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DANIEL F. DOEPPERS

Lighting a Fire Home Fuel in Manila, 1850–1945

Cities are energy intensive. The forms and sources of urban energy supplies vary in different technological eras, but only occasionally is fuel use examined both historically and geographically. For a long time Manila households remained heavily dependent upon biomass sources. Domestic sources of firewood changed radically over time. As the twentieth century progressed, wood was left as the cooking fuel of the less affluent majority except in times of crisis. New fuels came to be used in more affluent households. Increasingly coal and petroleum products were imported. Considerable coal was turned into cooking gas, and advertising campaigns were used to promote the home use of gas as the “modern” thing.

KEYWORDS: METROPOLITAN MANILA · FIREWOOD · CHARCOAL · COOKING GAS · DEFORESTATION

Cities are energy intensive—even when they are located in the tropics and use no fuel for home heating. The various forms and sources of urban energy supplies vary in different technological eras. It is one of the singularities that, while the historic processes of mass industrialization and urbanization were going on in several mid-latitude countries that possessed important coal resources, tropical countries mostly lacked this critical energy commodity.¹ For a long time the local energy systems used by Manila households remained heavily dependent upon domestic biomass sources, namely, firewood. As the early twentieth century progressed, however, these were left as the cooking fuels of the less affluent majority. Firewood tended to return to more universal status in times of crisis. The Second World War (to say nothing of the later 1970s) was such a crisis.

The changing composition and origins of household energy supplies in the metropolis of Manila is the subject of this article. It forms a part of a larger project in progress on the provisioning of the city from 1850 through 1945, and uses some of the sources developed for that larger project, including, among others, extensive reports of the domestic cargoes arriving in the city by coastal sailing vessel; intensive interrogation of the *contribución industrial* records in the Philippine National Archives (PNA); interviews with a broad sample of ordinary residents who began their urban work lives in the 1930s; and extensive perusal of commercial advertisements. These sources reveal a great deal, but are not continuously available for the period under review. Fuel wood once came from the immediate environs of the city. As natural stocks in nearby areas were used up, source areas were displaced to more distant locales. In the mid-nineteenth century, much of the city's supply came from the mangrove fringe and forest zones around Manila Bay and from numerous places along the Zambales coast. Expanding parts of the former Zambales forest zone and others nearby were converted to cattle grazing and shifting field agriculture. By the 1870s fuel production from Zambales had fallen off and the bulk of the urban supply was now coming from Masbate Island and other locales around the Sibuyan Sea to the south. In the twentieth century the extension of the railway down the length of the southern Luzon peninsula tapped the rich natural forest resources of this zone as well. Roads and trucks further added to the ease of forest exploitation.

In the meantime, new fuels replaced firewood in more affluent households and during good times. Increasingly coal and petroleum products were

imported to support the energy needs of the city. A considerable amount of imported coal was turned into cooking gas. After 1917 most of this cooking gas was manufactured from coke or anthracite and distributed by the Manila Gas Company. The same company launched advertising campaigns designed to promote the use of gas for cooking and water heaters as the clean “modern” thing, part and parcel of having a “modern kitchen.” Much of this campaign was aimed at middle class women. Such substitutions of energy sources might be welcomed for whatever they could have contributed to slowing the rate of deforestation. Ancillary to its main focus, this article makes an incremental contribution to our understanding of Philippine deforestation and the build up of carbon dioxide in the global atmosphere.²

Supplying Manila with Firewood

Food preparation ordinarily requires cooking, and cooking requires fuel supplies. In the nineteenth and early twentieth centuries most people in Manila cooked with firewood. This is no longer the case, as Bensel and Harris (1996a) rightly conclude, but it was for a very long time. The Manila energy system in the mid-nineteenth century was based primarily on biomass sources—fuel wood and charcoal together making up the lion’s share. These were the fuels for cooking, smoking fish, and lime burning in Tondo and Malabon, for pottery and tile firing in nearby Pasig and Makati, and also for brick making. These fuels were augmented by biowastes derived from storm-damaged trees, dead palm fronds, and the wreckage of boats and carpentry waste. At the same time, the transport of provisions to the city was powered by wind, water current, biomass in the form of animal browse, and human energy—until steam navigation and steam railways began to form an appreciable part of the mix, the latter in the 1890s. With these developments the balance of the urban energy system began to change. Coal was imported where a highly concentrated energy source was needed—all the way from Cardiff, Wales, in sailing vessels initially. It made up a small but growing part of the total. Imported kerosene came increasingly to supplant local coconut oil in lighting the homes and streets of affluent residents, and in the twentieth century gasoline was needed to fuel the new automobiles and trucks powered by internal combustion engines.

Considerable use was made of firewood and charcoal in the city as in the country as a whole. Where was it produced and how did it get to the city? Von Thünen’s (1996/1842) classic discussion of the locational pattern

of fuel supply for isolated “eotechnic” towns places firewood firmly in a second “ring” of land use out from the individual town.³ In his calculations, firewood would be produced further away than vegetables and animal feed, whose production constituted a good deal of the inner ring; however, because of its relatively low value per unit, fuel wood could not bear the cost of overland transport from more distant sites—i.e., from a third “ring.” But von Thünen’s assumptions do not fit closely the case of metropolitan Manila, even in the nineteenth century. In the century before the Second World War, little of Manila’s fuel wood was deliberately planted and raised, whether in a long cycle or in short cycle of fast growing woody species as operates around Cebu City today (Remedio and Bensel 1992). In particular, it is not clear what portion of Manila’s supply might have come from the practice of coppicing—harvesting branches without killing the central tree itself. Most fuel wood was then collected from nature. Further, von Thünen posited delivery by ox cart—an energy expensive form of transportation, whereas most of Manila’s biomass fuel was delivered by energy efficient water transport and later by railroad as well.

The *casco* navigation system that brought Manila some of its supply of rice from nearby provinces on a just-in-time basis also delivered prodigious quantities of fuel.⁴ Only a little amount of fuel wood arrived by cart. Vessels using the intracoastal waterways through Bulacan and the route across Laguna de Bay and down the Pasig River provided favored subjects for painters and photographers, but with a few exceptions this flow of energy supplies largely escaped the statistical system. Six large *casco*s loaded with fuel wood were reported during a one-week survey of commerce on the Pasig River in 1853—these may have been generated by clearing for the expansion of coconut stands in the Laguna hills. The following year some 3,600 *talacsanes* of firewood were received in the city through the coastal trade. Hundreds of *talacsanes* arrived from the western Batangas ports of Nasugbu and Calatagan each year—760 in 1862. In 1870 the province of Pampanga alone sent 2,200 *talacsanes* of firewood to the capital. The *talacsan*, or *talaksán*, as a unit of measure then implied something like a cord—firewood cut to one-meter length and stacked in a pile ten feet long and approximately five feet high, or, more generally, an orderly pile. Firewood delivered in this form was known to Tagalog speakers as *bundok* or *kahoy bundok*, implying that it was composed of upland wood rather than mangrove or other coastal species. It also implied that the wood was only crudely split or was unsplit. It was not

destined for ordinary household use without further processing. To Spanish bureaucrats keeping the tally, however, it was all simply *leña*, firewood.⁵

Far greater quantities of fuel wood arrived in the city as *rajas de leña* (from the Spanish *rajar*, to split). *Rajas* were flat lines of a hundred pieces of split firewood. The individual pieces were more or less between 0.8 meter and 1.0 meter in length. In the Tagalog of the day such firewood was known generically as *bakawan*, which implied not only that it was split but also that it was of a mangrove species—*Rhizophora* or something similar. *Bakawan* is also the specific word for mangrove. The wood of coastal mangroves makes excellent fuel wood and charcoal, delivering more heat per unit of volume and weight than most, better even than mid-latitude oak or hickory. A lot of firewood was eventually sold in the city as kindling—*rajitas*, although the term is rarely found in shipping records. This form was finely split for use in household cooking and was generally wholesaled in units of fifty pieces.

In his consideration of the deforestation of Central Luzon, Marshall McLennan (1980) begins with the stripping away of mangroves along the coastal margins of Manila Bay. The fringe of living mangrove holds beach sediments in place from wave action and provides an environment in which numerous aquatic and avian life forms flourish and reproduce. The removal of this fringe along the strand often contributes to the creation of biologically impoverished coastal zones, and to beach erosion as well. Nevertheless, mangroves are useful and valuable as firewood and for the manufacture of slow burning charcoal. The bark of mangroves could have been valuable as a source of tannic acid for processing hides into leather, but little of it was actually put to this use. Mangrove bark was used to give color to *tuba*, an indigenous alcoholic beverage (Bacon and Gana 1909). In addition to being “mined” for firewood, mangroves often occupy and even define areas that can be converted into fishponds. As a result mangroves have been pilaged systematically for private gain and public loss. This loss of mangroves is a tragedy of national proportions in the archipelago (and elsewhere in the tropics). In my experience, one has to go all the way to Puerto Princesa or Bohol to see them in robust condition.

Human exploitation of mangrove wood is certainly of very long standing. In the days before massive population growth, however, it was concentrated demand from urban dwellers that initially tipped the balance beyond the local biological capacity for regeneration. Mangroves were removed from the vicinity of Manila by the middle of the nineteenth century. Tondo

and Malabon people now went to the Bulacan coast to cut mangrove for the firewood trade. Already in 1850 one could see great stores of firewood cut, split, and stacked in coastal Paombong, Bulacan, ready to be transported to the markets of Manila. The inhabitants of adjacent Hagonoy were also engaged heavily in the firewood trade. In both municipalities place-names recall a tradition of charcoal making. Over time the production of bakawan firewood and charcoal in these places seemed to fit in with the emerging local concentration on nipa products. Much of the fuel wood was moved by casco traveling along the intracoastal waterways and through the Canal de la Reina to the commercial heart of the city in Binondo. According to McLennan (1980, 17) the overexploitation of this resource led to an attempt by the Spanish authorities to get replacement mangroves “cultivated” in the coastal zone from Malabon to Bataan. Further away from the city, the commercial exploitation of the coastal mangroves of Pampanga and Bataan began early but reached a high pitch later in the nineteenth century. Overexploitation was rapidly turning the provision of cooking fuel from an “inner” to an “outer” project (Buzeta and Bravo 1850–1851, 2:75, 391–92; Coastal Resource Management Project 1999, 16–17).⁶

Cities are energy intensive. In 1862, when we can begin a regular accounting, arrivals of fuel wood from the outer zone, the provinces lying beyond Manila Bay and Laguna de Bay, amounted to some 3,180,000 rajas, or more than three hundred million pieces—double the receipts of a decade earlier.⁷ Assuming that the population of the city was then something on the order of 200,000, this would work out to more than 1,500 pieces per capita or more than four sticks per capita per day. As with rice, deliveries from the outer zone in that year were approximately adequate to meet the household needs of the city. The many other energy needs in production and processing are accounted for by the uncounted flow from the inner zone. Further, the merchants of Manila may also have been supplying a little fuel wood to places outside the city.

The rich daily record of shipments arriving from the outer zone reveals a great deal about the changing geography of fuel wood supply and therefore of deliberate environmental modification as well. In 1862, 75 percent of the city’s outer zone fuel wood supply in rajas came from the Zambales coast. At that particular moment at least 42 percent of the entire flow originated in the Bolinao Peninsula, later detached from Zambales Province (fig. 1). The concentration in Bolinao might have been even greater, but a large amount

was recorded as coming simply from “Zambales” without giving the specific port of departure. Charcoal came from this same concentrated area. Of 360 kiln-loads of charcoal (*hornados*) delivered to Manila from the outer zone in 1862, 351 came from here. The pueblos of Santa Cruz (Zambales), Bolinao, and Bani were the major charcoal shipping centers. Santa Cruz also sent odd amounts of charcoal in balance pole baskets and larger containers called *batulanes* and *canastos*, respectively. So many small shipping centers are reported from this zone—fourteen—that one may safely conclude that the rajas were cut and the charcoal made in the immediate micro hinterlands of each.

What happened here was a “mining” of “nature’s capital,” as Bill Cronon (1991, 148–51) would put it, in order to seize a commercial opportunity for fuel production within a set of nearby, but outback, locales. It was also a concerted conversion of wooded hilly landscapes into grassy cover for the low-density production of cattle. The commercial logic of both developments—fuel wood and cattle—revolved around the Manila market. This environmental conversion was already underway in the 1810s and 1840s even though Bolinao and the Zambales coast were then still regular targets of southern slave raiders. By the early 1860s the coast was safe from such raids and Manila’s otherwise unmet fuel requirements were growing. In this environment, the Zambales coast emerged as the major source of biomass fuel from the outer zone. Not surprisingly, it also ranked high in the supply of building timber. Both the mangroves and upland species located on slopes near major streams were being stripped at breakneck pace. Almost all of the forest cover of the Bolinao Peninsula had been removed by the end of the nineteenth century (see Burzynski 2002, 168–92; Warren 1982, esp. 426).⁸

Nature’s capital in trees, however, is a readily diminishable resource. Within ten years the geography of the city’s firewood supply had changed dramatically. The primary locus of outer zone provision of fuel wood shifted to the Tayabas isthmus and the island of Masbate (fig. 2). At the same time, the geography of charcoal deliveries hardly changed at all. All of it still came from Zambales-Bolinao, with Bani and Santa Cruz as the leading centers. But from the same zone only 350,000 rajas of firewood arrived in the capital—down from almost 2.4 million in 1862. It is difficult to know to what degree this abrupt total decline may be an artifact of the record. Possibly it was the result of the very troubled Manila-area politics of 1872, the year of the Cavite mutiny and bloody Spanish reprisals. Better to stay home than to

Figure 1. Ordinary firewood shipments to Manila in 1862 (in thousands of *rajas*)

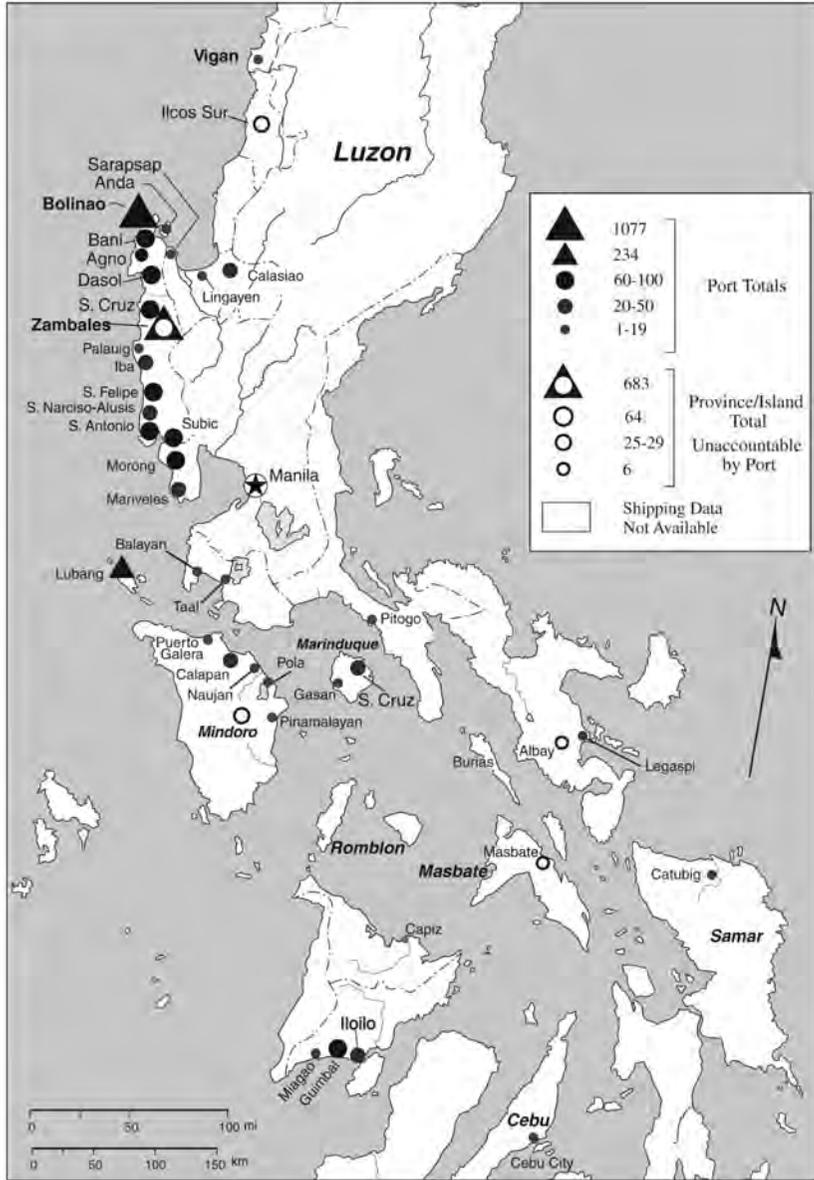


Figure 2. The changing volume of ordinary firewood shipped to Manila, 1862 vs. 1872 (in thousands of *rajas*)



be accused in Manila by friars and other colonial reactionaries. But the calculation of decline receives support from a different perspective. Burzynski (2002) reports that the total numbers of timber shipments arriving in Manila in sample years 1872 and 1875 were down from the level of 1864, and within this diminished commerce the specific flow from Zambales-Bolinao was off even more in both years, not just in the year of the mutiny. It appears the change was real.

Collectively the shores and riversheds around the Sibuyan Sea (west of southern Luzon) were emerging as the major source of both fuel wood and timber for the city, but on a slightly later timetable than the decline in Zambales. Reported overall deliveries of rajas to Manila from the outer zone in 1872 were down more than 40 percent from the level of a decade earlier, but from the Sibuyan Sea they were up eight times over. This zone includes Masbate, Romblon, Marinduque, Tayabas/Quezon, the southeastern ports of Mindoro, and the small islands of Ticao and Burias. Shipments to Manila from these places amounted to almost 1.1 million rajas in 1872 versus only 133,000 a decade earlier. Of this figure, the larger portion came from Masbate and southern frontier Tayabas. Vulnerable to slave raiding through the first half of the nineteenth century, these places were now developing more extensive populations. In Masbate and the small adjacent islands, a free-range cattle industry sprang up. Like Bolinao-Zambales, Masbate and the small islands were stripped of their woody cover and converted to a biologically impoverished grassy landscape for beef cattle—producing poor quality meat that, in any case, was rarely or never tasted by the least affluent half of the Manila population. Shifting our focus to the removal of timber for building construction, we see that the entire Sibuyan basin now dominated the Manila market. Tayabas, Mindoro, and Romblon, in particular, constituted three of the top four provinces in this trade from 1864 through 1881 according to Burzynski (*ibid.*). Timber shipments from Masbate declined after 1864 (to fifth place), and it was replaced in the top four by Marinduque. In other words, the exploitation of Masbate for commercial quantities of fuel wood and timber was intensive, and it peaked in the middle 1860s. Deforestation of the others took longer. In the process Manila was supplied with timber and firewood—and then cattle. Wernstedt and Spencer (1967, 99–104) point to clearing and repeated deliberate burning as the proximate cause of extensive grasslands in the Philippines—burning for game hunting initially and then in order to promote cattle grazing. By the 1950s 74 percent of the

land area of Masbate was in such grasslands—by far the largest percentage of the major islands.⁹

Turning to the social organization of the commerce in fuel wood, there is little sign of concentration in these years. Few names of commercial agents (*consignados*) receiving firewood cargoes in the city stand out. One that does is Victoriano Tan Ungco, a Christian Chinese who handled at least 200,000 rajas arriving in five shipments from Bolinao in 1862. But many names appear—Filipino, Spanish, and a few Chinese, and Tan Ungco's trade represents but a limited portion of the whole. In truth, I know too little about how the enormous trade in fuel wood was conducted. The considerable labor involved in splitting the wood in the sending ports suggests a role for local commercial capital or locally based buyers—in much the same way that laborers were engaged in Pangasinan to pound rice prior to shipment (fig. 3). It is certainly possible that the splitters worked on an advance system. Already in 1861 reports of local prices in Bolinao and Bani routinely list rajas of firewood and baskets of charcoal. Later the *contribución industrial*

Figure 3. Splitting *bakawan* for the urban market. In 1862, more than 300 million pieces were received in Manila by coastal shipping



Source: USNA II, Still Photo Branch, RG 151, FC-84C, box 84

records for the 1890s refer to one Efitacio Tamayo licensed to “speculate” in firewood, charcoal, and nipa in Hagonoy, Bulacan, in 1896 and Nicolas Sanchez of the same province licensed to trade in firewood and nipa in “all the provinces” using four *cascos*. Others were doing the same thing. One was Venancia Narvaez based in San Roque on the Cavite Peninsula. Narvaez was operating a steam-powered sawing establishment that generated scrap and from which she also “speculated” in firewood, nipa shingles, and the like.

How then were Tamayo, Sanchez, Narvaez, and others linked to the urban market? With four *cascos*, Sanchez would have delivered firewood into the heart of the city by waterway and canal. There he could have turned the cargoes over to a wholesale dealer with whom he was connected or undertaken to sell directly to storeowners in smaller wholesale lots. The others

Figure 4. “Unloading Charcoal in Manila”



Source: PJC 1935

could readily have rented *cascos*. Advertisements in *El Comercio* suggest that a lot of the firewood trade during the 1880s and 1890s was conducted by people simply arriving in the port with a cargo of firewood and waiting in the river or at quayside for interested parties to purchase their requirements off the deck without prior arrangement. In 1891 at least three large domestic sailing vessels were engaged in this trade. The master of the *Anita* placed advertisements in April, July, and August offering *rajas de tangal*—a high quality mangrove-like species. Another vessel was selling first quality *rajas* from Masbate. The ads offer to sell at a certain price per thousand (i.e., ten *rajas*) or by the hundred for a higher unit price. In each case the asking price is given “on board.” Wickberg (1965, 104) presents evidence that local speculators in “cordwood and charcoal” included many Chinese. Still the existence of a substantial off-the-deck segment in the market of the 1890s is not a sign of a concentrated or highly organized trade (fig. 4).¹⁰

Burzynski’s (2002, 169–80) intensive study of the timber trade reaches similar conclusions, but points to signs of growing commercial specialization over the period between 1860 and 1880. The signs include a rising percentage of whole cargo arrivals as opposed to partial ones, a growing number of *consignados* handling multiple cargoes rather than just one, and a declining

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percentage of timber cargoes handled by the master of the vessel. He attributes this last change to the growing use of advance purchase orders. The use of such orders in the firewood trade is unknown, but the extensive off-the-deck sales element in the 1890s may indicate that the rationalization of the fuel wood trade lagged behind that of building timber. The off-the-deck trade also seems to indicate that the operators of neighborhood *sari-sari* (variety) stores and firewood retailers could still buy fuel wood in the city directly from the provincial buyer-shipper and bypass a layer of urban wholesalers. Presumably this was more likely in the firewood than the timber trade. Nearly every family used fuel wood everyday, and the turnover of inventory was likely to be rapid, while with timber turnover could be slow and episodic (Burzynski 2002).

In the early twentieth century one could see the emergence of a more regular fuel wood wholesale structure in the city than previously. Newspaper advertisements placed by dealers began to appear. In 1901 the dynamic commodities dealer M. Yap Sioco occasionally listed firewood in his regular wholesale rice advertisements. More particularly, a small ad began to appear every week announcing *rajas-tangal* for sale along with the offer of home delivery. A walking guide identifies the seller as Rafael Cabuo with a lumber and firewood yard on Calle Jolo in Binondo. One now encountered huge well-ordered stacks of firewood in these wholesale yards and also ambulant vendors transporting their stock by balance pole (*pingga*) (fig. 5).¹¹ In addition to Cabuo, the same guide revealed six other firewood dealers and wood yards—four of them concentrated in Santa Cruz along with some saw mills on Gandara and Ezpeleta Streets. At the same time three charcoal dealers were found in Quiapo and Santa Cruz. Whatever the situation before, there was now a regular commercial infrastructure dealing routinely in fuel wood. All three charcoal dealers and at least four of the seven firewood dealers were Chinese. At the retail level, eleven of seventeen Chinese *sari-sari* stores licensed in Paco district in 1896 included a firewood *tienda* at the same address (Witton 1903, 207–69).¹² These data foreshadow patterns to come.

On the production side an account from northern Bataan offers a case in point. At the end of the nineteenth century the livelihood possibilities in Llana Hermosa were concentrated in working with nature's bounty: tapping nipa palms, cutting and splitting mangroves for firewood, and cutting and dragging building timber. The products of these efforts, transported by river and across the bay, were readily saleable in Malabon and Manila and also in Cavite as well as other towns in Bataan. Some of the firewood produced

Figure 5. Ambulant vendor hawking small bundles of fuel wood using a *pingga*, ca. 1910



Source: Cox 1911, fig. 1

in Llana Hermosa was used in Pampanga to fuel small steam-operated sugar mills of the sort that had proliferated in the 1870s and early 1880s (*Libertas* 1900, 1; Paguio 1997, 154). In fact, the scattered sugar mills of the late nineteenth century consumed considerable quantities of firewood.

In the early twentieth century small-scale preparation of firewood, charcoal making, and lumbering continued in Zambales and in the hills north of the Laguna de Bay. Considerable firewood and charcoal continued to arrive in the city by sea. Some of it was even imported via Singapore. But there was now a new domestic element—the Manila-Dagupan Railroad was opening up the interiors of Luzon to much cheaper cargo ton-mile transportation charges and more nearly year-round transport than had been possible before. In many places all this tended to give a boost to timber and firewood extraction. A new sawmill began operation in Tarlac at Capas, supplying Manila with firewood delivered by rail. New railway lines were also opened to the south of the city. Railway cars full of firewood were now unloaded in the

Tutuban yards in the city and the contents taken away for urban delivery by ox-cart. In total, the rail system carried less than 10,000 metric tons of firewood per year during 1910–1915, except for a peak in 1913. Cargo volume then began to climb—presumably because of the impact of the First World War on the price and quantity of imported energy supplies. In extremis, the railway system hauled 44,000 metric tons in 1917 and 71,000 metric tons of firewood in 1918, most of these destined for Manila. Nationally, licensed firewood extraction from public forests reached a peak in 1920. In the course of time, otherwise remote places along the southern rail line went through an extended phase of specializing in the production of firewood and charcoal for the city.¹³

Firewood and Other Fuels

Households also routinely use energy for lighting. As Foreman (1899, 358) puts it in the 1890s, “Every dwelling, rich or poor, consumes a certain amount of [coconut] oil nightly for lighting.” Foreman relates that the simple coconut oil lamps were kept burning all night because of the fear of earthquakes. In practice, this oil was poured into something like a glass and floated on an equal amount of water with a wick suspended from an adjustable prong of tin. Even with the advent of kerosene lanterns, “the vast majority use coconut oil because of the economy.” Oil, or *aceite* in Spanish records, arrived in Manila from many sources, but by the 1890s a whole rural industry was in place in Tayabas-Infanta, Laguna, and eastern Batangas provinces, where coconut palms were raised in growing numbers “solely for the purpose of extracting the oil.” Extraction on an artisanal scale was done by a man operating a side-screw press and using his entire body weight to tighten the turn “nut” on a sack made of matting that contained the coconut pulp. There were 200 of these presses in the parish of Pagsanjan, Laguna, in 1865 and several more in nearby Pila and Lumbang. The oil thus extruded from the coconut pulp was heated and skimmed, cooled, and “sent to market in small, straight-sided kegs, on ponies” carrying a keg slung on each side (*ibid.*; see also Cruikshank 2003, 3:222–23; 4:121–22, 168–69). Copra in sacks also moved to the lake coast ports from the interior in the same manner. Eventually and gradually moving down the social pyramid of affluence, kerosene lanterns (by the 1870s), gaslights, and then electric lights entered the mix of home lighting. In 1910 upscale city retailers advertised *Luz para Provincias*—elegant lanterns that were no longer selling well in the city because those who could

afford such fixtures were now using electric lights. Kerosene continued in local use for decades in part because of its special application in night fishing with the use of bright lanterns. Alcohol began to come on for use as an illuminant when the tax was dropped on the denatured form in 1909. This alcohol was manufactured by local Manila operations such as the Legarda and Tuason's La Rosario distillery and refinery. A more intense stimulus was given by the high cost of shipping during the First World War—favoring locally produced alcohol over imported kerosene.¹⁴

Manila's energy system was modernizing—for cooking as well as lighting, transportation, and other realms of activity. The horses of the *tranvía* system of street railways were replaced by an integrated electric trolley system within a few years of the American takeover. A new and much expanded electric generating utility replaced the limited one put up during the last years of the nineteenth century.¹⁵ The new electricity and transportation company, Meralco, quickly became a colossus of local affairs. Imported coal for powering the generators was delivered by barge on the Pasig River. Initially gas for delivery to homes in the metropolitan area by pipeline was manufactured in Paco from Australian bituminous coal. After 1917 approximately two-thirds of production was so-called water gas made from coke or anthracite. The majority of the stock in the Manila Gas Company came to be owned by an entity known as the Central Public Service Corporation of Chicago.

Gasoline-burning automotive vehicles replaced private carriage horses—though not horse rigs for hire, and the city underwent an explosion of suburban development during the 1920s and 1930s. The suburbanization was driven not just by the well to do, but also by the new bureaucratic middle class. Families of this same class were switching to gas water heaters and oil or gas stoves for cooking. They were encouraged in this shift by the long-term advertising campaign of the Manila Gas Corporation to promote gas as the “modern” fuel, something “modern women” expected. Earlier the electric utility, Meralco, had conducted such an advertising campaign, promoting applications of electricity as the modern affluent style. Doreen Fernandez (1994, 109–11) points to the power of such advertising in locally available foreign magazines, such as the *Ladies Home Journal*, and to the themes of domestic science of the new public education. Clean-burning modern stoves set in a sanitary kitchen were contrasted with the soot-producing traditional pottery *kalan* that held pots above blazing sticks of firewood.¹⁶ Increasingly, the *kalan* was relegated to a “dirty kitchen” area outside or done away with entirely in middle class homes—at least until the Japanese occupation. The famous “Mayon

Stove,” built and sold by C. Tuason and Sons, was an attempt to market an elegant contemporary stove that nevertheless continued to use firewood. Many institutions, hotels, and restaurants also switched to gas, and the number of Manila Gas Company customers increased from fewer than 3,000 in 1913, the first year of operation, to 19,000 in 1930, slipping to approximately 16,000 in 1933–1934 during the depression.¹⁷ Still, a majority of Manila’s households continued to use firewood and charcoal. Even the affluent occasionally used such fuels for roasting fish or meat over an open flame, *ihaw* style.

In the 1930s charcoal was widely employed in small quantities for heating the hand irons used to smooth dresses and also in roasting pigs, roasting maize and chestnuts, and in specialty confectionary baking. Charcoal burns with much less soot than wood. (It would be brought back again to middle class homes for cooking during the fuel and economic crises of the late Marcos era.) Firewood in the form of rajas continued to find use in the local manufacture of soap. *Bundok* firewood, increasingly made of fast growing species, was used in laundries and perhaps in some shops employing steam engines. On the eve of war the Bureau of Forestry established sustained yield, rotationally harvested plantations for use as firewood (Tamesis 1941, 888).¹⁸ Both sorts of fuel wood were widely used in bakeries, candy factories, and some restaurants, especially large *pansiterias*.¹⁹ Finely split rajitas, always primarily used for home cooking, continued to be a mainstay among the less affluent.

In the 1930s firewood came to the city from a broader area than before—Tayabas/Quezon and some thirteen other provinces, including all the ones mentioned above, as well as several in Bicol and even northern Mindanao. Firewood carried by railroad came mainly from along the Southern Main Line in Tayabas from the section of the peninsula south of Lagui-manoc-Padre Burgos to Ragay Gulf. The total in 1939–1940 amounted to 62,000 tons—a third from the municipality of Calauag alone. Most of this was cut on the hilly slopes of the northern side of the peninsula—formerly out of commercial reach when firewood moved exclusively by sea. Rajitas also came from local sources. The city itself was generating considerable scrap wood as a byproduct of the operations of nine sawmills, numerous lumberyards, and many furniture and cabinetmaking shops. This scrap was sold to approximately a hundred urban firewood dealers, who split the wood and tied it in bundles for the retail trade.

Despite the trend toward substitution by more “modern” fuels, the prices of firewood and charcoal were considered sufficiently important to be routinely reported by the Commonwealth’s Bureau of Commerce. These

prices oscillated through a wide range, describing two waves with dramatic peaks at the end of 1934 and again during 1938. The reasons for these price waves are not well understood, but one suspects that they were moving in rough parallel with other fuel prices. Economic historian W. G. Huff (2002) notes: “Both 1934 and 1938 were years of sharp decline in Philippine terms of trade . . . [leading perhaps to] substitution towards these fuels, pushing up their prices.” An expansion in fuel wood shipments to Manila in 1939–1940 was described as a response to consumer attempts to avoid paying the rising cost of imported coal.²⁰

Living Testimony

As contrasted with the modern fuels, wholesale commerce in the traditional fuels was heavily in the hands of Chinese dealers in the 1930s as it was also in the early 1900s, almost completely so in the case of charcoal. Repeatedly the Commonwealth government urged rural Filipino fuel wood producers to bypass the Chinese middlemen by coming to the city to set up direct supplier contracts with particular bakeries and restaurants. Retailing, at the same time, was not limited to Chinese. One small-scale retailer was the wife of Lorenzo Beroña in suburban San Juan del Monte. A widower, Beroña remarried in 1937. He had good employment with the Swiss textile dealers, Zuellig, and as a result was able to afford a lot and small house adjacent to the commercial area of the suburban town. Immediately after their marriage, Mrs. Beroña began to operate a home business selling firewood and charcoal to walk up customers. In a typical arrangement, her business was located in the *silong*, the open ground level of the house below the everyday living space. The fuel supplies came from the Visayas, but the Beroñas got them from a wholesale dealer in Santa Mesa. They continued this home business until the Japanese invasion interrupted the flow of supplies. Thousands of sari-sari stores in the city also retailed little bundles of kindling.

In the difficult context of the Japanese occupation and the subsequent economic chaos of the liberation period, far more urban families than usual turned to fuel wood and charcoal for cooking (fig. 6). Although the restored railroad and some motor vehicles continued to operate between Manila and

Facing page: **Figure 6. Women carrying charcoal to Manila by foot in hard times, 2 July 1945**

Source: USNA II, Still Photo Branch, RG 18–AG–6140, box 69



a number of the Luzon provinces, firewood supplies became difficult. A lack of interisland shipping contributed to the home fuel shortage. In this context, where the Beroñas were forced out of the firewood business, some other families found the same business provided a means to cope with the lack of wartime employment opportunities. Maximo Javier was one of these. A former stevedore and electrician, Javier left that work before the war. His wife, Ester Alfonso, supported the family by sewing athletic uniforms in various sporting goods and lettering shops. In 1942 Javier fell ill with symptoms like tuberculosis, and for most of that year he rested and recovered. Later during the war they sold firewood. "I traveled on foot to the Marikina Valley, got the wood in Calumpang, San Mateo, and finally Montalban and brought it back by pushcart. It was a long way on foot, and there were so many Japanese sentries. Once back in San Juan, I cut the wood into shorter lengths [rajitas] and sold it here for use in clay stoves."²¹

Coal and Kerosene

After the middle of the nineteenth century, coal was imported to the Philippines in growing quantities. The energy compactness of coal was a virtual requirement for the long distance steam vessels then coming into service. Anything less would have left little room for cargo. In 1862 coal came mainly from the British port of Cardiff and from Newcastle and Sydney in Australia. Delivery by sail passage on these routes took four to five months from Cardiff and two months from Australia. Coal was an expensive form of energy, and its import then was entirely handled by well-known trading firms: Russell and Sturgis, Aguirre, Smith Bell, Holiday Wise, Guichard, and the like. The pattern was much the same in the 1870s. By the 1890s most imported coal was coming from Australia, with 10 percent from Japan.²² In the early twentieth century fueling steamships was by far the greatest use for this fuel. Second generation shipping entrepreneur Teodoro Yangco was among those now dealing in this energy form. From domestic sources there was a modest flow of coal from Cebu to Manila in 1862. In 1872 it went unrecorded. Some coal was mined later in the century at Compostela and Danao on Cebu's east coast and sold in Manila, and there were other schemes to mine this important mineral.

Besides fueling vessels, coal was used to power steam engines on land and to generate electricity and coal gas. It fueled the giant pumps of the city's Carriedo water system from the 1880s onward and powered the new

San Miguel Brewery in the 1890s. It also came to be used in affluent homes. In the early twentieth century there were regular newspaper advertisements for home delivery of Australian coal for use in cooking and water heating.²³ Increasingly coal and petroleum products were imported to support the energy needs of the city. Except for a sharp dip during the First World War, total annual coal consumption in the Philippines from 1908 through 1924 was usually in the vicinity of half a million metric tons. From 1912 through 1916 substantially all of this was imported. Faced with the shortages and astronomical prices of the First World War, the legislature authorized the creation of a National Coal Company with the aim of greatly increasing the desultory production in the country. Its stated goals were never reached. Coal was the keystone fuel of the technological age, but unfortunately, by accident of geology, Philippine supplies generally delivered less heat energy per ton than the imported commercial coals. During the early 1920s domestic coal accounted for less than 10 percent of total use. Most of this came from Cebu, and nearly all was of subbituminous quality (Faustino 1927a, b; Foreman 1899, 378–80; Halsema 1991, 134–35, 154–61, 234; Wernstedt and Spencer 1967, 477, 580, 651; *El Comercio* 1895).

Between 1916 and 1941 some thirty different Manila coal dealers were recorded. The most notable now were Madrigal and Company; Ampil and Company; Jose Lim Chumbuque; and the big Japanese firm, Mitsui Busan Kaisha. During this period numerous European commercial organizations gave up their earlier interests in supplying this fuel, and a number of new Chinese and Japanese firms were founded. Creating a monumental conflict of interest, Governor-General Harrison chose Vicente Madrigal, a local ship-owner and, as such, the biggest coal importer during the First World War, as the first president and general manager of the new National Coal Company (Halsema 1991, 154).²⁴ Madrigal was an enterprising entrepreneur who ventured into several lines of business, including cotton textile manufacture.

One of the important coal dealers now was Isaac Ampil, the Filipino entrepreneur and manager behind Ampil and Company (*Graphic* 1932). With Ampil coming from Gagalangin, Tondo, it is not surprising that his business career began as the owner of a small horse and *calesa* stable since there were many such businesses in that neighborhood. By 1900, however, he was working as a “*bodega* checker for a Chinese dealing in coal.” During this time he was able to attend night school after work. By 1908 he was employed as a merchandise checker by the Manila Railroad, the Chinese having closed his coal business. After another round with rental *calesas*, he mobilized his

experience with coal to strike out on his own. Initially he bought small quantities and delivered them to “downtown stores.” In this phase he served “as his own purchaser, salesman, and distributor.” By 1910 he had built this business into Ampil and Company. At this point “he bought launches and went into the coal business big scale” (*ibid.*, 22). Fifteen years later, Ampil branched into manufacture of fertilizer, paints, and lumbang oil.

At the other end of the socioeconomic spectrum, coal shipments were also an important source of employment for local stevedores. Among these was Sixto Manuel, who began his work life in 1925 at age 14 as a *carbonero* and *extra-extra*. He recalls many years of shoveling coal, first loading it on a barge and then loading the coal on overseas ships in the South Harbor. Eventually he became a *kapatas*, the boss of a work gang. While union stevedores unloaded general cargo, Mr. Manuel’s group was limited to handling bulk coal and copra.

Coal supplies were the critical raw material for the city’s household gas distribution system. During the war, because of the lack of replenishment of imported coal supplies, the gas system could not be kept fully operational. Already, by the midpoint of 1942, pressure in the system was usually too low for cooking. Coal was also critical for electric power generation. Coconut oil was substituted, but under the pressure of inadequate fuel resources electricity use fell by two-thirds.

Like coal, kerosene was also used in stoves, but was in greater demand for household lighting. In nearby south China, the use of kerosene came on very rapidly in the early 1880s in replacement of groundnut oil, and by the 1920s and 1930s 80 percent to 90 percent of agrarian households there were using kerosene. The nefarious tactics used by the American Standard Oil Company in taking over the Chinese market for this fuel from the Russian product are well known.²⁵ These involved incurring losses in order to substantially undersell competitors until they gave up and withdrew from the market whereupon the winner, now enjoying monopoly market control, reset prices in order to recoup its tactical losses—buccaneer commerce. It remains to be seen if the same thing was done in the Philippines. Later, in the 1930s, the foreign oil companies exhibited considerable hostility to the rise of a domestic Philippine industry producing alcohol fuel from sugar molasses waste. Switching to internationally traded petroleum fuels brought important practical efficiencies. It also involved getting caught in such webs of skullduggery.

Russia was the leading supplier of kerosene to the Philippines in the early 1890s with more than 40 percent of the market. It was followed by

American companies collectively in second place. M. Genato, located on the Escolta, emphasized both Russian and American brands in frequent consumer advertisements. Later the U. S. completely dominated. In 1894 the Philippines imported nearly three million gallons, a lot of it from the U.S., but only 600,000 came directly. The rest was landed first in Hong Kong and then reexported (Hitchcock 1898, 145–46).²⁶ By the mid-1910s U.S. companies supplied 82 percent of local use directly. In the 1920s Indonesia, then the Dutch East Indies, supplied 15 percent to 18 percent of Philippine kerosene imports. Texaco’s “Carabao” brand kerosene sold in large square cans was well known to consumers in this era. Judged by the sales mix of the Standard-Vacuum Oil Company in the late 1930s, there were then two kinds of economies—those whose petroleum imports were more than 40 percent kerosene (China, Indochina, and Indonesia) and those where diesel or fuel oil was the leading form and kerosene comprised less than 14 percent (Japan and Malaya). The Philippines belonged to the latter group and was moving ahead smartly into the internal-combustion machine age.²⁷

Conclusions

For a long time the local energy system for food preparation in Manila remained heavily dependent upon domestic biomass sources, especially firewood and charcoal. As the twentieth century progressed, however, these were left as the cooking fuels of the less affluent majority in ordinary times, returning as more universal fuels in times of crisis. The Second World War was such a crisis—to say nothing of the later 1970s.

Firewood once came from the immediate environs of the city, from the fringe of mangroves around Manila Bay and from the adjacent hilly interior. As the nearby natural stocks were used up source areas were continuously displaced to more distant places. In the mid-nineteenth century, much of the city’s fuel supply came from the mangrove zone nearby, especially in Bulacan and from numerous small port hinterlands along the Zambales coast. Charcoal, in particular, tended to come from the Bolinao Peninsula. During the 1870s Masbate Island and various other places around the Sibuyan Sea took over much of this supply role. In both Zambales-Bolinao and Masbate the removal of forest cover was followed by cattle grazing for the supply of the Manila beef market. In the twentieth century the extension of the railway down the length of southern Luzon tapped the rich natural forest resources of this zone as well. In the meantime, new fuels competed with and increas-

ingly replaced firewood in more affluent households during good times. These new fuels included coal, both directly and following its conversion into coal gas. This cooking gas was being supplied to almost 20,000 homes on the eve of the Second World War. Coconut oil and kerosene were also variable parts of the mix, but enjoyed greater use for lighting than for cooking.

These changes in fuels also involved changes in how kitchens were organized. Firewood tended to be burned in slender sticks on a *kalan*, a pottery base with prongs supporting a pot. In the twentieth century the electric and gas utility companies and the retailers of stoves and water heaters initiated extensive newspaper and periodical advertising campaigns carrying the message of clean, i.e., nonsmoky, and sanitary kitchens. This message was reinforced in the hands-on method of public school instruction. The affluent were the first to adopt the new cooking ways. But the messages were intended to resonate with the women of secure middle class families as well . . . and they did.

Abbreviations used

CIJ	<i>Commerce and Industry Journal</i>
FPP	<i>Philippines Free Press</i>
PJC	<i>Philippine Journal of Commerce</i>
PJS	<i>Philippine Journal of Science</i>
PNA	Philippine National Archives
USNA	United States National Archives

Notes

The author is happy to recognize the helpful comments of two anonymous reviewers.

- 1 Lewis Mumford (1934/1963) calls this early industrialization "paleotechnic"—a complex of iron, coal, and steam together with the many applications and implications of their use.
- 2 Important as other fuel wood uses were, this article does not take up nonurban causes of deforestation, such as for tobacco curing in the Ilocos.
- 3 An "eotechnic" complex is a technological assemblage utilizing primarily wood, wind, and water variously as material, motive force, and transport medium (Mumford 1934/1963).
- 4 A *casco*, or *kasko*, is a long flat-bottom barge employed in rivers, canals, and other quiet waters, propelled by poling occasionally, assisted by lanteen sails.

- 5 Shipments data from *Resumen 1854 in Comisión Central de Estadística de Filipinas 1855*; Cavada 1876, 162. See also *CIJ* 1926; Reyes 1931; Cox 1911. A *talacsan*, known as *toempoeqan kajoe* in Java, is pictured in Mayer 1897, 2:72.
- 6 On the exploitation and exhaustion of mangroves for fuel wood and charcoal, see the Historical Data Papers (Philippine National Library c1950). The mangrove fringe of Davao City was likewise mined by Japanese woodcutters for the fuel wood supply of that city in the 1920s and 1930s.
- 7 Shipments data are summarized from daily arrivals reported in the "Movimiento Marítima" of the *Gaceta de Manila* for 1862, and from *Resumen 1853 in Comisión Central de Estadística de Filipinas 1855*.
- 8 On the pattern of declining forest cover, see the booklet and map *Decline of the Philippine Forest* (Environmental Science for Social Change 1999). Firewood was the single commercial product coming from Bataan to Manila in the available data for 1818, while firewood and lumber are listed for Zambales (Archivo Francisco Ibero-Oriental 1819). During December 1846, ten of fourteen loads of charcoal arriving in Manila came from Zambales (*La Esperanza, Diario de Manila* 1846).
- 9 Wernstedt and Spencer 1967, 99–104—drawing on San Buenaventura 1958. See also Kummer 1991; Burzynski 2002, 180–85.
- 10 See the *Contribución industrial* records for Bulacan and Cavite in PNA 1893–1896. See also Rodríguez 2002, 122. On prices, see *Gaceta de Manila* 1861. For advertisements, see *El Comercio*: 11 Mar. 1885 and 11 Apr., 6 and 26 July, 16 Aug., and 24 Oct. 1891. Cox (1911, 6) identifies *tangal* as *Ceriops tagal*, but the term was often used generically.
- 11 See the pictures in Cox 1911.
- 12 See advertisements in *El Comercio*, 28 Jan., 4 Oct., 7 Oct.–26 Nov. 1901, and the *Contribución industrial* records for Manila in PNA 1893–1896. See also Wickberg 1965, 104–5.
- 13 See Philippine Islands Bureau of Customs 1903–1904, 84; *Manila Critic* 11 Apr. 1903, 1; *Report of the Philippine Commission* 1904, 671; 1906, 479; Manila Railway Company 1912, 49; 1914, 21–22; 1918, graph following 8; Philippine Islands Bureau of Commerce 1923, 35; Rivera and McMillan 1952, 75; and, for *rajas* from Singapore, see advertisements, *El Comercio*, 24 Feb. and 17 Mar. 1902.
- 14 Both imported kerosene lamps and fuel were advertised in 1875; see *El Comercio*, 26 May 26 and 29 Oct. See also advertisements: *Petroleo in El Resumen*, 12 July 1891; "Luz . . ." in *Razon*, 18 Feb. 1910; *Commerce Reports* 1916, 175, 349. Coconut oil lit the remaining residences of the city following the holocaust of February 1945 (St. George 1945).
- 15 La Electricista was set up in 1892. Ten years later it was said to represent a capital investment of one million pesos (*El Comercio* 1901, 1902).
- 16 See advertisements by the Manila Gas Corporation promoting gas and offering water heaters and stoves on a monthly pay plan: *Philippines Herald*, 2 Dec. 1923; *PPF*, 22 Nov. 1924; *Manila Times*, 11 Dec. 1928; *Tribune*, 27 June and 15 July 1930; *Trabajo*, Mar. 1938, 26. On the Meralco campaign, see "Electricity, No. 37, Economical Ironing" in *Manila Times*, 26 Sept. 1912, 2. On oil and electric stoves, see *PPF*, 13 Feb. 1926 and 5 Jan. 1929; and *Trabajo*, Feb. 1930, 20. On "Americanization," see Fernandez 1994. Of course, cooking outside the main dwelling had been common for generations (Stigand 1893–1894). For one form of *kalan*, see Witt 1918, plate 1.

- 17 See advertisement, "Mabuting Makabayan . . . Pugong Mayon," in *Pagkakaisa*, 23 May 1929, 7; *Sampaguita*, 30 Mar. 1930, 21; and "Mayon smokeless cook stove," in *Graphic*, 10 Dec. 1930; *PPF*, 23 Feb. 1929, 35. On Manila gas production, see *PPF* 1911; *Bulletin* 1922; *Herald* 1926; *American Chamber Commerce Journal* 1934; Nellist 1931, 142.
- 18 An anonymous reviewer believes that nonnative *ipil-ipil*, *Leucaena leucocephala*, now widely used for sustained yield firewood lots, was a postwar introduction.
- 19 Among others, Ramon Arce added a huge "firewood type oven" when he added bread and other baked goods to his "Selecta" brand businesses in the immediate postwar period. Philippine Supreme Court Case G. R. L-14761, 28 Jan. 1961, available at <http://www.lawphil.net/judjuris/juri1961/jan1961>.
- 20 See also Reyes 1931, 16; *CIJ* 1932; Manila Railroad Company 1938, 17; 1939-1940, 17; Commonwealth of the Philippines Department of Labor 1936, 61. Prices were published monthly in the *PJC* and the *CIJ* from 1934 onward.
- 21 Interviews with Lorenzo Beroña, San Juan, 2 Feb. 1985; and Maximo A. Javier and Ester Alfonso, San Juan, 28 Feb. 1985. See *CIJ* 1926.
- 22 For a technical evaluation of Japanese coals, see *Gaceta de Manila* 1888.
- 23 See the frequent advertisements of Michael & Co., Callejon San Gabriel, *Manila Times*: 2 Jan. 1907 and 28 Sept. 1908; and *El Renacimiento*, 11 Sept. 1909.
- 24 On coal dealers and home delivery, see the series *Manila City Directory* (Bulletin Publishing 1904, 1906; Rosenstock Publishing 1911, 1916, 1921; Philippine Education Co. 1926, 1941) and advertisements, e.g., *Manila American*, 1 May 1906; *Yearbook of the Philippine Islands, 1920*, 73.
- 25 On kerosene in China, see Seymour 1883, 676; United Kingdom House of Parliament 1902; Lin 1997, 83. On Standard Oil company tactics, see *Manila American* 1906; Anderson 1975.
- 26 Direct exports from the U.S. to the Philippines passed one million gallons in half the years between 1884 and 1896. See M. Genato advertisements, "Petroleo," in *El Comercio*, 3 Nov. 1894, 1 Dec. 1895, and 14 Jan. 1898. Most Genato advertisements from this era feature Russian "Ancla" and American "Cometa" brands.
- 27 Stanvac was from 1933 until 1962 "a jointly owned subsidiary of the Standard Oil Company (New Jersey), later Exxon, and Socony-Vacuum [Oil Company], later Mobil." It represented "the single largest American direct investment in East and Southeast Asia immediately prior to Pearl Harbor" (Anderson 1975, 203, 204, 220). An early advertisement is for "Vacuum Oil Company" lubricants, *El Comercio*, 8 and 15 Jan 1898. For a more recent breakdown of energy sources, see Bensel and Harriss 1996b.

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