

The 19th-Century Sugar Mill at Indian Church, Belize

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Excavations at the Indian Church mill, carried out as an adjunct to investigation of the ancient Maya site of Lamanai in northern Belize, have combined with archival research to provide a picture of an ill-fated attempt at sugar production in the country, c1860-1875.

The Royal Ontario Museum, Toronto, Canada, has been engaged since 1974 in excavation of the ancient Maya site of Lamanai in the Orange Walk District of Belize, formerly British Honduras (Figure 1). The Maya settlement is distinguished by a very long occupation span that extended from perhaps as early as 1500 B.C. to approximately a century after the construction of a Spanish church at the site cA.D. 1570.¹ The occupation span was further lengthened, in a sense, by the 19th-century British development of a short-lived and not overly successful sugar operation at what had by then come to be known as Indian Church. As an adjunct to the excavation of the Maya site we have undertaken limited testing at the sugar mill, the major portion of which was completed in 1981 under the supervision of Mr. Claude Belanger, who is the proper architect, with the aid of Mr. Brian Marriott, who prepared plans, sections, and elevations of the construction (see Figure 2).

The mill machinery sits atop a high two-unit foundation of carefully constructed brickwork, the mass of the crusher support relieved by three unequal arches that pierce the structure from north to south (Figures 3a and 3b). The foundation, its size dictated by the 15-foot, 11-inch diameter of the flywheel, boasts a dentil-moulded cornice, an elaborate basal moulding, and other features that

bespeak British attention to detail even though the remoteness of the setting allowed few besides the plantation workers to view the structure. At the north (rear) side of the mill lies a complex of conduits, small tanks, and other units, also of brick, while at the east stand features composed partly of brickwork and partly of material probably removed from an ancient Maya structure. The largest of the features is a long, narrow platform with a stair at its north side and a rounded end at the east, its rubble core enclosed by a narrow brick-lined channel or trackway. The presence of a number of lengths of gear chain near the structure may provide a clue to the platform's use, but decipherment of the clue has not yet proved possible.

The crusher is of the three-roller type (Figure 4), with the cane hoist at the south, powered by chain drive from an auxiliary gear fitted to the shaft of the front lower roller spur gear. The waste product (bagasse) from the milling may have been passed down the north side of the mill by means of a pulley system driven from the rear lower roller shaft, but only the drive pulley remains. The juice was caught in a pit beneath the crusher, and was apparently conveyed to the north side of the mill for clarification via a system of pipes or open conduits that led from an opening at the east side of the foundation top. Once clarification was completed, the juice was carried to the large concrete-lined masonry evaporation tank at the mill's west side, probably in cast-iron pipe of which only a few sections remain in place. The rather awkward system for handling the juice, as well as other oddities in the mill's design, probably result from the many modifications carried out during the life of the operation.

The single-cylinder steam-powered beam engine sits west of the crusher (Figures 3a and 3b, and 5). It is fitted with a

D-slide valve, and above the inboard-end valve port there is an elaborate Ionic-columned arch (Figure 6) that appears to have supported the pressure-relief system, which rose vertically through the center of the arch. Speed control seems to have been effected solely by means of a hand-operated dog element at the engine's inboard end that appears to have regulated valve movement. In order to operate the control, a worker would have been forced to stand on the two rails that support the engine and also border the beam. The danger to a worker straddling the area in which the beam was in motion was obviously great, and must have been increased by the absence of any braking system. This would be cause for great concern in today's industrial world, but was probably taken as a matter of course at the Indian Church mill.

In addition to the crusher, the engine provided power for a pair of pumps set at the west side of the foundation top. The pumps were actuated by a rocker-arm set atop another Ionic column; the arm was driven by a massive shaft connected to the main beam. The pumps appear, from their position, to have provided the means of transporting the juice from the evaporation tank to the area where boiling to grain was carried out. This step in the process was presumably at the mill's north side, but as none of the apparatus required for clarification, final boiling, and molasses removal remains, the location and exact nature of these activities is very far from certain. The units at the north side of the mill were invisible prior to excavation, capped by as much as 15 inches of soil with only slight irregularities in the ground surface to indicate the presence

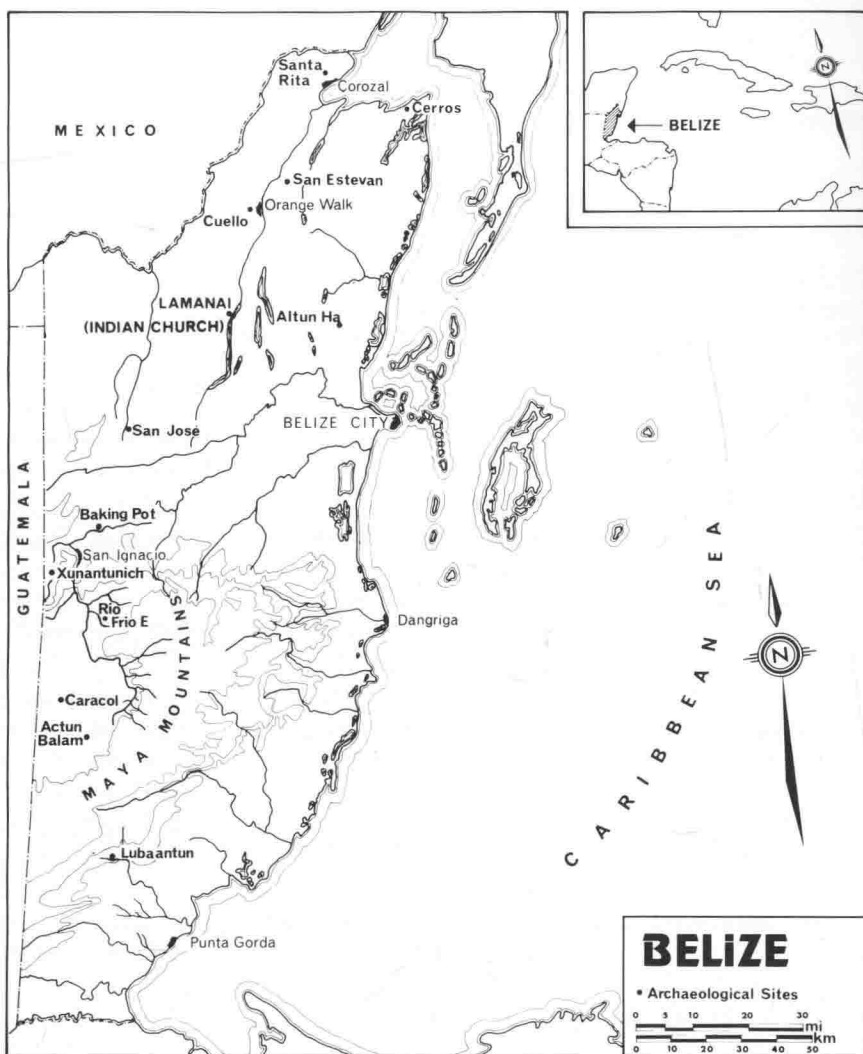


Figure 1. Map of Belize showing the location of Lamanai/Indian Church and other archeological sites.

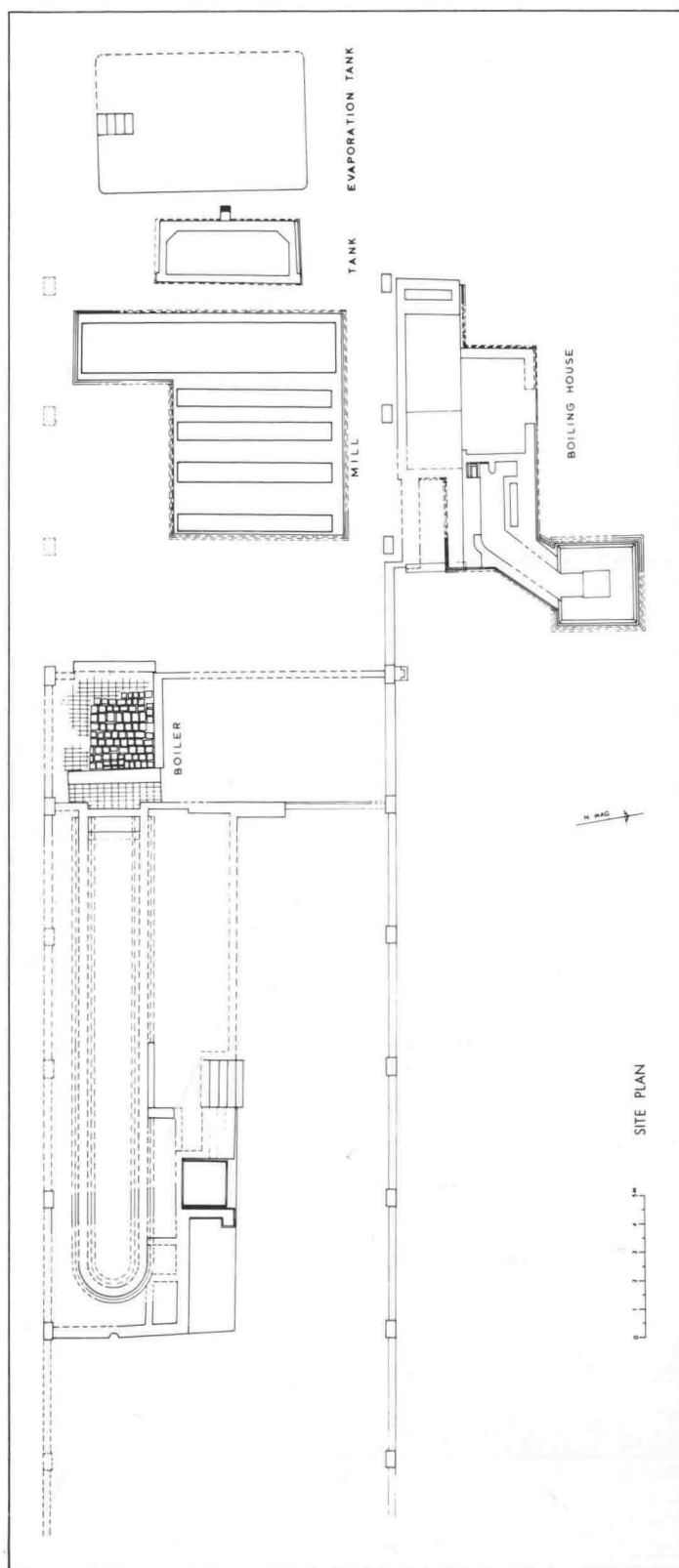


Figure 2. Plan of the mill site. Royal Ontario Museum (hereafter ROM), Claude Belanger, 1982

of buried construction. As the soil cover is considerably greater than the average of nine inches for ancient Maya plaza surfaces abandoned c.A.D. 900, it is probably identifiable as the product of decay of a wooden covering structure, of a form that cannot now be determined.

The location of the steam boiler also remains somewhat uncertain, though the position of the steam supply pipe at its junction with the engine (Figure 5) demonstrates that the boiler stood east of the mill. Excavation in this area revealed a flagstone-surfaced platform that could have served as the boiler foundation, though there are no indications of bolts or other elements required to hold the firebox in place. Work east of the platform (Figure 7) sectioned a large deposit of ash and other material that may strengthen the identification of the feature as the boiler foundation, though the origin of the ash is obviously impossible to determine. The boiler was removed in 1970;

hence the uncertainty regarding its position, as well as its form.

An earlier boiler arrangement is represented by the left and center sections of an iron firebox front found near the northeast corner of the crusher foundation, where they were apparently dumped during the final refitting of the mill. The pieces unfortunately carry no maker's name, but their form and size show that the boiler comprised two externally fired, horizontally mounted tanks with diameters of approximately 46 inches, set atop fireboxes 51 inches high, fitted with large round-topped fuel supply and draft doors at the base and a similar but smaller pair of doors above.

Though small amounts of coal and clinker have been found near the mill and in other areas used during the period of sugar production, we can only hope that common sense led

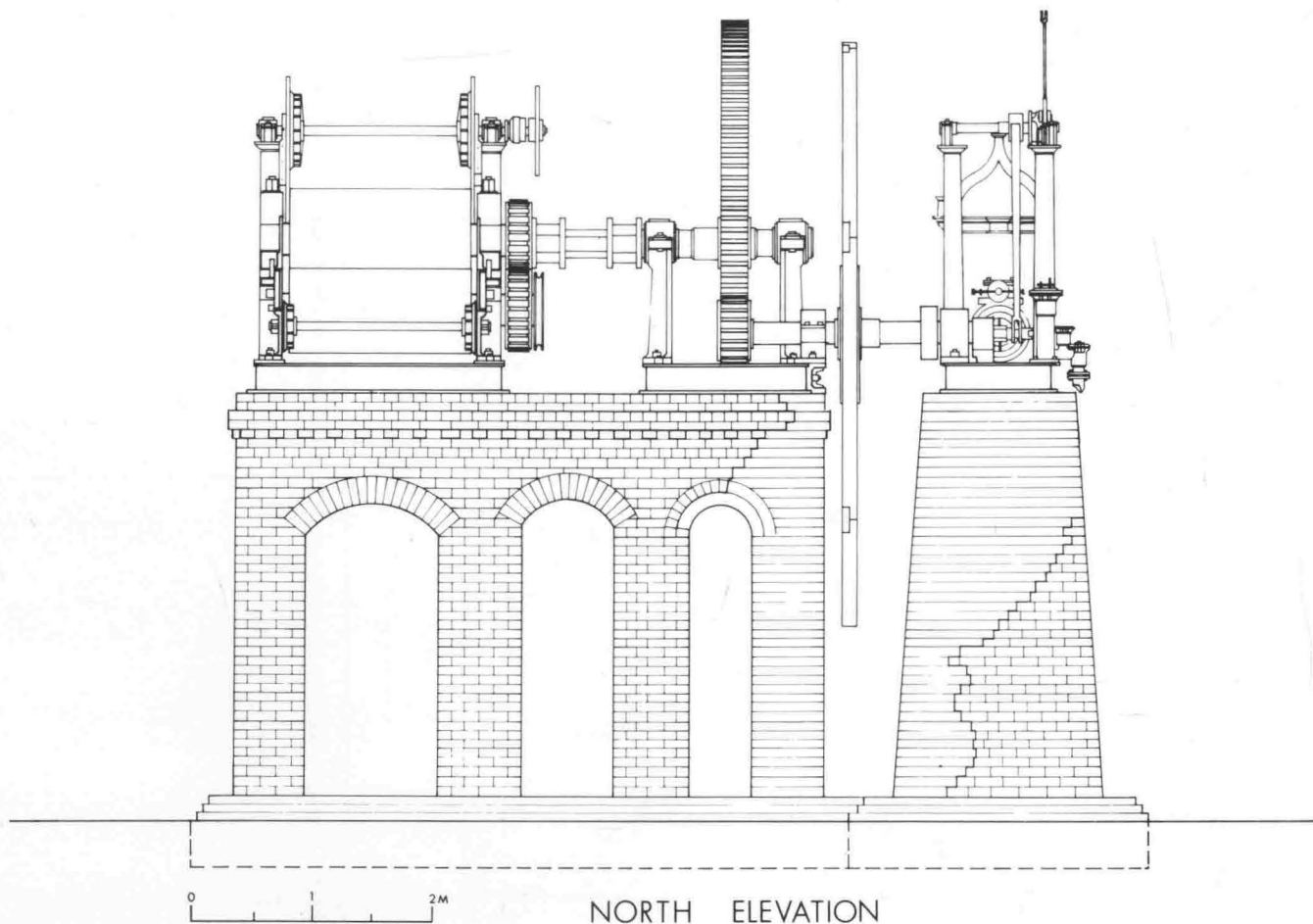


Figure 3a. North elevation of the mill. ROM, Brian Marriott, 1981-1982

the mill's operators to rely on the forest for fuel. Water for the boiler, and possibly also for use in the second crushing of the cane, was available in endless supply from New River Lagoon, a large freshwater lake some 680 yards east of the mill, but neither the means of transporting the water up a moderate gradient to the mill nor those used in moving sugar to the lake for transportation downriver can now be determined.

The mill machinery, the last in a series installed during the short lifespan of the operation, bears the mark "Leeds' Foundry, New Orleans" on both the cane hoist and the relief-valve support above the engine. The latter unit has, in addition, the date "1866" at its center; this is three years prior to installation of the equipment. The design of the engine seems archaic for the late 1860s, and one might first be inclined to see this as a reflection of the well-known British conservatism in matters mechanical. The explana-

tion seems to lie, however, in the history of Leeds' Foundry. Prior to the 1860s the firm, founded in 1825, specialized in sugar mill machinery, but at the outset of the American Civil War the foundry's operation was given over to the production of cannon, which was carried on until the fall of New Orleans.² The collapse of the Confederacy must have temporarily carried the firm's fortunes with it, but the date of the Indian Church machinery shows that Leeds began soon after the war to redevelop the trade it had enjoyed in earlier years. As might be expected, the product Leeds offered initially was little changed from that of the 1850s, and may have proved marketable only to inexperienced operators such as those at Indian Church.

The date of the initial construction at Indian Church is unknown, as the event seems not to have attracted sufficient attention to warrant mention in dispatches or the annual Blue Book reports for British Honduras, now Belize.

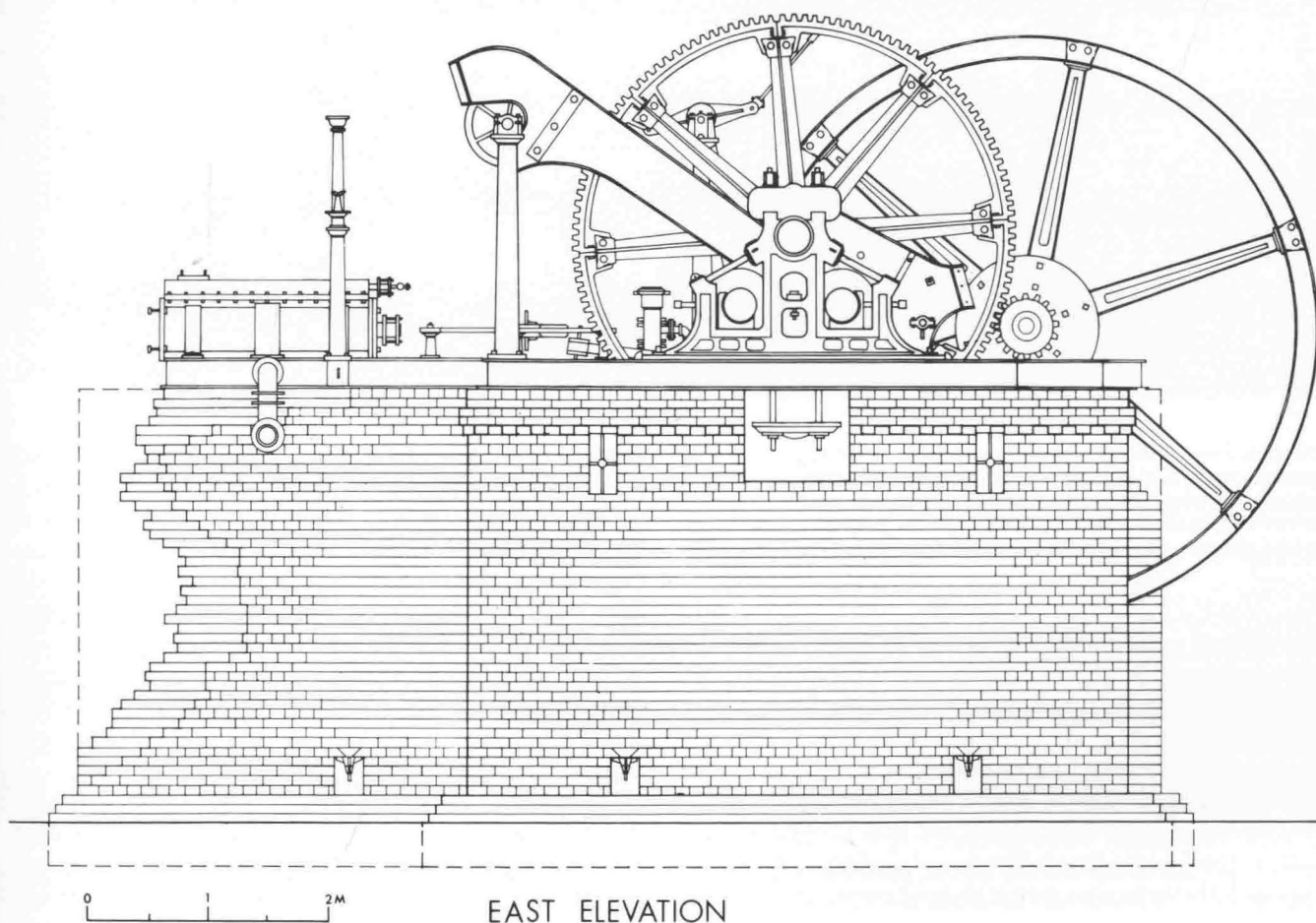


Figure 3b. East elevation of the mill. ROM, Brian Marriott, 1981-1982



Figure 4. View of the mill from the northeast. Note the cornice moulding at left, beneath the crusher. The engine is out of view behind the flywheel, at the right. In the right foreground, an excavator is beginning work on features behind the mill. All photographs by the author, May 1981

The original grant of the Indian Church Work, or plantation, was made in 1837, and the earliest record of sale is dated 1845, but it is not clear whether the latter transaction had directly to do with plans for sugar production.³ The purchaser of the land ultimately became a partner in the firm of Hyde, Hodge & Co., which oversaw the early development of the sugar estate; the firm's holdings were sold in 1864 to the British Honduras Company Ltd., which managed the enterprise during its brief period of intensive production.⁴

A private letter to the Mexican Consul in Belize City dated at Mérida, Yucatán, 31 May 1864, shows that there was a considerable settlement at Indian Church by that time, and the Return for that year mentions cane and corn under cultivation at the community. The dispatch that covers the Blue Book for 1864 shows 1,352 acres in sugar that year, and Indian Church surely represented a significant portion of that acreage.⁵ It is reasonable to assume that sugar production began at the estate some years prior to 1860, but it is not possible to show that any of the existing mill structures are of that date.

There seems to have been almost no time in the mill's short history that was not plagued with difficulties. The owners attempted to solve a shortage of local labor by importing Jamaicans, Barbadians, and the first lot of Chinese immi-



Figure 5. *View of the mill from the southwest, showing the relationship between engine and crusher. Note the steam supply pipe extending to the right of the engine.*

grants, brought out from Amoy in 1865, but despite these steps the Blue Book for that year notes that the advance in sugar growing was less than expected. In the view of government officials, the problems were "... easily accounted for in the absence of all knowledge of sugar cultivation on the part of those originating the movement and their unfortunate trustfulness in persons but little qualified to aid them."⁶ Along with the labor force, 1865 saw the importation of a "... sugar mill and steam engine and another 18 Horse engine with sugar mill, clarifiers, pans &c ..."⁷ This is a clear indication that the sugar industry was gearing up for increased production. Unfortunately there is no way to determine whether one of the mills was destined for Indian Church, rather than for estates farther north or in the southern part of the country, but the change in the mill's ownership in the preceding year seems

likely to have brought with it an attempt to improve production with new machinery.

The Blue Book for 1867 shows sugar first exported in 1862 in the amount of 397,176 pounds, which rose to 1,218,560 pounds by 1867; the total production for the latter year was 868 tons, of which 324 were consumed in the colony, while rum production was 53,714 gallons, of which 48,900 were consumed locally.⁸ The Indian Church mill was presumably a major contributor to these totals, though there is no evidence of rum production at the site. In any case, the role of the estate in the country's development was great enough that by 1866 Indian Church was



Figure 6. Closeup view of the engine from the inboard end. Centered in the beam supported by the two columns, but not visible in this photograph, is the date "1866"; "Leeds Foundry" and "New Orleans" flank the date.

characterized in government reports as one of the important industrial settlements in the northern part of the colony. Yet within a very few years the estate's fortunes were on the wane, and the settlement on its way to extinction.

The estate continued to suffer problems with the Chinese laborers, who were unable to adapt to the climate and died in astounding numbers. Added to this were depredations by the Icaiche or "peaceful" Maya, who raided the settlement on 4 February 1867, killed two men, burned the cooper's shop, the stores, and kitchen, and carried off all movable property.⁹ Indian Church was a military encampment for a time thereafter, but by February of 1868 the garrison had

been withdrawn and life had apparently returned to its normally peaceful state, apart from the high mortality among the workers.

Indian Church was listed in the Blue Book for 1868 as one of ten sugar estates on which steam machinery had been erected, and was shown with an estimated 230 acres in cane. The original machinery had apparently been done away with, as Item 80 in the Blue Book includes the statement that "... on three of these Estates, Caledonia, Indian Church and Seven Hills, new and very powerful steam machinery has been erected within the past 10 months, calculated to be sufficient for at least four times the extent of land yet in cultivation." Despite the prob-

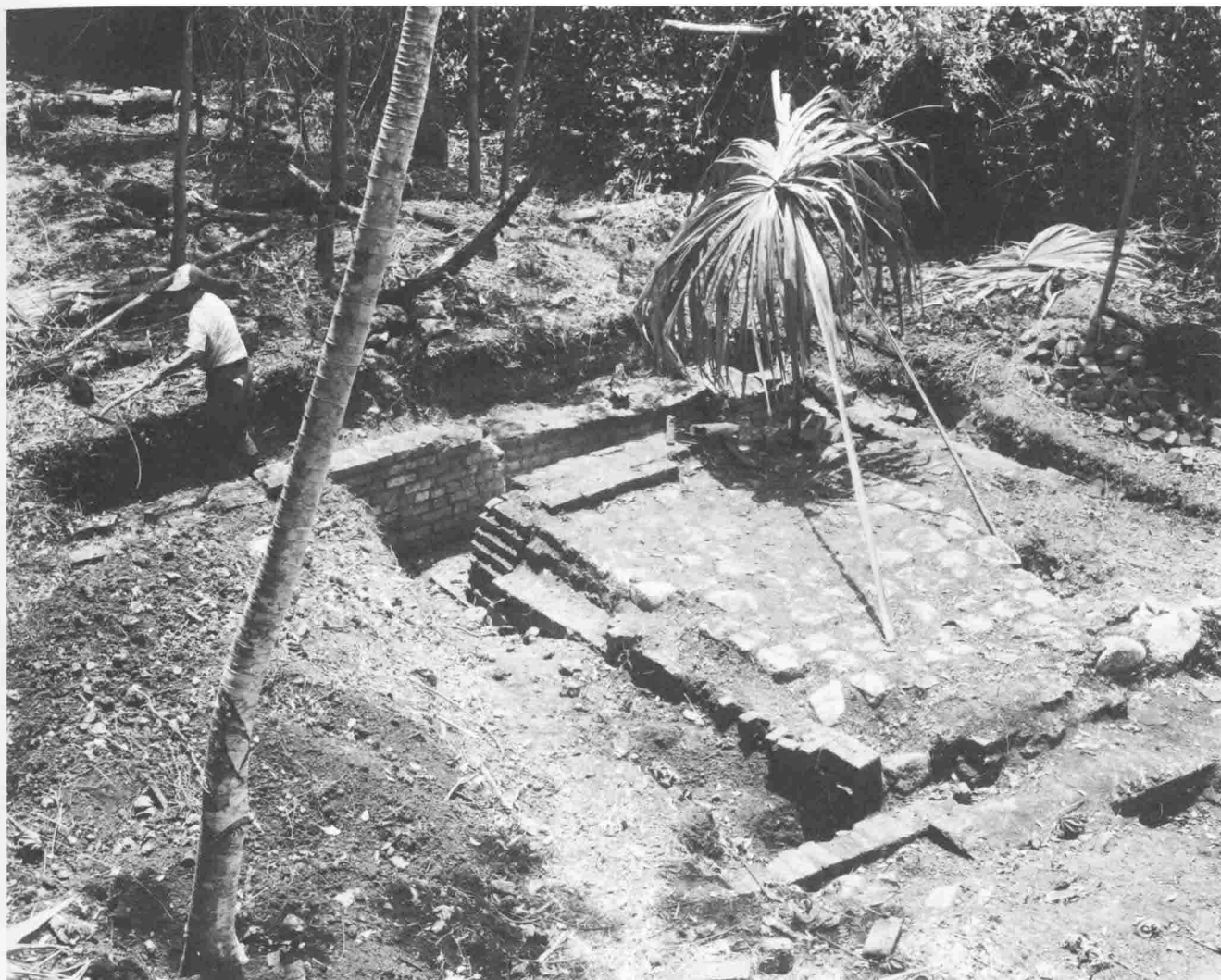


Figure 7. Excavation in progress at the east side of what may be the steam boiler platform, east of the mill.

lems, expansion was obviously still in the minds of the operators of Indian Church in 1868, so much so that the new machinery was supplanted in very short order by the equipment purchased from Leeds' Foundry.

By April of 1869, installation of the machinery now at the site was under way. A dispatch of the 29th of that month, in describing the death of the manager of the British Honduras Company from fever after a 36-hour canoe trip and portage from Indian Church to Belize City, notes that he was "... superintending the erection of some new and powerful machinery which had recently been sent from England for use on the Company's Sugar Estates. . ."¹⁰ National pride must have guided the dispatch-writer's pen,

or else he was unaware that British enterprise was wedded in this case to American industrial design, albeit of an outmoded quality. Installation of the new machinery presumably continued despite the manager's demise, but the equipment unquestionably saw few years of use before the mill's short history came to an end.

The problems that beset Indian Church may have been exacerbated by the antique design of the new machinery, but in truth the final refitting of the mill came at a time when the operation was already in its declining years. A settlement was still in existence at the site in 1870, but after this no mention of the estate appears in Blue Books or dispatches. The success of the beet sugar industry in Europe

brought an end within the decade to any economic attraction that cane sugar production might have had in fledgling operations such as those in Belize, and the Indian Church estate was almost certainly in ruins, first economically and then physically, well before the lands were purchased by the Belize Estate and Produce Company Ltd. in 1883.

Excavations have revealed a huge quantity of discarded ironmongery scattered around the mill's foundations. Included in the scrap piles are a number of items, among them a crusher roller much smaller than those now in place, that must be from the earlier lots of dismantled machinery. In the parts dump are several groups of large spur and bevel gears from which numerous teeth are stripped, a kind of concrete expression of the incompetence that harried the operation. The presence of a large stack of apparently unused pipe atop a brick foundation immediately northeast of the crusher probably identifies the building as a warehouse; here and elsewhere north of the mill are sections of gear chain from the cane hoist, as well as a melange of machine parts not yet identified. The machinery that remains in place is in surprisingly excellent condition, with so little oxidation of surfaces that Roman numeral and punctation markings that served as guides for the assembly of sections of the flywheel and main gear as well as elements of the crusher frame are still clearly visible.

The excavations have also yielded small amounts of domestic refuse at the crusher base and near the apparent boiler foundation. The midden contents include bowl and stem fragments of clay pipes that bear the mark "Roach, London," as well as sherds of blue-on-white earthenware and other ceramics, and a small number of animal bones. Though the mill operators were obviously less than conscientious about cleaning up around the site, the bulk of the midden presumably lies elsewhere, perhaps associated with brick house-foundations and other features recorded between the mill and the lake. Farther north, two Chinese coins, almost certainly evidence of the presence of the Amoy laborers, have been recovered from the surface amidst a scatter of 19th-century ceramics and other refuse, but we have not been able to identify the spot where those unfortunate and largely unwilling participants in Belize's early sugar industry lie buried.

Investigation of the mill, coupled with compilation of documentary evidence pertaining to Indian Church, has thus far given us a general picture of the form and history of the short-lived experiment in sugar production at the estate. We are, however, unhappily conscious that the gaps in our understanding of the 19th-century material are in some cases almost as great as those in our interpretation of the ancient Maya remains. We hope to fill some of the gaps during the 1982 and later seasons through detailed photographic recording of standing and discarded mill machinery, as well as excavation of house foundations, a large cistern, and other mill-associated construction; with this work we should be able to document at least some of the events in the final chapter of the nearly 3,500-year history of Lamanai/Indian Church.

Acknowledgments

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Notes

1. David M. Pendergast, "The Church in the Jungle: The ROM's First Season at Lamanai," *Rotunda* 8, 2 (1975):32-40; and also "Lamanai, Belize: Summary of Excavation Results, 1974-1980," *Journal of Field Archaeology* 8, 1 (1981):29-53.
2. H. Righter, *Standard History of New Orleans, Louisiana* (Chicago: Lewis, 1900), p. 524; and W.A. Albaugh and E.N. Simmons, *Confederate Arms* (New York: Bonanza, 1957), p. 238.
3. Private Records, Vol. 3, Registry Office, Belize City, Belize.
4. *Ibid.*, Vol. 4.
5. Despatches Outwards, 1865 (No. 87, 10 August), National Archives, Belmopan, Belize.
6. *Ibid.*, 1866, no number or date given.
7. *Ibid.*
8. Blue Book for British Honduras, 1867 (R98, No. 101, 19 June 1868), National Archives, Belmopan.
9. Despatches Outwards, 1867 (R91, Nos. 308 and 309, of 4 and 6 February; R92, No. 31, 11 February); and also unnumbered private letter, R.I. Downes to the Acting Colonial Secretary, 7 February, National Archives, Belmopan.
10. *Ibid.*, 1869 (R98, No. 44, 29 April).