

## Introduction

**AMONG THE VARIOUS PHYSICAL INFRASTRUCTURES** around us, the electric grid is critically foundational. From the production of electricity by diesel fuel, coal, nuclear, or hydroelectric power stations, to the running of electric current through high-, medium-, and low-tension wires, all the way to the electric appliances of the individual consumer—electricity is the quintessential infrastructure, feeding and sustaining other essential grids like water supply and irrigation, railway systems, and the Internet. Wherever we go and whenever we look, we see electric wires and their visible energetic products. They crawl under our feet, spring out of the ground, and cut across the sky. Although the electric grid is an old-fashioned infrastructure, consisting of concrete physical connections between one point and another, we cannot do without it—all other wireless grids rely on it. Imagine not being able to charge—for example, not being able to periodically insert your laptop or cell phone into a source of wired electricity. “It’s outdated,” complains one writer. “It isn’t suited to meet our power demands.” Still, we are absolutely dependent on it.<sup>1</sup>

Although we tend to think of the grid—a cobweb of wires a century and a half old—as a long-completed project, electrification is still an ongoing process. Grids never sleep; once they more or less cover any definite area, their tendency is to transcend the boundary they have just established and expand beyond it through outreach to yet unconnected

areas or attachment to a neighboring grid. On the one hand, vast areas of the world are still unconnected to electricity—for instance, Sub-Saharan Africa, where most of the rural population is unwired. On the other hand, soaring demand prompts separate grids to join forces. Consider the recent trilateral agreement between Greece, Cyprus, and Israel to lay a 200-megawatt underwater cable that “will ultimately link Israel’s electricity supply with that of the European Union.”<sup>2</sup> From the outset, processes of electrification substantially “transformed the landscapes of the city, factory, home, and farm” (Nye 1990: 381). I should add that processes of electrification have also had the capacity to transform the landscapes of regions and countries and transnational space; because of their tendency to expand, they may even reconfigure the dimensions, coordinates and topologies of space itself.

This book is about electrification: the construction of a powerhouse and the assembly of an electric grid. It considers the materials the grid is made of—wires, poles, generators, transformers, current meters, and numerous other big and small devices—all participating in the generation, circulation, transformation, and distribution of electric current to and through multiple contact points. Many other connection types are involved in the process of bringing about wired electric light: “administrative,” “legal,” “political,” “diplomatic,” “imperial,” “personal,” “cultural,” “financial,” “ideological,” and “technical.” Yet such categorical designations are only analytic shorthand. None of these types and sets of connections are independent of any other. Each connection type invokes a former one or, at times, a new one, sometimes of an entirely different order. Ultimately, all of these connections and attachments come together to assemble a grid made of copper wires and poles; electricians, technicians, and engineers; consumers and officials; textual and graphic representations; and technical and legal documents.

I write this account as a sociologist, not as an electrical engineer or a historian of technology. My aspiration is to contribute to social theory, and my intention is to do so by probing into the electrification of 1920s colonial Palestine. My empirical case certainly aims to converse with other studies of Palestine and hopefully to enrich the understanding of its history. It also aspires to go beyond its idiosyncrasies to demonstrate how the trajectory of an electric network may yield relevant insights for

sociohistorical research. Here is my argument: electrical connections participate in processes of group formation, take an active part in the performativity of social asymmetries; shape areas and regions and other spatial formations; and actively assemble, sustain, and enable taken-for-granted categories and dichotomies such as the private and public spheres.

Major works on the origins and diffusion of electricity have so far focused on Europe and the United States. This is not surprising. It was in the industrialized countries of Europe and in the United States that electricity “began”: discovered, developed, and eventually widely transmitted and distributed. Thomas Hughes’s *Networks of Power: Electrification in Western Society 1880–1930* (1983) set the tone, announcing a departure from technological determinism—that is, the assumption that technological innovations have a history of their own, independent of other social influences, and that they in turn function as a governing principle in shaping cultural and political processes. Hughes moved away from the tendency to account for technological successes and failures merely in terms of the cost, efficiency, and safety concerns that they satisfy (or fail to satisfy) on the road to fulfilling some preordained social needs.

Hughes launched a study of electricity that placed the “residuals” of political and economic factors at the center of inquiry. However, he did not simply move from technological determinism to “social” explanations for technological developments. Rather, he insisted on analyzing electrification in terms of a “seamless web” of connections and contributing factors (Hughes 1986; Nye 1990; Latour 2005: 81). Comparing the history of electrification in Germany, Britain, and the United States, he showed that politics and science; administrative, legal, and engineering concerns; businesspeople and entrepreneurs; inventors and investors; technical problems and engineering solutions; and regional geography and economic cycles were all involved in establishing the pace and form of electrification and its uneven development and rationalization in these countries.

To make sense of this seamless web, Hughes adopted an evolutionary approach to the history of electric systems (1983: 7–9): “Although the electric power systems described herein were introduced in different places and reached their plateaus of development at different times, they were related to one another by the overall model of system evolution”

(1983: 14). He assigned agency and concrete properties to electric systems: they had a will and a sense of direction; “young” systems behaved differently from “old” ones (1983: 15); they had a “style” (Nye 1990: 79).

All in all, Hughes identified four evolutionary phases in the career of electrical systems: “invention and development,” “technology transfer,” “system growth,” and “substantial momentum” (“mass, velocity, and direction”) (1983: 14–15; see Chapter 4 in this book). Within this history of system evolution, he was adamant in showing that progression (in each case and in comparative perspective) was never linear, that it faced setbacks and problems, and, most important, that it could not be explained only in terms of efficiency, rationality, and cost-effectiveness. Like Hughes, Mark Granovetter and Patrick McGuire analyzed the American electricity industry in terms of its “identifiable social networks” and showed that “the way the electricity industry developed was only one of several possible outcomes, and not necessarily the most technically or economically efficient” (1998: 148; see also Platt 1991).

It was only after solving key technological issues and stabilizing standards and models of electricity production and distribution that the electric grid fully arrived in countries outside the industrial core. Like telegraphy before it, wired electricity was often carried on and through the circuits of colonial rule. The diffusion of electricity in Europe and the United States presupposed a material and human infrastructure already receptive to the new technology—in other words, a relatively high degree of industrialization, relatively developed transportation systems, and considerable numbers of urbanites who could afford to be wired and transformed into private and commercial consumers. As the case of Palestine will demonstrate, colonies and other countries on the periphery of the industrial world lacked such infrastructure. Consequently, electricity had to discover viable directions of flow and create from scratch its sources of demand. On the one hand, electrification in the colonies actually took off straight from the third and fourth stages that Hughes assigned to electrical systems. On the other hand, the electric grid had to search for direction in the absence of the relatively obvious sources of demand that existed in parts of Europe and the United States.

Perhaps it is no coincidence that the few studies that consider electrification in former colonies tend to view the process through the prism

of identity politics. Historian Moses Chikowero, noting the lack of research on the history of electricity in Africa, has studied the electrification of Bulawayo in colonial Zimbabwe (Rhodesia) from 1894 to 1939. Directly linking the process to “power politics,” he shows that electrification was racially based and served the white settler community while excluding Africans (Chikowero 2007). And Rao and Lourdasamy, looking at electrification in the Madras Presidency of colonial India from 1900 to 1947, show that linguistics-based regional politics—not merely techno-geographical considerations—led to the creation of two separate electrical grids (Rao and Lourdasamy 2010).

The studies of Rao and Lourdasamy and Chikowero swiftly move from the technical to the political aspects of electrification. Both presuppose already stable and identifiable ethnic or racial groups that used electricity to further their goals and ends. This book diverts from this line of reasoning and insists on avoiding a categorical distinction between the technical and the political. Specifically, it does not account for electrification in terms of already established power politics and already consolidated national movements (i.e., Jewish-Zionists and Arab-Palestinians) pitted against each other. Rather, the purpose here is to explore how electrification “makes politics” rather than merely transmits it—how electrification participates in the formation of distinct ethno-national groups rather than simply reflecting it. This distinction is subtle yet crucial, and it requires further elaboration on the logic of inquiry.

Let us pose two questions: Is electrification only a technical process of sending electric energy from one point to another? Or is it also one of the many means by which dominant groups (economic elites, ruling classes, ethnic groups, etc.) enhance their power and consolidate their superiority? In conceptual terms, are we to treat the wires that transport electricity to various contact points as intermediaries or as mediators? As first explained by Bruno Latour, an intermediary “transports meaning or force without transformation: defining its inputs is enough to define its outputs.” Mediators, on the other hand, “transform, translate, distort, and modify the meaning or the elements they are supposed to carry”; “their input is never a good predictor of their output” (Latour 2005: 39).

Let us now reconsider the two questions. With this terminology in mind, it may be plausibly argued that *both* tacitly presuppose that electric

wires function as intermediaries. A positive answer to the first question is almost trivial. Once the “war of currents” was decided, the whole point about the flow of (alternating) electric current became the fact that it remained stable throughout its long-distance circulation.<sup>3</sup> Knowing the input of electricity at the source (the generating facility) accurately predicts the output at the other ends of the grid.<sup>4</sup> A positive answer to the second question is less trivial, but if such an answer is chosen, it also treats electrical wires as sociologically neutral; electric wiring is only a way to consolidate a social force that is already there. In this sense, the electric grid does not matter much; just like other machines, procedures, rituals, or even parliamentary politics, electric wires are just a medium for transmitting—embedding in electric current—the force of some social group (a nation, a class, a criminal organization, etc.) from one location to another or from one position to another.

The path of the present study leads elsewhere. It suggests that electrification—specifically, the concrete material infrastructure that enables it—deploys numerous mediators. The political and economic circumstances behind it are not necessarily a good predictor of outcomes. The process of electrification can be neither reduced to its technical elements nor fully accounted for in terms of already existing political, cultural, or economic factors that determine its nature and scope. And just as electrification cannot be decomposed into its distinct political and technical aspects (i.e., science and society), so it cannot be treated as having only “social origins and effects” without being treated as “social” in and of itself.

The laying of a grid does something more than transmit electricity by connecting wires to a source of power. It does more than assemble a material infrastructure. In fact, it connects sketches, diagrams, maps, and contracts to lamps, transformers, poles, and current meters. It brings together investors, entrepreneurs, electricians, engineers, lawyers, government officials, statisticians, and expert advisers. It welds laws and regulations to commercial investments and political aspirations. It generates and affirms “identifiable social networks” (Granovetter and McGuire 1998: 148). It creates areas of coverage that translate into separate regions. In these ways, the grid is a maker of groups and a generator of political and economic difference among groups and individuals.

The study of an evolving grid should also be a good way to connect otherwise seemingly unrelated objects of study. Studying “technopolitics” in Egypt, Timothy Mitchell observes: “There are studies of military tactics, irrigation methods, Anglo-Egyptian relations, hydraulic engineering, parasites, the sugar industry, and peasants. But there are no accounts that take seriously how these elements interact” (2002: 27). Their heterogeneity, he writes, seems to resist explanation, and this resistance in turn “may have something to do with the mixing of natural and social worlds” (2002: 27), with each subject area seemingly locked into a separate science. I treat the electric grid and its dynamics of growth as a social assemblage also because it provides an opportunity to bring together some seemingly unrelated issues such as ethno-national relations, irrigation methods, municipal governance, colonial rule, orange groves, group formation, and railway networks.

The grid, in other words, cannot be understood only in terms of the context within which it is made possible. The method of inquiry that I propose here does not assign “context” a determining role in accounting for the general direction or order of events. The conceptualization of context as container within which things happen is replaced here with an imagery of a “flattened topography” (Latour 2005: 174). The unlevelled landscape of concrete actors embedded in a general frame (i.e., big and small, high and low) is transformed into a terrain of equals. This method of inquiry does not ignore “context.” Rather, it traces the actions and movements that link the sites of big and small so as to make them commensurable: if context matters, let it make itself present in and through these movements.

In studying grids, one direction follows the premise that “every new technology is a social construction and the terms of its adoption are culturally determined” (Nye 1990: 381). In methodological terms, this direction includes the experience and perspective of users in accounting for the spread of electricity and the expansion of grids. Nye shows that electricity was initially introduced as a phenomenon of the urban public sphere and was perceived as a spectacle of modernity in theaters, fairs, and newly electrified streets (on the distinction between “lighting of festivity” and “lighting of order,” see Schivelbusch 1995: 137 and Chapter 3

in this book). Kline shows that the extension of electricity from the city to the countryside, presumably introducing urban modernization to rural areas, led to a complex cultural dialogue between urban and rural people. Rather than unambiguously embracing these hallmarks of progress, farmers resisted, modified, selectively used, and assimilated the new technology “into existing social patterns” (2000: 269).

Both Nye and Kline, then, deploy a user-centered approach to show that cultural factors influenced the reception of electrical power in ways that overrode utilitarian considerations.<sup>5</sup> They find that, at least in its early phase but sometimes extending well into the 1930s and 1940s, the direction and shape of the grid widened the gap between rich and poor and between urban and rural. So the grid “does” something, and the sociology offered in this study traces the way things become attached and connected and, in the process, produce categorical and epistemological differences and distinctions.

The method of inquiry adopted in this book concerns itself with tracing the expansion of the electric grid from the point of view of electric wires and poles: What were the directions in which electric current flowed? Who was wired? What was connected? Following the wires, various chapters of this book shed light on the ways in which electrification marked, affirmed, and produced a variety of social differences: between Arabs and Jews, between urban and rural, between private and public, between state and market, and between industry and agriculture as components of an “economy.”

The book follows in the footsteps of, and uses some tools made available by, Latour’s “sociology of associations” (2005: 7). The underlying theoretical principle at work here is that no such autonomous domain that can be properly labeled “social” exists distinct from other domains (political, economic, technological, etc.) and that no such thing as a “social context” exists as a hovering universe that may explain—more or less successfully—various presumably “nonsocial” affairs or entities (e.g., a technological development, a mathematical formula, an earthquake). The “social,” as Latour articulates it, is “a trail of associations between heterogeneous elements” and it is “what is glued together by many other types of connectors” (2005: 5).