

Early Hawaiian Bridges

Robert C. Schmitt

Nobody knows when bridges were first constructed in Hawai'i, but published references go back at least as far as 1825. Visiting Hilo on 13 June of that year, C. S. Stewart recorded the presence of a pioneering foot-bridge over the Wailuku River:

About a hundred yards above the beach, it [the stream] opens into a still deep basin, encircled by high cliffs. Into this basin the whole stream is projected by two cascades, the upper about twenty feet, and the lower about eight feet, both rushing over their respective ledges of rock in unbroken sheets. A rude bridge crosses the stream just above the falls; and it is a favorite amusement of the natives to plunge from it, or from the adjoining rocks, into the rapids, and pass head foremost over both falls, into the lower basin.¹

The Wailuku River bridge must have existed for only a short time, and it was quickly forgotten. Sereno Bishop, born on the Big Island in 1827, later recalled, "There were no bridges in these islands until after 1840."² Titus Coan, the pioneer missionary who settled in Hilo in 1835, wrote, "For many years after our arrival there were no roads, no bridges, and no horses in Hilo," and devoted seven pages of his autobiography to a harrowing recital of the dangers encountered while crossing streams in East Hawai'i.³

Nu'uaniu Stream, which formed the northwestern boundary of early Honolulu, would certainly seem to have been a prime candidate for bridging, but no such feature appears on any available maps prior to the 1840s. Discussing the Duperrey map of 1819, for example, Clark wrote: "At least forty more settlers had forded the bridgeless stream and erected huts on the other side."⁴ Nu'uaniu Stream likewise appears unspanned in the Tabulevitch map of 1818 and Malden map of 1825.⁵

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The first bridge over Nu‘uanu Stream appears to have been one erected on the present Beretania Street right-of-way in 1840. In an article describing “Improvements and Changes in and about Honolulu,” the *Polynesian* reported:

Then we leave Rev. L. Smith’s new church, a neat and large building of adobies, capable of accommodating two thousand persons, and not far from that, to the westward a new and substantial bridge, with a causeway, crossing the river and low ground in that vicinity. Its expense exceeded \$1200, and it has proved of great utility, being a great thoroughfare, and affording a pleasant road for Ewa, instead of the long ride through the water as was formerly the case.⁶

Smith’s church was Kaumakapili, located on Beretania Street between Maunakea Street and Nu‘uanu Avenue.⁷ The Beretania bridge was apparently the first major span in the Islands.

Others quickly followed. In 1845 the first published annual report of the Minister of the Interior noted that “some improvements have been made on the bridges and roads in this and other islands.”⁸ A year later his report stated: “A good road has also been made from Honolulu to Pauoa, also three roads on the Waikiki plain, with arched stone bridges.”⁹

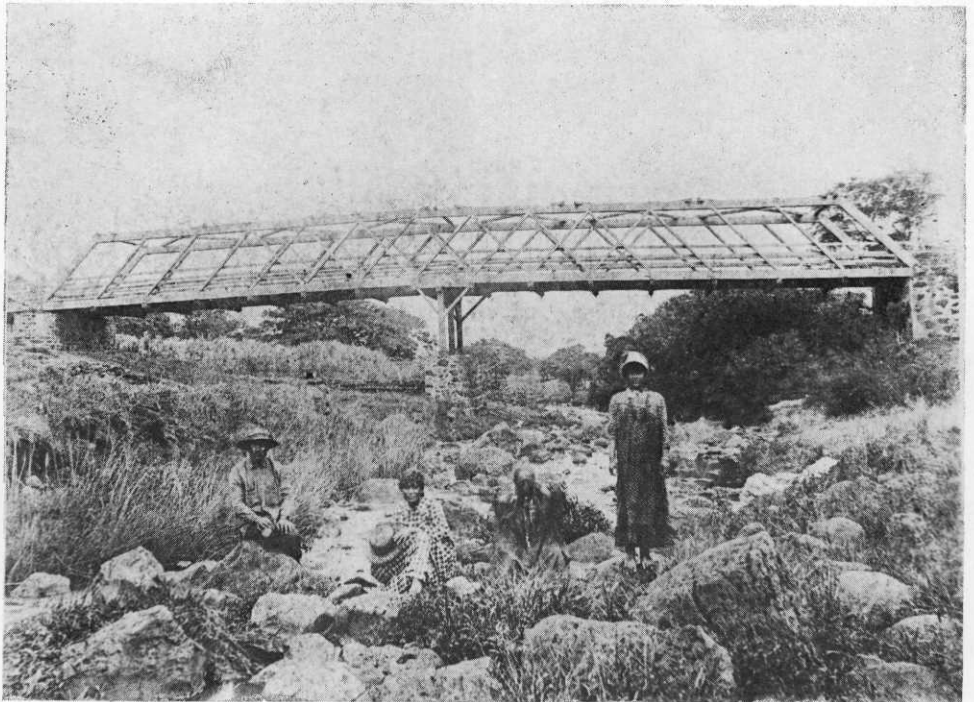
Early bridge builders often relied on funding provided by contributors. In 1829, for example, Stephen Reynolds recorded donating “three dollars to build [a] Bridge over the large Gulch near Allen’s.” In 1840 he “gave John E. Emerson two dollars to pay some expense of a Bridge over the large Gulch near Wai[a]lua—the whole cash expense was subscribed by Residents.” Four months later he contributed “five dollars toward the Bridge begun by Rev. Lowell Smith which the foolish among the foreigners helped to pay for it.”¹⁰

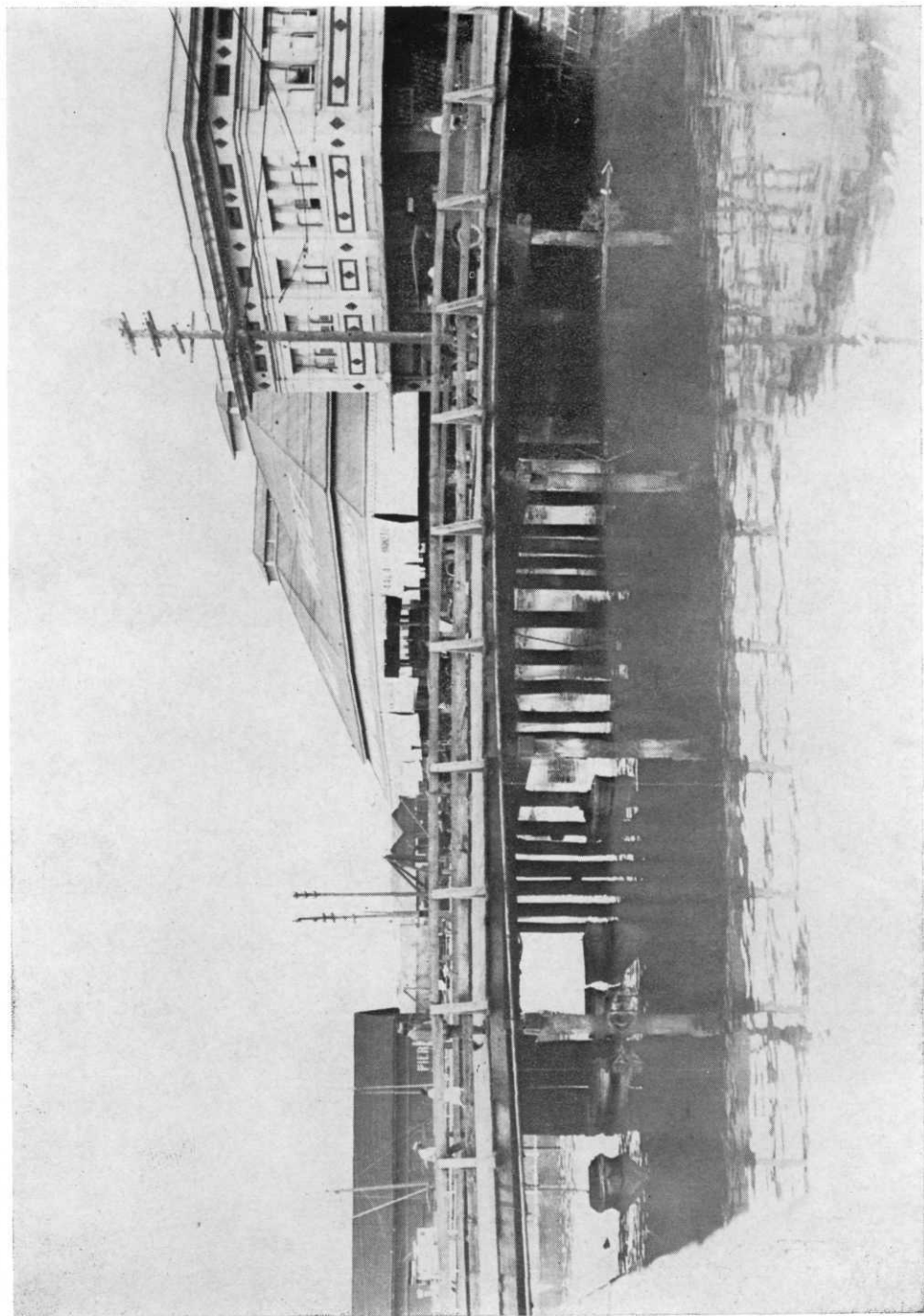
These pioneering bridges were unfortunately vulnerable to floods. On 1 April 1847, for example, heavy storms struck Kaua‘i, and “all the bridges on the island were carried away.”¹¹ Ten days later O‘ahu suffered the same fate:

The rain on Sunday night swelled the streams so as to cause them to carry away the two bridges on the Nuuanu road, with a portion of the embankments, and the two bridges over the stream on the roads to Ewa [that is, King and Beretania Streets]. The water on the upper Nuuanu bridge rose very suddenly to nearly twenty feet above its ordinary level, and carried away the bridge and abutments, leaving not a vestige behind. . . . The new wooden bridge on the upper Ewa road [Beretania] was entirely carried off. . . . The Government are about building two substantial stone arched bridges over the Nuuanu

FIG. 1 (*top*). Covered bridge near Hilo, around 1880. (AH photo.)

FIG. 2 (*bottom*). School Street Bridge over Nu‘uanu Stream, Honolulu, late 19th Century. (AH photo.)





stream, but it will be some time before they can be open to the public, as the stones have to be drawn from the reef.¹²

Another freshet hit Honolulu less than five weeks later, causing further havoc:

On Tuesday afternoon [11 May 1847] Nuuanu stream, during the heavy rain, rose *ten feet in twenty minutes*, by actual measurement, and swept away not only the wooden frame for the stone arch just completed, but the stone abutments also of the upper bridge, Damage, \$300. On Wednesday afternoon, the rain poured down as if a second deluge was at hand. The upper Ewa bridge was seen floating out of the harbor at the rate of about four knots.¹³

Hilo's dangerous Wailuku River was finally spanned again in 1859. On 3 September a 196-foot long suspension bridge near the mouth of the river was opened to the public, thereby making unnecessary the fordings that had previously taken so many lives. Less than seven weeks later, while being crossed by a picnic party of eight or ten persons and their horses, this bridge collapsed; thrown into the stream, the group narrowly averted death from the falling timbers or by drowning.¹⁴

Mark Twain, visiting the Islands in 1866, reported (presumably in jest) that a member of the Legislature "got up and gravely gave notice of a bill to authorize the construction of a suspension bridge from Oahu to Hawaii, a matter of a hundred and fifty miles! He said the natives would prefer it to the inter-island schooners, and they wouldn't suffer from sea-sickness on it."¹⁵

Innovations sporadically appeared. During the 1880s, or thereabouts, at least two covered bridges spanned streams near Hilo (fig. 1).¹⁶ In 1901 the old School Street bridge over Nu'uuanu Stream was replaced by a two-span steel bridge, described as "the first steel bridge erected in this city" (fig. 2).¹⁷

Railroading was introduced to the Islands in 1879, often over rugged terrain requiring extensive trestle construction. Trains of the Hawaiian Railroad Company, for example, rounded 25 curves and crossed 17 bridges in their 20-mile run from Māhukona to Niuli'i. The two largest bridges on the line were about 300 feet long and 45 feet high, and a photograph of one of these trestles, dated 1882, appears to be one of the oldest bridge photos in existence in Hawai'i.¹⁸ Another old photograph, made about the same time, shows a trestle

FIG. 3. King Street Bridge viewed from River Street, Honolulu, 4 March 1924. (AH photo.)

of the 'O'ōkala Plantation Railroad; during the 1920s, a locomotive fell from this trestle into the gulch below.¹⁹

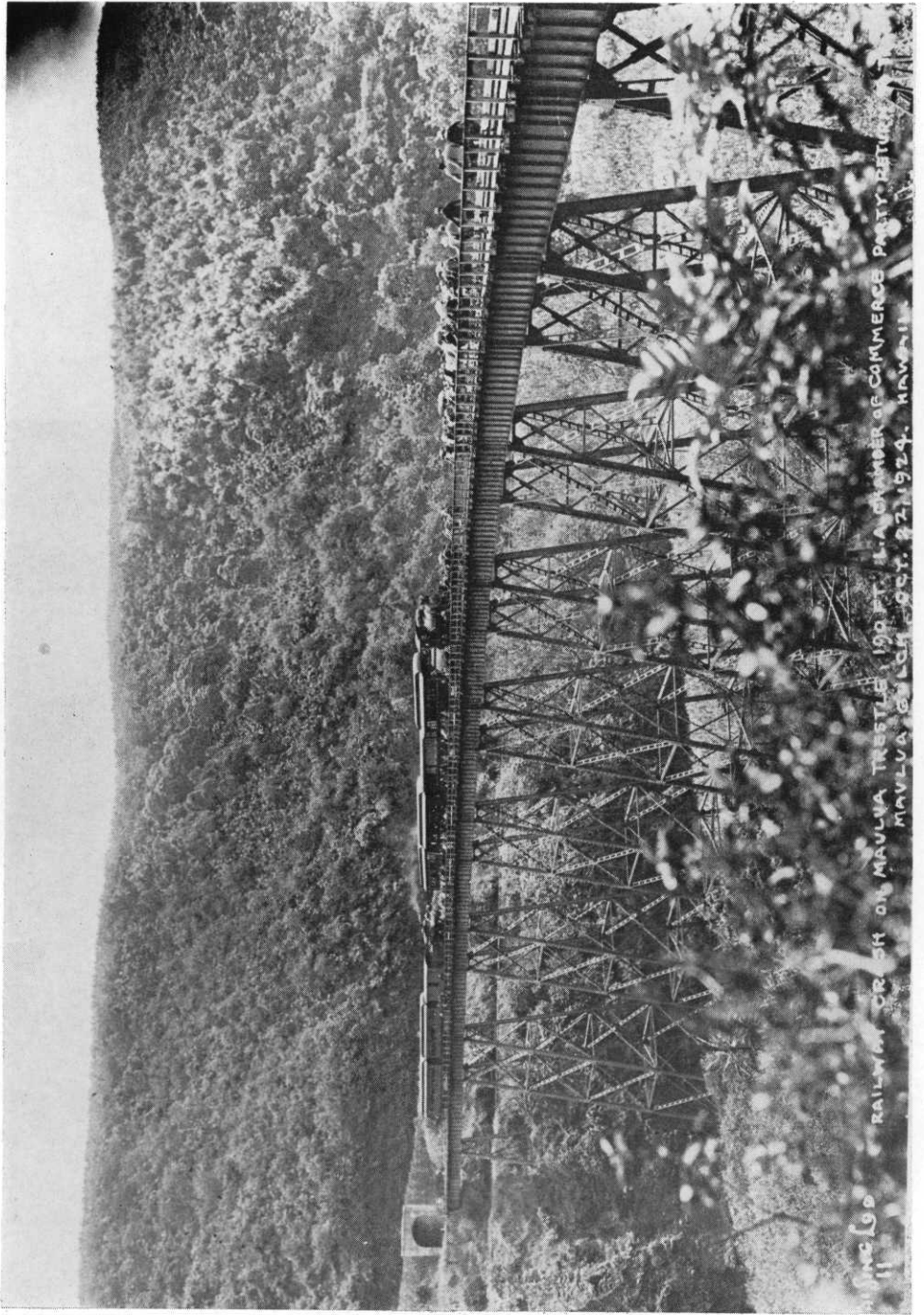
The highest of the railroad bridges was reputedly the Maliko Gulch span on Maui, built for the Kahului Railroad in 1912–1913 and opened to traffic on 8 February 1913. This steel trestle-bridge had a length variously reported as 684 and 780 feet and a height of 230 feet at the center pier. The Kuiaha Gulch timber trestle, a short distance to the east, was 330 feet long and 130 feet high. The last train crossed these bridges in May 1966, and both spans were dynamited in March 1967.²⁰

Also in 1912–1913 the Hawai'i Consolidated Railway was pushing its standard-gauge line from Hilo into Hāmākua, a job which entailed extensive bridging and tunneling work. An early account stated that this line crossed over 12,000 feet in bridges, 211 water openings under the tracks, and individual steel spans up to 1,006 feet long and 230 feet in height. Some of the most notable were those over Maulua and Honoli'i gulches, the Wailuku River, and Laupāhoehoe.²¹

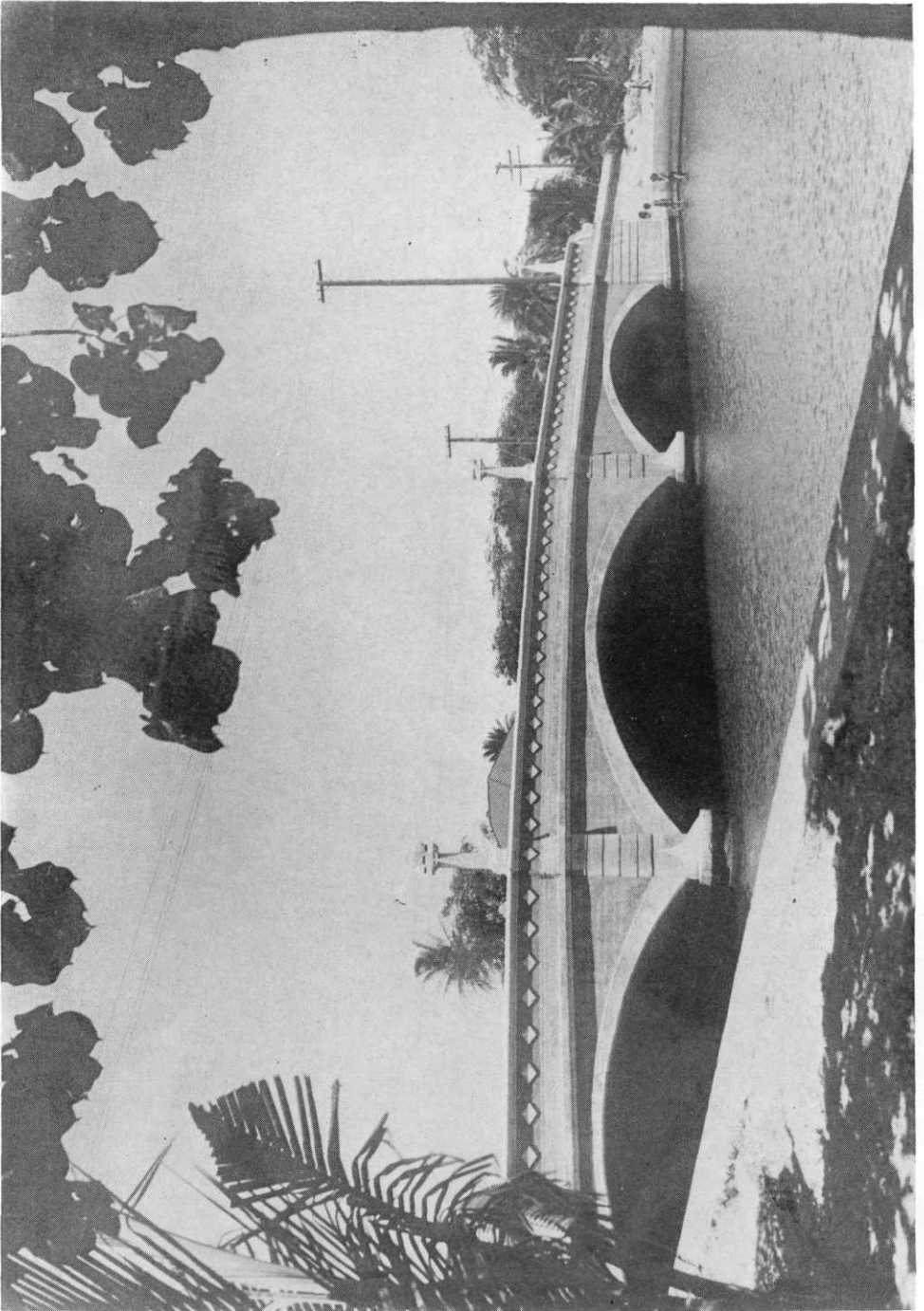
These railroad bridges were sometimes the scene of accidents and near-disasters. In 1916, for example, a work train of the Kaeleku Sugar Company was derailed and jumped a 25-foot trestle near Hāna, killing five of the 50 workers on board.²² Weakened by earthquakes and a tsunami, the railroad bridge over the Wailuku River in Hilo collapsed on 31 March 1923, just after one loaded passenger train had crossed and as another was approaching.²³ On 22 October 1924 a passenger train, emerging from a tunnel, rear-ended another passenger train, which had stopped on the Maulua bridge to permit its load of tourists to get off and view the scenery; fortunately no injuries occurred.²⁴ Two of the largest bridges on the Hilo line were destroyed by the 1946 tsunami, a disaster which effectively put that railroad out of business.²⁵

Some of the most spectacular bridge construction in Island history took place on the Hāmākua coast during the late 1940s and early 1950s, as Territorial engineers realigned Māmalahoa Highway along the former route of the defunct Hawai'i Consolidated Railway. This route averaged better than one bridge per mile over its 40-mile

FIG. 4. The 190-foot-high Maulua Trestle on the Hawai'i Consolidated Railway, 22 October 1924, shortly after the train on the left had hurtled out of the tunnel and plowed into the train at the right, stopped to let its passengers get off and view the scenery. Surprisingly, nobody was hurt. (AH photo.)



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RAILWAY BRIDGE ON MAULUA TRESTLE 190 FT. A MEMBER OF COMMERCE PARTY DETU
MAULUA ISLAND OCT. 27, 1924. HAWAII



length. Two were converted railway trestles: Hakalau, at 722 feet, thought at that time to be Hawai'i's longest highway span, and Nānue, 208 feet high and 528 feet long, described as the highest such bridge in the Islands.²⁶ (Hakalau Bridge is actually shorter than the He'eia Viaduct Bridge, an 882-foot span on O'ahu constructed in 1922.²⁷) The Hāmākua route also included the first bridge in Hawai'i of monopiered (single-column) design, Waikaumalo Bridge, and the first built with the help of cobalt 60 (used to detect flaws in samples of welds), Maulua Bridge.²⁸

Further advances were made in the 1960s. A bridge over the Kalihiwai River, Kaua'i, was washed away by the 1957 tsunami and in 1963 was replaced by a new span; 800 feet long and 70 feet high, the new Kalihiwai Bridge was described (incorrectly) as the State's longest.²⁹ The John Rudolph Slattery bascule bridge, linking O'ahu with Sand Island, was officially opened on 22 May 1962. Replacing a causeway built during World War II, this 670-foot span across a 400-foot channel was hailed as "the fourth largest of its kind in the U. S."³⁰ In 1983, however, this drawbridge was permanently locked in its "down" position.³¹

At the end of 1983 the State Department of Transportation counted 1,093 highway bridges in the Islands, or one for every 3.7 miles of roadway. This total included 251 bridges on the Big Island, 150 on Maui, 19 on Moloka'i, 592 on O'ahu, and 81 on Kaua'i. The longest, Pearl City Viaduct on O'ahu, had a length of 5,946 feet, and the highest, Nānue Bridge in Hilo, rose 208 feet at its maximum elevation.³² Besides these highway bridges, there were railroad trestles on Maui and foot bridges throughout the State.

The oldest of the highway spans still in use in 1981 was the Old Māmalahoa Highway bridge over Pu'uokalepa Stream, north of Pāpa'ikou, Hawai'i. This 33-foot-long structure was built in 1904. O'ahu's oldest, the 54-foot Waipahu Street bridge over Waikele Stream, dated from 1905. On Maui the oldest was a 48-foot bridge carrying Hāna Highway over Mokulehua Stream, erected in 1908. Two bridges on Kaua'i, both on Maluhia Road near Kōloa, went back to 1910: a 28-foot span crossing Wailana Stream (Branch No. 3) and a 46-footer over Wailana Stream (Branch No. 4). The Department of Transportation added that several bridges on Kaua'i may be older—"they are former plantation bridges that were turned over

FIG. 5. The Kalākaua Avenue bridge over the Ala Wai Canal, Waikiki, built in 1924. (AH photo.)

to the state, and therefore their construction dates are not known.” Moloka‘i’s oldest, a 325-foot bridge on Maunaloa Highway over Manawainui Stream, was built in 1939.³³ An inventory of bridges on O‘ahu, published in 1983, listed 127 built before 1940 and still standing. Five bore dates earlier than 1920.³⁴ These older bridges provide colorful links with Hawai‘i’s past.

NOTES

- ¹ C. S. Stewart, *Journal of a Residence in the Sandwich Islands During the Years 1823, 1824, and 1825* (1830; facs. rpt. Honolulu, U of Hawaii P for Friends of the Library of Hawaii, 1970) 365–366.
- ² Sereno Edwards Bishop, *Reminiscences of Old Hawaii* (Honolulu: Hawaiian Gazette, 1916) 4 and 45.
- ³ Rev. Titus Coan, *Life in Hawaii* (New York: Anson D. F. Randolph, 1882) 31–37.
- ⁴ T. Blake Clark, “Honolulu’s Streets,” *Papers of the HHS*, no. 20 (March 1939) 5–24, at 7.
- ⁵ Edward B. Scott, *The Saga of the Sandwich Islands*, vol. 1 (Crystal Bay, Nev.: Sierra-Tahoe, 1968) 24 and 32.
- ⁶ *P*, 17 Oct. 1840: 74.
- ⁷ See the 1843 and 1845 maps in Scott, *Saga of the Sandwich Islands* 62 and 63.
- ⁸ *Report of the Minister of the Interior . . . May 21st, 1845*, 10.
- ⁹ *Report of the Minister of the Interior . . . Aug. 1, 1846*, 6.
- ¹⁰ Stephen Reynolds, Journal, 1823–1842, ts., entries for 29 Dec. 1829, 16 Jan. 1840, and 7 May 1840, AH.
- ¹¹ *P*, 10 April 1847: 191.
- ¹² *P*, 17 April 1847: 195.
- ¹³ *P*, 15 May 1847: 210; Richard A. Greer, “Honolulu in 1847,” *HJH*, 4 (1970): 59–95, especially 61 and 67.
- ¹⁴ *PCA*, 23 June 1859: 2, 17 Sept. 1859: 2, and 3 Nov. 1859: 2.
- ¹⁵ Mark Twain, *Letters from the Sandwich Islands* (San Francisco: Grabhorn, 1937) 86. Originally published in the *Sacramento Weekly Union*, 23 June 1866.
- ¹⁶ AH photo file.
- ¹⁷ *F*, July 1901: 113.
- ¹⁸ J. C. Condé, *Narrow Gauge in a Kingdom* (Felton, Calif.: Glenwood, 1971) 34 and 45.
- ¹⁹ Jesse C. Condé and Gerald M. Best, *Sugar Trains* (Felton, Calif.: Glenwood, 1973) 57.
- ²⁰ *HAA 1913*: 177–178; *HAA 1914*: 213; John B. Hungerford, *Hawaiian Railroads* (Reseda, Calif.: Hungerford, 1963) 69 and 75; Gerald M. Best, *Railroads of Hawaii* (San Marino, Calif.: Golden West, 1978) 28 and 33; *HA*, 6 March 1967: A-8; *HA*, 13 March 1967: A-2; *HSB*, 9 March 1967: A-20.
- ²¹ *HAA 1913*: 177; Lorrin A. Thurston, “Railroading in Hilo,” *HAA 1914*: 142–153; Hungerford, *Hawaiian Railroads* 48; Best, *Railroads of Hawaii* 132–134, 136–137, 142–143, and 154.
- ²² *HSB*, 23 June 1916: 1.
- ²³ *HAA 1924*: 94.
- ²⁴ Best, *Railroads of Hawaii* 143–144.

- ²⁵ *Annual Report, Superintendent of Public Works, Territory of Hawaii, June 30, 1950* 26-27; Peggy Ferris, "Highway on Stilts," *PP*, vol. 66 (1954 Annual): 98, 99, and 124; Best, *Railroads of Hawaii* 152-153.
- ²⁶ *Annual Report to the Governor, Superintendent of Public Works, Fiscal Year Ending June 30, 1952*, 14; Ferris, "Highway on Stilts" 99 and 124.
- ²⁷ Hawaii State Department of Transportation, Highways Division, *Bridge Record, Hawaii Federal Aid Highway System, 1962* (Honolulu: Jan. 1963) 69.
- ²⁸ Ferris, "Highway on Stilts" 99 and 124.
- ²⁹ *HSB*, 18 Sept. 1963: 41.
- ³⁰ *HSB*, 23 May 1962: 4, 10 July 1962: 25, and 12 Dec. 1963: 26.
- ³¹ *HA*, 3 Dec. 1983: B-8.
- ³² Hawaii State Department of Planning and Economic Development, *The State of Hawaii Data Book 1984* (Honolulu: February 1985) 527.
- ³³ Memoranda to Schmitt from the Hawaii State Department of Transportation, 2 February 1981 and 18 March 1981; cited in the Hawaii State Department of Planning and Economic Development, *The State of Hawaii Data Book 1981* (Honolulu: November 1981) 400.
- ³⁴ Bethany Thompson, *Historic Bridge Inventory, Island of Oahu* (Honolulu: Hawaii State Department of Transportation, Highways Division, June 1983).