or an hour, seamlessly conveys a definite amount of water with no additional contextual information such as its source and the time of year. This made it easier to conceive of water as a bare object, as a substance whose meaning derives not from its social world but from those other objects to which it can be made equivalent. This detached, scientific comportment was a fundamentally different way of looking at and orienting oneself toward water, and one step in the larger process of its commodification. This in turn facilitated the recontextualization of water into a new set of purposes—the expansion of absorptive capacity and the furthering of the Zionist project. These ends were not necessarily unified or coherent. The Jewish Agency and the PEC often clashed in their respective interests. Yet they both relied on a similar kind of orientation, which understood water first and foremost in

terms of the other things it could produce: irrigated crops, expanded immigration quotas, and enhanced electric current. What was framed as scientific research and progress was based on an understanding that water was a mere resource to be extracted and put into a system.

This varied greatly from the kind of knowledge Palestinians had developed over time that understood water as part of their larger matrix of everyday practice and social life. It is, of course, not as though Palestinians did not possess specialized knowledge of how to irrigate their crops, or as though they were incapable of thinking scientifically about their environment.¹²² For Palestinians, as for any people undergoing historical change, these various temporalities and kinds of knowledge would have been simultaneously accessible. Yet, while for Palestinians these two kinds of knowledge were not necessarily incompatible, from a colonial perspective they were fundamentally at odds. The British considered Palestinian agricultural practice to be “primitive in the extreme”¹²³ and in need of “civilising.”¹²⁴

The PEC introduced new temporalities into Palestine. Streetlamps and light fixtures illuminated the home and public spaces after dark. Farmers could pump from aquifers without relying on diesel engines, essentially tapping into future water supplies. Investors could even hand over their money for the promise of future profit. But even more important are the temporalities that this infrastructure effaced. The position of the sun no longer matters as much when one can flip a switch inside the home. Seasonal rainfall is less meaningful once one is able to pump groundwater at any time of the year. Natural calendars gradually became less relevant. The objectification of water—stripping it of its social context and turning it into a commodity—thus had the effect of homogenizing time, of ridding it of all the concrete features that had previously characterized it. The theft of water in Palestine was, therefore, neither solely material nor entirely spatial. It was nothing less than the disruption of practiced, skillful ways of being in the world, a way of life for which there was no room in the colonial imagination.

About the Author

Cristina Violante is a PhD student in jurisprudence and social policy at the University of California, Berkeley, and a JD student at Berkeley Law. Her research examines the legal underpinnings of settler colonialism, with particular emphasis on the ways in which property law has facilitated environmental commodification, and the history of water law.

Endnotes

1. Mureed al-Barghouti, “Songs for a Country No Longer Known,” *JPS* 27, no. 2 (1998): 59–67, <https://doi.org/10.2307/2538284>.
2. Samer Alatout, “‘States’ of Scarcity: Water, Space, and Identity Politics in Israel, 1948–59,” *Environment and Planning D: Society and Space* 26, no. 6 (2008): 972, <https://doi.org/10.1068/d1106>.
3. Eyal Weizman, *Hollow Land: Israel’s Architecture of Occupation* (New York: Verso, 2007), 15.
4. Ghassan Kanafani, *The 1936–39 Revolt in Palestine* (New York: Committee for a Democratic Palestine, 1972), 20, <http://pflp-documents.org/documents/PFLP-Kanafani3639.pdf>.
5. Ilana Feldman, *Life Lived in Relief: Humanitarian Predicaments and Palestinian Refugee Politics* (Oakland, CA: University of California Press, 2018), 20. See also Sherene Seikaly, “The Matter of Time,” *American Historical Review* 124, no. 5 (2019): 1681–88, <https://doi.org/10.1093/ahr/rhz1138>.
6. Julie Peteet, *Space and Mobility in Palestine* (Bloomington: University of Indiana Press, 2017), 167.

7. Julie Peteet, "Closure's Temporality: The Cultural Politics of Time and Waiting," *The South Atlantic Quarterly* 117, no. 1 (2018): 48, <https://doi.org/10.1215/00382876-4282037>.
8. Such questions include, for example, how the method of proportional water management described here worked with communal land tenure (*musha*).
9. British Colonial Office, "Proposed Irrigation Ordinance," August 25, 1933, file CO 733/248/3, The National Archives, London.
10. Proportional or time-based water sharing is not unique to Palestine. It is a common method of collective water management found often but not exclusively in areas that were formerly part of Islamic, Arab, or Spanish empires. For analogous practices in Egypt, see Jessica Barnes, *Cultivating the Nile: The Everyday Politics of Water in Egypt* (Durham, NC: Duke University Press, 2014), 23, 37, 61, 87; for Oman, see Mandana Limbert, *In the Time of Oil: Piety, Memory, and Social Life in an Omani Town* (Stanford, CA: Stanford University Press, 2010), 115–33; for Morocco and Tunisia, see Abdellah Hammoudi, "Substance and Relation: Water Rights and Water Distribution in the Drā Valley," in *Property, Social Structure and Law in the Modern Middle East*, ed. Ann Elizabeth Mayer (Albany: State University of New York Press, 1985), 27–57, and Habib Attia, "Water-Sharing Rights in the Jerid Oases of Tunisia," in *Property, Social Structure and Law in the Modern Middle East*, ed. Ann Elizabeth Mayer (Albany: State University of New York Press, 1985), 85–106. While such systems share many commonalities, the institutions of water sharing—both the infrastructure and the rules that govern water use—vary from place to place. In many of the other proportional water-sharing systems, there have been similar transitions or attempted transitions to volumetric measurements like the one that I am exploring here, which often produced similar tensions between time- and volume-based measures (see, for example, Barnes, *Cultivating the Nile*, 49). Part of what makes the case of Palestine unique, however, is the particular historical context and trajectory in which this tension arose—that is, in the context of an incoming settler population that was in the process of establishing institutions that would later form the basis of an exclusive settler state. Illuminating the specifics of this case is worthwhile not only out of historical interest but also because these are the roots of a process of dispossession that is still ongoing.
11. British Irrigation Advisor D. G. Harris, "Note on Proposed Irrigation Ordinance," February 8, 1935, p. 20, file CO 733/284/3, The National Archives, London. For the purposes of this paper, the first and last methods of measurement mentioned here, the "proportion of the discharge of a spring" and "number of hours of supply in a rotation," are being treated analogously. Although they do vary, they are both proportional ways of sharing a water source. For an explanation of analogous systems in a different setting, see Thomas Glick, *Irrigation and Society in Medieval Valencia* (Cambridge, MA: Belknap Press of Harvard University Press, 1970), 12–13, 186, 230.
12. Palestinians continue to be pushed to convert to volume-based water distribution systems, often by developmental agencies. See Julie Trottier, *Hydropolitics in the West Bank and Gaza Strip* (Jerusalem: Palestinian Academic Society for the Study of International Affairs, 1999), 89, 110–11, http://passia.org/media/filer_public/9f/59/9f5902ed-dc9a-4792-a357-99392042547e/hydropolitics_in_the_west_bank_and_gaza_strip.pdf.
13. For a more complete description of Battir's distribution system, see Trottier, *Hydropolitics*, 113.
14. Isabel Kershner, "A Palestinian Village Tries to Protect a Terraced Ancient Wonder of Agriculture," *New York Times*, June 25, 2012, http://www.nytimes.com/2012/06/26/world/middleeast/palestinian-village-tries-to-protect-landmark.html?_r=0.
15. Trottier, *Hydropolitics*, 114.
16. Trottier, *Hydropolitics*, 86.
17. Trottier, *Hydropolitics*, 88.
18. Trottier, *Hydropolitics*, 88.
19. As Stamatopoulou-Robbins notes in the context of waste, our experience of water is "inseparable from the infrastructures that manage" it: Sophia Stamatopoulou-Robbins, *Waste Siege: The Life of Infrastructure in Palestine* (Stanford, CA: Stanford University Press, 2019), 4.
20. See, for example, the reference to "astronomical fractions" of water rights in *A Survey of Palestine: Prepared in December 1945 and January 1946 for the Information of the Anglo-American*

- Committee of Inquiry*, vol. 1 (Palestine: Government's Printer, 1946), 390, https://www.bjpa.org/content/upload/bjpa/a_su/A%20SURVEY%20OF%20PALESTINE%20DEC%201945-JAN%201946%20VOL%20I.pdf. On the use of stargazing to allocate time-based water shares in Oman, a practice that likely holds some parallels or similarities to water sharing in Palestine, see Harriet Nash and Dionisius A. Agius, "The Use of Stars in Agriculture in Oman," *Journal of Semitic Studies* 56, no. 1 (Spring 2011): 167–82, <https://doi.org/10.1093/jss/fgq063>. For analogous techniques in Morocco and Tunisia, see Hammoudi, "Substance and Relation," 41, and Attia, "Water-Sharing Rights," 90–93, respectively. To the extent that time-based water sharing still exists in these regions, it is now widely done by clock time.
21. While *suheyl* formally refers to Copernicus and *al-shi'ra* to Sirius in Arabic, *suheyl* was also a generic term used for very bright stars and referred informally in particular to Sirius. See Alexander von Humboldt, *Cosmos: A Sketch of a Physical Description of the Universe*, vol. 4, trans. E. C. Otte and B. H. Paul (New York: Harper & Brothers, Publishers, 1866), 44, 46. See also Richard Hinckley Allen, *Star-Names and Their Meanings* (New York: G. E. Stechert, 1899), 69, 122.
 22. Gustaf Dalman, *Work and Customs in Palestine: The Course of the Year and the Course of the Day*, vol. 1, *Autumn and Winter*, trans. Nadia Abdulhadi-Sukhtian (Ramallah: Dar Al Nasher, 2013), 14.
 23. This calendar also included knowledge of when to sow and harvest various crops, and how and when to anticipate rain. Dalman, *Work and Customs in Palestine*, 6. Barnes highlights a similar temporality to water use in Egypt. Barnes, *Cultivating the Nile*, 40.
 24. Beshara Doumani, *Rediscovering Palestine: Merchants and Peasants in Jabal Nablus, 1700–1900* (Berkeley: University of California Press, 1995), 4.
 25. Alexander Schölch, "European Penetration and the Economic Development of Palestine, 1856–82," in *Studies in the Economic and Social History of Palestine in the Nineteenth and Twentieth Centuries*, ed. Roger Owen (London: Palgrave Macmillan, 1982), 12–17.
 26. Nahla Abdo-Zubi, "Colonial Capitalism and Rural Class Formation: An Analysis of the Processes of Social, Economic and Political Change in Palestine, 1920–1947" (PhD diss., University of Toronto, 1989), 73.
 27. Doumani, *Rediscovering Palestine*, 133, 165.
 28. For an explication of this differentiation in the Mandate era in particular, see Abdo-Zubi, "Colonial Capitalism and Rural Class Formation," 170–72.
 29. Abdo-Zubi identifies six criteria that qualify agricultural production as capitalist: "1) Capital investment in agriculture; 2) The mechanization of agricultural production; 3) The development of intensive agriculture; 4) The production of commercial and industrial crops; 5) The consequent replacement of small-scale agricultural production with large-scale industrial production; And finally, that hired or wage labour must be the main source of surplus value in capitalist agriculture," from Abdo-Zubi, "Colonial Capitalism and Rural Class Formation," 208. While some factors were undoubtedly already present, British policy and Zionist settlement intensified and added to them, especially the shift to intensive agriculture discussed in the third section.
 30. E. P. Thompson, "Time, Work-Discipline, and Industrial Capitalism," *Past & Present* 38 (1967): 60, <https://doi.org/10.1093/past/38.1.56>.
 31. Thompson provides one of the most well-known analyses of the penetration of clock-time and its effect on labor in his "Time, Work-Discipline, and Industrial Capitalism," 56–97. He draws from and attempts to complicate the concept of "task-orientation" often used to describe labor that is structured along "'natural' work-rhythms" as opposed to clock-time. While capitalist agriculture no doubt features a similar work experience as that of the factory, it is unlikely that this had become the norm of agricultural labor by the Mandate period.
 32. Walter Benjamin, "Theses on the Philosophy of History," in *Illuminations*, trans. Harry Zohn (New York: Schocken Books, 1969), 261.
 33. Terraced agriculture in what is now called the West Bank provides but one example. Mureed al-Barghouti describes his uncle as "a master of irrigation" who, although illiterate, was "capable of irrigating the mountain and the valley using a minimal amount of water, with no waste, as if he were an outstanding agricultural engineer with university degrees," from al-Barghouti, "Songs for a Country," 64.

34. I am using background practice here in a Heideggerian sense to mean “the shared everyday skills, discriminations, and practices into which we are socialized [that] provide the conditions necessary for people to pick out objects, to understand themselves as subjects, and, generally, to make sense of the world and of their lives,” from Hubert Dreyfus, *Being-in-the-World: A Commentary on Heidegger’s Being and Time, Division 1* (Cambridge, MA: Massachusetts Institute of Technology Press, 1990), 4. One can draw a loose parallel with what Barnes describes as the “production” of water scarcity in Egypt. Barnes notes that water’s presence is generated “through very material interactions with the flow of water ... how we see the world shapes how we interact with and transform it, which in turn influences what we see” (*Cultivating the Nile*, 36). She highlights “the everyday practices that actually determine what water flows where,” showing that “the presence or absence of water is not a given but is produced through particular sets of social, technical, and political interactions,” from Barnes, *Cultivating the Nile*, 36.
35. Trottier, *Hydropolitics*, 116–17.
36. Dreyfus, *Being-in-the-World*, 19.
37. Trottier, *Hydropolitics*, 115.
38. Lewis French, “Agricultural Development and Land Settlement in Palestine,” 77–78, December 23, 1931, file CO 733/214/5, The National Archives, London.
39. See, for example, Dawson Shephard, “Letter from the Irrigation Officer to the Acting Director,” 1–2, August 22, 1933, file CO 733/248/3, The National Archives, London.
40. Trottier, *Hydropolitics*, 115.
41. Sherene Seikaly, *Men of Capital: Scarcity and Economy in Mandate Palestine* (Stanford, CA: Stanford University Press, 2016), 94. Beshara Doumani shows that “the value of units carrying the same name varied from region to region, town to town, village to village ... [and] a measuring container could also be made to yield different results depending on who was giving and who was taking,” from Doumani, *Rediscovering Palestine*, 247.
42. Doumani, *Rediscovering Palestine*, 247. Even in France, the birthplace of the standardized metric system, there was significant resistance to the standardization of weights and measures, from Witold Kula, *Measures and Men*, trans. R. Sreter (Princeton, NJ: Princeton University Press, 1986).
43. One of the best sources on this is Kula, *Measures and Men*.
44. Barnes provides an example of this in the Egyptian case. See Barnes, *Cultivating the Nile*, 40.
45. Laura Nader, “Introduction,” in *Property, Social Structure, and Law in the Modern Middle East*, ed. Ann Elizabeth Mayer (Albany: State University of New York, 1985), 4.
46. Nader, “Introduction,” 5. See also Hammoudi, “Substance and Relation,” 29.
47. Hammoudi, “Substance and Relation,” 29.
48. Such a reframing is important for several reasons. One is that time-based water sharing is, in fact, found in what we know as the West. Second, and more important, aside from this time/volume distinction that I am attempting to draw out, there are actually many similarities between “Western” and “non-Western” property rights in water. For example, to say that Western law facilitates “ownership” over the substance is slightly misplaced, because in both common law riparian systems and the system of prior appropriation—the two types of water law found today in the United States—property rights to water are usufruct, meaning that one possesses rights to *use* the water, *not to own* the water itself. That is why I am locating this effect of water becoming the “object” of ownership, as opposed to a mediator of social relationships, not in Western conceptions of property in the abstract but rather in this practice of measuring water rights volumetrically, which, I argue, objectifies water. In fact, the system of establishing water rights that Limbert describes in Oman is remarkably similar to the system of prior appropriation that is used today in the western United States (with, again, one major difference being the kind of measurement). For these reasons, it becomes strange to describe one type of water distribution as endemic to or originating in a certain geographic area. Most of these systems are mentioned in some form or another in Roman law and have circulated since then, often through conquest or geographic expansion.
49. Or, in cases in which water rights are attached to land ownership, large landowners will come to control more water than others. See, for example, John Wilkinson, “Muslim Land and Water Law,” *Journal of Islamic Studies* 1 (1990): 68.

50. See, for example, Hammoudi, "Substance and Relation," 45. Limbert provides a contrasting example by showing how, in the case of an area in central Oman, this kind of inequity was avoided by providing each user with two water shares per rotation and "alternating them between day and night," from Limbert, *In the Time of Oil*, 124–5. She also argues that the division of time-shares upon inheritance served to dilute and counteract the ability of wealthy parties to amass inequitable proportions of water rights.
51. Trottier, *Hydropolitics*, 35.
52. Emphasis in original. Dreyfus, *Being-in-the-World*, 197.
53. Dreyfus, *Being-in-the-World*, 83.
54. Karl Marx, *Capital: A Critique of Political Economy*, vol. 1, trans. Ben Fowkes (New York: Penguin Publishing Group, 1992), 166.
55. The ability of irrigators to sell off their water shares is another issue that demands further research. It is not uncommon in other areas where analogous water-sharing systems are found for some communities to allow the selling of water shares and for some not to do so. See, for example, Glick, *Irrigation and Society*, 12–13, 186. In the case of Palestine, Trottier notes, for example, that in Battir, alienation of water outside the community is forbidden (Trottier, *Hydropolitics*, 116). This likely partly explains why Battir's close-knit proportional water-sharing system still exists to this day. Yet this was certainly not the case all over Palestine. The market in water rights that arose during the Mandate, explored in the third section of this article, provides one example in which alienation occurred, and the British understood it to be a feature of local law that water could be sold separately from land in this way. See French, "Agricultural Development and Land Settlement in Palestine," 62–64.
56. Marx, *Capital*, 128.
57. Limbert finds a similar phenomenon in the case of Oman, where the government introduced piped water, bought and sold in terms of volume, in an area that had previously used time-based shares on locally managed canals. Water became "a commodity derived from unknown origins, 'bought,' 'owned,' and 'distributed' by the household, its value to be calculated in terms of quantity rather than time," from Limbert, *In the Time of Oil*, 127.
58. House of Commons Debates, July 4, 1922, series 5, vol. 156, columns 293–341, <https://api.parliament.uk/historic-hansard/commons/1922/jul/04/colonial-office>. See also Ronen Shamir, *Current Flow: The Electrification of Palestine* (Stanford, CA: Stanford University Press, 2013), 26.
59. See, for example, Montague Brown, "Agriculture," in *Economic Organization of Palestine*, ed. Sa'id B. Himadeh (Beirut: American University of Beirut, 1938), 209.
60. League of Nations, "The Palestine Mandate," July 24, 1922, Yale Law School: The Avalon Project: Documents in Law, History and Diplomacy, https://avalon.law.yale.edu/20th_century/palmandada.asp.
61. For some background on this, see Riyad Mousa, "The Dispossession of the Peasantry: Colonial Policies, Settler Capitalism, and Rural Change in Palestine, 1918–1948," (PhD diss., University of Utah, 2006), 136–39. Abdo-Zubi strongly critiques the way historians have characterized *musha'*, see Abdo-Zubi, "Colonial Capitalism," 55–56, 62.
62. See, for example, French, "Agricultural Development and Land Settlement in Palestine," 16–17. See also Charles Kamen, *Little Common Ground: Arab Agriculture and Jewish Settlement in Palestine, 1920–1948* (Pittsburgh, PA: University of Pittsburgh, 1991), 195; and Abdo-Zubi, "Colonial Capitalism," 90, 94. Despite hardly investing in social services during the Mandate, the British ran agricultural stations and demonstration plots "to encourage the rural population to adopt improved farming practices," from Brown, "Agriculture," 188, and see 186–90 for more general information. On the lack of social services, see Seikaly, *Men of Capital*, 156. Any social services the British did provide were expected to be paid for through direct and indirect taxation of Palestinians themselves—a taxation scheme that was particularly burdensome on the rural population. See Abdo-Zubi, "Colonial Capitalism," 125–33.
63. David Horowitz, "Scheme for the Settlement of German Jews in Palestine," January 1936, file S25/9707, Central Zionist Archives, Jerusalem.
64. The Jewish National Fund and Jewish Agency for Palestine Water Research Bureau, "Water Survey of Palestine," 1942, file KKL8/66, Central Zionist Archives, Jerusalem.

65. This is partly why, as Samer Alatout shows, “Zionist water and political experts *believe[d] water to be abundant from the mid-1930s through the mid-1950s ...*” (Emphasis in original, “States’ of Scarcity,” 960).
66. *Survey of Palestine*, 345; Brown, “Agriculture,” 186–87, 196–98; and Abdo-Zubi, “Colonial Capitalism,” 213.
67. “Memorandum on the Water Resources of Palestine” (Jerusalem: Government Printer, 1947), 7. See also Abdo-Zubi, “Colonial Capitalism,” 215–16.
68. See, for example, a British project that could not be implemented for this reason in Wadi Fara’a. Sir Harold MacMichael, High Commissioner of Palestine to Oliver Stanley, Colonial Secretary of HMG, Jerusalem, July 17, 1944, file 733/458/12, The National Archives, London; and British Colonial Office, “Proposed Irrigation Ordinance.”
69. Memorandum on the Draft Palestine (Amendment) Order in Council No. 2 by the Attorney General, September 7, 1935, file 73/303/6, The National Archives, London.
70. French, “Agricultural Development and Land Settlement in Palestine,” 64.
71. “The weakest goes to the wall” is a British colloquialism meaning that the weakest loses in a struggle. The British believed that this situation was exacerbated by Palestinian law, which allowed water to be sold off from its associated land, and by laws of inheritance, which often subdivided shares (from French, “Agricultural Development and Land Settlement in Palestine,” 62–64).
72. Summary of a Letter from Max Bourcart to the Zionist Organization, January 22, 1920, file Z4/40002-26, Central Zionist Archives, Jerusalem.
73. For an example of the Jewish Agency seeking US water expertise, see “Memorandum on the Water Resources of Palestine,” 21–31. For correspondence with Elwood Mead, see, for example, his letter to the Zionist Organization, July 29, 1932, file F38/1298-7, Central Zionist Archives, Jerusalem.
74. Abdo-Zubi, “Colonial Capitalism,” 217; and Palestine Economic Corporation to Haim Arlosoroff, February 25, 1933, file F38/1298-2, Central Zionist Archives, Jerusalem.
75. Annual Report of the Department of Agriculture and Forests for the Year Ending March 1934,” 1934, file 733/273/6, The National Archives, London.
76. *Survey of Palestine*, 375. This is likely why a PICA representative on the General Agricultural Council pushed very hard for all water rights to be defined in terms of quantity. It is a more secure kind of property right. See “Minutes of the 14th Meeting of the General Agricultural Council,” July 20, 1933, file 733/248/3, The National Archives, London.
77. *Survey of Palestine*, 394.
78. “Mekoroth Water Company Limited Prospectus,” May 16, 1944, file S90/2056/7, Central Zionist Archives, Jerusalem. See also Al-Haq, Addameer Prisoner Support and Human Rights Association, Cairo Institute for Human Rights Studies, Al Mezan Center for Human Rights, The Community Action Center/ Al-Quds University, The Jerusalem Legal Aid and Human Rights Center, and Habitat International Coalition–Housing and Land Rights Network, *Joint Submission to the Human Rights Committee on Israel’s Sixth Periodic Review: Parallel Report on Israel’s Violation and Failed Implementation of the International Covenant on Civil and Political Rights*, January 31, 2022, 14, http://www.hlrn.org/img/documents/Joint_submission_to_HRC_on_Israel.pdf.
79. Other, more finite water legislation was passed over the course of the Mandate, such as the Water Survey Ordinance (1938) and the Flooding and Soil Erosion (Prevention) Ordinance (1941), but these “only touched the fringe of the problem,” which was, in the British mind, the ability to control surface and groundwater. See “Memorandum on the Water Resources of Palestine,” 1–2.
80. Enclosure II to letter from Arthur Wauchope, High Commissioner for Palestine to Secretary of State for the Colonies, to Sir Philip Cunliffe-Lister, August 25, 1933, file 733/248/3, The National Archives, London. For a good example of the lobbying language used by the Jewish Agency, see “Bernard Joseph to Chief Secretary, Government Offices, Jerusalem,” March 8, 1942, file KKL8/130, Central Zionist Archives, Jerusalem. On this point, see also K. Gaarde, “British Colonial Water Legislation in Mandatory Palestine,” in *A History of Water, Volume 2: The Political Economy of Water*, eds. Richard Coopey and Terje Tvedt (London: I.B. Tauris, 2006), 172–89.

81. "Letter from Dawson Shepherd, Irrigation Office, to the Acting Director of Development," August 22, 1933, file 733/248/3, The National Archives, London.
82. For estimates of some of the imported capital that was invested in agriculture, in particular, see Abdo-Zubi, "Colonial Capitalism," 210–11.
83. "Minute to Secretary of State," April 16, 1943, file 733/400/21, The National Archives, London.
84. Reed D. Benson, Burke W. Griggs, and A. Dan Tarlock, *Water Resource Management: A Casebook in Law and Public Policy*, 8th ed., (St. Paul, MN: Foundation Press, 2021), 310–14.
85. *Survey of Palestine*, 395. For a hydrological explanation, see Benson, Griggs, and Tarlock, *Water Resource Management*, 316.
86. Trottier, *Hydropolitics*, 60.
87. "Report of Irrigation Committee," November 13, 1929, file 733/203/1, The National Archive, London.
88. Abdo-Zubi, "Colonial Capitalism," 45.
89. Abdo-Zubi, "Colonial Capitalism," 57.
90. Abdo-Zubi, "Colonial Capitalism," 176–96, 209. See also, for example, "More and Cheaper Water for Farmers: 'Mekoroth' Activities in 1941," *Palestine Post*, February 18, 1942, file S90/2056/7, Central Zionist Archives, Jerusalem, for details about agricultural water sales reported in cubic meters.
91. "Annual Report of the Department of Agriculture and Forests 1933–1934," file 733/273/6; French, "Agricultural Development and Land Settlement in Palestine," 64.
92. French, "Agricultural Development and Land Settlement in Palestine," 64.
93. For the history of the Palestine Electric Corporation, see Shamir, *Current Flow* and Fredrik Meiton, *Electrical Palestine: Capital and Technology from Empire to Nation* (Oakland: University of California Press, 2019).
94. "Water Rights in the Auja Basin," *Palestine Post*, January 3, 1935, file S90 2230/37, Central Zionist Archives, Jerusalem. See also "Fate of Concessions," *Falastin*, March 19, 1932, file CAOG 14/108, The National Archives, London; and "Letter to Ormsby-Gore, Secretary of State for the Colonies," September 14, 1937, file 733/337/2, The National Archives, London.
95. The latter of these became the more mainstream, associated with institutions such as the kibbutz.
96. Shamir, *Current Flow*, 158 n. 8.
97. See Gershon Shafir, *Land, Labor and the Origins of the Israeli-Palestinian Conflict, 1882–1914* (Berkeley and Los Angeles: University of California Press, 1996).
98. *Survey of Palestine*, 534.
99. Shamir, *Current Flow*, 126–48. By 1934, irrigation was the largest demand for PEC electricity. Basim Faris, *Electric Power in Syria and Palestine* (Beirut: American University of Beirut, 1936), 56.
100. "Letter from W. M. Christie to the Secretary of State of the Colonies," June 2, 1938, file 733/374/12, The National Archives, London.
101. "Minute by V. Glenday," January 1, 1943, file 733/440/20, The National Archives, London; "High Commissioner Harold MacMichael to Oliver F. G. Stanley, Secretary of State," December 10, 1942, file 73/440/20, The National Archives, London.
102. Emphasis in original. "Letter to Ormsby-Gore, Secretary of State for the Colonies," September 14, 1937, The National Archives, London.
103. "Detailed Report to Judge Mack by Samuel J. Rosensohn," July 19, 1922, file A405/42/B, Central Zionist Archives, Jerusalem.
104. Namely, the Palestine Jewish Colonization Association, the Jewish Colonial Trust, the Palestine Development Council, the Joint Distribution Committee, and the Economic Board. See "Palestine Electric Corporation Limited Report," undated, file S90/2230/37, Central Zionist Archives, Jerusalem; "Detailed Report to Judge Mack by Samuel J. Rosensohn," July 19, 1922; "J. E. Palmer Tomkinson to Mr. Baker," undated, file L51/404, Central Zionist Archives, Jerusalem; "Letter to D. Israeli," October 23, 1934, file L51/405, Central Zionist Archives, Jerusalem.
105. "Detailed Report to Judge Mack by Samuel J. Rosensohn," July 19, 1922, file A405/42/B, Central Zionist Archives, Jerusalem.

106. "Letter from Pinhas Rutenberg to U.S. Judge Julian Mack," January 30, 1923, file A101/121, Central Zionist Archives, Jerusalem.
107. "Mekoroth Water Company Limited, Prospectus," May 16, 1944, file S90/2056, Central Zionist Archives, Jerusalem.
108. "Anglo-Palestine Bank to D. Israeli," March 15, 1935, file L51/405, Central Zionist Archives, Jerusalem.
109. "Letter from H. R. Baker to S. Hoofien," February 21, 1935, file L51/405, Central Zionist Archives, Jerusalem. See, also, "31 Times Over: Palestine Electric Oversubscription," *Palestine Post*, March 1, 1935, file S90 2230/37, Central Zionist Archives, Jerusalem.
110. "Anglo-Palestine Bank to D. Israeli," March 15, 1935.
111. *Hydro-Electric Development of Palestine: The Rutenberg Project, Detailed Prospectus* (New York: Palestine Development Council, 1922), 21.
112. *Hydro-Electric Development of Palestine*, 10. For other draft prospectuses from later in the 1930s, see file 733/281/14 and file 733/261/10, The National Archives, London.
113. Barnes, *Cultivating the Nile*, 49.
114. "Minute from H. Downie to Williams," May 16, 1934, file 733/268/1, The National Archives, London.
115. Both this and the case of the British administration and the Jewish Agency clashing over water legislation, discussed above, illustrate why it is not entirely accurate to say that the British/Zionist relationship was one of simple collaboration. While the two did collaborate when their interests converged, there were also plenty of instances in which they were at odds.
116. It was likely for this reason that Rutenberg wanted as many people as possible, whether European or Palestinian, to depend on the electric grid. In an interview he gave, he said that it enhanced "the security of their installations all over the country" if "the maximum number of people" were interested in maintaining an electric supply (source: "Interview with Mr. P. Rutenberg, Managing Director of the Palestine Electric Corp.," June 3, 1934, file 733/268/1, The National Archives, London).
117. *Survey of Palestine*, 534.
118. "Chairman of The Agricultural Mortgage Company of Palestine Limited to Under Secretary of State for the Colonies," October 9, 1940, The National Archives, London; "The Agricultural Mortgage Company of Palestine Limited to the Chief Secretary," May 3, 1940, file 733/422/5, The National Archives, London.
119. "Translation of Coded Cable," September 12, 1938, file 733/374/12, The National Archives, London.
120. "Minute by A. C. C. Parkinson," October 20, 1938, file 733/374/12, The National Archives, London.
121. Faris, *Electric Power in Syria and Palestine*, 167.
122. Some even lauded the experimentation taking place in British and Zionist research stations (from Seikaly, *Men of Capital*, 43).
123. "Minute by J. Hall," August 10, 1929, file no. 733/174/9, The National Archives, London.
124. French, "Agricultural Development and Land Settlement in Palestine," 78. See 13–14 of the report for French's own critiques of this "civilising."