

# PROJECTING CAPITALISM

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A History of the  
Internationalization of  
the Construction Industry

Marc Linder

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**PART III**

**AN EMERGING WORLD  
MARKET FOR  
CONSTRUCTION: THE  
POST-WORLD WAR II PERIOD**

Trading capital is not very patriotic, but follows the laws of profit and loss without any regard to political speculation.

Joseph Devey, *The Life of Joseph Locke* 234-35 (1862)



## The Post-World War II Ascendancy of U.S. Multinational Construction Firms

Now...that we are in a new era, when we have an exportable surplus of finished products, our turn has come to cultivate the buyers of other lands. In this process engineering is the handmaiden of commerce.<sup>1</sup>

### Depression-Era Government-Financed Infrastructure Projects as a Source of Accumulation Enabling Western Firms to Internationalize

Steve [Bechtel] can walk with governments, but he infinitely prefers to walk and talk with the oil men, the chemical men, the industrialists who represent his own type of rugged individualism in the American tradition. As long as some projects are too big and complex for private purses, or are tied in with national defense, Steve Bechtel will build for the government, but the business firms that operate for business motives are his choice.<sup>2</sup>

The course of internationalization of U.S. construction firms was decisively transformed during the depression of the 1930s and World War II. Whereas firms had previously had to rely on demand from private firms or foreign governments, World War II military orders introduced a new contingent of companies to construction abroad. During the decade before the federal government offered these opportunities, however, it had provided a small group of western firms with the requisite capital and experience with complex construction projects in the form of gigantic hydroelectric and irrigation projects.

The trajectories of several of the world's best known multinational construction firms, founded between the turn of the century and World War I, illustrate this development. Brown & Root, for example, began as an earth-moving company in 1919, but did not move "into the big time" until it built the Marshall Ford Dam in Texas for the federal government during the late 1930s, after which "the rise of [its] fortunes was swift."<sup>3</sup> The project marked the beginning of Brown & Root's long-term symbiotic relationship with Lyndon Johnson to which it in no small part owes its prosperity and prominence. Its pioneer role in the late 1930s and early 1940s in building the first commercial offshore drilling platforms in the Gulf of Mexico helped secure it a dominating position beginning in the 1950s in the North Sea, Persian Gulf, Venezuela, and Peru.<sup>4</sup>

<sup>1</sup>"Closer Relations with Latin-America Through Engineering," 89 *ENR* 422, 423 (1922) (editorial).

<sup>2</sup>Neill Wilson & Frank Taylor, *The Earth Changers* 293 (1957). Although Wilson and Taylor claimed to have written "an unsponsored, independent review" rather than a "company book," their completely uncritical chatty boosterism does offer some informative material, especially for the post-World War II period, based on "the valued cooperation of those chiefly involved...." *Id.* at 7.

<sup>3</sup>"Roadbuilders with a Flair for Other Jobs," *BW*, May 25, 1957, at 90, 98; "The Brown & Root Story," 3:7 *AB* 1, 2 (1954).

<sup>4</sup>See Robert Caro, *The Years of Lyndon Johnson: The Path to Power* 458-68, 469-75, 742-53 (1982);

After several years of building railroads as a railway employee and supervisor in the West, Warren A. Bechtel (1872-1933) began subcontracting in 1906. His Oakland-based firm, which he did not incorporate until 1925, then built railroad lines, train sheds, and terminals for the Southern Pacific, Western Pacific, Northwestern Pacific, Union Pacific, and Santa Fe roads, and dams in the West.<sup>5</sup>

Bechtel's genesis resembled that of several other western builders of a similar vintage—Utah Construction Company, Morrison-Knudsen, and Henry J. Kaiser—which frequently collaborated with one another on projects.<sup>6</sup> Harry Morrison (1885-1971) worked for a Chicago firm building a dam and then for the U.S. Reclamation Service in the Northwest for several years in positions ranging from axman to construction supervisor before he and another Reclamation Service employee, Morris Knudsen, formed a partnership in Idaho in 1912, which built canals, dams, railways, and roads in the West.<sup>7</sup> In 1914 Kaiser (1882-1967) began his street, road, and highway paving operations in British Columbia and the Pacific Northwest. In the period between World War I and the depression, government-funded road building, performed in large part by private contractors, became an increasingly significant and capital-intensive sector of construction. Although Kaiser Paving Company gained some prominence in the West as one of the pioneers in mechanizing road construction during this period, the firm had not yet reached the front ranks of the industry.<sup>8</sup>

Utah Construction was an older and larger organization.<sup>9</sup> Indeed, Bechtel had begun subcontracting irrigation and railroad projects under Utah Construction, "one of the great railroad construction firms of the West," as early as 1910.<sup>10</sup> The association became a turning-point for Bechtel's firm. By 1915, "the tidy sum" that Bechtel received as subcontractor under Utah inspired him to confide that he had "never expected to have that much money in a lifetime."<sup>11</sup> By 1930, Utah's president, William Wattis, was "one of the wealthiest men in the West."<sup>12</sup> He and his brother Edmund had completed several railroad construction projects in the Northwest before forming Utah Construction in 1900. During the next thirty years Utah built thousands of miles of railroad track in addition to many major dams (including Hetch Hetchy, American Falls, and Guernsey), bridges, and irrigation projects, becoming "the largest building organization in the West" with "a virtual monopoly on all major western contracts...."<sup>13</sup>

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*idem*, *The Years of Lyndon Johnson: Means of Ascent* 180 (1990); [Brown & Root], *Brownbuilder: The First 50 Years* 1-6 (1969); *Brownbuilder*, No. 1, 1992, at 11.

<sup>5</sup>Robert Ingram, *A Builder and His Family: 1898-1948*, at 1-25 (1961 [1949]); 24 *NCAB* 224 (1967 [1935]) (s.v. "Bechtel"). The dearth of monographic literature still makes it necessary to rely heavily on semi-official company histories as source material. See H. Larson, *Guide to Business History* 266 (1948).

<sup>6</sup>"The Earth Movers I: Beginning the Epic of the Six Companies of the West," *Fortune*, Aug. 1943, at 99.

<sup>7</sup>*NCAB*, Current Vol. G 1943-46, at 225 (1946) (s.v. "Morrison, Harry"); "The Earth Mover," *Time*, May 3, 1954, at 86, 91; Robert Brown, Jr., "The Story of M-K," 3:4 *AB* 1-4 (1954); Wilson & Taylor, *Earth Changers* at 37-44; J. Bonny, *Morrison-Knudsen Company, Inc.: Fifty Years of Construction Progress* 18-19 (1962).

<sup>8</sup>John Grier, "Construction," in President's Conference on Unemployment, 1 *Recent Economic Changes in the United States* 219, 244-48 (1929); Thomas Cochran & William Miller, *The Age of Enterprise: A Social History of Industrial America* 298 (rev. ed., 1961 [1942]); John Hicks, *Republican Ascendancy, 1921-1933*, at 9 (1963 [1960]); Frank Taylor, "Builder No. 1," *SEP*, June 7, 1941, at 9; R. LeTourneau, *Mover of Men and Mountains* 136-63 (1967 [1960]); Kaiser Industries Corporation, *The Kaiser Story* 5-13 (1968).

<sup>9</sup>Sidney Hyman, *Marriner S. Eccles: Private Entrepreneur and Public Servant* 36-37 (1976).

<sup>10</sup>"The Earth Movers I" at 102.

<sup>11</sup>Ingram, *A Builder and His Family* at 8-13 (quotations at 8, 13).

<sup>12</sup>Joseph Stevens, *Hoover Dam: An American Adventure* 3 (1988).

<sup>13</sup>25 *NCAB* 294 (1967 [1936]) (s.v. "Wattis") (quotation); Wilson & Taylor, *Earth Changers* at 23-25; Stevens, *Hoover Dam* at 36, 39 (quotation).

By 1931, in spite of being the largest contractors in the West, these firms were "by industrial standards...far from rich."<sup>14</sup> Moreover, with the exception of Kaiser, they had also been only marginally or not at all involved in international projects before World War II. Kaiser's subcontract under Warren Brothers for the Central Highway in Cuba had expanded its capacities considerably by 1930. Utah's only cross-border activity had been laying tracks for the Southern Pacific into Mexico in 1923, whereas Bechtel and Morrison-Knudsen had conducted strictly domestic operations.<sup>15</sup> A number of East Coast construction companies such as Warren, Ulen, Fuller, and Raymond were not only internationally oriented but also significantly larger.<sup>16</sup> Morrison-Knudsen's business volume, for example, did not reach a million dollars until 1923.<sup>17</sup>

Thus when the owners of the western firms met in 1931 to discuss submission of a bid on the enormous Boulder (Hoover) Dam project, they could not "scrape together" the \$8 million in working capital that the surety companies demanded to underwrite the construction. To be sure, *Fortune* exaggerated in 1943 when it asserted that within "a few short years" these firms had been transformed "from...just a roving band of unknown contractors" into "tycoons" with "practically unlimited" credit.<sup>18</sup> Far from being still "all but unknown" even in northern California,<sup>19</sup> Warren Bechtel had already been national president of the Associated General Contractors of America (AGCA), the largest membership association of construction firms in the United States.<sup>20</sup>

After Congress authorized the Boulder Canyon Project in 1928,<sup>21</sup> President Hoover's Secretary of the Interior, Ray Lyman Wilbur, had to decide whether to build the dam directly with government employees and equipment or to enter into contracts with low-bidding construction firms.<sup>22</sup> Since the turn of the century, the federal government had developed considerable experience in building huge infrastructure projects by force account. In addition to the Panama Canal, construction of which was overseen by the Isthmian Canal Commission,<sup>23</sup> the U.S. Reclamation Service built many large canals and dams in the West such as Arrowrock. Although contractors such as Utah and Morrison-Knudsen had also built a number of dams for the government, "[f]ew private firms were capable of building structures of such unprecedented size and sophistication...."<sup>24</sup> By the

<sup>14</sup>"The Earth Movers I" at 99.

<sup>15</sup>"Damn Big Dam," *Time*, Mar. 23, 1931, at 14, 15; "One Firm's Formula for Success: Diversification," *ENR*, Apr. 11, 1957, at 34, 38; Wilson & Taylor, *Earth Changers* at 25; chapter 7 above.

<sup>16</sup>In 1931, these four firms' total assets were \$27 million, \$18 million, \$13 million, and \$5 million respectively. *MMI* 2789, 688, 2947, 461 (1932). Morrison-Knudsen's total assets were still only \$4 million in 1939 (the first year for which *Moody's* published data about it) and \$19 million at the height of World War II in 1943. *MMI* 1643 (1941); *MMI* 1368 (1945). Utah Construction's total assets increased from \$7 million in 1931 to \$13 million in 1943. *MMI* 1096 (1932); *MMI* 1933 (1945). Bechtel and Kaiser, as individually owned firms, were not listed in *Moody's*.

<sup>17</sup>Ernie Hood, "Putting a New Face on Old Afghanistan Is One of Morrison-Knudsen's Projects," *ENR*, Feb. 21, 1952, at 45, 48.

<sup>18</sup>"The Earth Movers III: Despite Henry Kaiser's Ventures into Industrial Realms, They Decide to Stay As They Are—Contractors Looking for Business," *Fortune*, Oct. 1943, at 139, 144-93. Utah Construction borrowed its \$1 million share from Crocker First National Bank. Marriner Eccles, *Beckoning Frontiers: Public and Personal Recollections* 63 (Sidney Hyman ed., 1951).

<sup>19</sup>Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water* 131 (1987 [1986]).

<sup>20</sup>Ingram, *A Builder and His Family* at 38.

<sup>21</sup>Boulder Canyon Project Act, ch. 42, 45 Stat. 1057 (1928).

<sup>22</sup>It is unclear what *Fortune* meant in characterizing government supervision of private contractors as a compromise between government and private construction. "The Dam," *Fortune*, Sept., 1933, at 74, 82.

<sup>23</sup>See chapter 7 above.

<sup>24</sup>Michael Robinson, *Water for the West: The Bureau of Reclamation 1902-1977*, at 20 (quotation), 22 (1979); *History of Public Works in the United States 1776-1976*, at 318, 321 (Ellis Armstrong ed., 1976);

mid-1920s, with the restoration of “normalcy,” the newly created Bureau of Reclamation moved toward contracting out work previously executed by the government.<sup>25</sup>

Nevertheless, during the 1920s, the AGCA—of which Warren Bechtel was national president in 1928, followed four years later by Kaiser—was engaged in a constant battle with the U.S. Army Corps of Engineers, allegedly the world’s largest owner of construction equipment. The AGCA accused the Corps of Engineers of interfering with private enterprise and driving contractors out of business.<sup>26</sup> In the 1930s, the AGCA also denounced the Tennessee Valley Authority (TVA), which built its own dams and adopted advanced labor-relations policies with its employees, and the Works Progress Administration for “push[ing] the general contractors completely out of the public works picture....”<sup>27</sup>

By and large the federal government did not itself build the great hydroelectric projects in the West during the Depression. In particular for Hoover’s administration, “keeping the Government out of any business that would yield a profit” was axiomatic.<sup>28</sup> Thus, instead of entrusting construction to the Bureau of Reclamation or other government agency, Wilbur “farmed out Boulder Dam,” which at the time was the largest civil contract into which the federal government had ever entered, to low-bidding nonunion firms.<sup>29</sup> Those low bidders were Bechtel, Kaiser, Morrison-Knudsen, Utah, and several other contractors, which formed Six Companies, Inc., the joint venture that built Boulder Dam between 1931 and 1936.<sup>30</sup>

Against the background of unprecedented unemployment, the dam’s remote location, and government support for the companies, the dam workers during the first summer unsuccessfully struck over demands for better working and living conditions and five dollars for a day’s work in “[t]emperatures of 140 degrees in the shade.”<sup>31</sup> Relying on armed force, “Six Companies, in concert with the federal officials running the project reservation, cracked down hard on labor organizers.” Having suppressed the strike in 1931 aimed at the collective sale of labor power, the firms were able to “use the almost unlimited supply of cheap labor...drawn from the huge pool of unemployed men loitering in Las Vegas” to impose take-it-or-leave-it conditions.<sup>32</sup> In the absence of federal or state labor-protective intervention<sup>33</sup>—the labor provision of the contract between the

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“‘Damn Big Dam,’” *Time*, Mar. 23, 1931, at 14, 15 (Utah built American Falls, Gibson, and Guernsey dams). According to a former director of the Reclamation Service, the government often chose to accept the risk itself rather than trusting in a low-bidding contractor to build deep foundations for dams in inaccessible places or tunnels where conditions were difficult to foresee. F. Newell, “Federal Land Reclamation: A National Problem: I. Origin, Problems and Achievements of Federal Land Reclamation,” 91 *ENR* 666, 671 (1923).

<sup>25</sup>Stevens, *Hoover Dam* at 37-38; Robinson, *Water for the West* at 44.

<sup>26</sup>In the nineteenth century, when members of the Corps of Engineers were frequently detailed to private entities such as railroads, construction firms were less ungrateful. Forest Hill, *Roads, Rails and Waterways: The Army Engineers and Early Transportation* (1957).

<sup>27</sup>Booth Mooney, *Builders for Progress: The Story of the Associated General Contractors of America* 40, 48, 54, 74-76, 78 (1965); Marguerite Owen, *The Tennessee Valley Authority* 236 (1973); “Tennessee Valley Authority Adopts Labor Relations Policy,” 115 *ENR* 511 (1935).

<sup>28</sup>Charles Beard & Mary Beard, *America at Midpassage* 42 (1939).

<sup>29</sup>Judson King, “Open Shop at Boulder Dam,” 67 *NR* 147 (1931) (quotation); William Warne, *The Bureau of Reclamation* 29 (1973).

<sup>30</sup>See George Pettitt, *So Boulder Dam Was Built* (1935). The entity actually consisted of eight companies, the other four being MacDonald & Kahn, J.F. Shea, Pacific Bridge, and General Construction.

<sup>31</sup>See “Early Resumption of Dam Predicted,” *NYT*, Aug. 12, 1931, at 14, col. 5; “1400 Men Laid Off at Hoover Dam After Demand for \$5 Wage,” 107 *ENR* 271 (1931); Elwood Mead, “The Construction of Boulder Dam,” *LD*, Nov. 4, 1933, at 14 (Commissioner, U.S. Bureau of Reclamation).

<sup>32</sup>Stevens, *Hoover Dam* at 99, 71 (quotations), 65-79.

<sup>33</sup>On the companies’ successful contestation of state safety law jurisdiction over the project, see Six

government and Six Companies was confined to a prohibition on the employment of "Mongolian labor"<sup>34</sup>—"each man must depend upon his own individual initiative in dealing with the contractors...."<sup>35</sup> Consequently, as Edmund Wilson, on location at the time, observed, "the companies automatically resort[ed] to that systematic skimping, petty swindling and barefaced indifference to the fate of their employees which is necessary to provide stockholders and officers with profits...."<sup>36</sup>

Chief among the Six Companies' chiseling methods was the venerable institution of payment in scrip redeemable only at the company store. The employees could expect no intervention by the Hoover administration because it "saw nothing wrong with the contractors' turning a profit on the dam job whenever and wherever they could." It was only two years later that Roosevelt's Secretary of the Interior ordered an end to this additional source of profits.<sup>37</sup> Like Peto and other British railway contractors ninety years earlier, Six Companies also extracted profit by means of housing their captive labor force; over the four-year period the rate of return on this capital investment may have been as high as 641 per cent. As a result of monopsony on the labor market and monopoly on consumer markets, the partners "were earning multimillion-dollar profits at a time when other construction firms were begging for work or going out of business."<sup>38</sup>

In spite of this unexpected financial success, the companies aspired to reduce wage rates and speed up the pace of work still further even if higher accident and mortality rates resulted. If sued by injured workers, Six Companies was not above jury-fixing. The employers also held labor costs to a minimum by refusing to include the travel time between the camp and dam site as part of the working day.<sup>39</sup> Little wonder that aggrieved workers spoke of "the organized greed of the 'Six Companies' which has the tacit endorsement or acquiescence of the Federal Government."<sup>40</sup>

Although continuous efforts by police and company officials "to purge the Hoover Dam employment rolls of union organizers" enabled the employers to atomize the work force, the unavailability of the New Deal federal government as a strike breaker weakened Six Companies' position somewhat. Thus in 1935, when workers shut the project down for two weeks in a strike directed at longer shifts and "a company-police system which the union maintained was used to subdue and terrorize men who 'have the temerity to complain against the atrocious conditions prevalent,'" they were not completely unsuccessful.<sup>41</sup>

That same year, the Department of Justice finally charged Six Companies with 70,000 individual violations of the federal public works eight-hour law, which at five dollars per violation exposed the firms to a liability of \$350,000. Protests by Kaiser and Elwood Mead, the Commissioner of the Bureau of Reclamation, however, led to a settlement reducing the fine to \$100,000. Although this sum was "hardly an excessive fine since the Six Companies reportedly made eighteen

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Companies, Inc. v. Stinson, 58 F.2d 649 (D. Nev. 1932); Six Companies v. Stinson, 2 F. Supp. 689 (D. Nev. 1933).

<sup>34</sup>U.S. Bureau of Reclamation, *Boulder Canyon Project Final Reports*, Pt. I: *Introduction*, Bull. 1: *General History and Description of Project* 85-86 (1948).

<sup>35</sup>King, "Open Shop at Boulder Dam" at 147.

<sup>36</sup>Edmund Wilson, "Hoover Dam," 68 *NR* 66 (1931).

<sup>37</sup>Stevens, *Hoover Dam* at 150, 175 (quotation); *NYT*, May 11, 1933, at 6, col. 5.

<sup>38</sup>Stevens, *Hoover Dam* at 169 (quotation), 129, 285 n.23.

<sup>39</sup>*Id.* at 289 n.15, 99, 167, 164, 60, 206-14, 70.

<sup>40</sup>Victor Castle, "Well, I Quit My Job at the Dam," 133 *Nation* 207, 208 (1931).

<sup>41</sup>Stevens, *Hoover Dam* 234 (quotation), 234-41; 44 *MLR* 660, 661 (1935) (quoting from the *Bulletin of Metal Trades Department*, Aug. 1935). By the time Bonneville Dam was built in the mid-1930s, Kaiser conducted an all-union operation. Kaiser Industries Corp., *Kaiser Story* at 60.

million dollars,” by law it inured not to the benefit of the workers, but to that of the United States.<sup>42</sup>

Whereas the TVA was able to “eliminate middleman costs for managerial services” by executing its projects by means of its own organization,<sup>43</sup> Hoover Dam proved to be “a gold mine for Six Companies,” netting the firms more than \$10 million in after-tax profits on a \$49 million contract.<sup>44</sup> This contribution from “the inexhaustible springs of the national treasury,” a like sum from two other depression-era public works in the West, Bonneville and Grand Coulee dams, and additional amounts for building the San Francisco-Oakland Bay Bridge and other infrastructure projects (including the third set of locks for the Panama Canal) enabled four of the joint venturers, Bechtel, Morrison-Knudsen, Kaiser, and Utah, to accumulate sufficient capital to launch joint and separate international military-industrial careers.<sup>45</sup> Moreover, by building such hydroelectric and irrigation projects, these firms were instrumental in industrializing the West—making possible, for example, the mass production of aluminum—and thus opening up expansive opportunities for others’ and their own capital. In particular, they were able to realize Kaiser’s vision of ending the “longstanding eastern domination of the construction industry and precipitate a major shift of economic power from the Atlantic Coast to the Pacific.”<sup>46</sup>

Although the data on the growth of the firms’ assets demonstrate that it is an exaggeration to claim that the Bechtels and Morrison-Knudsens became “instant giants after cutting their teeth on Hoover Dam,”<sup>47</sup> the project did signal an end to the relative anonymity of construction firms. Marriner Eccles, “the moving power” of Utah Construction whose family owned a substantial share of the company, relinquished his position as president to become chairman of the board on leave when he became special assistant to the Secretary of the Treasury and then governor of the Federal Reserve Board while his firm was still building the dam.<sup>48</sup> In particular Kaiser

brought about a fundamental change of style in the way heavy construction companies presented themselves to the public. Previously, contractors tended to believe that the noise of their rivets, trip hammers and concrete mixers would bespeak their virtues. Kaiser, a fertile-minded publicist, generated a steady flow of news stories, information kits, progress reports and special “briefings” which built a national and international reputation for the Six Companies.<sup>49</sup>

<sup>42</sup>40 U.S.C. §§ 321, 324 (1934); “Boulder Dam Payroll Impounded by Federal Court,” 114 *ENR* 362 (1935); “Six Companies Inc. Protests Payroll Seizure in Telegram to Ickes,” 114 *ENR* 400 (1935); James Kluger, *Turning Water with a Shovel: The Career of Elwood Mead* 147, 195 (1992) (quotation).

<sup>43</sup>Gordon Clapp, *The TVA: An Approach to the Development of a Region* 30 (1955).

<sup>44</sup>“Complete Unit Prices for Hoover Dam,” 106 *ENR* 505 (1931); “The Earth Movers I” at 214.

<sup>45</sup>“The Earth Movers I” at 99 (quotation); “The Earth Movers II: They Turn to Shipbuilding and Change the Face of the West,” *Fortune*, Sept. 1943, at 119, 120-21; Ingram, *A Builder and His Family* at 28-29, 31-41; Kaiser Industries Corp., *Kaiser Story* at 23; Peter Wiley & Robert Gottlieb, *Empires in the Sun: The Rise of the New American West* 15-23, 31-38 (1982); Mark Foster, *Henry J. Kaiser: Builder in the Modern American West* 46-64 (1989).

<sup>46</sup>See U.S. Bureau of Reclamation, *The Story of Boulder Dam* (Conservation Bull. No. 9, 1941); Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* 210-12, 269-71 (1992 [1985]); Reisner, *Cadillac Desert* at 151-70; Stevens, *Hoover Dam* at 42 (quotation).

<sup>47</sup>Reisner, *Cadillac Desert* at 153.

<sup>48</sup>*MMI* 1096 (1932); “Marriner Stoddard Eccles,” *Fortune*, Feb., 1935, at 62, 64 (quotation); *NCAE: Current Volume E* (1937-38), at 434-35 (1938) (s.v. “Eccles”); Eccles, *Beckoning Frontiers* at 45-46, 63, 175; Arthur Schlesinger, Jr., *The Age of Roosevelt: The Politics of Upheaval* 237-41 (1960); Hyman, *Marriner S. Eccles* at 160.

<sup>49</sup>Hyman, *Marriner S. Eccles* at 76.

## World War II: Laying the Foundation of U.S. Hegemony

Allied with international bankers, sometimes with the aid of manufacturers and producers of equipment and materials...these builders focussed their attentions mainly on Central and South America.... Until the shadows of World War II began to gather, this was a small and select fraternity, whose activities caused scarcely a ripple in the main current of construction which was concerned with building...America.<sup>50</sup>

A major breakthrough toward the creation of a world construction market occurred shortly before and during World War II in conjunction with the exploitation of petroleum resources in Venezuela and the Middle East. On the basis of the leading role played by the U.S. domestic oil industry, U.S. construction firms had already acquired the expertise and capital equipment necessary for building wells, pipelines, and refineries. Since U.S. oil companies were also preeminent internationally, U.S. contractors were able to gain favored access to overseas projects.<sup>51</sup>

The early history of several of the world's largest multinational construction firms reflects this oil-based internationalization. Fluor Corporation, which was founded in 1912, began building refineries in California in 1922 for Richfield Oil. Having abandoned general contracting by the mid-1920s, Fluor expanded its operations beyond California by 1930, but did not receive a major overseas contract until 1947 when Aramco awarded it one to expand its facilities in Saudi Arabia. "This experience in the Middle East would lead Fluor into prominent positions in a variety of markets around the world."<sup>52</sup>

Bechtel, alone and in partnership with others including Kaiser, had been building pipelines in the West and Midwest since 1929 for Standard Oil of California and Pacific Gas and Electric—two of the principal supporters of the Industrial Association, an organization of large construction industry users and banks, which from 1921 to 1936 imposed an open-shop on the strongly unionized San Francisco building trades<sup>53</sup>—and other large gas and oil firms.<sup>54</sup> Having "decided that there was more money in designing refineries than in building pipelines,"<sup>55</sup> Bechtel formed a new entity in 1937 together with John A. McCone—future head of the Atomic Energy Commission and the Central Intelligence Agency—whose Consolidated Steel Co. had sold steel to Six Companies for Boulder Dam. "[S]elf-contained," the newly formed Bechtel-McCone-Parsons Corporation "was able to design, engineer, procure equipment and materials, and build the complex processing structures of petroleum refining and industrial chemistry."<sup>56</sup> This venture marked the beginning of Bechtel's shift away from low-technology heavy construction toward construction-engineering.<sup>57</sup>

After building such plants and pipelines for Standard Oil of California, Hercules Powder, and other industrial firms in the United States in the 1930s, the new firm "prepared to gear up for service on a global scale" by building a

<sup>50</sup>"U.S. Construction Overseas," *ENR*, July 30, 1953, at 28, 29.

<sup>51</sup>See e.g., Harvey O'Connor, *The Empire of Oil* (1955); Ingram, *A Builder and His Family* at 41-87.

<sup>52</sup>[Fluor Corp.], *Heritage* [no pagination] (n.d. [ca. 1989]); "Emphasis on Sales Makes Fluor the Largest Construction Firm," *ENR*, July 15, 1976, at 24.

<sup>53</sup>William Haber, *Industrial Relations in the Building Industry* 409-41, 575 n.39 (1930); Michael Kazin, *Barons of Labor: The San Francisco Building Trades and Union Power in the Progressive Era* 256-76 (1989).

<sup>54</sup>Ingram, *A Builder and His Family* at 26-28; Foster, *Henry J. Kaiser* at 39.

<sup>55</sup>"The Earth Movers I" at 106.

<sup>56</sup>Ingram, *A Builder and His Family* at 42.

<sup>57</sup>Robert Ingram, *The Bechtel Story: Seventy Years of Accomplishment in Engineering and Construction* 12 (1968).

pipeline for the Standard Oil Company of Venezuela and docks for the Venezuelan government in 1940 in a joint venture with Raymond, whose harbor projects had already provided it with extensive international experience. During World War II, Bechtel began building petroleum refineries for Shell, Caltex, and Aramco in Curacao, Bahrain, and Saudi Arabia respectively as well as the large Canol military pipeline and refinery project in northwestern Canada and a section of the world's biggest pipeline in the United States.<sup>58</sup>

The Bechtels' self-portrayal in their in-house company history as "getting their resources ready for the country's service"<sup>59</sup> at the outset of World War II indirectly called attention to the other contest in which the United States was engaged—that with Britain over control of petroleum resources in the Middle East, especially in Saudi Arabia.<sup>60</sup> The role of private firms in the construction of oil facilities as well as of the U.S. Air Force base at Dhahran—which was its largest between Germany and Japan and occupied a strategic position for international communication lines—was crucial to implanting U.S. economic and military hegemony in that region over British imperial objections.<sup>61</sup> The restructuring of the internationally oriented U.S. construction industry, in turn, signaled the rise of petroleum industry-related firms such as Bechtel, which quickly surpassed Warren Brothers and other companies that had pioneered overseas before World War II, but then became confined largely to roadbuilding and other infrastructure projects in Latin America.<sup>62</sup>

Of World War II military construction projects valued at \$2.4 billion, U.S. firms performed half in countries of the British Commonwealth. They carried on a further tenth in Latin America especially in connection with building, under the auspices of the U.S. Army Corps of Engineers, the Pan American or Inter-American Highway, which was designed to protect the Panama Canal. The participation by Morrison-Knudsen in the U.S. Navy's billion-dollar Pacific Naval Air Bases (PNAB) program during World War II, which increased its revenues tenfold, was perhaps the foremost example of this military route to internationalization.<sup>63</sup> But its Six Companies partners, Bechtel and Utah, were

<sup>58</sup>Ingram, *A Builder and His Family* at 42, 45-47, 72-75, 81; "Earth Movers I" at 102; "Earth Movers III" at 144; Edward Cleary, "Building the World's Biggest Oil Line," 129 *ENR* 915, 920 (1942) (Texas to New York).

<sup>59</sup>Ingram, *A Builder and His Family* at 47.

<sup>60</sup>See "Oil Projects Announced for the Middle East Area," 132 *ENR* 165 (1944); Herbert Feis, *Three International Episodes: Seen from E.A.* 93-190 (1966 [1946]); E. Varga, *Osnovnye voprosy ekonomiki i politiki imperializma (posle vtoroi mirovoi voyny)* 258-73 (1953); Gabriel Kolko, *The Politics of War: The World and United States Foreign Policy, 1943-1945*, at 294-313 (1970 [1968]); Joyce Kolko & Gabriel Kolko, *The Limits of Power: The World and U.S. Foreign Policy, 1945-1954*, at 69-73, 413-20 (1972); Fred Halliday, *Arabia Without Sultans* 50-51 (1974); Aron Miller, *Search for Security: Saudi Arabian Oil and American Foreign Policy, 1939-1949* (1980); Michael Stoff, *Oil, War, and American Security: The Search for a National Policy on Foreign Oil, 1941-1947* (1980); Wm. Roger Louis, *The British Empire in the Middle East 1945-1951: Arab Nationalism, the United States and Postwar Imperialism* 173-93 (1984); David Painter, *Oil and the American Century: The Political Economy of U.S. Foreign Oil Policy, 1941-1954* (1986).

<sup>61</sup>James Gormly, "Keeping the Door Open in Saudi Arabia: The United States and the Dhahran Airfield, 1945-46," 4 *DH* 189, 195 (1980). For an overview of Bechtel's activities in the Middle East, see Bechtel Corp., *The Arab Lands: An Age of Change* 19-31 & unpaginated (n.d. [ca. 1979]).

<sup>62</sup>See e.g., "Big Bolivian Highway Goes to American Firm," 135 *ENR* 88 (1945) (Warren); "Big South American Road Programs Will Aid International Communication," *id.* at 687 (J.A. Jones); "South America's Biggest Water Supply Job," 136 *ENR* 297 (1946) (U.S. firms using U.S. equipment operators in Caracas). By 1963, when *ENR* published its first listing of the 400 largest U.S. construction firms, the value of Bechtel's overseas contracts was five times greater than Warren Brothers'. "The 400 Largest Contractors," *ENR*, Aug. 6, 1964, at 69, 72. By 1969, when Bechtel was ranked first, Warren's new awards (in Canada and Spain) were less than one-tenth of Bechtel's. "Overseas Contracting: Big But Could Be Bigger," *ENR*, Nov. 5, 1970, at 80-81.

<sup>63</sup>"The Earth Mover," *Time*, May 3, 1954, at 86, 92; Morrison Knudsen Corporation, "History, 1912-1993," at 2 (n.d. [1993]).

also heavily involved in the Philippines and Samoa. Three other construction firms, Turner, Raymond, and Dillingham, also secured significant PNAB contracts.<sup>64</sup> Morrison-Knudsen, which even before the end of the war had carried out projects in Canada, Mexico, Panama, Venezuela, and Brazil, soon became one of the largest U.S. construction firms both domestically and internationally.<sup>65</sup>

By furnishing the larger U.S. construction firms the opportunity to execute these military projects all over the world as well as others such as the Alaskan-Canadian Highway, the state enabled them to obtain the technology, accumulate the capital, and establish the governmental and private economic contacts necessary to "go global."<sup>66</sup> Thus alone in 1946-47, businesses purchased construction machinery from government surplus assets stocks valued at \$271 million—a sum almost equal to the capital assets less reserves of construction corporations in 1944.<sup>67</sup> These advantages did not accrue to the largest firms exclusively as a result of their wartime construction activities. "As quasi-industrialists," Bechtel, Kaiser, and other Six Companies entities also built and operated the world's largest cement plant and became the world's largest shipbuilders. Bechtel-McCone also built and operated the federal government's huge airplane-modification center in Alabama.<sup>68</sup>

Germany's largest construction firm, Philipp Holzmann, also did its "duty...in good faith for our fatherland" during World War II, as it had during World War I and during the Nazi militarization of the economy in the 1930s. The company furnished employees and equipment, which became the core of its *Firmeneinsätze* in the Eastern and Western European countries occupied by the Nazi troops. Even after the defeat of the Nazis, Holzmann officials found no more damning circumlocution for their military construction achievements than "soulless mass output."<sup>69</sup> Hochtief, Wayss & Freytag, Berger, and Bilfinger & Grün, too, contributed their share to building Nazi fortifications, such as the West Wall in preparation for the war and along the French coast, as well as airports and naval installations and other military projects in Nazi-occupied Europe.<sup>70</sup> Unlike their U.S. competitors, however, these German firms, which had long been operating internationally, neither required nor were able to use a world war to expand their

<sup>64</sup>"The Earth Movers I" at 101; "The Earth Movers III" at 144; Ingram, *A Builder and His Family* at 60-65.

<sup>65</sup>*MMI* 1368 (1945). Because the data published by *Moody's* during this period excluded Morrison-Knudsen's revenue from foreign subsidiaries, it is difficult to quantify the degree of internationalization.

<sup>66</sup>"U.S. Contractors Go Global," *BW*, Apr. 14, 1956, at 139, 140; Henry Durham, "Road Construction in Paraguay," 126 *ENR* 876 (1941) (R.E. Hebard Co.); "Americans to Build War Facilities in Middle East," 127 *ENR* 776 (1941); "Pan American Highway Construction Award Made to Civilian Contractors," 129 *ENR* 340 (1942); W. Bober, "The Construction Industry After the War," 20 *HBR* 427-36 (1942); *Seventy Years, The Foley Saga* (n.d.); "The Earth Movers," *Fortune*, Aug. 1943, 99-107; *id.*, Sept. 1943, at 119-22, 219-26; *id.*, Oct. 1943, at 139-44, 193-99; A. Carter, "Building the Inter-American Highway. Part I—History, Survey, Access, and Housing," 131 *ENR* 209-22 (1943); Harold Richardson, "Alcan—America's Glory Road. Part III: Construction Tactics," 130 *ENR* 63, 70 (1943); "Army Reports on Pan American Highway," 13 *CE* 515 (1943); E. James, "Development of the Inter-American Highway," 14 *CE* 5 (1944); "Inter-American Highway Work Cost Four Times Original Estimate," 135 *ENR* 71 (1945); "U.S. Forces Build Airfields in Arabia," *id.* at 641; "Construction Industry Logs the War Years and Appraises Its Future," 136 *ENR* 192-93 (1946); Van Renssaler Sill, *American Miracle: The Story of War Construction Around the World* (1947).

<sup>67</sup>U.S. Bureau of Economic Analysis, *Fixed Nonresidential Business Capital in the United States, 1925-73*, at 481 (1974) (valued at original acquisition prices).

<sup>68</sup>"The Earth Movers III" at 142 (quotation), 139; "The Earth Movers II" at 220, 222, 225-26; Ingram, *A Builder and His Family* at 49-59, 75-76.

<sup>69</sup>Hans Meyer-Heinrich, "Die Entwicklung des Gesamtunternehmens," in *Philipp Holzmann Aktiengesellschaft im Wandel von Hundert Jahren 1849-1949*, at 231-32, 106, 209-28 (Hans Meyer-Heinrich ed., n.d. [1949]).

<sup>70</sup>Heiner Radzio, *Die Aufgabe heisst Bauen: 110 Jahre Hochtief 26-27* (1985); "Bilfinger & Grün" at 561; Wayss & Freytag, *100 Jahre Wayss & Freytag 1875-1975* [no pagination] (n.d. [1975]).

markets. Military defeat also compelled the second albeit temporary loss of those markets within a quarter-century.

### From World War II Until the End of the Keynesian Expansion: The American Quarter-Century

Since the war the American construction industry has taken on a new dimension... This is an entirely new phenomenon, marking a sharp departure from the situation prewar. Then the industry's foreign legion numbered not more than a dozen firms whose activities were largely confined to Latin America. [I]n the end it is the willingness of American capital to go abroad that will make the export of U.S. construction a thriving business.<sup>71</sup>

In the aftermath of the war, "aggressively profit-motivated private sector design and construction firms" soon displaced the U.S. military engineering units in constructing bases abroad as a "'military' component to the Marshall Plan...." As early as 1943, Bechtel and other large U.S. construction firms, which as "quasi-industrialists...were spreading themselves all over the world," clearly saw "Europe and South America and Asia as needing old factories rebuilt and new ones engineered." While many other industries, economists, and politicians feared a recurrence of depression, the Bechtels were "'not worried about any postwar letdown. For us the postwar is the period when we really come into our own.'"<sup>72</sup> In general, then, as most of the developed capitalist economies lay in ruins, overseas "dozens of U.S....contracting firms...[we]re moving energetically and with purpose."<sup>73</sup>

In the aftermath of destruction in Europe left behind by World War II, "the American construction industry developed into a world power."<sup>74</sup> As the reconstruction of Europe began, firms in the more developed industrial countries there had the technical capability to perform the vast bulk of the work on their own. Outside of U.S. military installations, U.S. firms were therefore largely confined to projects requiring the most advanced technology. M.W. Kellogg, Badger (Stone & Webster), Foster Wheeler, and Lummus opened offices to build, often for their U.S. corporate customers, refineries and fertilizer and petrochemical plants—to which they could easily transfer their experience in building refineries—based on the recently developed technologies that they monopolized. These firms, for example, "built the British oil refining industry from nothing to over 20 million tons capacity" because domestic firms lacked the ability.<sup>75</sup> In less-developed European countries such as Greece, where the U.S. military projected its power, U.S. firms exerted much greater influence.<sup>76</sup>

In the Western Hemisphere, Bechtel, Morrison-Knudsen, and Stone & Webster also opened offices in Canada by the early 1950s, which reflected their

<sup>71</sup>"The Export of U.S. Construction," *ENR*, July 30, 1953, at 156 (editorial).

<sup>72</sup>National Research Council, *Building for Tomorrow: Global Enterprise and the U.S. Construction Industry* 26 (1988); "The Earth Movers III," *Fortune*, Oct. 1943, at 142, 144, 199; Douglass North, *Growth and Welfare in the American Past: A New Economic History* 181 (1966). See also "The Earth Mover," *Time*, May 3, 1954, at 86, 92-93; .

<sup>73</sup>"World Construction Report," 140 *ENR* 131 (Feb. 19, 1948).

<sup>74</sup>"U.S. Construction Overseas" at 30-31.

<sup>75</sup>"U.S. Construction Overseas" at 57-72 (quotation at 57); Philip Fleming, "Impoverished Europe Faces Slow Comeback," 136 *ENR* 203-208 (1946); "Intake Caisson Lowered into Thames," *ENR*, Apr. 10, 1952, at 59 (Lummus builds refinery for Vacuum Oil Co. in England); Peter Spitz, *Petrochemicals: The Rise of an Industry* 303, 518 (1988); M.W. Kellogg, "The M.W. Kellogg Company" [no pagination (at 3)]; "Foster Wheeler Corporation," in 6 *IDCH* 145 (Paula Kepos ed., 1992). See also *ENR*, Feb. 19, 1953, at 200 (Foster Wheeler builds refinery for Standard-Vacuum Oil in South Africa).

<sup>76</sup>"U.S. Construction Overseas" at 66.

involvement in the development of that country's natural resources.<sup>77</sup> Morrison-Knudsen, for example, in the late 1940s and early 1950s built a hydroelectric facility for the Aluminum Company of Canada designed to reduce the cost of smelting the aluminum oxide reduced from bauxite in Jamaica.<sup>78</sup> Supported by U.S. Export-Import Bank loans and enjoying "an impressive preferred position," U.S. firms undertook a large volume of infrastructure construction throughout Latin America. Dams, hydroelectric projects, and roads together with mining facilities formed the bulk of this work. Although Morrison-Knudsen was the most intensively involved, Bechtel, Kaiser, Stone & Webster, Ebasco, Raymond, Snare, Utah, Jones, and American Bridge also performed many of these projects.<sup>79</sup> In a country such as Venezuela, in which the state channeled large and rapidly rising petroleum revenues into civil engineering projects designed to transform the state itself into an adequate agent of macrosocietal capital accumulation, a number of domestic construction firms emerged that were technically and financially capable of carrying out such less advanced work as roads. Where local firms secured politically privileged access to these contracts, U.S. firms focused on the technologically more demanding projects.<sup>80</sup>

U.S. funding funneled through the Mutual Security Agency provided privileged access for U.S. firms in Pakistan, Iran, Turkey, and other Asian and Middle Eastern countries. Again, Morrison-Knudsen was in the forefront of this dam and highway construction.<sup>81</sup> Morrison-Knudsen also bought some of the government-owned equipment it had used during the war in the Pacific from surplus stocks to transport to Afghanistan, where, beginning in 1946, Morrison-Knudsen Afghanistan Inc., financed by \$40 million from the Export-Import Bank and additional funds from other U.S. government agencies, built dams, canals, and roads designed to ward off Soviet "penetration." Under the name Morrison-Knudsen International Company, Inc., it performed several million dollars worth of work in China before the revolution in 1949.<sup>82</sup>

In the Philippines, the U.S. government created privileged access for U.S. capital by means of the Philippine Trade Act of 1946, which created equality between U.S. and Filipino firms with regard to the exploitation and development of natural resources and public utilities.<sup>83</sup> Only in Africa was the domination of the colonial powers so tight during the early postwar years that U.S. firms managed to secure contracts only under the aegis of the U.S. Air Force to build airbases in North Africa. The ubiquitous Morrison-Knudsen excelled here too. And during the Korean War the same firm formed two joint ventures to handle major infrastructure projects—Atlas Constructors with four other U.S. firms, and Société Anonyme Batignolles-Morrison Knudsen with the venerable French colonial

<sup>77</sup>"U.S. Firms Open Canadian Offices," *ENR*, Jan. 8, 1953, at 56, 60; Ingram, *Bechtel Story* at 19-20.

<sup>78</sup>Wilson & Taylor, *Earth Changers* at 192-206.

<sup>79</sup>"U.S. Construction Overseas" at 33-50 (quotation at 33); "Latin America Pushes Construction Jobs," 136 *ENR* 209-16 (1946); "Builders Beat Waves and Weather on Pipeline Under Venezuelan Gulf," *ENR*, Apr. 28, 1949, at 49; "American Firm to Rebuild Venezuelan National Ry.," *ENR*, Feb. 15, 1951, at 68 (Morrison-Knudsen).

<sup>80</sup>Ana Brumlik, "State Intervention and the Barriers to Accumulation of Capital in Construction, with Special Reference to the Labour Process: Venezuela, 1945-58," [4] *PBE, 1982: Labour in Building and Construction* 3-37, 3-42 (1983).

<sup>81</sup>See e.g. *ENR*, Mar. 3, 1949, at 33 (Ceylon); "American Engineering Firms in Asia," *ENR*, Jan. 19, 1950, at 54; "U.S. Construction Overseas" at 85-97; Bonny, *Morrison-Knudsen Company, Inc.* at 13-14.

<sup>82</sup>*MMI* 1982 (1947); *MMI* 800 (1948); Hood, "Putting a New Face on Old Afghanistan is One of Morrison-Knudsen's Projects" at 46; Wilson & Taylor, *Earth Changers* at 124-38 (quotation at 124). On British construction firms' late entry into Afghanistan, see "British Construction Work Overseas 1966-67," 193 *BTJ* 916, 918 (1967).

<sup>83</sup>Philippine Trade Act of 1946, ch. 244, § 341, 60 Stat. 141, 151; "Opportunities in the Philippines Are Open for U.S. Contractors," 17 *CE* 284 (1947).

railway builder.<sup>84</sup>

With as many as “400,000 local men on its payrolls,” Morrison-Knudsen, in addition to building airfields for countries such as Turkey that had entered into military alliances with the United States, was occupied with the construction of tunnels for copper and zinc mines in Peru and for roads in Venezuela, highways in Columbia, hydroelectric facilities in Brazil, dams in Afghanistan, Turkey, and Iran, as well as other infrastructure projects in Iraq, Sumatra, and Mexico.<sup>85</sup> A firm which grossed “a whopping” \$87 million dollars at the height of World War II construction, by 1951 Morrison-Knudsen executed \$300 million worth of construction—30 per cent of it overseas.<sup>86</sup>

Although postwar foreign policy proved irreconcilable with Henry Wallace’s grandiose projections of U.S. participation in the building of TVAs on the Danube, Ob, Ganges, and Paraná, during the late 1940s and 1950s internationally oriented U.S. construction firms did become vanguard elements in laying the military-industrial foundations of the burgeoning Pax Americana.<sup>87</sup> Thus, on the one hand, they built airbases for \$700 million in the remote Atlantic areas—Greenland, Iceland, Newfoundland, the Azores, and Bermuda—bereft of local labor.<sup>88</sup> When, on the other hand, shrinking U.S. oil reserves led to increased exploitation of petroleum reserves in the Middle East, U.S. construction firms, following in the tow of U.S. oil companies, became indispensable links in the “oil supply of the free world.”<sup>89</sup> The vast increase in demand for petroleum products generated by the Korean War, for example, consolidated Fluor’s position as an international petrochemical plant constructor.<sup>90</sup>

By the late 1940s, Bechtel had become “the largest engineer-constructor of oil transportation and processing facilities in the Middle East.”<sup>91</sup> Between 1944 and 1948, Bechtel built refineries, pipelines, and infrastructure for Aramco at Dhahran totalling \$200 million. By the mid-1950s, Bechtel, together with Morrison-Knudsen, Stone & Webster/Badger, and the British firm Wimpey, had already participated in the construction of the Trans-Arabian pipeline (originally requested by the U.S. Navy in order to supply the Sixth Fleet in the Mediterranean), an Iraqi-Syrian pipeline, refineries in Bahrain and Aden (for Anglo-Iranian Oil Company, whose refinery in Iran had been nationalized), a mining project in Venezuela, pipelines and refineries in Canada, and power plants in South Korea (supported by U.S. foreign aid funds).<sup>92</sup> Bechtel was grossing \$250 million annually—half of which stemmed from international projects—compared with only \$20 million twenty years earlier.<sup>93</sup> Bechtel’s former partner, Parsons, who had formed his own company in 1944, performed his

<sup>84</sup>MMI 1114 (1951); “Combine for Overseas,” *ENR*, Feb. 1, 1951, at 24; *id.*, May 3, 1951, at 56; “U.S. Construction Overseas” at 75.

<sup>85</sup>“The Earth Mover” at 86, 87; “Big Contractor’s Best Year,” *ENR*, Apr. 12, 1956, at 115; Bonny, *Morrison-Knudsen Co.* at 13-14; “Morrison-Knudsen Corp., “Partial Listing of Countries with Multiple MK Projects”; *idem*, “MK’s Major Projects” at 2 (n.d. [ca. 1993]).

<sup>86</sup>Hood, “Putting a New Face on Old Afghanistan is One of Morrison-Knudsen’s Projects” at 45, 47-48; “The Earth Mover” at 92.

<sup>87</sup>H. Wallace, “The Way to Abundance,” *NR*, Mar. 27, 1944, at 414.

<sup>88</sup>“U.S. Construction Overseas” at 55.

<sup>89</sup>*ENR*, May 8, 1952, at 68.

<sup>90</sup>“Fluor Corporation,” in 1 *IDCH* 569, 570 (Thomas Derdak ed., 1988).

<sup>91</sup>Ingram, *Bechtel Story* at 19.

<sup>92</sup>138 *ENR* 544 (1947); “Near East Pipeline Adds 300,000 bl a Day to the Oil Supply of the Free World,” *ENR*, May 8, 1949, at 68 (Bechtel and Wimpey build Iraq-Syria pipeline); Ingram, *A Builder and His Family* at 93-100; Wilson & Taylor, *Earth Changers* at 155-76; Halliday, *Arabia Without Sultans* at 51.

<sup>93</sup>Robert Sheehan, “Steve Bechtel: Born to Build,” *Fortune*, Nov. 1955, at 142.

first overseas construction project in 1952—a petroleum refinery in Turkey.<sup>94</sup>

By the mid-1950s, U.S. and European oil companies—directly through refinery construction and indirectly through the ancillary pipelines, shipping terminals, and power stations—accounted for half of postwar overseas construction available to U.S. firms.<sup>95</sup> The modern internationalization of the construction industry was clearly underway. That the leading international petroleum industry construction firms occupied a key position between “leading American and British oil interests...and the respective governments” of the Middle East was organizationally reflected in the fact that in 1950 Bechtel’s owner and Warren Bechtel’s son, Stephen Bechtel, joined, and in 1958 succeeded the president of Standard Oil of New Jersey as the chairman of, the Business Advisory Council, whose “impressive roster of the captains of industry and finance” advised the Secretary of Commerce on “the business interests of the country.”<sup>96</sup> The first member of the board of directors of J. P. Morgan & Co. from the West Coast, Bechtel “long had substantial investments in other enterprises” such as oil and utilities, which represented two-thirds of the family’s resources. Although Bechtel, unlike Kaiser, was not interested in owning the plants that his firm built, his investments closely tracked the industries for which Bechtel produced the fixed capital. Thus of the more than \$1 billion in construction that Bechtel completed during the first half of the 1950s, refineries, pipelines, and power plants accounted for almost four-fifths.<sup>97</sup> In 1957 *Fortune* ranked Bechtel as one of the richest Americans, with wealth estimated at between \$100 million and \$200 million.<sup>98</sup>

By the mid-1950s, when “US contractors dominated the scene worldwide, being responsible for more than 90 per cent of the large-scale construction work,”<sup>99</sup> leading firms had diversified into mining and power projects as well as geographically. Apprehensive that the next world war might exhaust the Mesabi and other Lake Superior iron ore ranges, U.S. steel manufacturers began exploring the periphery for relatively accessible reserves. In the early 1950s, Bechtel, together with Morrison-Knudsen, Raymond, and other firms, built the United States Steel Corporation’s Orinoco iron ore facility in Venezuela. The largest of its kind in South America, it yielded ore competitively priced with that mined in the United States. During the same period, Utah Construction carried out its own iron ore project in Peru on a speculative basis.<sup>100</sup> In spite of this incipient global scope, Bechtel, which was performing approximately half of its total construction volume abroad (in South America, the Middle East, Korea, the Philippines, Europe, and Canada), still did not consider itself “fully international.”<sup>101</sup>

Raymond International, whose overseas involvement antedated World War I but which was also the leading contractor for PNAB construction in World War II, employed more than half of its work force abroad by 1952.<sup>102</sup> As the world’s largest builder of foundations, in the 1950s it became one of the three or four leading U.S. firms operating abroad. International projects accounted for almost

<sup>94</sup>“The Parsons Story,” at 6 (mimeo, n.d. [ca. 1970]).

<sup>95</sup>“U.S. Contractors Go Global” at 140.

<sup>96</sup>Robert Engler, *The Politics of Oil: A Study of Private Power and Democratic Directions* 314-16 (1967 [1961]); Ingram, *Bechtel Story* at 112.

<sup>97</sup>Sheehan, “Steve Bechtel” at 145, 148, 150.

<sup>98</sup>Richard Smith, “The Fifty-Million-Dollar Man,” *Fortune*, Nov. 1957, at 176, 177. The owners of Brown & Root, George and Herman Brown, were placed in the \$75 million to \$100 million category.

<sup>99</sup>Stallworthy & Kharbanda, *International Construction* at 17 (citing no source for 1956).

<sup>100</sup>W. Wanamaker, “Vast and Varied Engineering Works Develop Venezuelan Iron-Ore Deposit,” *23 CE 807* (1953); “Moving a Mountain from Venezuela to the U.S.,” *ENR*, Jan. 28, 1954, at 52-55; Ingram, *Bechtel Story* at 49-50; Wilson & Taylor, *Earth Changers* at 107-12, 177-88.

<sup>101</sup>Ingram, *Bechtel Story* at 26-28, 61-64; Sheehan, “Steve Bechtel” at 142.

<sup>102</sup>“Raymond Pushes Back World Frontiers,” *ENR*, May 29, 1952, at 62, 66.

half of its volume, fluctuating between 13 per cent in 1951 and 64 percent in 1958.<sup>103</sup> By the mid-1950s, Morrison-Knudsen was performing more than one-third of its quarter-billion-dollar annual construction overseas.<sup>104</sup> Kaiser's vertically integrated international operations remained unique, building, for example, the automobile concern's own plant in Argentina in addition to other firms' industrial plants such as the Tata Iron Works in India.<sup>105</sup>

The post-World War II military wing of an internationalizing construction industry was most clearly embodied in Brown & Root, whose "first big overseas assignment" began in 1946 with the reconstruction of Guam and was followed by construction of NATO air bases in France and U.S. Navy and Air Force bases in Spain. Within a period of several years, then, "Uncle Sam...[w]as...a good customer" in the amount of more than \$200 million.<sup>106</sup> Morrison-Knudsen, too, became heavily committed to military construction, in particular by building the Distant Early Warning Line across northern Canada.<sup>107</sup> "In 1955 alone, the Corps of Engineers committed...around \$1.5 billion—about 30% of it abroad, with most of the jobs going to U.S. contractors."<sup>108</sup> The pattern of military and civilian construction, destruction, and reconstruction of Korea again furnished U.S. construction firms with profitable projects—but also with future competitors in the form of the participating South Korean firms, which, at the end of the domestic construction boom, shifted into overseas markets in order to keep their expanded capital profitable.<sup>109</sup>

Beginning in 1962, Brown & Root, Morrison-Knudsen, and Raymond joined in "one of the greatest construction programs of all time"—building bridges, airports, seaports, highways, bases, power plants, and hospitals in support of U.S. military intervention in Vietnam. Under the aegis of Morrison-Knudsen, profit-making firms were for the first time given a major share of construction in a war zone. Employing a work force of more than 52,000 by 1966, these firms, together J. A. Jones, became the ninth largest military contractor that year (receiving \$550 million), a position to which no construction firm had ever attained before.<sup>110</sup> Brown & Root has remained a mainstay of the U.S. military. With the subsequent

<sup>103</sup>Joseph Wilkinson, "Raymond International, Inc. Goes Up on the Big Board," *ENR*, June 16, 1960, at 44, 46.

<sup>104</sup>"U.S. Contractors Go Global" at 139.

<sup>105</sup>Wright Price, "Auto Manufacturing Plant Built in Argentina," 27 *CE* 88 (1957); "Victory in the Making," *Newsweek*, Aug. 26, 1957, at 80 (Tata); "Kaiser's Big Business All Began in Building," *ENR*, Jan. 17, 1963, at 62; Kaiser Industries Corp., *Kaiser Story* at 47-48; Foster, *Henry J. Kaiser* at 169-76, 250-51. Kaiser sold its holdings in Industrias Kaiser Argentina, the largest automobile manufacturer in Latin America, to Renault in 1967.

<sup>106</sup>"Roadbuilders with a Flair for Other Jobs," *BW*, May 25, 1957, at 90, 97 (quotation); "Navy Lists \$134 Million Construction for National Defense Installations," 140 *ENR* 460-61 (1948); "Navy Pushes Guam Dam in Race Against Rainy Season," *ENR*, Sept. 2, 1950, at 47; Brown & Root, "The First 50 Years" at 4; "Spanish Base and Its Builders," *ENR*, Oct. 20, 1955, at 24 (Brown & Root, Raymond, and Walsh);

<sup>107</sup>"Army Awards Pacific, Alaska Contracts," 137 *ENR* 1 (1946); "Aftermath in Morocco—Good Airbases," *ENR*, Aug. 27, 1953, at 30-41; V. Smith, "African Airbases—A Job Well Done," *ENR*, Aug. 11, 1955, at 34-42; Morrison Knudsen Corp., "Partial Listing of Countries with Multiple MK Projects" 2 (n.d. [1992]); *idem*, *History* at 2-3.

<sup>108</sup>"U.S. Contractors Go Global" at 140.

<sup>109</sup>National Research Council, *Building for Tomorrow* at 26; "Hyundai Looks Further Afield," *JC*, Mar. 1984, at 26; Shanmugan Visvanathan, "International Construction Industry" at 150 (M.A. thesis, University of Texas at Austin, 1990).

<sup>110</sup>"Builders Pave Way for S.E. Asian Action," *ENR*, June 7, 1962, at 20; "Construction-South Vietnam: Work Increases as War Expands," *ENR*, May 13, 1965, at 25; "Jack Bonny's Tub: Keeping Top Contractor Up Top," *ENR*, Aug. 19, 1965, at 44; "Construction Escalation in Vietnam," *ENR*, Feb. 3, 1966, at 11; "Construction's Man of the Year," *ENR*, Feb. 17, 1966, at 99; "Vietnam: On Schedule but Slowing," *ENR*, Aug. 11, 1966, at 61; "Who Needs It?," *ENR*, Dec. 15, 1966, at 242 (editorial); Robert Ploger, *Vietnam Studies: U.S. Army Engineers 1965-1970*, at 27-31 (U.S. Dept. of the Army, 1974).

advent of the New World Order, Brown & Root entered into an umbrella contract with the Army Corps of Engineers "to support unexpected operations around the world" should the military "be called to go into other countries."<sup>111</sup>

This type of long-term faithful and profitable commitment to the "home" nation-state may provide the most determinate way of "[i]dentifying the nationality" of multinational enterprises.<sup>112</sup> These entrepreneurial counterparts to the Roman legions have, not so much in spite of, but precisely through their transnationality, demonstrated as much loyalty to their state as the nineteenth-century colonial railway constructors did to theirs.

The principal internationalizing impulses during the 1950s and 1960s largely stemmed from the international economic boom, which called forth in industries in which U.S. manufacturers were dominant an enlarged demand for relatively sophisticated types of construction—such as nuclear power plants, petroleum refineries, and chemical plants—which only a limited number of firms possessed the technical knowledge and capital to perform. A further push towards internationalization occurred in the second half of the 1950s, when "oil processing capacity, especially in the United States, temporarily outran the demand, and the obvious result was a big reduction in refinery construction projects." Acting as a conjunctural buffer, foreign operations "took up part of the slack."<sup>113</sup>

By 1967, Bechtel, a leading constructor of all these facilities, had become the largest U.S. construction firm by having increased its volume 20 per cent annually during the preceding decade.<sup>114</sup> The "spectacular progress" in the production of synthetic materials based on oil and gas-derived organic chemicals in tandem with increasing plant size meant that by the mid-1960s, refineries and oil and gas plants accounted for one-fifth of total annual world investment in manufacturing. Whereas before World War II chemical firms typically designed their own plants and acquired the hardware directly from producers, by the 1960s three-fourths of major new plants were engineered and constructed by a small group of specialist firms. This transformation, which accompanied the shift from coal to oil and gas derivatives as well as from batch to flow production techniques, meant that chemical plants, like refineries before them, began to be conceived as "an integrated system, rather than as a conglomeration of separate vessels and pumps."<sup>115</sup>

By the beginning of the twentieth century the U.S. chemical industry had gained a historically crucial "path-dependent" advantage over its European competitors by virtue of its ability to effect an early shift to a petrochemical base as a result of its access to a domestic petroleum industry. Just as much of the know-how was transferred from U.S. petroleum refiners to U.S. chemical processors, a number of the construction firms that had been innovators in oil refinery construction, made the switch to chemical plants. In time the division of labor intensified, giving rise to chemical engineering, "the application of mechanical engineering to production activities involving chemical processing," in order to develop techniques for producing laboratory research results on a commercial basis.<sup>116</sup> The specialized chemical construction engineering firms

<sup>111</sup>"Brown & Root Drafted for Duty in Somalia," *ENR*, Jan. 4, 1993, at 12.

<sup>112</sup>John Dunning, *Multinational Enterprises and the Global Economy* 10-11 (1993).

<sup>113</sup>Ingram, *Bechtel Story* at 79, 78, and chapters 5-7.

<sup>114</sup>"Simple Formula to the No. 1 Spot," *ENR*, May 11, 1967, at 33.

<sup>115</sup>OECD, *The Petrochemical Industry: Trends in Production and Investment to 1985*, at 7 (1979); C. Freeman, "Chemical Process Plant: Innovation and the World Market," *NIER*, No. 45, Aug. 1968, at 29, 30.

<sup>116</sup>Ralph Landau & Nathan Rosenberg, "Innovation in the Chemical Processing Industries," in *Technology & Economics: Papers Commemorating Ralph Landau's Service to the National Academy of Engineering* 107, 110, 114 (1991).

performed a crucial role in the creation of a world chemical and petrochemical market:

Once a major new process technology was developed, or the scaling up of a given production process was carried out, SEFs [specialized engineering firms] could reproduce that new technology, or larger scale production process, for many clients. Such economies could not be accumulated by the chemical manufacturers themselves, precisely because they could produce that technology only for their own, limited internal needs, whereas SEFs had a much more extensive experience with designing that particular plant many times for different clients. Moreover, as they worked for many different clients, they accumulated useful information related to the operation of plants under a variety of conditions.<sup>117</sup>

Drawing on U.S. domestic industrial leadership in these sectors and acting as important transmission belts of technology and uncodified know-how in their own right, U.S. construction-engineering firms were able to achieve a dominant position in this burgeoning world market. From 1960 to 1966, for example, U.S. firms accounted for almost two-thirds of the value of world export contracts for chemical, oil, and gas plants. Whereas U.S. firms secured more than one-third of the contracts (by value) of all plants in Western Europe during this period, non-U.S. firms accounted for less than one per cent of the contract value for plants in the United States. U.S. firms gained more than 85 per cent of all contracts awarded to foreign firms in the Western Hemisphere and more than 70 per cent in Western Europe, which in turn accounted for 44 per cent of U.S. firms' foreign contracts (by value). Western European firms achieved their greatest successes building petrochemical plants in the Soviet Union and Eastern Europe, where U.S. firms did not compete for political reasons, and infrastructural projects in their respective nation-state's (former) colonial empires.<sup>118</sup>

The worldwide demand for plastics triggered such an increase in demand for ethylene that by the 1950s Stone & Webster was "engineering ethylene plants worldwide for most every major oil company." Many of these plants it built in Japan. Indeed, Stone & Webster had made such advances in developing the relevant processes that Esso decided to rely on it (and other U.S. firms such as Lummus, Braun, and Kellogg) instead of its own engineering division to build its olefin units. Kellogg, in association with the chemical industry, achieved similar successes in engineering proprietary processes for large-scale ammonia plants, of which it had built half of the world total by 1967—a field which it continued to dominate.<sup>119</sup>

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<sup>117</sup>*Id.* at 117-18.

<sup>118</sup>Freeman, "Chemical Process Plant," tab. 2-4 at 33-35. The British firm John Brown Ltd., for example, built several chemical and petrochemical facilities in the Soviet Union in the 1960s and 1970s. "British Construction Work Overseas 1963-64," 187 *BTJ* 593, 595 (1964); "British Construction Work Overseas, 1965-1966," 191 *BTJ* 874 (1966); "British Construction Work Overseas 1971/72," 9 *TI* 294, 295 (1972).

<sup>119</sup>William Allen, Jr., *Stone & Webster: A Century of Service* 18 (1989); Spitz, *Petrochemicals* at 378, 430-35 444-45; Freeman, "Chemical Process Plant" at 39, 48; M.W. Kellogg, "The M.W. Kellogg Company" [no pagination (at 4)].