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Princeton and Oxford, 2019, Folch, C., Water Alternatives,**

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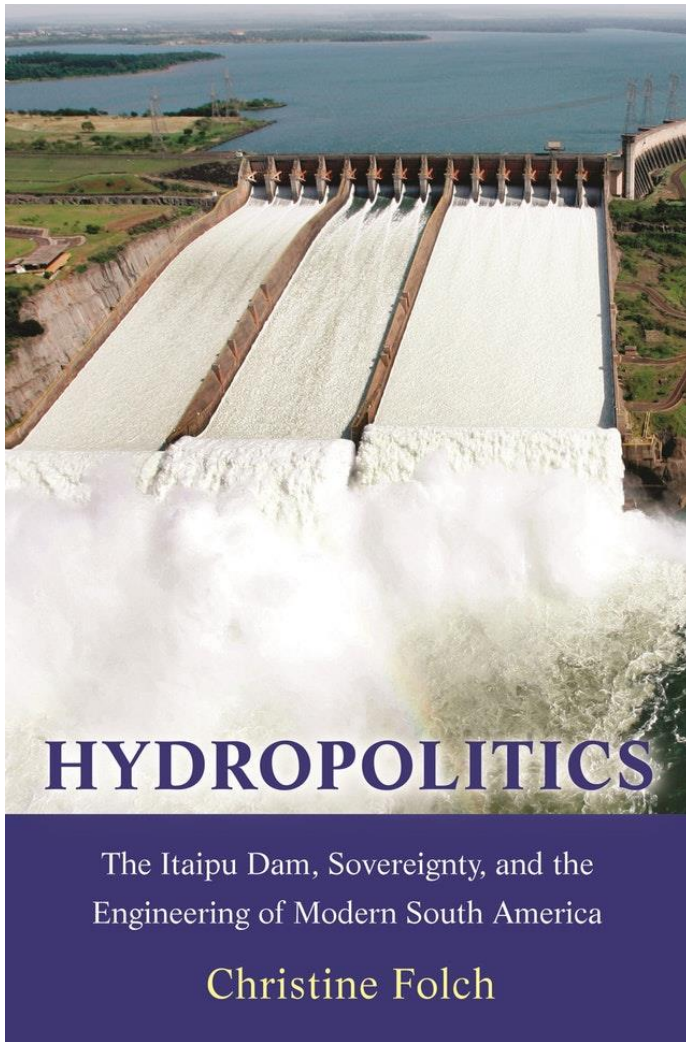
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Folch, C. 2019. *Hydropolitics. The Itaipu Dam, sovereignty, and the engineering of modern south America*. Princeton and Oxford: Princeton University Press.

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Based on in-depth, ethnographic fieldwork conducted from 2007 to 2010 (with follow-up visits in 2013, 2016 and 2017), this well-researched book traces the complex 'hydropolitics' of the Itaipú dam, the binational giant that straddles the Parana River and is co-owned by the Paraguayan and Brazilian public utilities, ANDE and Eletrobras. By framing her book as research in hydropolitics, the author aims to uncover the specific political economy stemming from an industrialization and electrification powered by water, rather than fossil fuels (p. 4). In so doing, she echoes many national monographies that have traced the long-term effects of constructing (and operating) large dams on state structures and state-society relations. Curiously, many of these contemporary works (e.g. Erik Swyngedouw's on Spain, Harry Verhoeven's on Sudan, or Ahmet Conker's on Turkey) are not mentioned,. The notion of hydrocracy is not discussed either, even though Itaipú's Executive Directorate appears to fit the definition, and the author emphasizes her interest in "hydroelectric statecraft" in general (p. 21).

To explore this example of hydropolitics, the book is neatly organized in six chapters. The introduction brings home the magnitude of Itaipú dam, the world's largest producer of renewable energy. Its 20 turbines have a capacity of 14,000 megawatts, "capable of

singlehandedly powering 20% of Brazil's total electricity needs, or seven Paraguays" (p. 12). To construct it, a total workforce of 35,000 labored from 1975 to 1991, 146 workers perished during the endeavour. The author briefly situates the dam in the history of Paraguay, and introduces her political ecological approach based on the premise that "our relationship to the environment is a form of cultural production which, in turn, inflects political, economic and social structures". Along the way, many "densely packed claims" are made by the author, as she herself acknowledges (p. 4). They alternate -at times somewhat dizzily- with many key facts, figures and sweeping historical narratives.

Chapter 1, 'Current', explores how the dam was shaped by, and how it subsequently transformed, the way national sovereignty is understood and exercised in Paraguay. It describes the making of 'Brazilian' and 'Paraguayan' megawatts, even though the dam is owned in condominium -that is, indivisibly- and even though the flow of electric charge is obviously generated by the same water in the same river at the same dam (p. 34). Thus, for example, the directorate drew a line of concrete in the middle of the Parana river, placing all 'Paraguayan' turbines west of the line and 'Brazilian' turbines east of it (even though Paraguay still only uses two turbines' worth of electricity, the excess being sold to Brazil).. The chapter traces with great care and precision the ongoing dialectics between binationality and sovereignty, the former heightening anxieties around the second.

Chapter 2, 'Currency', describes the complex process culminating in the tariff the Itaipú condominium charges both ANDE (the utility fully owned by the Paraguayan State) and Eletrobras (the Brazilian utility that was partly privatized in 1995, as a minority set of shares was made publicly available). Confusion reigns as ANDE and Eletrobras are also, simultaneously, co-owners of the dam, so that they basically sell electricity to themselves. The author describes the overlapping of different revenue streams, each with its own set of justifications.. Technicalities abound, inescapably, although the presentation is sometimes made harder to follow as it is regularly interspersed with highly theoretical developments (such as the claim that "rather than thinking of price as the result of strict numerical formulas, grammatical thinking allows us to apprehend the social constraints, the "mathematical and moral principles" of permitted intensities among variables -p. 72). Overall, however, the chapter powerfully demonstrates that far from being determined by market mechanisms, prices are structured by government prerogatives at the explicit behest of political projects (p. 73).

Chapter 3, 'Renegotiating integration', follows the renegotiation of the binational treaty in the wake of the 2008 election, in Paraguay, of the left government of -former bishop- Fernando Lugo. On the campaign trail, Lugo had pledged to recover 'hydroelectric sovereignty' (gaining full freedom for Paraguay to access and use its half of energy as it wishes) and obtain a 'fair price' for the megawatt hours sold to Brazil. As such, the author closely traces the unfolding of the negotiation between November 2008 and July 2009, when a joint declaration was finally signed between Lugo and Lula, the Brazilian president. Here the author shows the simultaneous operation of two groups of Paraguayan actors, with different negotiation strategies, political ideologies and professional expertise. While the Commission on Hydroelectric binational entities (Spanish acronym CEBH), part of the Paraguayan Ministry of

Foreign Relations, did not hesitate to confront Brazilian diplomats and organize mass demonstrations near the border, the more technocratic team at the Executive Directorate of Itaipú tried to woo Brazilian business actors, Brazilian representatives and the parliament of Mercosur (Parlasur). All in all, the author shows that the two repertoires created a productive tension which, coupled with Lula's fundamental receptiveness to Paraguayan grievances, enabled the signing of the joint declaration. The latter ratified an additional US\$240 million per year injected into the Paraguayan treasury, in compensation for the excess energy ceded to Brazil. The author shows how this whole historical sequence was only one iteration of the long-standing anxiety fuelled by the asymmetrical relationship with Brazil.

Chapter 4, 'Debt', delves into the dynamics of Itaipú's cumulative debt and its political ramifications. One of the first financial decisions taken was that, although the dam was equally co-owned by Brazil and Paraguay, Brazil alone, with its much larger economy, would be responsible for securing all additional funding for the dam, as well as for providing all the guarantees and collateral. As soon as 1975, Eletrobras began to loan money directly to Itaipú itself to complete construction, in the midst of a global credit contraction. However, when energy sales began in 1985, the energy tariff was set below the minimum needed to cover the operating costs. Between 1974 and 2009, therefore, the dam had contracted a debt –mostly to Eletrobras- of some \$27 billion,. The debt was interpreted in strikingly different ways. It was deemed mostly illegitimate by the CEBH, as a manifestation of Brazilian imperialism. Meanwhile, Brazilian government officials, shocked by this assertion, argued that Brazil had been the bearer of risk (p. 147). The controversy was only heightened by the numerous technicalities and opacities surrounding the mechanics of compound interest. The chapter brings out the moral dimension of money and debt, as financial obligations are interpreted according to notions of risk, effort and decency.

Chapter 5, 'neoextractivist futures', analyzes competing visions of hydroelectric-led development. The Lugo campaign had repoliticized the issue of how to best use the royalties and ceded energy payments from Itaipú, openly criticizing the personalist logics and party loyalty that had marred the Colorado administrations prior to Lugo. The author traces the disagreements between the leftist activists in the Hydroelectric Commission and the liberal technocrats in the Itaipú Executive Directorate. The former wanted to direct all revenues to a special Fund that would allocate it mostly to the development of infrastructure, the construction of low-income housing and the "development of the productive sector". Its priority was to stop allocating monies to the recurring expenses of municipalities, which, not surprisingly, was loudly contested by the municipal governments (and probably also by a large proportion of the population) who needed this money to balance their budget. On the other hand, the Itaipú technocrats wanted to transform ANDE from a mere producer of energy sold to Brazil into an international electricity firm, with the financial and structural wherewithal to compete on the Brazilian market. Beyond their opposition, both projects ignored the environment and human rights. Neither of them was adopted, for although a special Fund was created, it focused almost exclusively on redistribution to short-term projects or direct cash transfers.

The final chapter, 'Ecoterritorial turns', reflects on the political rescaling induced by Itaipú. It touches on many topics including the global shift towards the legal recognition of rivers, mountains and nature as persons, the promise of energy integration at the continental level and its tension with national sovereignty, the memory of imperialism, the future of the Anthropocene ... As such, it is the least focused and therefore the least convincing chapter of the book.

Overall, this book convincingly brings out the main 'hydrostate effects' of Itaipú. In the long run, the dam has clearly strengthened the governing capacity of the Paraguayan State and increased the power of both its technocratic and political elites, especially as, much like oil, hydroelectricity operates in the absence of large concentrations of unskilled workers who might be the cause of disruption.

Another recurring and valuable theme of the book is the complex mixture of 'market-driven and fiat-based' accumulation strategies that surround Itaipú. In fact, the money that is made out of the dam is mostly obtained by administrative declarations, not a market. It leads the author to reflect on "how a patchwork of financial-legal exceptions, some neoliberalized, others not, buttress the global capitalist market". Many more insights are mentioned in passing, for instance, the way binationality has shielded the dam from privatization, or the "long-standing pattern in Paraguay for the political opposition to use technical assessment of hydroelectric projects as an anti-political, non-partisan way to obliquely challenge the regime". They provide interesting avenues for future research.

Two weaknesses should be mentioned, however. The first, which is also the most significant, is the narrow focus of the book on a sub-set of Paraguayan politics. The author did almost her entire fieldwork in Paraguay, with only occasional interviews conducted in Brazil. As such, the title of the book is misleading as the book really only concerns the effects of Itaipú on Paraguayan politics. This may be justified from a practical point of view: as she acknowledges in her introduction, her fieldwork benefitted from a window of opportunity provided by Lugo's presidency that triggered a push toward transparency in Itaipú, making financial documents publicly available to an unprecedented degree, never repeated. However, it is hard not to regret this asymmetry in the case of a binational dam, and an overall reflection in which binationality looms so large. The dam provided an opportunity to trace and compare the effects of one piece of infrastructure on two different polities. A better grasp of Brazilian politics would also have been useful to truly understand the dynamics of the renegotiation of the treaty. Beyond that, however, and perhaps even more problematically, the grasp of Paraguayan politics is quite narrow even on its own terms: it mostly focuses on the Itaipú Directorate and the CEBH, while the broader politics fostered by Itaipú are mostly illustrated by a few press excerpts. Apparently no systematic research was conducted on how the Colorado party, business interests, the Paraguayan [l]campesino[l] movement and other social organizations relate to Itaipu. Historically, references to the politics of Itaipú before 2008 is also cursory, which is regrettable as the 'old politics' apparently proved remarkably

resilient. A more detailed account of the Colorado Party as a vehicle to secure construction contracts and appointments to high-earning positions would have been welcome, as would have been a more detailed description of the often-mentioned (but little described) "barons of Itaipú".

The second weakness is more theoretical and therefore more debatable. It is likely that a reader who is not already convinced by the distributed agency postulated by science and technology studies will remain unconvinced after reading this book. For example, the author asserts that calculation formulas are "important actors" insofar as they "assert equivalences" and "mask discrepancy" (p. 66). But why would having the effect of obscuring discrepancy and producing equivalences be a sufficient attribute of agency? Structuring action is precisely what institutions, as humanly devised constraints, are supposed to do, and it is hard, here, not to see the formula as an ordinary –and certainly very interesting– institution rather than an actor. Is it useful to conflate the creative choices made under uncertainty by human actors with the structuring effect of a formula or a concrete wall? The author herself seems to hesitate, signalling agency at some point (asserting, for example, that "price, as a moral-technoeconomic assemblage, [I]ensured[/I] responsible engineering and patriotism") but apparently backtracking shortly afterwards (considering, p. 66, that "the electricity tariff [I]was used[/I] to recognize and defend national sovereignty and to accomplish various political projects", a formulation more to the liking of this reviewer).

Despite these criticisms, this book is a highly informative and thought-provoking piece of political anthropology. It should be of great interest not only to students of water and energy politics, but also to readers more generally interested in technopolitics and in the role of high-level engineers in contemporary states.